
Tri-County Solar LLC Solar Project Glint and Glare Analysis Report

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Prepared for:

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1.0 Introduction

BOW Renewables, LLC (BOW) has conducted a Glint and Glare Analysis of the Tri-County Solar (Project), a 6.43MWdc / 5MWac solar facility, situated on approximately 25.5 acres of a 45.29-acre brownfield property located in Kane County, IL (**Figure 1**). BOW utilized the web-based Solar Glare Hazard Analysis Tool (SGHAT) from Sandia National Laboratories officially licensed through ForgeSolar. The SGHAT provided by ForgeSolar meets the Federal Aviation Authority (FAA) 86 FR 25801 and is the industry leading simulation software for glint and glare analysis. This analysis of the simulation will cover the inputs, assumptions, and results.

Utilizing the assumptions and recommendations based in this report, no glare was detected at any of the aviation facilities, roadways/railways, or buildings in the surrounding area.

ForgeSolar is a web-based interactive simulation tool that provides an assessment of two important functions. The first function of the software is to predict when and where glare/glint will occur throughout the year, while the second function provides an assessment of potential hazards to the human eyes at designated points of interest surrounding the Project. During the daily normal operations of a solar project utilizing a Single-Axis Tracker (SAT), the solar modules will typically reflect less than 5% of sunlight while it perpendicularly tracks the sun throughout the day. However, during sunsets and sunrises, most SATs will utilize a shade mitigation strategy which will cease the perpendicular tracking and start the “backtracking” (**Figure 2**) from approximately 60 degrees to 5-10 degrees increasing the angle of incidence where it is more likely to cause a hazard, see **Figure 3**.

ForgeSolar utilizes an interactive Google map for locating the site, adding the proposed PV array(s), and marking Points of Interest (POI), vehicular travel routes, and flight paths. Using this interface, latitude, longitude, and elevation are automatically recorded, providing crucial information for calculations. Additional information regarding the PV array, reflectance, environment, and other factors are entered by the user.

If glint/glare is predicted to be found, the tool calculates the retinal irradiance and subtended angle of the glint/glare source to identify potential ocular hazards. These hazards can range from temporary after-image to retinal burn. The results are presented in a plot that shows when glint/glare will occur throughout the year with color codes indicating the potential ocular hazard level.

2.0 Methods

The glint and glare simulation analyzes potential glint and glare at the POIs, measured from Above Ground Level (AGL) and recorded minute by minute, around the area. As detailed below, the following points of interest were analyzed: aviation facilities, roadways/railways, and buildings.

The PV array consists of only the area taken up by the solar panels since the panels are the objects causing the potential glare. Even though panels absorb sunlight, there is still some light that can be reflected in different directions and must be analyzed. ForgeSolar utilizes the total array footprint to determine glint and glare.

Four scenarios were performed to look at the minimum and maximum heights of the PV solar panels along with the different heights between commuter and commercial vehicles. It is ForgeSolar’s recommendation that simulations should be performed using the minimum and maximum values of the panel height, based



on the solar PV panel's dimensions, to bound the height of the PV array. This will expand the range of observed glare and improve accuracy compared to the results using a single panel height value. This thought process was taken a step further to analyze the varying vehicle heights of both commuter and commercial vehicles.

- Scenario 1 – Minimum solar PV panel height and commuter vehicle height
- Scenario 2 – Minimum solar PV panel height and commercial vehicle height
- Scenario 3 – Maximum solar PV panel height and commuter vehicle height
- Scenario 4 – Maximum solar PV panel height and commercial vehicle height

The “All Scenarios” section lists which parameters and values remained unchanged throughout all simulations. The values chosen were based off the most recent site plan, ForgeSolar recommendations/defaults, and BOW Renewables experience. For additional parameters, see Appendix C – ForgeSolar Reports.

All Scenarios – Parameters and Values:

<i>Racking Parameter</i>	<i>Value Used</i>
<i>Axis Tracking</i>	Single-Axis
<i>Tracking Axis Orientation (deg)</i>	180
<i>Maximum Tracking Angle (deg)</i>	60
<i>Resting Angle (deg)</i>	6
<i>Ground Cover Ratio, GCR (%)</i>	40
<i>Backtracking Method</i>	Shade-Slope

<i>Module Parameter</i>	<i>Value Used</i>
<i>Module Surface Material</i>	Smooth Glass with ARC
<i>Vary Reflectivity with Sun Position (Y/N)</i>	Yes
<i>Correlate Slope Error with Surface Type (Y/N)</i>	Yes
<i>Slope Error (mrad)</i>	8.43

<i>Location Parameter</i>	<i>Value Used</i>
<i>Coordinates</i>	41.983099, -88.271827
<i>Timezone Offset</i>	UTC-06:00
<i>Minimum Sun Altitude (deg)</i>	0
<i>Subtended Angle of Sun (mrad)</i>	9.3
<i>Peak Direct Normal Irradiance, DNI (W/m²)</i>	1000
<i>DNI Varies (Y/N)</i>	Yes

<i>Observer Parameter</i>	<i>Value Used</i>
<i>Ocular Transmission Coefficient</i>	0.5
<i>Pupil diameter (m)</i>	0.002
<i>Eye Focal Length (m)</i>	0.017
<i>Observer in Building Height Above Ground (ft)</i>	16



Route Parameter	Value Used
<i>Azimuthal View Angle (deg)</i>	50
<i>Downward View Angle (deg)</i>	90
<i>Train Driver Height Above Ground (ft)</i>	15

Flight Path Parameter	Value Used
<i>Glide Slope (deg)</i>	3
<i>Threshold Crossing Height (ft)</i>	50
<i>Max Downward Viewing Angle (deg)</i>	30
<i>Azimuthal Viewing Angle (deg)</i>	50

Points of Interest:

- Aviation
 - o Runways – 2-mile approach path
 - o Air Traffic Control Towers (ATCTs) - 105 ft
 - o Helipads – 500 ft
 - o See **Figure 4 & 5** for general visualization
- Roadways/Railways
 - o Freight train cabs - 15ft
 - o Commuter vehicles (cars and small trucks) - 4 ft
 - o Commercial vehicles (semi-trucks) - 8 ft
 - o See **Figure 6** for general visualization
- Buildings
 - o 2 Story buildings – 16 ft
 - o See **Figure 7** for general visualization

3.0 Results

Utilizing the ForgeSolar web-based program, a simulation for the Project was conducted over the course of one year using one-minute increments. The results were outputted into a Glare Hazard Plot (GHP) plotting Retinal Irradiance (W/cm^2) against the Subtended Source Angle (mrad). The GHP displays the expected ocular impact of each minute of predicted glint/glare and is displayed on the chart as a small circle in its respective hazard zone.

- Green - Low potential to cause after-image
- Yellow - Potential to cause temporary after-image
- Red - Potential to cause retinal burn (permanent eye damage)

3.1 Aviation:

This portion of the report includes an analysis of the potential glare that could impact airplane/helicopter pilots and Air Traffic Control Tower (ATCT) operators.

Within a 5-mile radius of the Project, one airport, one ATCT, and one helipad were identified. This includes the Dupage Airport, the ATCT at the Dupage Airport, and the St. Joseph Hospital helipad (**Figure 8**). Additionally, eight approach paths were identified at the Dupage Airport.



Based on the ForgeSolar glare results for all four scenarios, no glare that the FAA considers an impact to pilots was observed on any of the aviation facilities mentioned above.

3.2 Roadways/Railways:

This section of the report includes an analysis of the potential glare that could impact vehicle drivers and train operators.

Within the vicinity of the Project, multiple roadways (or road segments) and railways (or railway segments) were identified. This includes road segments of Dunham Road, East Middle Street, IL-25, South Gilbert Street, South Pointe Avenue, Stearns Road, and 3 railway segments **(Figure 9)**.

Based on the ForgeSolar glare results for all four scenarios, no glare was observed on any of the roadways and railways mentioned above.

3.3 Buildings:

This section of the report includes an analysis of the potential glare that could impact residents in nearby occupied buildings.

Near the Project, there were 56 buildings identified that consisted of houses or businesses **(Figure 10)**. The results in this section do not include the ATCT nor helipad.

Based on the ForgeSolar glare results for all four scenarios, no glare was observed on any of the nearby buildings mentioned above.

4.0 Conclusion

BOW performed several ForgeSolar glare analysis simulations for the 6.43MWdc / 5MWac Tri-County Solar project located in Kane County, IL. Four scenarios were evaluated, and most of the input parameters were left unchanged between each scenario to focus on only a few key parameters such as panel height and vehicle height. This process helps create the lower and upper bounds for potential glare.

Based on the most recent design that was submitted on the Site Plan for the Special Use Permit, ForgeSolar recommendations, and BOW's experience, the Project is anticipated to result in a total of zero minutes of glare on aviation, roadway/railway, and building receptors.

One of the parameters that has a great influence on glint and glare for SAT solar projects is the resting angle. The resting angle was set to 6 degrees, which helped produce no glare on any of the points of interest mentioned in this report.

