APPENDIX B

Solar Glare Analysis

TECHNICAL MEMORANDUM

To: Starlight Solar, LLC

From: Spenser Branch, Visual Resources Specialist

Date: August 23, 2023

Re: **Glint and Glare Assessment, Starlight Solar Project, San Diego County, California/ SWCA Project No. 53792**

INTRODUCTION

Starlight Solar, LLC (the applicant), proposes to construct, operate, and maintain the Starlight Solar Project. The project consists of a proposed utility-scale, solar photovoltaic (PV) power plant on approximately 570 acres on unincorporated land in southeastern San Diego County, California (the project area). Additional project features include temporary and permanent access roads, solar trackers, junction boxes, a step-up transformer/on-site substation, drainage and discharge facilities, a 230-kilovolt generation tie line, and groundwater wells for use during construction.

Purpose

The purpose of this memorandum is to summarize potential glinting and glare effects of the project. Based on the results of these effects, potential health, safety, and visual mitigation measures associated with these glinting and glare effects may be proposed. For the purposes of this memorandum, *glint* is defined as a bright, momentary flash of light; *glare* is defined as a more continuous and sustained presence of light that may appear to "sparkle" from public viewing locations.

The source of potential glint and glare for the project is proposed PV panels. However, PV panel surfaces are designed specifically not to reflect light, thus reducing the potential for glint and glare.

GLINT AND GLARE ANALYSIS

Analysis for the Starlight Solar Project used the GlareGauge (also known as Solar Glare Hazard Analysis Tool [SGHAT]) model developed by Forge Solar and the U.S. Department of Energy's Sandia National Laboratories to evaluate potential glare. The analysis focused on potential glare effects on observation points and linear travel routes. Aircraft landing and approach were considered; the proposed Starlight Solar Project area is approximately 6.5 miles west of the County-owned and publicly used Jacumba Airport. While the project is not located on airport property and therefore not subject to Federal Aviation Administration (FAA) jurisdiction under Federal Aviation Regulations Part 77 to protect airspace safety, and is located beyond the 2-mile final approach as defined in the Interim Solar Policy, the applicant has sought to voluntarily apply FAA ocular hazard standards (78 *Federal Register* 63276).

These results comply with the FAA standards described in the Interim Solar Policy.

Software

GlareGauge employs an interactive Google map where the user can quickly locate a site, draw an outline of the proposed solar energy system, and specify observer locations and, if needed, aircraft approach paths. Latitude, longitude, and elevation are automatically recorded through the Google interface, providing necessary information for sun position and vector calculations. Additional information regarding the orientation and tilt of the solar energy panels, reflectance, environment, and ocular factors are entered by the user.

If glare is found, the tool calculates the retinal irradiance and subtended source angle (size/distance) of the glare source to predict potential ocular hazards ranging from a temporary afterimage to retinal burn. The results are presented in a simple, easy-to-interpret plot that specifies when glare will occur throughout the year, with color codes indicating the potential ocular hazard. The tool can also predict relative energy production while evaluating alternative designs, layouts, and locations to identify configurations that maximize energy production while mitigating the impacts of glare.

Assumptions

- The proposed solar project will operate 365 days per year, during daylight hours.
- "Green" glare is glare with low potential to cause an afterimage (flash blindness) when observed prior to a typical blink response time.
- "Yellow" glare is glare with potential to cause an afterimage (flash blindness) when observed prior to a typical blink response time.
- Times associated with glare are denoted in standard time.
- Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover, and geographic obstructions.
- Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array subsections 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.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
- The glare hazard determination relies on several approximations, including observer eye characteristics, angle of view, and typical blink response time. Actual results and glare occurrence may differ.

- Actual ocular impact outcomes encompass a continuous, rather than a discrete, spectrum.[1]

Input Parameters

The GlareGauge inputs the specifications of the array including a single-axis tracking system with a north–south orientation, maximum tracking angle of 60°, a panel height of 6 feet above ground level, and a resting angle of 30°. Starlight Solar, LLC, also assumed a smooth panel surface with anti-reflective coating to provide maximum flexibility in module selection. Modeling was then undertaken for the applicable sensitive receptors: observation points (OPs) from a casual observer (e.g., hikers, equestrians). No air traffic control towers were included.

All of the modeling result output sheets are provided as Attachment A-1.

Results

OPs used a height of 6 feet, and route receptors used a height of 4 feet (an average height of passenger cars, trucks, and diesel trucks).

Table 1. Glare Observation Points

Name	Description
OP 1: Residence	Private residence near project area
OP 2: Residence	Private residence near project area
OP 3: Residence	Private residence near project area
OP 4: Residence	Private residence near project area
OP 5: Residence	Private residence near project area
OP 6: Residence	Private residence near project area
OP 7: Residence	Private residence near project area
OP 8: Residence	Private residence near project area
OP 9: Residence	Private residence near project area
OP 10: Residence	Private residence near project area
OP 11: Residence	Private residence near project area
OP 12: Residence	Private residence near project area
OP 13: Residence	Private residence near project area
OP 14: Residence	Private residence near project area
OP 15: Residence	Private residence near project area
OP 16: Residence	Private residence near project area
OP 17: Residence	Private residence near project area
OP 18: Residence	Private residence near project area
OP 19: Residence	Private residence near project area
OP 20: Fire Station	San Diego County Fire Station
OP 21: Fire Station	Cal Fire White Star Fire Station
Route Receptor 1: Interstate 8	Main travel route northwest bound
Route Receptor 2: Interstate 8	Main travel route southeast bound

[1] Refer to www.forgesolar.com/help/ for assumptions and limitations not listed here.

Name	Description
Route Receptor 3: North U.S. Highway 183	Main northwest–southeast travel route
Route Receptor 4: San Diego and Arizona Railway	Main east-west travel route
Route Receptor 5: San Diego and Arizona Railway	Main east-west travel route
Route Receptor 6: San Diego and Arizona Railway	Main east-west travel route
Route Receptor 7: North U.S. Highway 183	Main east-west travel route

Glint and Glare Effects Discussion

The Starlight Solar Project has "0" minutes of potential glint or glare at all airports, OPs, and route receptors. No yellow or green glare will be discreetly observable based on the model output.

RECOMMENDATIONS

Mitigation measures such as the use of non-reflective materials, finishes, and surface treatments on project components would reduce contrast and glare. Visual (vegetation) barriers are the most effective at mitigating glare from solar arrays when the vegetation is located as close to the source as possible. If vegetation is used, native and naturalized plants should be specified to match or complement existing vegetation within the area. Existing vegetation within and surrounding the project area should be maintained and preserved to the greatest extent possible. Preserving existing vegetation will reduce the project's overall impact to the existing health of soils, wildlife, cost, and visual aesthetics.

ATTACHMENT A-1

GlareGauge Output Model Report

FORGESOLAR GLARE ANALYSIS

Project: **53792 Starlight Solar**
Site configuration: **53792_Starlight Solar_082023**
Analysis conducted by Ryan Rausch (rrausch@swca.com) at 19:13 on 04 Aug, 2023.