If there are any major design changes that occur after this report is provided, another glare analysis will have to be conducted to reconfirm the no glare results.



Appendix A – Definitions

Axis Tracking - Whether PV array modules are fixed-mount or utilize single- or dual-axis tracking.

Azimuthal View Angle - Describes the horizontal field-of-view (left and right) of observers traveling along the Route. An azimuthal view angle of 180° implies that the observer can see visible glare anywhere around them. An azimuthal view angle of 50° (default) implies that the observer has a total field-of-view of 100° (50° left and right of their direction of travel). The default value of 50° is derived from FAA research which found that the impact of glare decreases as its distance from the observer view increases such that glare beyond 50° is mitigated.

Backtracking – A PV parameter that can be used to simulate various strategies that rotate the modules away from the sun to reduce shading. These strategies typically take effect when the sun's position lies outside the range of rotation defined by the maximum tracking angle of the PV panels, or when substantial shading occurs, depending on the strategy selected.

Direction - Azimuthal angle of approach of aircraft which defines the straight path toward the runway. Measured clockwise from true north.

DNI - Direct Normal Irradiance from the Sun at a location. Derived from scaling Peak DNI according to time and sun position. Measured in W/m^2 .

Downward View Angle - Describes the minimum downward viewing angle of the observer utilizing this path (motorist, pilot, rail passenger, etc.). Glare which is visible at a location below the field-of-view defined by this angle will be ignored. For example, a Route modeling a custom flight track with a downward view angle of 0° would ignore glare from PV during flight.

Elevation/Altitude - Elevation above the mean sea level at a specified location. ForgeSolar automatically queries the Google Elevation services for an approximate value.

Eye Focal Length - Distance between the nodal point (where rays intersect in the eye) and the retina. This value is used to determine the projected image size on the retina for a given subtended angle of the glare source. A typical eye focal length is 0.017m.

GCR - Ground-coverage ratio of PV system, defined as ratio between the PV module area and total ground area. Used by shade-slope and shade Backtracking strategies.

Glare - Typically defined as a continuous source of bright light.

Glide Slope - Angle of descent of aircraft toward a runway. This has a default value of 3°.

Glint - Typically defined as a momentary flash of bright light, often caused by a reflection off a moving source.

Latitude - North-south measurement of location relative to the equator, with range of [-90° to 90°]. Latitude is measured in decimal degrees and assumes the WGS84 datum.

Longitude - Measurement of east-west position relative to Prime Meridian, with range of [-180°, 180°]. Longitude is measured in decimal degrees and assumes the WGS84 datum.



Maximum Downward Viewing Angle - The vertical FOV of the pilot, measured positive downward from the approach path vector. Acceptable values are 0° to 90°, where 90° implies no downward restriction. A default value of 30° assumes glare appearing beyond the corresponding FOV is mitigated.

Maximum Tracking Angle - Maximum angle of rotation of tracking system in both east and west directions. For example, a typical system with a 120° range of rotation has a max tracking angle of 60° (east/west).

Module Orientation/Azimuth - The azimuthal facing or direction toward which the PV panels are positioned. Orientation is measured clockwise from true north. Panels which face north, which is typical in the southern hemisphere, have an orientation of 0°. Panels which face south, which is typical in the northern hemisphere, have an orientation of 180°.

Module Surface Material - The type of material comprising the PV modules. The reflectivities of the material choices have been characterized to generate scaled values for each time step.

Ocular Hazard # - Numeric representation of predicted glare hazard: 0 (no glare), 1 (green glare), 2 (yellow glare).

Ocular Transmission Coefficient – A measure of how much light entering the eye reaches the retina. A value of 0.5 is typical.

Orientation of Tracking Axis - Azimuthal angle of axis over which the PV panels rotate. Measured clockwise from true north at 0°. For example, tracking systems in the northern hemisphere typically utilize a "south azimuth" tracking axis with an orientation of 180°, allowing panels to rotate east-west with south-facing tilt (if any).

Pupil Diameter - Defines the diameter of the pupil of the observer receiving predicted glare. The size impacts the amount of light entering the eye and reaching the retina. The typical value for this diameter in daylight is 0.002 m.

PV Rotation Angle - Panel rotation angle, including backtracking, measured +west with flat at 0°. Note that the vector component is +east.

Reflectivity - Fraction of light reflecting toward receptors. Reflectivity depends on material, module configuration, and sun position.

Resting Angle - Angle of rotation of panels when sun is outside tracking range and backtracking rotation has settled. In legacy "instant" backtracking, panels revert to the position described by this rotation angle at all times when the sun is outside the rotation range. In backtracking modes shade, shade-slope, and interval, the rest angle describes the shallowest possible angle of east/west rotation of panels during times of possible backtracking (i.e. early morning and late evening). For example, a system with a backtracking strategy "shade" and rest angle of 5° will begin the day at 5° east, rotate toward the sun, then follow its path until backtracking again activates in the evening. The panels will then backtrack toward a final rest position of 5° west. Depending on the backtracking and location, the panels may not always reach the rest angle position while the sun is up.

Retinal Irradiance - Irradiance (flux per unit area, W/cm²) impacting retina, at the back of the eye. Defines y-axis of hazard plot. Note that retinal irradiance does not depend on distance to source.



Shade-Slope - Slope-aware backtracking method designed to accommodate PV modules placed on arbitrarily oriented slopes and reduce shading.

Slope Error - Specifies the amount of scatter that occurs from the PV module. Mirror-like surfaces that produce specular reflections will have a slope error closer to zero, while rough surfaces that produce more scattered (diffuse) reflections have higher slope errors. Based on observed glare from different PV modules, the default value is 8.43 mrad.

Subtended Angle of the Sun – The apparent size of the Sun as seen from Earth. This helps determine how much of the Sun’s light is reflected towards an observer. The average subtended angle of the sun as viewed from earth is ~9.3 mrad or 0.5°.

Subtended Glare Angle - Angle subtended by glare spot on PV array from point-of-view of receptor (i.e. effective glare spot size when viewed by observer). Defines x-axis of log-log hazard plot.

Sun Altitude - Vertical (elevation) component of the angular position of sun at given time. 0° implies sun is at horizon (i.e. sunrise/sunset). 90° indicates the sun is directly overhead.

Sun/Module Incidence Angle - Angle between panel normal vector and sun position vector. An angle of 0° indicates the panel is directly facing the sun. An angle of 90° indicates the sun and panel vectors are orthogonal to each other (e.g. panel on flat ground and sunrise/sunset).

Temporary After-Image – A brief visual spot or image that remains after looking at a bright light. An example of a temporary after-image is the remaining visual spot from a camera flash.

Threshold Crossing Height - Height above ground of aircraft when it crosses the runway threshold. This value is typically 50 ft.

Tilt of Tracking Axis - Tilt above flat ground of axis over which panels rotate (e.g. torque tube). System on flat, level ground would have axis tilt of 0°. Tracking axis tilt is only used by instant and none backtracking strategies. Other backtracking strategies either compute the tilt from the slope (shade-slope) or assume the modules are on flat ground with no axis tilt.

Total Elevation - Sum of the elevation and height above ground. The system will automatically calculate the height or total elevation when the other is provided. During analysis, the total elevation determines the Cartesian Z value of the point.



Appendix B – Figures



Figure 1 – Overall Capture of Site

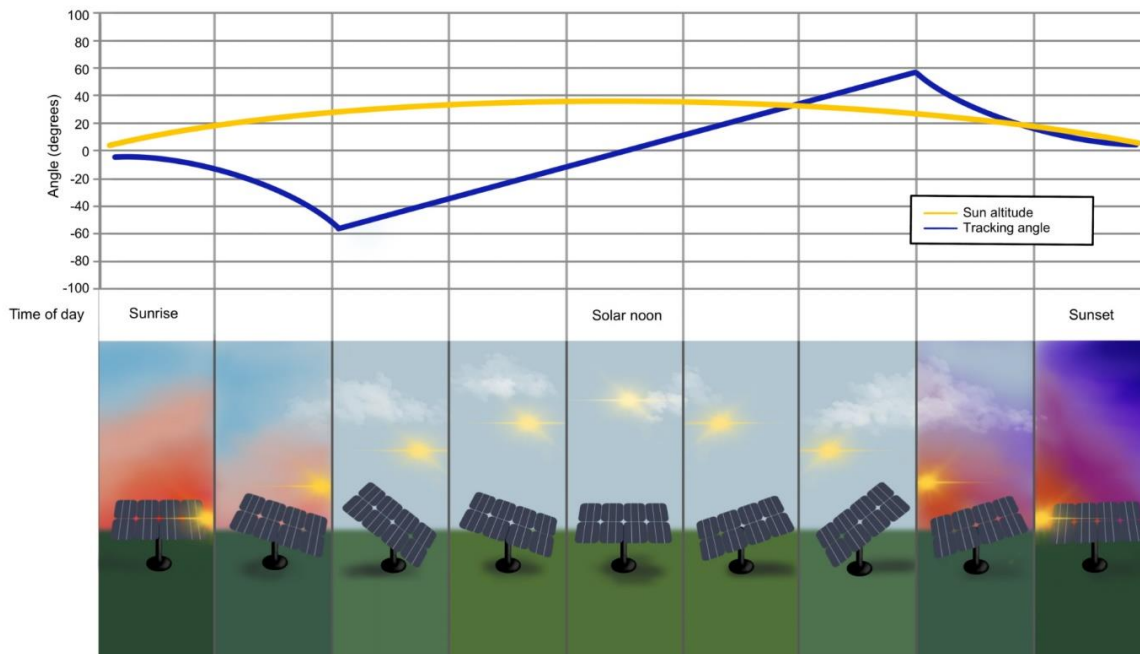


Figure 2 – Illustration of SAT with Backtracking



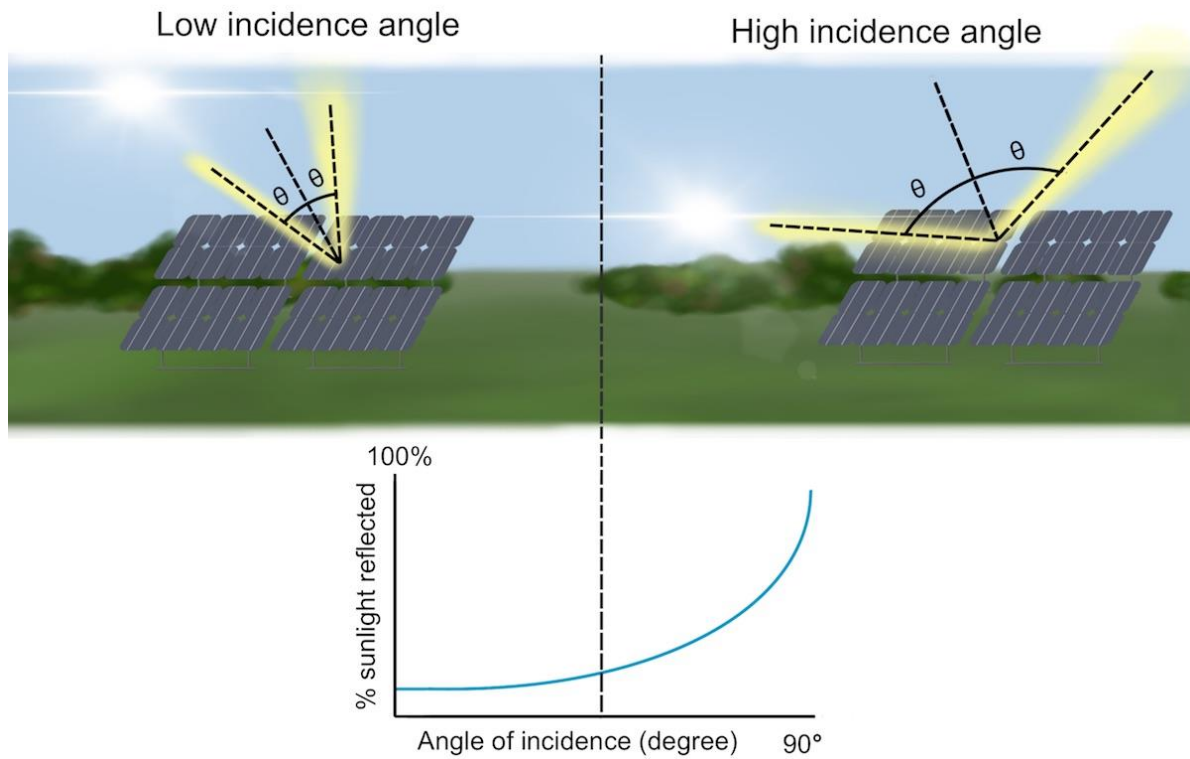


Figure 3 – Illustration of Low Vs. High Incidence Angle

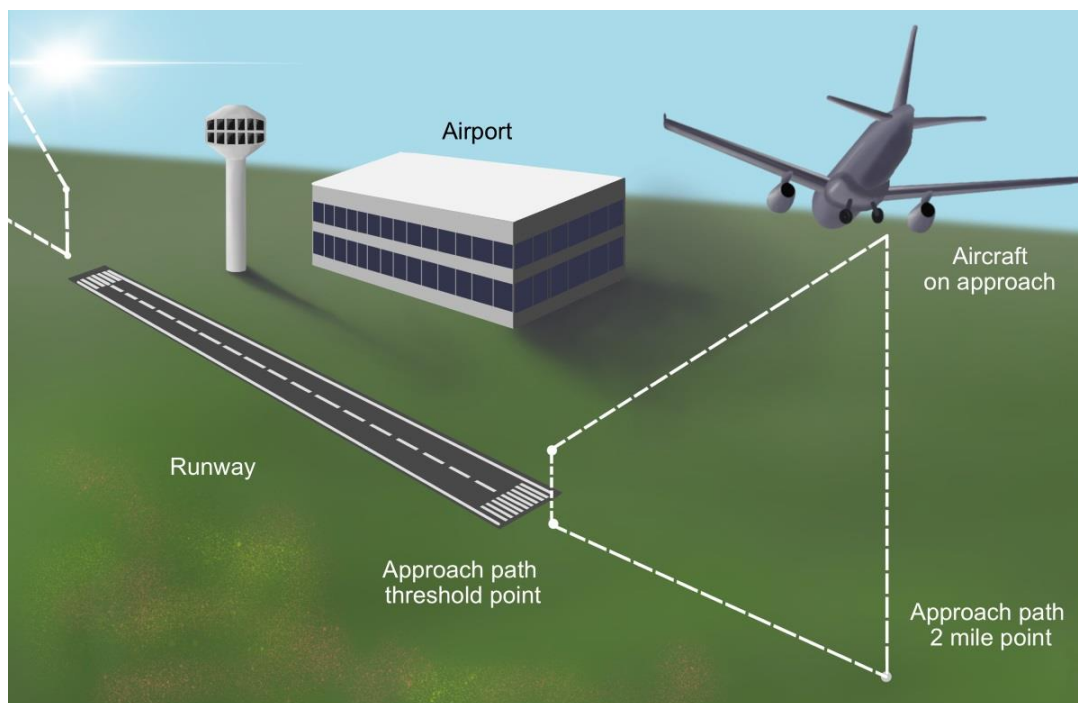


Figure 4 – Illustration of Aircraft Utilizing 2-Mile Approach Path Towards Airport

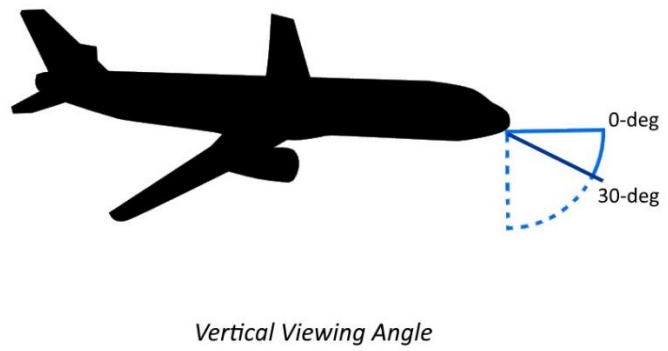
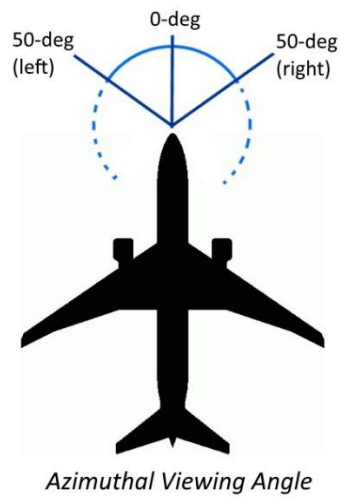


Figure 5 – Aircraft Field-of-View Defined by Azimuthal and Downward Viewing Angle Parameters