U.S. FAA 2013 Policy Adherence

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

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

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

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

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

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

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

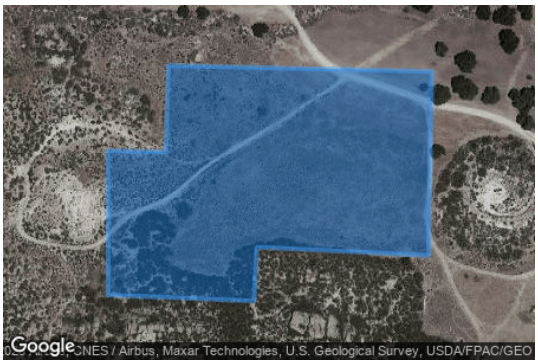
SITE CONFIGURATION

Analysis Parameters

DNI: peaks at 1,000.0 W/m^2
Time interval: 1 min
Ocular transmission coefficient: 0.5
Pupil diameter: 0.002 m
Eye focal length: 0.017 m
Sun subtended angle: 9.3 mrad
Site Config ID: 96867.12338
Methodology: V2

PV Array(s)

Name: PV array 1
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 30.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

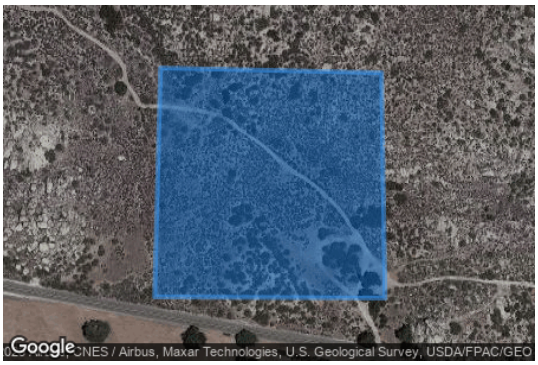


Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.641907	-116.282018	3475.18	6.00	3481.18
2	32.640502	-116.282050	3471.65	6.00	3477.65
3	32.640566	-116.283606	3492.24	6.00	3498.24
4	32.640155	-116.283632	3498.30	6.00	3504.30
5	32.640200	-116.284957	3509.40	6.00	3515.40
6	32.641302	-116.284957	3508.04	6.00	3514.04
7	32.641293	-116.284432	3495.56	6.00	3501.56
8	32.641953	-116.284410	3495.63	6.00	3501.63

Name: PV array 2
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 30.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.644258	-116.287872	3513.23	6.00	3519.23
2	32.644240	-116.286842	3499.74	6.00	3505.74
3	32.643752	-116.286853	3501.09	6.00	3507.09
4	32.643670	-116.283516	3483.64	6.00	3489.64
5	32.642641	-116.283495	3487.57	6.00	3493.57
6	32.642695	-116.286542	3509.25	6.00	3515.25
7	32.642252	-116.286542	3512.86	6.00	3518.86
8	32.642279	-116.287786	3528.58	6.00	3534.58

Name: PV array 3
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 30.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

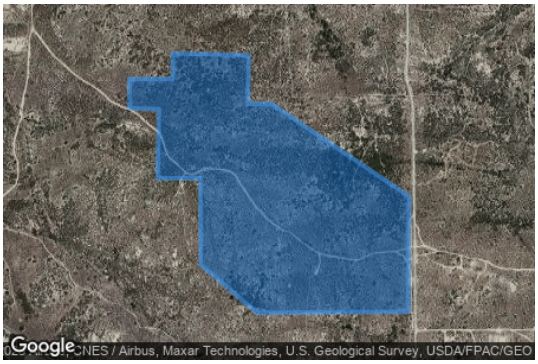


Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.646905	-116.282669	3518.48	6.00	3524.48
2	32.645161	-116.282722	3488.81	6.00	3494.81
3	32.645152	-116.280630	3495.17	6.00	3501.17
4	32.646868	-116.280662	3547.51	6.00	3553.51

Name: PV array 4
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 30.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.646098	-116.284146	3520.88	6.00	3526.88
2	32.646269	-116.285359	3507.02	6.00	3513.02
3	32.646450	-116.287064	3515.44	6.00	3521.44
4	32.647362	-116.288867	3543.94	6.00	3549.94
5	32.647679	-116.289178	3551.30	6.00	3557.30
6	32.650784	-116.290585	3564.45	6.00	3570.45
7	32.651290	-116.290687	3570.23	6.00	3576.23
8	32.654845	-116.290639	3652.38	6.00	3658.38
9	32.654872	-116.286669	3672.06	6.00	3678.06
10	32.658424	-116.286528	3653.62	6.00	3659.62
11	32.657719	-116.278149	3537.57	6.00	3543.57
12	32.655574	-116.278160	3564.65	6.00	3570.65
13	32.655638	-116.282486	3610.80	6.00	3616.80
14	32.654428	-116.282497	3637.98	6.00	3643.98
15	32.654428	-116.284010	3649.03	6.00	3655.03
16	32.650102	-116.284069	3611.75	6.00	3617.75

Name: PV array 5
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 30.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

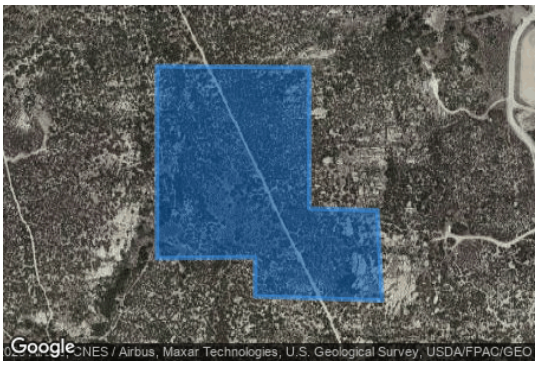


Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.654983	-116.281692	3632.03	6.00	3638.03
2	32.654924	-116.278940	3593.46	6.00	3599.46
3	32.653451	-116.278962	3629.05	6.00	3635.05
4	32.653442	-116.278103	3612.23	6.00	3618.23
5	32.650628	-116.273114	3595.14	6.00	3601.14
6	32.647114	-116.273146	3586.00	6.00	3592.00
7	32.647078	-116.278639	3584.66	6.00	3590.66
8	32.648541	-116.280678	3614.07	6.00	3620.07
9	32.651170	-116.280699	3678.47	6.00	3684.47
10	32.651179	-116.282244	3674.08	6.00	3680.08
11	32.651839	-116.282244	3691.65	6.00	3697.65
12	32.652381	-116.282212	3682.60	6.00	3688.60
13	32.653278	-116.282201	3670.51	6.00	3676.51
14	32.653309	-116.283264	3677.84	6.00	3683.84
15	32.654202	-116.283269	3644.94	6.00	3650.94
16	32.654206	-116.281706	3645.69	6.00	3651.69

Name: PV array 6
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 30.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

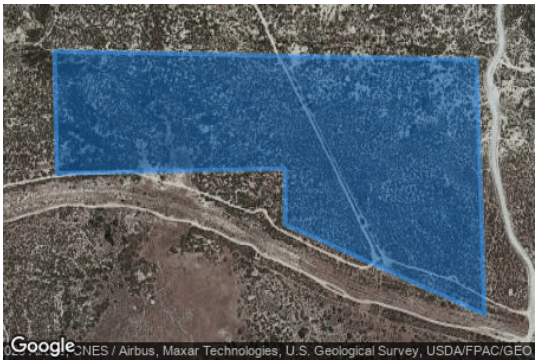
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.635702	-116.291434	3651.26	6.00	3657.26
2	32.635666	-116.289578	3636.89	6.00	3642.89
3	32.635268	-116.289578	3621.02	6.00	3627.02
4	32.635268	-116.288430	3616.41	6.00	3622.41
5	32.633597	-116.288409	3602.35	6.00	3608.35
6	32.633579	-116.289428	3612.67	6.00	3618.67
7	32.632169	-116.289342	3637.31	6.00	3643.31
8	32.632169	-116.287368	3619.64	6.00	3625.64
9	32.630362	-116.287368	3582.95	6.00	3588.95
10	32.630389	-116.290726	3590.36	6.00	3596.36
11	32.631808	-116.290759	3624.60	6.00	3630.60
12	32.631817	-116.291381	3631.86	6.00	3637.86

Name: PV array 7
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 30.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



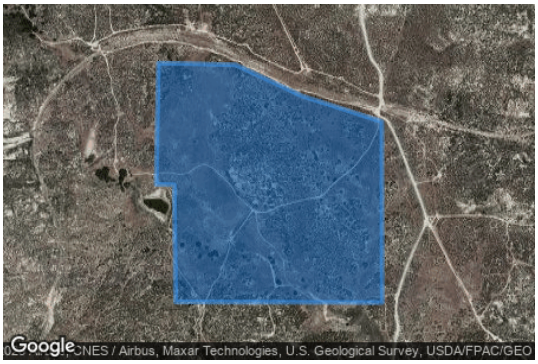
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.633664	-116.286148	3577.20	6.00	3583.20
2	32.633646	-116.283380	3541.70	6.00	3547.70
3	32.631496	-116.283380	3554.64	6.00	3560.64
4	32.631469	-116.282146	3524.04	6.00	3530.04
5	32.630095	-116.282060	3542.36	6.00	3548.36
6	32.630159	-116.284367	3532.18	6.00	3538.18
7	32.630755	-116.284367	3534.53	6.00	3540.53
8	32.630737	-116.286148	3528.37	6.00	3534.37

Name: PV array 8
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 30.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.627551	-116.286785	3520.92	6.00	3526.92
2	32.629412	-116.286828	3533.69	6.00	3539.69
3	32.629286	-116.279167	3478.22	6.00	3484.22
4	32.625400	-116.279017	3464.00	6.00	3470.00
5	32.626774	-116.282644	3504.56	6.00	3510.56
6	32.627623	-116.282644	3526.58	6.00	3532.58

Name: PV array 9
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 30.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.626427	-116.286251	3519.35	6.00	3525.35
2	32.626405	-116.284822	3481.68	6.00	3487.68
3	32.626373	-116.283443	3483.11	6.00	3489.11
4	32.625418	-116.281015	3475.50	6.00	3481.50
5	32.624643	-116.278137	3456.78	6.00	3462.78
6	32.619131	-116.278127	3438.71	6.00	3444.71
7	32.619149	-116.285626	3489.59	6.00	3495.59
8	32.622718	-116.285680	3463.78	6.00	3469.78
9	32.622736	-116.286334	3459.44	6.00	3465.44

Flight Path Receptor(s)

Name: Jacumba Airport - East
Description:
Threshold height: 50 ft
Direction: 264.2°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	32.616309	-116.161571	2824.08	50.00	2874.08
Two-mile	32.619231	-116.127381	3141.37	286.15	3427.51

Name: Jacumba Airport - West
Description:
Threshold height: 50 ft
Direction: 80.2°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	32.615514	-116.169478	2805.11	50.00	2855.11
Two-mile	32.610587	-116.203341	2899.00	509.53	3408.54

Discrete Observation Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	32.656799	-116.291426	3686.15	6.00
OP 2	2	32.659301	-116.289602	3679.87	6.00
OP 3	3	32.659427	-116.279907	3498.01	6.00
OP 4	4	32.658695	-116.276495	3466.02	6.00
OP 5	5	32.651966	-116.272689	3554.42	6.00
OP 6	6	32.648461	-116.271724	3629.54	6.00
OP 7	7	32.648361	-116.268258	3650.75	6.00
OP 8	8	32.646320	-116.271777	3565.38	6.00
OP 9	9	32.642525	-116.276208	3445.64	6.00
OP 10	10	32.640104	-116.279062	3460.69	6.00
OP 11	11	32.637431	-116.283582	3581.30	6.00
OP 12	12	32.633347	-116.278647	3439.79	6.00
OP 13	13	32.633320	-116.281102	3477.51	6.00
OP 14	14	32.631097	-116.280823	3491.20	6.00
OP 15	15	32.629543	-116.277336	3476.72	6.00
OP 16	16	32.622920	-116.264746	3291.53	6.00
OP 17	17	32.646194	-116.288425	3518.81	6.00
OP 18	18	32.655322	-116.287380	3667.70	6.00
OP 19	19	32.655742	-116.289987	3674.81	6.00
OP 20	20	32.672206	-116.290693	3541.17	6.00
OP 21	21	32.647383	-116.317351	4016.95	6.00

Route Receptor(s)

Name: Interstate 8 -Northbound
Path type: One-way (toward increasing index)
Observer view angle: 50.0°

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

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.661954	-116.238266	3148.91	4.00	3152.91
2	32.663704	-116.244406	3226.97	4.00	3230.97
3	32.665381	-116.250417	3267.57	4.00	3271.57
4	32.667095	-116.256492	3315.21	4.00	3319.21
5	32.668845	-116.262653	3338.34	4.00	3342.34
6	32.670613	-116.268761	3382.41	4.00	3386.41
7	32.672363	-116.274804	3475.07	4.00	3479.07
8	32.674112	-116.280997	3565.81	4.00	3569.81
9	32.675880	-116.287211	3619.61	4.00	3623.61

Name: Interstate 8 -Southbound
Path type: One-way (toward increasing index)
Observer view angle: 50.0°

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

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.675700	-116.287962	3611.08	4.00	3615.08
2	32.673878	-116.281522	3557.90	4.00	3561.90
3	32.672074	-116.275211	3467.63	4.00	3471.63
4	32.670351	-116.269275	3382.18	4.00	3386.18
5	32.668628	-116.263061	3329.37	4.00	3333.37
6	32.666847	-116.256841	3311.46	4.00	3315.46
7	32.665119	-116.250728	3268.91	4.00	3272.91
8	32.663374	-116.244594	3216.34	4.00	3220.34
9	32.661628	-116.238417	3148.49	4.00	3152.49