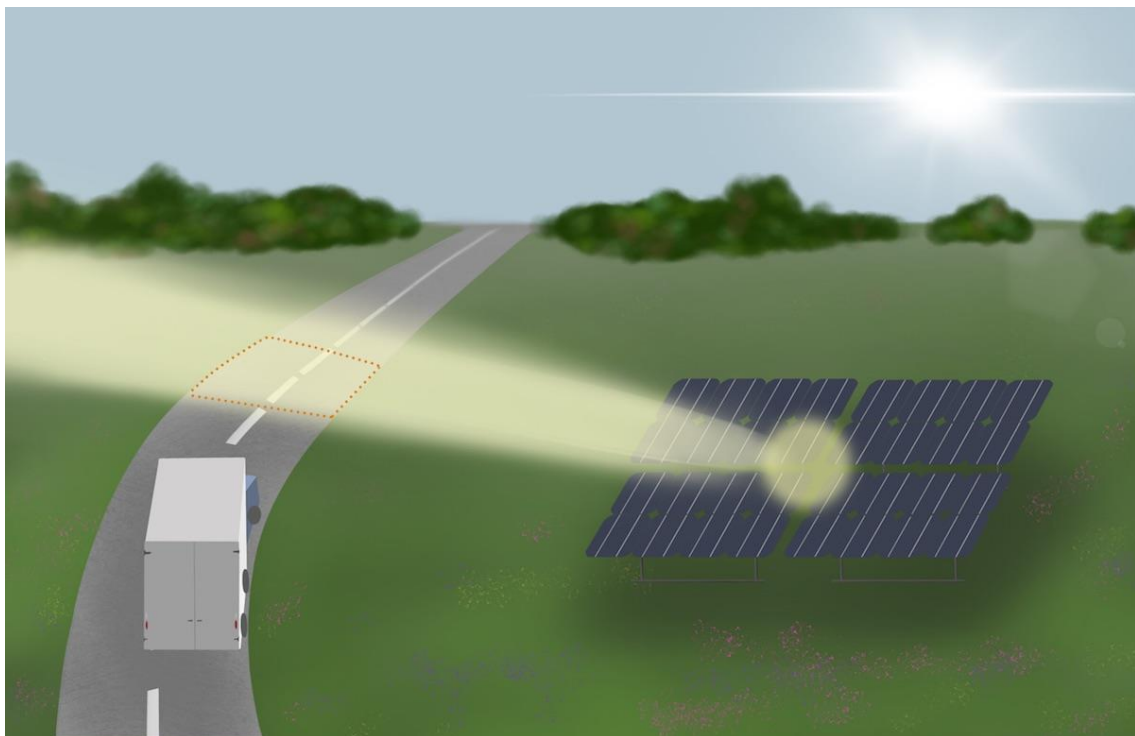


Figure 6 – Illustration of Reflected Glare Impacting a Roadway

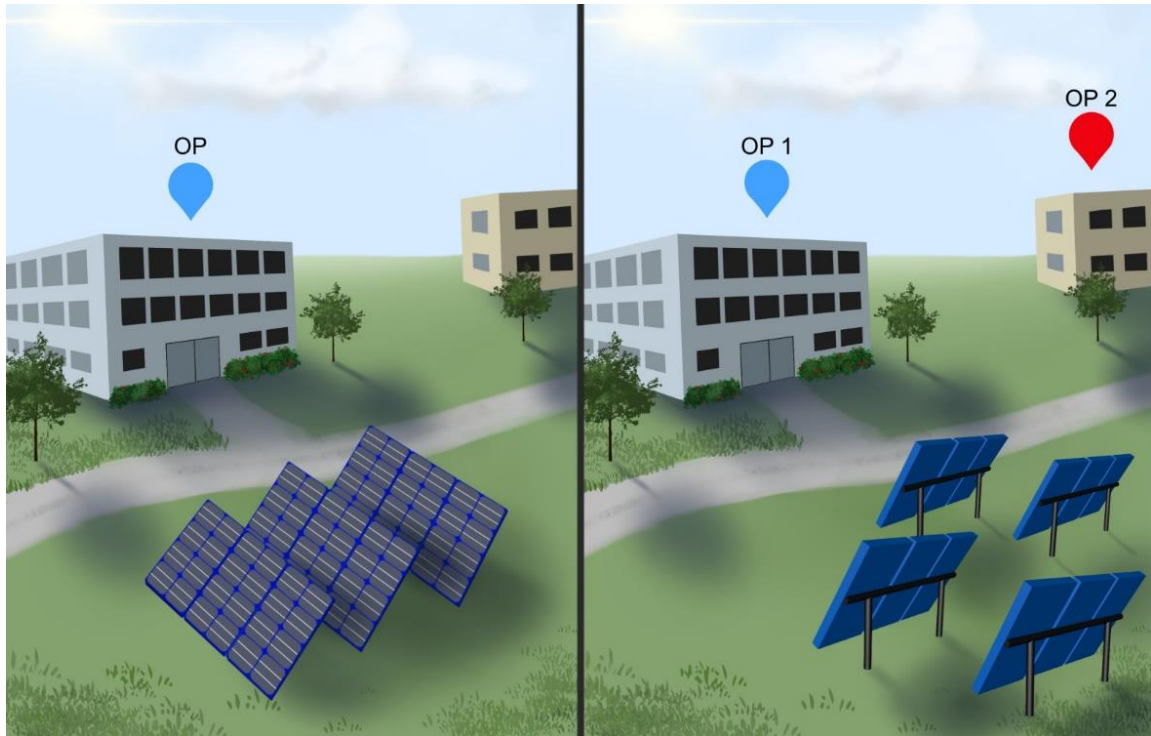


Figure 7 – Illustration of POIs and Observation Points (OP)