Name: Old Highway 80
Path type: Two-way
Observer view angle: 50.0°

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

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.662910	-116.269061	3307.20	4.00	3311.20
2	32.662675	-116.270305	3326.62	4.00	3330.62
3	32.665330	-116.278266	3368.82	4.00	3372.82
4	32.665493	-116.279446	3376.69	4.00	3380.69
5	32.665710	-116.281528	3393.76	4.00	3397.76
6	32.665919	-116.282461	3401.65	4.00	3405.65
7	32.666659	-116.284263	3431.52	4.00	3435.52
8	32.667228	-116.285272	3453.14	4.00	3457.14
9	32.668005	-116.286399	3478.50	4.00	3482.50
10	32.668773	-116.288491	3500.47	4.00	3504.47
11	32.669242	-116.290132	3513.33	4.00	3517.33
12	32.668890	-116.292600	3538.71	4.00	3542.71
13	32.668706	-116.293978	3554.71	4.00	3558.71

Name: San Diego and Arizona Railway
Path type: Two-way
Observer view angle: 50.0°

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

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.616399	-116.329377	3667.75	10.00	3677.75
2	32.616702	-116.327913	3662.21	10.00	3672.21
3	32.617144	-116.326362	3657.64	10.00	3667.64
4	32.618044	-116.324163	3653.74	10.00	3663.74
5	32.618832	-116.322524	3648.76	10.00	3658.76
6	32.619067	-116.321843	3646.40	10.00	3656.40
7	32.619207	-116.321189	3643.02	10.00	3653.02
8	32.619257	-116.320577	3648.69	10.00	3658.69
9	32.619221	-116.319815	3648.59	10.00	3658.59
10	32.619058	-116.318936	3651.26	10.00	3661.26
11	32.618665	-116.317948	3648.64	10.00	3658.64
12	32.618037	-116.316623	3649.52	10.00	3659.52
13	32.617545	-116.315615	3650.36	10.00	3660.36
14	32.617367	-116.315266	3650.69	10.00	3660.69
15	32.617155	-116.314730	3650.89	10.00	3660.89
16	32.617028	-116.314284	3651.31	10.00	3661.31
17	32.616979	-116.313952	3651.68	10.00	3661.68
18	32.616938	-116.313421	3651.30	10.00	3661.30
19	32.616974	-116.312863	3651.24	10.00	3661.24
20	32.617083	-116.312176	3656.49	10.00	3666.49
21	32.617218	-116.311302	3650.45	10.00	3660.45
22	32.617290	-116.310642	3651.43	10.00	3661.43
23	32.617263	-116.309939	3654.71	10.00	3664.71
24	32.617035	-116.308551	3656.89	10.00	3666.89
25	32.616836	-116.307639	3657.45	10.00	3667.45
26	32.616714	-116.306797	3657.97	10.00	3667.97
27	32.616453	-116.305059	3659.97	10.00	3669.97
28	32.616291	-116.304102	3660.39	10.00	3670.39
29	32.616129	-116.303485	3659.97	10.00	3669.97
30	32.615851	-116.302761	3661.68	10.00	3671.68

Name: San Diego and Arizona Railway
Path type: Two-way
Observer view angle: 50.0°

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

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.623799	-116.263833	3347.84	10.00	3357.84
2	32.622656	-116.263892	3334.85	10.00	3344.85
3	32.622082	-116.263854	3334.45	10.00	3344.45
4	32.621594	-116.263682	3329.22	10.00	3339.22
5	32.621173	-116.263507	3323.81	10.00	3333.81
6	32.620759	-116.263233	3321.30	10.00	3331.30
7	32.620396	-116.262912	3318.20	10.00	3328.20
8	32.619852	-116.262236	3312.97	10.00	3322.97
9	32.619436	-116.261474	3307.61	10.00	3317.61
10	32.619141	-116.260218	3297.23	10.00	3307.23
11	32.618924	-116.259027	3290.99	10.00	3300.99
12	32.618580	-116.258169	3285.03	10.00	3295.03
13	32.618020	-116.257171	3277.41	10.00	3287.41
14	32.617668	-116.256377	3270.63	10.00	3280.63
15	32.617577	-116.255540	3267.26	10.00	3277.26
16	32.617668	-116.254821	3256.91	10.00	3266.91
17	32.617939	-116.253630	3254.49	10.00	3264.49
18	32.618038	-116.253019	3246.09	10.00	3256.09
19	32.617957	-116.252257	3250.52	10.00	3260.52
20	32.617668	-116.251635	3242.63	10.00	3252.63
21	32.617234	-116.251104	3238.52	10.00	3248.52
22	32.615933	-116.250149	3225.23	10.00	3235.23
23	32.615183	-116.249505	3219.03	10.00	3229.03
24	32.614722	-116.248862	3214.55	10.00	3224.55
25	32.614460	-116.248175	3209.26	10.00	3219.26
26	32.614135	-116.246426	3197.72	10.00	3207.72
27	32.613620	-116.244141	3181.50	10.00	3191.50
28	32.613236	-116.243097	3172.59	10.00	3182.59
29	32.612830	-116.242175	3167.88	10.00	3177.88

Name: San Diego and Arizona Railway
Path type: Two-way
Observer view angle: 50.0°

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

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.615830	-116.302776	3662.04	10.00	3672.04
2	32.615588	-116.302331	3662.95	10.00	3672.95
3	32.614584	-116.300581	3665.48	10.00	3675.48
4	32.614358	-116.299916	3665.41	10.00	3675.41
5	32.614304	-116.299218	3665.90	10.00	3675.90
6	32.614385	-116.298542	3669.72	10.00	3679.72
7	32.614810	-116.297266	3661.06	10.00	3671.06
8	32.615497	-116.295624	3637.12	10.00	3647.12
9	32.616054	-116.294105	3635.08	10.00	3645.08
10	32.616253	-116.293466	3627.86	10.00	3637.86
11	32.616493	-116.292463	3619.50	10.00	3629.50
12	32.616701	-116.291852	3620.34	10.00	3630.34
13	32.617048	-116.291219	3610.91	10.00	3620.91
14	32.617555	-116.290731	3609.50	10.00	3619.50
15	32.618146	-116.290382	3596.24	10.00	3606.24
16	32.619538	-116.289998	3594.81	10.00	3604.81
17	32.620604	-116.289805	3581.54	10.00	3591.54
18	32.621074	-116.289784	3577.85	10.00	3587.85
19	32.621761	-116.290020	3572.94	10.00	3582.94
20	32.622745	-116.290463	3563.74	10.00	3573.74
21	32.623119	-116.290611	3560.64	10.00	3570.64
22	32.623562	-116.290723	3551.55	10.00	3561.55
23	32.623996	-116.290729	3550.41	10.00	3560.41
24	32.624506	-116.290621	3556.09	10.00	3566.09
25	32.625058	-116.290391	3561.35	10.00	3571.35
26	32.625532	-116.290010	3547.28	10.00	3557.28
27	32.626056	-116.289511	3527.18	10.00	3537.18
28	32.626494	-116.288878	3524.33	10.00	3534.33
29	32.626779	-116.288320	3529.86	10.00	3539.86
30	32.627064	-116.287510	3532.84	10.00	3542.84

Name: San Diego and Arizona Railway
Path type: Two-way
Observer view angle: 50.0°

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

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	32.627046	-116.287505	3529.18	10.00	3539.18
2	32.627177	-116.286925	3523.20	10.00	3533.20
3	32.627235	-116.286378	3523.39	10.00	3533.39
4	32.627236	-116.285546	3506.11	10.00	3516.11
5	32.627083	-116.284613	3502.55	10.00	3512.55
6	32.626690	-116.283486	3495.28	10.00	3505.28
7	32.626193	-116.282387	3489.95	10.00	3499.95
8	32.625790	-116.281330	3481.48	10.00	3491.48
9	32.625506	-116.280203	3472.70	10.00	3482.70
10	32.625099	-116.278353	3460.43	10.00	3470.43
11	32.624787	-116.276958	3451.73	10.00	3461.73
12	32.624399	-116.275069	3435.86	10.00	3445.86
13	32.624173	-116.274028	3430.90	10.00	3440.90
14	32.624173	-116.273331	3427.78	10.00	3437.78
15	32.624281	-116.272623	3419.45	10.00	3429.45
16	32.624462	-116.272054	3412.95	10.00	3422.95
17	32.625022	-116.271062	3416.11	10.00	3426.11
18	32.625600	-116.270147	3393.96	10.00	3403.96
19	32.626179	-116.269286	3391.25	10.00	3401.25
20	32.626712	-116.268331	3385.61	10.00	3395.61
21	32.626938	-116.267559	3375.83	10.00	3385.83
22	32.626974	-116.266647	3375.74	10.00	3385.74
23	32.626865	-116.265971	3371.08	10.00	3381.08
24	32.626649	-116.265381	3368.91	10.00	3378.91
25	32.626287	-116.264780	3364.48	10.00	3374.48
26	32.625910	-116.264381	3362.16	10.00	3372.16
27	32.625594	-116.264177	3359.41	10.00	3369.41
28	32.625124	-116.263936	3354.92	10.00	3364.92
29	32.624596	-116.263807	3349.25	10.00	3359.25
30	32.623800	-116.263839	3348.94	10.00	3358.94

GLARE ANALYSIS RESULTS

Summary of Glare

PV Array Name	Tilt (°)	Orient (°)	"Green" Glare min	"Yellow" Glare min	Energy kWh
PV array 1	SA tracking	SA tracking	0	0	-
PV array 2	SA tracking	SA tracking	0	0	-
PV array 3	SA tracking	SA tracking	0	0	-
PV array 4	SA tracking	SA tracking	0	0	-
PV array 5	SA tracking	SA tracking	0	0	-
PV array 6	SA tracking	SA tracking	0	0	-
PV array 7	SA tracking	SA tracking	0	0	-
PV array 8	SA tracking	SA tracking	0	0	-
PV array 9	SA tracking	SA tracking	0	0	-

Total annual glare received by each receptor

Receptor	Annual Green Glare (min)	Annual Yellow Glare (min)
Jacumba Airport - East	0	0
Jacumba Airport - West	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0

Receptor	Annual Green Glare (min)	Annual Yellow Glare (min)
OP 14	0	0
OP 15	0	0
OP 16	0	0
OP 17	0	0
OP 18	0	0
OP 19	0	0
OP 20	0	0
OP 21	0	0
Interstate 8 -Northbound	0	0
Interstate 8 -Southbound	0	0
Old Highway 80	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0

Results for: PV array 1

Receptor	Green Glare (min)	Yellow Glare (min)
Jacumba Airport - East	0	0
Jacumba Airport - West	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
OP 14	0	0
OP 15	0	0
OP 16	0	0
OP 17	0	0
OP 18	0	0
OP 19	0	0
OP 20	0	0
OP 21	0	0
Interstate 8 -Northbound	0	0
Interstate 8 -Southbound	0	0
Old Highway 80	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0

Flight Path: Jacumba Airport - East

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Jacumba Airport - West

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 14

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 15

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 16

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 17

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 18

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 19

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 20

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 21

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Southbound

0 minutes of yellow glare
0 minutes of green glare

Route: Old Highway 80

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Results for: PV array 2

Receptor	Green Glare (min)	Yellow Glare (min)
Jacumba Airport - East	0	0
Jacumba Airport - West	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
OP 14	0	0
OP 15	0	0
OP 16	0	0
OP 17	0	0
OP 18	0	0
OP 19	0	0
OP 20	0	0
OP 21	0	0
Interstate 8 -Northbound	0	0
Interstate 8 -Southbound	0	0
Old Highway 80	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0

Flight Path: Jacumba Airport - East

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Jacumba Airport - West

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 14

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 15

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 16

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 17

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 18

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 19

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 20

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 21

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Southbound

0 minutes of yellow glare
0 minutes of green glare

Route: Old Highway 80

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Results for: PV array 3

Receptor	Green Glare (min)	Yellow Glare (min)
Jacumba Airport - East	0	0
Jacumba Airport - West	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
OP 14	0	0
OP 15	0	0
OP 16	0	0
OP 17	0	0
OP 18	0	0
OP 19	0	0
OP 20	0	0
OP 21	0	0
Interstate 8 -Northbound	0	0
Interstate 8 -Southbound	0	0
Old Highway 80	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0

Flight Path: Jacumba Airport - East

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Jacumba Airport - West

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 14

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 15

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 16

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 17

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 18

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 19

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 20

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 21

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Southbound

0 minutes of yellow glare
0 minutes of green glare

Route: Old Highway 80

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Results for: PV array 4

Receptor	Green Glare (min)	Yellow Glare (min)
Jacumba Airport - East	0	0
Jacumba Airport - West	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
OP 14	0	0
OP 15	0	0
OP 16	0	0
OP 17	0	0
OP 18	0	0
OP 19	0	0
OP 20	0	0
OP 21	0	0
Interstate 8 -Northbound	0	0
Interstate 8 -Southbound	0	0
Old Highway 80	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0

Flight Path: Jacumba Airport - East

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Jacumba Airport - West

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 14

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 15

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 16

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 17

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 18

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 19

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 20

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 21

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Southbound

0 minutes of yellow glare
0 minutes of green glare

Route: Old Highway 80

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Results for: PV array 5

Receptor	Green Glare (min)	Yellow Glare (min)
Jacumba Airport - East	0	0
Jacumba Airport - West	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
OP 14	0	0
OP 15	0	0
OP 16	0	0
OP 17	0	0
OP 18	0	0
OP 19	0	0
OP 20	0	0
OP 21	0	0
Interstate 8 -Northbound	0	0
Interstate 8 -Southbound	0	0
Old Highway 80	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0