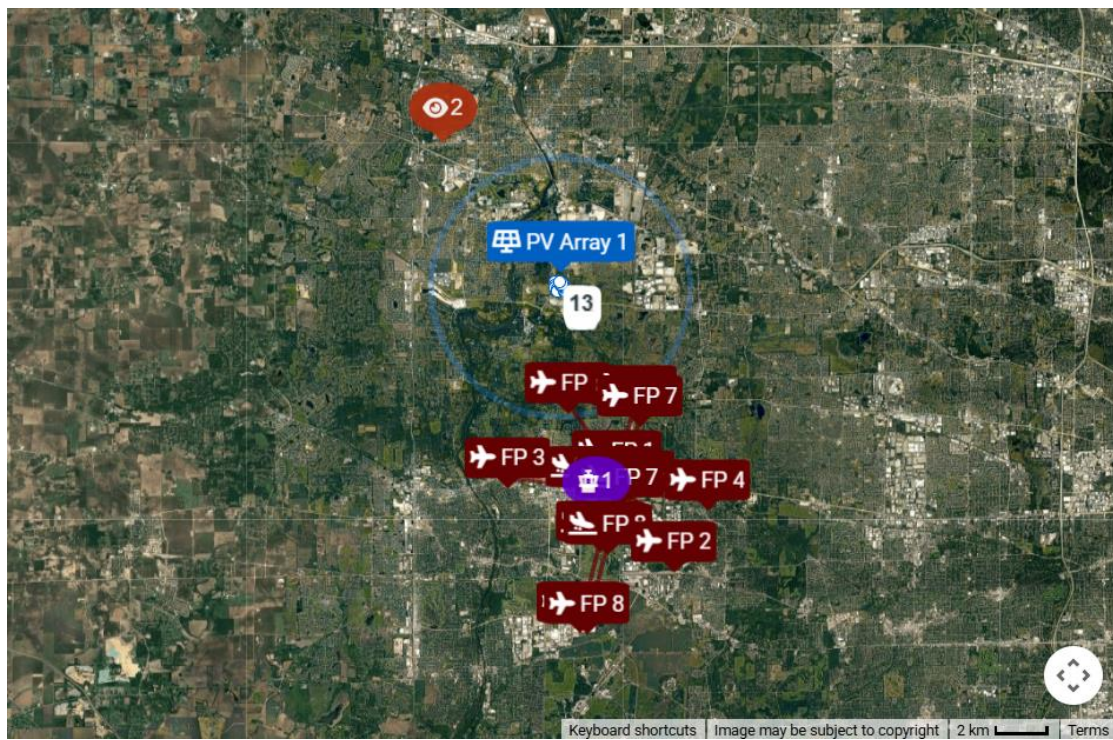


Figure 8 – Points of Interest for Aviation Facilities



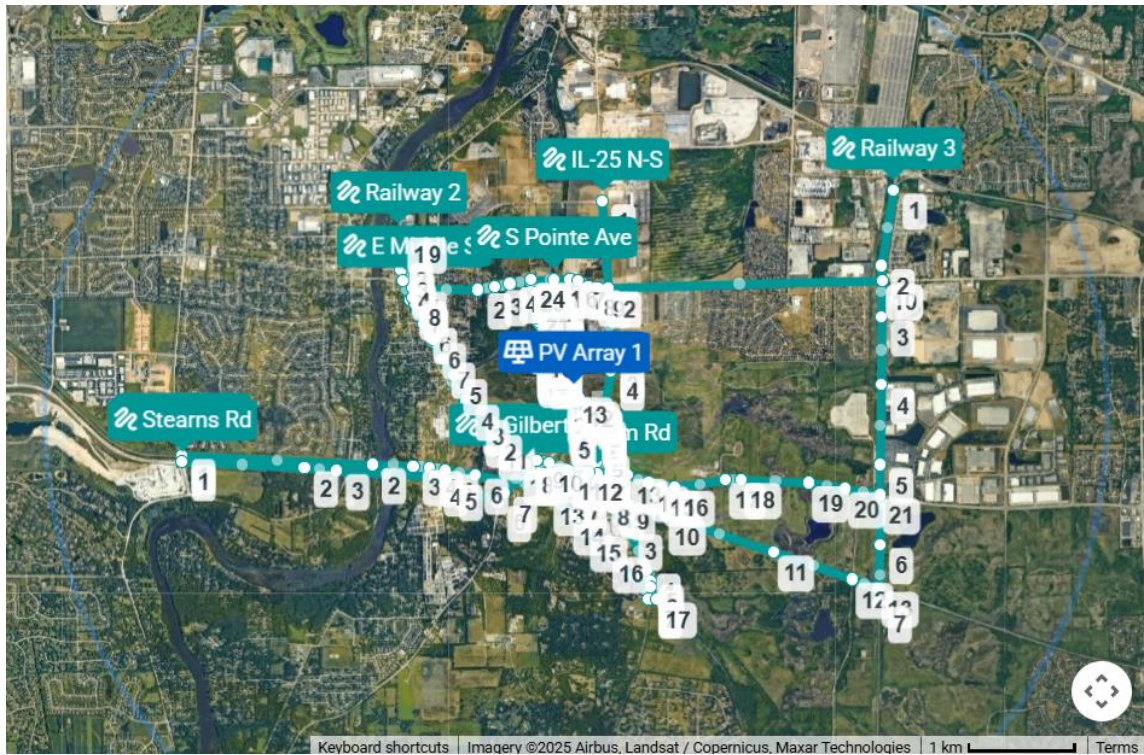


Figure 9 – Points of Interest for Roadways/Railways

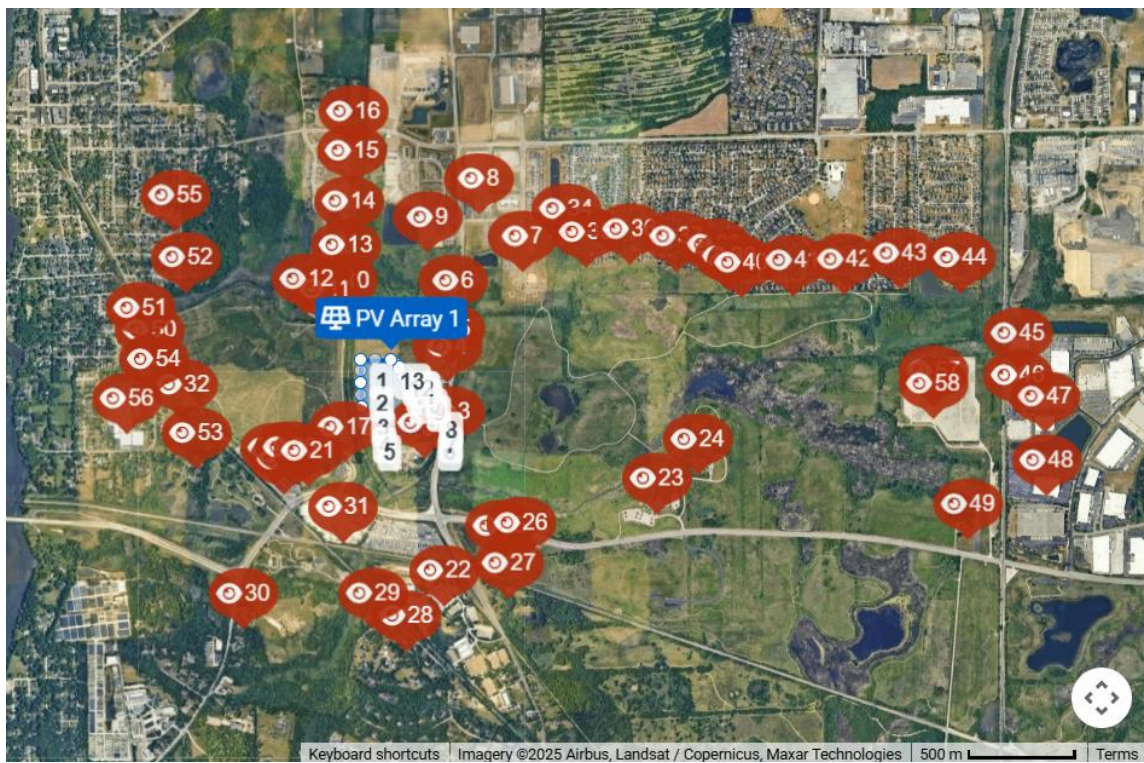


Figure 10 – Points of Interest for Buildings



Appendix C – ForgeSolar Reports

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FORGESOLAR GLARE ANALYSIS

Project: **Tri-County Solar**

Site configuration: **Rev 02 - Scenario 1**

Site description: Scenario 1 - 3ft panel height and 4ft vehicle height

Created 10 Oct, 2025

Updated 10 Oct, 2025

Time-step 1 minute

Timezone offset UTC-6

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 5 MW to 10 MW

Site ID 161567.27066

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 No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV Array 1	SA tracking	SA tracking	0	0.0	0	0.0	-

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
Dunham Rd	0	0.0	0	0.0
E Middle St	0	0.0	0	0.0
IL-25 N-S	0	0.0	0	0.0
Railway 1	0	0.0	0	0.0
Railway 2	0	0.0	0	0.0
Railway 3	0	0.0	0	0.0
S Gilbert St	0	0.0	0	0.0
S Pointe Ave	0	0.0	0	0.0
Stearns Rd	0	0.0	0	0.0
FP 1	0	0.0	0	0.0
FP 2	0	0.0	0	0.0
FP 3	0	0.0	0	0.0
FP 4	0	0.0	0	0.0
FP 5	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
FP 6	0	0.0	0	0.0
FP 7	0	0.0	0	0.0
FP 8	0	0.0	0	0.0
1-ATCT	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
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
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OP 22	0	0.0	0	0.0
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OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0
OP 58	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV Array 1

Axis tracking: Single-axis rotation

Backtracking: Shade-slope

Tracking axis orientation: 180.0°

Max tracking angle: 60.0°

Resting angle: 6.0°

Ground Coverage Ratio: 0.4

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	41.984454	-88.273527	769.08	3.00	772.08
2	41.983485	-88.273528	766.62	3.00	769.62
3	41.982465	-88.273456	765.56	3.00	768.56
4	41.981773	-88.273312	765.24	3.00	768.24
5	41.981447	-88.273095	765.16	3.00	768.16
6	41.981445	-88.269664	761.14	3.00	764.14
7	41.981771	-88.269591	763.21	3.00	766.21
8	41.982414	-88.269589	769.54	3.00	772.54
9	41.983108	-88.270241	777.43	3.00	780.43
10	41.983435	-88.270893	779.25	3.00	782.25
11	41.983802	-88.271109	779.60	3.00	782.60
12	41.984128	-88.271254	779.44	3.00	782.44
13	41.984455	-88.271833	781.61	3.00	784.61

Route Receptors

Name: Dunham Rd

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



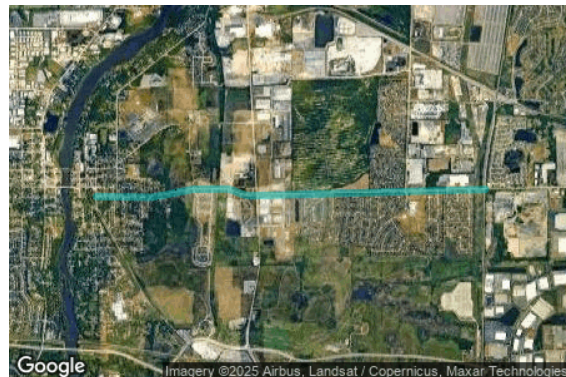
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.977800	-88.269093	742.15	4.00	746.15
2	41.975564	-88.267600	756.87	4.00	760.87
3	41.972868	-88.265454	755.29	4.00	759.29
4	41.969629	-88.263502	756.50	4.00	760.50
5	41.968704	-88.263180	742.30	4.00	746.30
6	41.968114	-88.263158	740.56	4.00	744.56
7	41.967125	-88.263309	752.45	4.00	756.45

Name: E Middle St

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



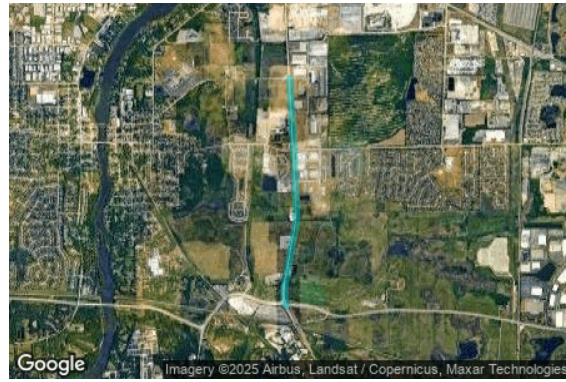
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.993396	-88.290122	735.00	4.00	739.00
2	41.993316	-88.282650	745.25	4.00	749.25
3	41.993547	-88.280805	741.41	4.00	745.41
4	41.993823	-88.279096	736.24	4.00	740.24
5	41.994134	-88.276767	743.08	4.00	747.08
6	41.994172	-88.272156	744.46	4.00	748.46
7	41.994028	-88.271416	743.43	4.00	747.43
8	41.993622	-88.270139	744.93	4.00	748.93
9	41.993470	-88.269119	751.69	4.00	755.69
10	41.994121	-88.236722	764.11	4.00	768.11