Flight Path: Jacumba Airport - East

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Jacumba Airport - West

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 14

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 15

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 16

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 17

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 18

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 19

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 20

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 21

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Southbound

0 minutes of yellow glare
0 minutes of green glare

Route: Old Highway 80

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Results for: PV array 6

Receptor	Green Glare (min)	Yellow Glare (min)
Jacumba Airport - East	0	0
Jacumba Airport - West	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
OP 14	0	0
OP 15	0	0
OP 16	0	0
OP 17	0	0
OP 18	0	0
OP 19	0	0
OP 20	0	0
OP 21	0	0
Interstate 8 -Northbound	0	0
Interstate 8 -Southbound	0	0
Old Highway 80	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0

Flight Path: Jacumba Airport - East

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Jacumba Airport - West

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 14

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 15

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 16

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 17

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 18

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 19

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 20

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 21

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Southbound

0 minutes of yellow glare
0 minutes of green glare

Route: Old Highway 80

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Results for: PV array 7

Receptor	Green Glare (min)	Yellow Glare (min)
Jacumba Airport - East	0	0
Jacumba Airport - West	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
OP 14	0	0
OP 15	0	0
OP 16	0	0
OP 17	0	0
OP 18	0	0
OP 19	0	0
OP 20	0	0
OP 21	0	0
Interstate 8 -Northbound	0	0
Interstate 8 -Southbound	0	0
Old Highway 80	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0

Flight Path: Jacumba Airport - East

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Jacumba Airport - West

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 14

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 15

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 16

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 17

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 18

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 19

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 20

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 21

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Southbound

0 minutes of yellow glare
0 minutes of green glare

Route: Old Highway 80

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Results for: PV array 8

Receptor	Green Glare (min)	Yellow Glare (min)
Jacumba Airport - East	0	0
Jacumba Airport - West	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
OP 14	0	0
OP 15	0	0
OP 16	0	0
OP 17	0	0
OP 18	0	0
OP 19	0	0
OP 20	0	0
OP 21	0	0
Interstate 8 -Northbound	0	0
Interstate 8 -Southbound	0	0
Old Highway 80	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0

Flight Path: Jacumba Airport - East

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Jacumba Airport - West

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 14

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 15

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 16

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 17

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 18

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 19

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 20

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 21

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Southbound

0 minutes of yellow glare
0 minutes of green glare

Route: Old Highway 80

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Results for: PV array 9

Receptor	Green Glare (min)	Yellow Glare (min)
Jacumba Airport - East	0	0
Jacumba Airport - West	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
OP 14	0	0
OP 15	0	0
OP 16	0	0
OP 17	0	0
OP 18	0	0
OP 19	0	0
OP 20	0	0
OP 21	0	0
Interstate 8 -Northbound	0	0
Interstate 8 -Southbound	0	0
Old Highway 80	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0
San Diego and Arizona Railway	0	0

Flight Path: Jacumba Airport - East

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Jacumba Airport - West

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 14

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 15

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 16

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 17

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 18

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 19

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 20

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 21

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 8 -Southbound

0 minutes of yellow glare
0 minutes of green glare

Route: Old Highway 80

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Route: San Diego and Arizona Railway

0 minutes of yellow glare
0 minutes of green glare

Assumptions

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

APPENDIX C

Contrast Rating Worksheets

Form 8400-4
(June 2018)

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

Date: 05/04/2022
District Office: California Desert District
Field Office: Palm Springs/South Coast FO
Land Use Planning Area:

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Starlight Solar	T17S R7E S21	Approximately 1.3 miles to Project Boundary. See report map.
2. Key Observation Point (KOP) Name KOP 2 - I8 westbound		
3. VRM Class at Project Location VRM Class Objectives not designated for Project Location	(Lat. Long) 32°40'06.37"N / -116°15'38.88"W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Undulating terrain with geometric rock outcoppings and geologic features	Low-to moderate shrubs, tall globular deciduous trees,	Upright T-line, geometric structures for residences.
LINE	Predominantly soft undulating horizon with hard lines where rock outcroppings occur	large masses of vegetation; irregular shapes	Angular and straight for transmission lines related substation. Straight and angular for structures.
COLOR	Light tan/sand to khaki exposed soils	Dark green for shrubs and green for trees	White dull gray matte energy structures, reds, grays and tans for structures
TEX-TURE	Continuous smooth simple terrain with areas of coarseness where rock outcroppings occur	Fine, dense patches of shruby growth. small linear patches of taller vegetation.	Repetitive T-line structures, organized isolated residential structures, dense isolated residential structures

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Geometric graded area.	Geometric cleared area.	Geometric solar arrays.
LINE	Strait and geometric lines.	Strait and geometric lines.	Angular, strait solar arrays.
COLOR	Light tan/sand to khaki exposed soils	No perceived change	Grayish/blue arrays.
TEX-TURE	Fine, sand-gravel soils with coarse rock outcroppings more apparent	No perceived change	Smooth, flowing, continuous arrays.

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

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

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

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

Evaluator's Names: N. Conrad Langley
Date: 05/04/2022

(Continued on Page 2)

Comments from item 2.

This KOP is from I-8 westbound and represents travelers along an eligible designated scenic highway. Viewers along this roadway would be traveling at a high rate of speed and would be looking south-southwest to view the Project approximately 1.3 miles from this vantage point.

Views from this vantage point are of expansive panoramas of gently undulating terrain in the foreground with moderately slopped hills in the middleground and large mountains in the background. The site appears naturalistic with dense low growing, dark green shrubs such as manzaneta and low growing native trees such as juniper. Development in this area consist of single-family residential housing dispersed throughout the landscape. An existing substation is located in the foreground with associated transmission lines dotting the landscape.

The project would be constructed on the hillside, spreading east to west from this vantage point. The dark panels would appear similar in hue to the existing vegetation and would have weak to moderate contrast relative for color. The form and line of the array would vary from the existing site conditions and the scale if the project is larger than other existing structures in the community. Despite the rock outcroppings remaining in place along the ridgeline, the array would attract attention and would have strong (significant) line contrast with the terrain.

The project is expected to attract the attention of the casual observer temporarily during construction, however once built the project contrast is expected to be Strong (Significant) with the subject landscape expected to partially retain its' existing character.

Additional Mitigating Measures (See item 3)

Form 8400-4
(June 2018)

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

Date: 05/04/2022
District Office: California Desert District
Field Office: Palm Springs/South Coast FO
Land Use Planning Area:

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Starlight Solar	T17S R7E S19	Approximately 1.65 miles to Project Boundary. See report map.
2. Key Observation Point (KOP) Name KOP 3 I-8 eastbound		
3. VRM Class at Project Location VRM Class Objectives not designated for Project Location	(Lat. Long) 32°40'47.16"N / -116°17'44.41"W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Undulating terrain with geometric rock outcoppings and geologic features; pyramidal landforms	Low-to moderate shrubs, tall globular deciduous trees	Upright T-line, geometric structures for residences.
LINE	Predominantly soft undulating horizon with hard lines where rock outcroppings occur	large masses of vegetation; irregular shapes	Repeating straight, angular and vertical t-line towers & poles with thin connecting lines
COLOR	Light tan/sand to khaki exposed soils	Dark green trees; silver-green to olive green for shrubs	Metallic flat gray or rust brown. reddish-brown structures, beige water tank.
TEX-TURE	Continuous smooth simple terrain with areas of coarseness where rock outcroppings occur	Fine, dense patches of shruby growth. small linear patches of taller vegetation.	Organized, directional, linear repeating substation components. Smooth metallic.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No perceived change	Geometric cleared area.	Geometric solar arrays.
LINE	No perceived change	Strait and geometric lines.	Angular, straight solar arrays.
COLOR	No perceived change	No perceived change	Grayish/blue arrays.
TEX-TURE	No perceived change	No perceived change	Smooth, flowing, continuous arrays.

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

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

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

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

Evaluator's Names: N. Conrad Langley
Date: 05/04/2022

(Continued on Page 2)

Comments from item 2.

This KOP is from I-8 eastbound and represents travelers along an eligible designated scenic highway. Viewers along this roadway would be traveling at a high rate of speed and would be looking south-southeast to view the Project approximately 1.65 miles from this vantage point.

Views from this vantage point are of expansive panoramas of gently undulating terrain in the foreground with moderately slopped hills in the middleground and large mountains in the background. The site appears naturalistic with dense low growing, dark green shrubs such as manzaneta and low growing native trees such as juniper. Development in this area consist of single-family residential housing dispersed throughout the landscape. Commercial structures associated with the community are located near the highway and seen in the immediate foreground.

The project would be constructed on the hillside, spreading east to west from this vantage point. The dark panels would appear similar in hue to the existing vegetation and would have weak to moderate contrast relative for color. The form and line of the array would vary from the existing site conditions, however with the rock outcroppings remaining in place along the ridgeline, the array would attract attention, but would have moderate impacts on the terrain. The scale of the project as seen from this vantage point covers a larger area than other structures in the community, but is broken up by small segments of open vegetation.

The project is expected to attract the attention of the casual observer temporarily during construction and once built the project contrast is expected to have strong (significant) contrast with the subject landscape, however the area is expected to partially retain its' existing character

Additional Mitigating Measures (See item 3)

Form 8400-4
(June 2018)

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

Date: 05/04/2022
District Office: California Desert District
Field Office: Palm Springs/South Coast FO
Land Use Planning Area:

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Starlight Solar	T17S R7E S28	Approximately .65 miles to Project Boundary. See report map.
2. Key Observation Point (KOP) Name KOP 4 - Hwy 80		
3. VRM Class at Project Location VRM Class Objectives not designated for Project Location	(Lat. Long) 32°39'46.19"N / -116°16'09.60"W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Undulating terrain, hilly	Low-to moderate shrubs, tall globular deciduous trees	Repeating verticals for power lines; Geometric shapes in substation. Curving road. Cylindrical water tank.
LINE	Predominantly soft undulating to flat horizon	large masses of vegetation; irregular shapes	Repeating straight, angular and vertical t-line towers & poles with thin connecting lines
COLOR	reddish-khaki exposed soils	Dark green trees; silver-green to olive green for shrubs	Metallic flat gray or rust brown. reddish-brown structures, beige water tank.
TEX-TURE	Continuous smooth simple terrain with fine texture soils	Fine or moderately coarse patches of shruby growth. Small groupings of taller vegetation.	Organized, directional, linear repeating substation components. Smooth metallic.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No perceived change	Geometric cleared area.	Geometric solar arrays.
LINE	No perceived change	Strait and geometric lines.	Angular, straight solar arrays.
COLOR	No perceived change	No perceived change	Grayish/blue arrays.
TEX-TURE	No perceived change	No perceived change	Smooth, flowing, continuous arrays.

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

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

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

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

Evaluator's Names: N. Conrad Langley
Date: 05/04/2022

(Continued on Page 2)

Comments from item 2.

This KOP is from Hwy 80 westbound and represents travelers along the highway. Viewers along this roadway would be traveling at low to moderate rates of speed and would be looking west to southwest with partially to mostly screened views of the Project approximately .65 miles from this vantage point.

Views from this vantage point are directional with views focused on the immediate foreground due to topography and vegetation screening. Although the vegetation is mature and there are intermittent long-range views, travelers are primarily to the roadway immediately before them with little to no views of the Project. Development in this area consist of substation and associated power lines as well as single-family residential housing dispersed throughout the landscape.

The project would be constructed on the hillside, approximately .5 miles at its' nearest location, but would predominately be screened to Hwy 80 travelers from both directions due to topography and vegetation.

Additional Mitigating Measures (See item 3)

Form 8400-4
(June 2018)

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

Date: 05/04/2022
District Office: California Desert District
Field Office: Palm Springs/South Coast FO
Land Use Planning Area:

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Starlight Solar	T17S R7E S32	Less than .1 miles to Project Boundary. See report map.
2. Key Observation Point (KOP) Name KOP 6 - Jewel Valley Road		
3. VRM Class at Project Location VRM Class Objectives not designated for Project Location	(Lat. Long) 32°39'18.18"N / -116°17'26.83"W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Undulating terrain; triangular and pyramidal	Low-to moderate shrubs; digitate branches	Not perceptible
LINE	Predominantly soft undulating to curving	large masses of vegetation; irregular shapes	Not perceptible
COLOR	tan to light brown exposed soils	Dark green shrubs, light green undergrowth	Not perceptible
TEX-TURE	Continuous smooth simple terrain with fine texture soils; coarse boulder fields	Fine or moderately coarse patches of shruby growth.	Not perceptible

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Ribbon-like access roads, geometric clearing for panels	Geometric cleared area.	Geometric solar arrays.
LINE	Straight and curving lines for grading	Straight and geometric lines.	Angular, straight solar arrays.
COLOR	Greater expanses of exposed soil	No perceived change	Grayish/blue arrays.
TEX-TURE	No perceived change	No perceived change	Smooth, flowing, continuous arrays.

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

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

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

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

Evaluator's Names: N. Conrad Langley
Date: 05/04/2022

(Continued on Page 2)

Comments from item 2.

This KOP is from Jewel Valley Road southbound and represents local travelers. Viewers along this roadway would be traveling at low rates of speed and would be looking primarily south with unobstructed views of the project less than .1 mile from the road.

Views from this vantage point are panoramic in nature of a naturalistic landscape. The introduction of solar panels would screen or partially screen panoramic views from this vantage point for a total of approximately .8 miles for 2 array sections. The solar array would introduce new form, line, color, and texture to the site and would be seen most visibility from this vantage point. Views would have strong (significant) contrast due to the close proximity to the panels.