Name: IL-25 N-S

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



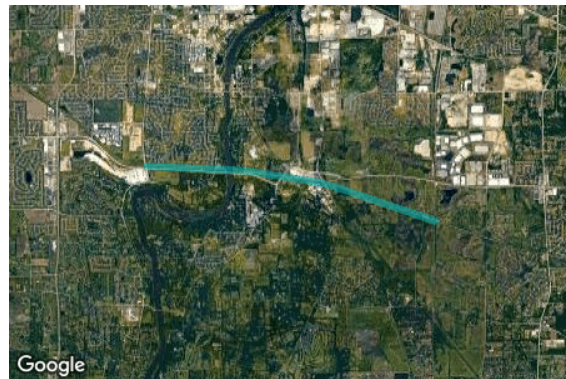
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.000820	-88.268570	759.42	4.00	763.42
2	41.993488	-88.267990	756.78	4.00	760.78
3	41.987105	-88.267628	757.22	4.00	761.22
4	41.986372	-88.267649	759.74	4.00	763.74
5	41.979687	-88.269275	751.93	4.00	755.93
6	41.978690	-88.269318	742.64	4.00	746.64
7	41.977795	-88.269087	742.15	4.00	746.15

Name: Railway 1

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



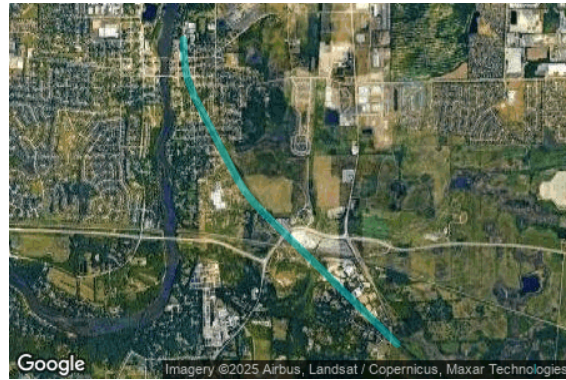
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.979232	-88.316262	755.21	15.00	770.21
2	41.978562	-88.294689	706.06	15.00	721.06
3	41.978418	-88.290054	724.87	15.00	739.87
4	41.978235	-88.288262	728.40	15.00	743.40
5	41.978035	-88.286535	723.15	15.00	738.15
6	41.977597	-88.283027	720.87	15.00	735.87
7	41.976257	-88.271826	735.80	15.00	750.80
8	41.975850	-88.268682	740.82	15.00	755.82
9	41.975427	-88.266332	744.01	15.00	759.01
10	41.974231	-88.261419	749.36	15.00	764.36
11	41.971088	-88.249045	760.11	15.00	775.11
12	41.968849	-88.240207	761.15	15.00	776.15
13	41.968083	-88.237139	762.57	15.00	777.57

Name: Railway 2

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	41.998064	-88.291800	731.02	15.00	746.02
2	41.995811	-88.291606	732.80	15.00	747.80
3	41.995002	-88.291461	733.27	15.00	748.27
4	41.994113	-88.291198	733.67	15.00	748.67
5	41.992431	-88.290361	732.96	15.00	747.96
6	41.990370	-88.288932	733.55	15.00	748.55
7	41.987391	-88.286840	735.31	15.00	750.31
8	41.983714	-88.284249	737.96	15.00	752.96
9	41.982607	-88.283289	738.39	15.00	753.39
10	41.981606	-88.282232	740.13	15.00	755.13
11	41.980510	-88.280859	743.47	15.00	758.47
12	41.978344	-88.277860	748.05	15.00	763.05
13	41.975805	-88.274386	749.77	15.00	764.77
14	41.974230	-88.272192	744.57	15.00	759.57
15	41.972806	-88.270288	744.34	15.00	759.34
16	41.970948	-88.267680	745.23	15.00	760.23
17	41.967091	-88.262405	745.68	15.00	760.68

Name: Railway 3

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



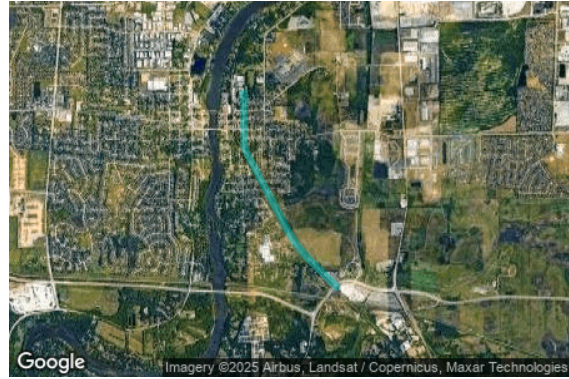
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.001700	-88.235437	770.58	15.00	785.58
2	41.995336	-88.236821	763.02	15.00	778.02
3	41.991022	-88.236831	765.79	15.00	780.79
4	41.985326	-88.236943	765.33	15.00	780.33
5	41.978451	-88.236976	769.38	15.00	784.38
6	41.971706	-88.237029	770.35	15.00	785.35
7	41.966789	-88.237165	771.10	15.00	786.10

Name: S Gilbert St

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	41.978322	-88.277403	733.89	4.00	737.89
2	41.981356	-88.281545	724.85	4.00	728.85
3	41.982550	-88.282867	728.90	4.00	732.90
4	41.983846	-88.283989	746.55	4.00	750.55
5	41.985999	-88.285513	740.07	4.00	744.07
6	41.989123	-88.287769	734.41	4.00	738.41
7	41.992101	-88.289867	731.19	4.00	735.19
8	41.992632	-88.290107	719.85	4.00	723.85
9	41.998035	-88.290101	729.78	4.00	733.78

Name: S Pointe Ave

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



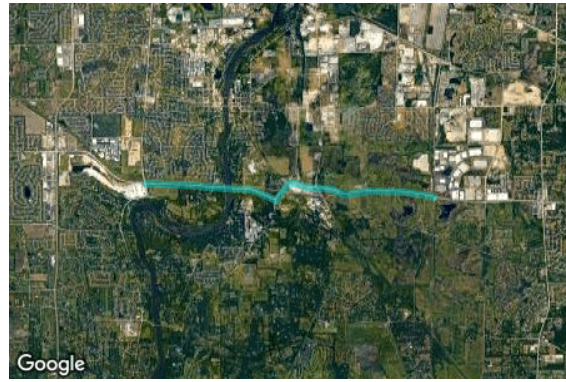
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.994154	-88.274178	746.80	4.00	750.80
2	41.991469	-88.274384	737.08	4.00	741.08
3	41.990951	-88.274545	730.77	4.00	734.77
4	41.990600	-88.274513	730.68	4.00	734.68
5	41.990377	-88.274470	736.91	4.00	740.91
6	41.987035	-88.274706	734.49	4.00	738.49
7	41.986820	-88.274781	735.08	4.00	739.08
8	41.986629	-88.275082	734.20	4.00	738.20
9	41.986589	-88.275618	734.03	4.00	738.03
10	41.986660	-88.276133	730.60	4.00	734.60
11	41.986884	-88.276337	730.32	4.00	734.32
12	41.987195	-88.276412	730.65	4.00	734.65
13	41.987968	-88.276305	730.70	4.00	734.70
14	41.988223	-88.276090	730.74	4.00	734.74
15	41.988327	-88.275682	732.16	4.00	736.16
16	41.990393	-88.275586	730.51	4.00	734.51
17	41.990672	-88.275843	730.53	4.00	734.53
18	41.990887	-88.276144	730.87	4.00	734.87
19	41.991248	-88.276144	745.41	4.00	749.41
20	41.991575	-88.276112	735.45	4.00	739.45
21	41.992038	-88.276240	735.56	4.00	739.56
22	41.993050	-88.276090	732.36	4.00	736.36
23	41.993887	-88.276702	739.84	4.00	743.84
24	41.994175	-88.276777	743.37	4.00	747.37

Name: Stearns Rd

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	41.978734	-88.316331	741.95	4.00	745.95
2	41.978279	-88.302459	729.60	4.00	733.60
3	41.977976	-88.298887	734.04	4.00	738.04
4	41.977483	-88.287600	701.83	4.00	705.83
5	41.977092	-88.285938	703.60	4.00	707.60
6	41.975274	-88.280401	726.52	4.00	730.52
7	41.976119	-88.279796	723.49	4.00	727.49
8	41.978512	-88.277157	737.31	4.00	741.31
9	41.978842	-88.275926	754.49	4.00	758.49
10	41.978667	-88.274553	755.25	4.00	759.25
11	41.978045	-88.272321	736.26	4.00	740.26
12	41.977849	-88.270219	742.77	4.00	746.77
13	41.977625	-88.265691	751.58	4.00	755.58
14	41.976924	-88.263288	760.38	4.00	764.38
15	41.976589	-88.261976	762.81	4.00	766.81
16	41.976589	-88.260367	764.54	4.00	768.54
17	41.977195	-88.254509	771.00	4.00	775.00
18	41.977195	-88.252793	766.48	4.00	770.48
19	41.976987	-88.245132	761.07	4.00	765.07
20	41.976496	-88.240946	762.77	4.00	766.77
21	41.975933	-88.237021	770.85	4.00	774.85