Additional Mitigating Measures (See item 3)

Form 8400-4
(June 2018)

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

Date: 05/04/2022
District Office: California Desert District
Field Office: Palm Springs/South Coast FO
Land Use Planning Area:

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Starlight Solar	T17S R7E S4	.5 miles to Project Boundary. See report map.
2. Key Observation Point (KOP) Name KOP 7 - Jewel Valley Road		
3. VRM Class at Project Location VRM Class Objectives not designated for Project Location	(Lat. Long) 32°38'21.9"N / -116°16'21.96"W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Pyramidal and mounded	Low-to moderate shrubs with digitate branches, globular	Tall poles, ribbon-like roadway; boxy mailboxes
LINE	Curving and smooth	large masses of vegetation; irregular shapes	tall, thin (poles); curving (road)
COLOR	tan to light gray exposed soils	Dark green shrubs and trees, light green undergrowth	Browns and dark browns; gray (roadway)
TEX-TURE	coarse boulder fields, fine soils	Fine or moderately coarse patches of shruby growth.	Fine

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No perceived change	No perceived change	Geometric solar arrays.
LINE	No perceived change	No perceived change	Angular, straight solar arrays.
COLOR	No perceived change	No perceived change	Grayish/blue arrays.
TEX-TURE	No perceived change	No perceived change	Smooth, flowing, continuous arrays.

SECTION D. CONTRAST RATING __SHORT TERM ✓LONG TERM

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

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

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

Evaluator's Names — Date
N. Conrad Langley — 05/04/2022

(Continued on Page 2)

Comments from item 2.

This KOP is from Jewel Valley Road northbound and represents local travelers as well as the residence at this KOP. Viewers along this roadway would be traveling at low rates of speed and would be looking primarily north with views of the project screened due to topography.

Views from this vantage point are focused on the immediate foreground due to terrain and vegetation. The landscape appears semi-naturalistic with dispersed residences sitting off the roadway screened by vegetation and terrain. Solar panels in this landscape would introduce new form, line, color, and texture, however would only be seen while array is in the most vertical configuration.

Additional Mitigating Measures (See item 3)

Form 8400-4
(June 2018)

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

Date: 05/04/2022
District Office: California Desert District
Field Office: Palm Springs/South Coast FO
Land Use Planning Area:

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Starlight Solar	T17S R6E S25	Less than 1.65 miles to Project Boundary. See report map.
2. Key Observation Point (KOP) Name KOP 8 - Hwy 94		
3. VRM Class at Project Location VRM Class Objectives not designated for Project Location	(Lat. Long) 32°40'39.58"N / -116°18'55.09"W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Undulating terrain; triangular and pyramidal hills	Low-to moderate shrubs; digitate branches; clusters of larger trees	Geometric, boxy residences, cylindrical water tanks, tall vertical poles.
LINE	Predominantly soft undulating to curving and irregular hills	large masses of vegetation; irregular shapes	Straight and angular; curving (road and powerline)
COLOR	tan to light brown exposed soils; tan rocky outcroppings	Dark green shrubs, light green and silver-green undergrowth	Tans and browns; greys
TEX-TURE	Continuous smooth terrain with coarse boulder fields	Fine or moderately coarse patches of shruby growth.	moderately coarse

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Ribbon-like access roads, geometric panel array clearing	Geometric cleared area.	Geometric solar arrays.
LINE	Straight and linear	Straight and geometric lines.	Angular, straight solar arrays.
COLOR	Greater expanses of exposed soil	No perceived change	Grayish/blue arrays.
TEX-TURE	No perceived change	No perceived change	Smooth, flowing, continuous arrays.

SECTION D. CONTRAST RATING __SHORT TERM ✓LONG TERM

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

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

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

Evaluator's Names: N. Conrad Langley
Date: 05/04/2022

(Continued on Page 2)

Comments from item 2.

This KOP is from Hwy 94 eastbound and represents travel route viewers from an eligible designated scenic highway. Viewers along this roadway would be traveling at low to moderate rates of speed and would be looking primarily east as they crest the hill with panoramic views of the project area, as represented by this KOP. Views of the project would be partially to fully unobstructed from a distance of 1.5 miles looking to the southeast.

Views from this vantage point are panoramic views of a naturalistic landscape. The dark panels would appear similar in hue to the existing vegetation and would have weak contrast relative for color. The form and line of the array would vary from the existing site conditions. Due to the the rock outcroppings remaining in place along the ridgeline, the array would attract attention, but would have minor impacts on the terrain from this KOP.

Additional Mitigating Measures (See item 3)

Form 8400-4
(June 2018)

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

Date: 09/12/2023
District Office: California Desert District
Field Office: Palm Springs/South Coast FO
Land Use Planning Area:

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Starlight Solar	T17S R6E S25	1.6 miles to Project Boundary. See report map.
2. Key Observation Point (KOP) Name: KOP 9 - Tierra del Sol Road		
3. VRM Class at Project Location: VRM Class Objectives not designated for Project Location	(Lat. Long) 32'33.49"N / -116°19'03"W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Undulating terrain; triangular and pyramidal hills	Low-to moderate shrubs; digitate branches; clusters of larger trees	Geometric, boxy residences, cylindrical water tanks, tall vertical poles.
LINE	Predominantly soft undulating to curving and irregular hills	large masses of vegetation; irregular shapes	Straight and angular; curving (road and powerline)
COLOR	tan to light brown exposed soils; tan rocky outcroppings	Dark green shrubs, light green and silver-green undergrowth	Tans and browns; greys
TEX-TURE	Continuous smooth terrain with coarse boulder fields	Fine or moderately coarse patches of shruby growth.	moderately coarse

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Ribbon-like access roads, geometric panel array clearing	Geometric cleared area.	Geometric solar arrays.
LINE	Straight and linear	Straight and geometric lines.	Angular, curvfed solar arrays.
COLOR	Greater expanses of exposed soil	No perceived change	Grayish/blue arrays.
TEX-TURE	No perceived change	No perceived change	Smooth, flowing, broken arrays.

SECTION D. CONTRAST RATING ___SHORT TERM ✓LONG TERM

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

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

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

Evaluator's Name: R. Rausch (desktop)

Date: 09/12/2023

(Continued on Page 2)

Comments from item 2.

This KOP represents viewers traveling along Tiera del Sol, an important north-south corridor in the region. This views from this local roadway are considered high quality and representative of the region's valued rural and scenic character. From much of Tierra del Sol, views to the project would be blocked by intervening landform and vegetation. However, from certain areas, such as the vicinity of the CALFIRE White Star fire station, portions of the project would be easily seen in the distance. Travelers viewing eastward from Tierra del Sol Road may see would see the arrays to the east, where the intervening foreground landforms drop in elevation, and the arrays come into the middleground view, appearing as modular, darker, and contrasting forms on the hillsides. The views of the project from Tierra del Sol diminish to partially obscured and not visible the further south a traveler is from the project

Additional Mitigating Measures (See item 3)

To be determined by permitting authority.