Flight Path Receptors

Name: FP 1

Description:

Threshold height: 50 ft

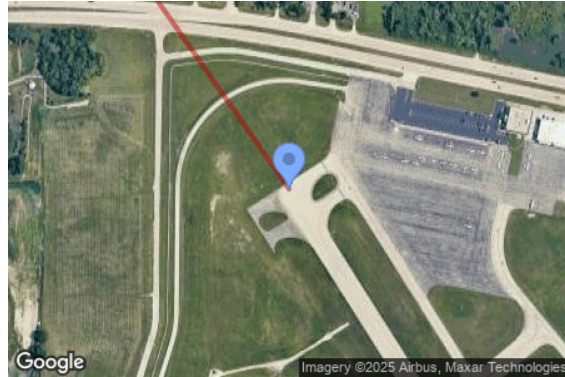
Direction: 145.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.919178	-88.245694	756.36	50.00	806.36
Two-mile	41.942862	-88.268007	773.62	586.16	1359.78

Name: FP 2

Description:

Threshold height: 50 ft

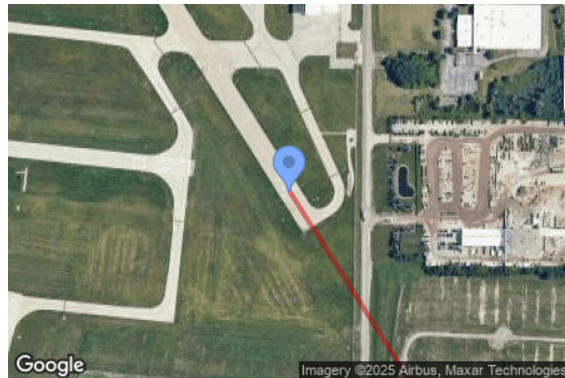
Direction: 327.5°

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	41.911818	-88.239432	755.05	50.00	805.05
Two-mile	41.887422	-88.218556	773.90	584.59	1358.48

Name: FP 3

Description:

Threshold height: 50 ft

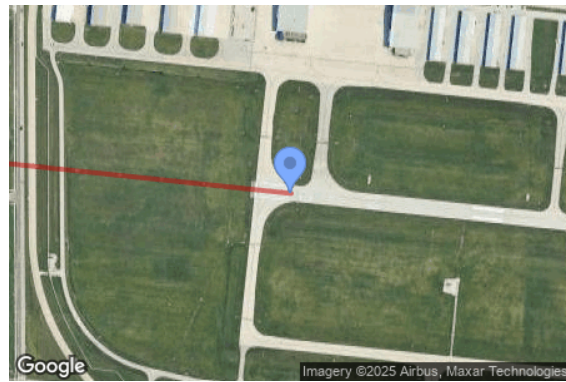
Direction: 96.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.913441	-88.257884	752.75	50.00	802.75
Two-mile	41.916458	-88.296570	728.15	628.02	1356.17

Name: FP 4

Description:

Threshold height: 50 ft

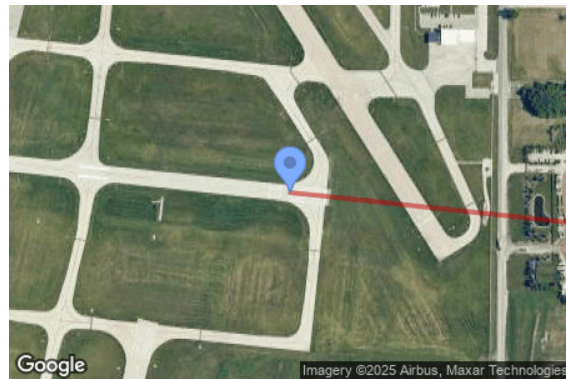
Direction: 276.1°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.912185	-88.241763	753.51	50.00	803.51
Two-mile	41.909097	-88.203088	770.34	586.60	1356.94

Name: FP 5

Description:

Threshold height: 50 ft

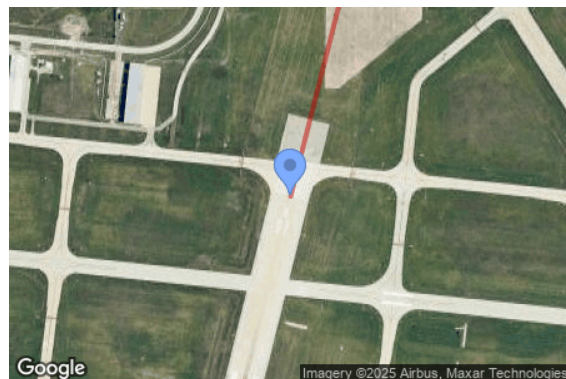
Direction: 194.2°

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	41.913752	-88.246971	754.65	50.00	804.65
Two-mile	41.941776	-88.237403	764.59	593.49	1358.08

Name: FP 6

Description:

Threshold height: 50 ft

Direction: 13.9°

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	41.894493	-88.253408	750.10	50.00	800.10
Two-mile	41.866421	-88.262717	752.80	600.73	1353.53

Name: FP 7

Description:

Threshold height: 50 ft

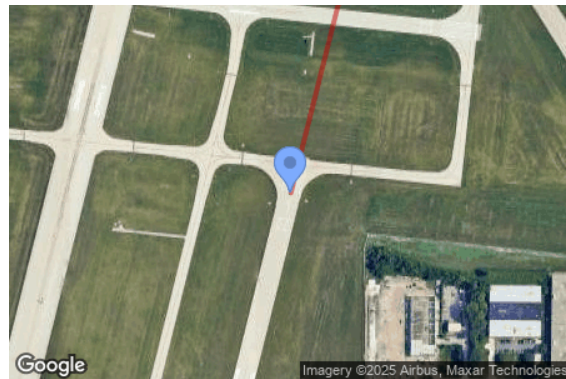
Direction: 194.1°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.910073	-88.244350	757.68	50.00	807.68
Two-mile	41.938112	-88.234861	759.43	601.67	1361.11

Name: FP 8

Description:

Threshold height: 50 ft

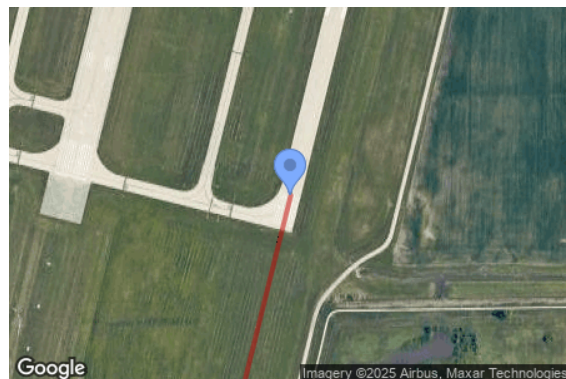
Direction: 13.9°

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	41.893816	-88.249780	747.86	50.00	797.86
Two-mile	41.865755	-88.259148	752.03	599.26	1351.29

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
1-ATCT	1	41.906833	-88.255524	757.94	105.00
OP 2	2	42.036580	-88.326480	832.45	500.00
OP 3	3	41.981185	-88.268470	762.27	16.00
OP 4	4	41.983959	-88.268598	756.38	16.00
OP 5	5	41.984666	-88.268480	756.93	16.00
OP 6	6	41.986725	-88.268321	761.81	16.00
OP 7	7	41.988597	-88.264375	751.89	16.00
OP 8	8	41.990983	-88.266862	764.54	16.00
OP 9	9	41.989406	-88.269757	738.79	16.00
OP 10	10	41.986751	-88.274518	732.87	16.00
OP 11	11	41.986382	-88.275591	740.73	16.00
OP 12	12	41.986823	-88.276613	730.59	16.00
OP 13	13	41.988179	-88.274350	750.61	16.00
OP 14	14	41.990074	-88.274196	731.01	16.00
OP 15	15	41.992212	-88.274045	738.71	16.00
OP 16	16	41.993893	-88.273915	746.32	16.00
OP 17	17	41.980570	-88.274448	751.85	16.00
OP 18	18	41.979632	-88.278451	741.62	16.00
OP 19	19	41.979224	-88.277903	741.82	16.00
OP 20	20	41.979730	-88.277580	740.51	16.00
OP 21	21	41.979501	-88.276552	754.60	16.00
OP 22	22	41.974505	-88.268802	742.68	16.00
OP 23	23	41.978363	-88.256675	761.59	16.00
OP 24	24	41.980066	-88.254380	757.35	16.00
OP 25	25	41.976394	-88.265589	766.84	16.00
OP 26	26	41.976518	-88.264382	771.43	16.00
OP 27	27	41.974784	-88.265117	762.69	16.00
OP 28	28	41.972592	-88.270965	744.51	16.00
OP 29	29	41.973545	-88.272827	737.20	16.00
OP 30	30	41.973555	-88.280218	724.92	16.00
OP 31	31	41.977195	-88.274512	735.80	16.00
OP 32	32	41.982338	-88.283674	736.82	16.00
OP 33	33	41.980749	-88.269929	749.38	16.00
OP 34	34	41.989706	-88.261809	764.59	16.00
OP 35	35	41.988753	-88.260699	764.66	16.00
OP 36	36	41.988890	-88.258196	767.62	16.00
OP 37	37	41.988590	-88.255584	765.51	16.00
OP 38	38	41.988283	-88.253447	767.88	16.00
OP 39	39	41.987739	-88.252564	771.00	16.00
OP 40	40	41.987499	-88.251919	771.49	16.00
OP 41	41	41.987549	-88.248974	773.92	16.00
OP 42	42	41.987601	-88.246032	763.52	16.00
OP 43	43	41.987870	-88.242872	765.51	16.00
OP 44	44	41.987704	-88.239442	758.52	16.00
OP 45	45	41.984521	-88.236170	768.92	16.00
OP 46	46	41.982689	-88.236199	771.10	16.00
OP 47	47	41.981803	-88.234647	771.64	16.00
OP 48	48	41.979155	-88.234531	776.23	16.00
OP 49	49	41.977265	-88.239042	766.56	16.00
OP 50	50	41.984616	-88.285527	734.54	16.00
OP 51	51	41.985604	-88.286045	733.53	16.00

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 52	52	41.987670	-88.283466	735.17	16.00
OP 53	53	41.980295	-88.282847	719.85	16.00
OP 54	54	41.983403	-88.285283	741.60	16.00
OP 55	55	41.990332	-88.284079	747.10	16.00
OP 56	56	41.981744	-88.286841	712.01	16.00
OP 57	57	41.982893	-88.240992	768.10	16.00
OP 58	58	41.982410	-88.241019	767.29	16.00

Map image of 1-ATCT



Glare Analysis Results

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV Array 1	SA tracking	SA tracking	0	0.0	0	0.0	-

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
Dunham Rd	0	0.0	0	0.0
E Middle St	0	0.0	0	0.0
IL-25 N-S	0	0.0	0	0.0
Railway 1	0	0.0	0	0.0
Railway 2	0	0.0	0	0.0
Railway 3	0	0.0	0	0.0
S Gilbert St	0	0.0	0	0.0
S Pointe Ave	0	0.0	0	0.0
Stearns Rd	0	0.0	0	0.0
FP 1	0	0.0	0	0.0
FP 2	0	0.0	0	0.0
FP 3	0	0.0	0	0.0
FP 4	0	0.0	0	0.0
FP 5	0	0.0	0	0.0
FP 6	0	0.0	0	0.0
FP 7	0	0.0	0	0.0
FP 8	0	0.0	0	0.0
1-ATCT	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
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 58	0	0.0	0	0.0

PV: PV Array 1 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Dunham Rd	0	0.0	0	0.0
E Middle St	0	0.0	0	0.0
IL-25 N-S	0	0.0	0	0.0
Railway 1	0	0.0	0	0.0
Railway 2	0	0.0	0	0.0
Railway 3	0	0.0	0	0.0
S Gilbert St	0	0.0	0	0.0
S Pointe Ave	0	0.0	0	0.0
Stearns Rd	0	0.0	0	0.0
FP 1	0	0.0	0	0.0
FP 2	0	0.0	0	0.0
FP 3	0	0.0	0	0.0
FP 4	0	0.0	0	0.0
FP 5	0	0.0	0	0.0
FP 6	0	0.0	0	0.0
FP 7	0	0.0	0	0.0
FP 8	0	0.0	0	0.0
1-ATCT	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
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0
OP 58	0	0.0	0	0.0

PV Array 1 and Route: Dunham Rd

No glare found

PV Array 1 and Route: E Middle St

No glare found

PV Array 1 and Route: IL-25 N-S

No glare found

PV Array 1 and Route: Railway 1

No glare found

PV Array 1 and Route: Railway 2

No glare found

PV Array 1 and Route: Railway 3

No glare found

PV Array 1 and Route: S Gilbert St

No glare found

PV Array 1 and Route: S Pointe Ave

No glare found

PV Array 1 and Route: Stearns Rd

No glare found

PV Array 1 and FP: FP 1

No glare found

PV Array 1 and FP: FP 2

No glare found

PV Array 1 and FP: FP 3

No glare found

PV Array 1 and FP: FP 4

No glare found

PV Array 1 and FP: FP 5

No glare found

PV Array 1 and FP: FP 6

No glare found

PV Array 1 and FP: FP 7

No glare found

PV Array 1 and FP: FP 8

No glare found

PV Array 1 and 1-ATCT

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 Array 1 and OP 7

No glare found

PV Array 1 and OP 8

No glare found

PV Array 1 and OP 9

No glare found

PV Array 1 and OP 10

No glare found

PV Array 1 and OP 11

No glare found

PV Array 1 and OP 12

No glare found

PV Array 1 and OP 13

No glare found

PV Array 1 and OP 14

No glare found

PV Array 1 and OP 15

No glare found

PV Array 1 and OP 16

No glare found

PV Array 1 and OP 17

No glare found

PV Array 1 and OP 18

No glare found

PV Array 1 and OP 19

No glare found

PV Array 1 and OP 20

No glare found

PV Array 1 and OP 21

No glare found

PV Array 1 and OP 22

No glare found

PV Array 1 and OP 23

No glare found

PV Array 1 and OP 24

No glare found

PV Array 1 and OP 25

No glare found

PV Array 1 and OP 26

No glare found

PV Array 1 and OP 27

No glare found

PV Array 1 and OP 28

No glare found

PV Array 1 and OP 29

No glare found

PV Array 1 and OP 30

No glare found

PV Array 1 and OP 31

No glare found

PV Array 1 and OP 32

No glare found

PV Array 1 and OP 33

No glare found

PV Array 1 and OP 34

No glare found

PV Array 1 and OP 35

No glare found

PV Array 1 and OP 36

No glare found

PV Array 1 and OP 37

No glare found

PV Array 1 and OP 38

No glare found

PV Array 1 and OP 39

No glare found

PV Array 1 and OP 40

No glare found

PV Array 1 and OP 41

No glare found

PV Array 1 and OP 42

No glare found

PV Array 1 and OP 43

No glare found

PV Array 1 and OP 44

No glare found

PV Array 1 and OP 45

No glare found

PV Array 1 and OP 46

No glare found

PV Array 1 and OP 47

No glare found

PV Array 1 and OP 48

No glare found

PV Array 1 and OP 49

No glare found

PV Array 1 and OP 50

No glare found

PV Array 1 and OP 51

No glare found

PV Array 1 and OP 52

No glare found

PV Array 1 and OP 53

No glare found

PV Array 1 and OP 54

No glare found

PV Array 1 and OP 55

No glare found

PV Array 1 and OP 56

No glare found

PV Array 1 and OP 57

No glare found

PV Array 1 and OP 58

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

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FORGESOLAR GLARE ANALYSIS

Project: **Tri-County Solar**

Site configuration: **Rev 02 - Scenario 2**

Site description: Scenario 2 - 3ft panel height and 8ft vehicle height

Created 10 Oct, 2025

Updated 10 Oct, 2025

Time-step 1 minute

Timezone offset UTC-6

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 5 MW to 10 MW

Site ID 161573.27066

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 No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV Array 1	SA tracking	SA tracking	0	0.0	0	0.0	-

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
Dunham Rd	0	0.0	0	0.0
E Middle St	0	0.0	0	0.0
IL-25 N-S	0	0.0	0	0.0
Railway 1	0	0.0	0	0.0
Railway 2	0	0.0	0	0.0
Railway 3	0	0.0	0	0.0
S Gilbert St	0	0.0	0	0.0
S Pointe Ave	0	0.0	0	0.0
Stearns Rd	0	0.0	0	0.0
FP 1	0	0.0	0	0.0
FP 2	0	0.0	0	0.0
FP 3	0	0.0	0	0.0
FP 4	0	0.0	0	0.0
FP 5	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
FP 6	0	0.0	0	0.0
FP 7	0	0.0	0	0.0
FP 8	0	0.0	0	0.0
1-ATCT	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
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0
OP 58	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV Array 1

Axis tracking: Single-axis rotation

Backtracking: Shade-slope

Tracking axis orientation: 180.0°

Max tracking angle: 60.0°

Resting angle: 6.0°

Ground Coverage Ratio: 0.4

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	41.984454	-88.273527	769.08	3.00	772.08
2	41.983485	-88.273528	766.62	3.00	769.62
3	41.982465	-88.273456	765.56	3.00	768.56
4	41.981773	-88.273312	765.24	3.00	768.24
5	41.981447	-88.273095	765.16	3.00	768.16
6	41.981445	-88.269664	761.14	3.00	764.14
7	41.981771	-88.269591	763.21	3.00	766.21
8	41.982414	-88.269589	769.54	3.00	772.54
9	41.983108	-88.270241	777.43	3.00	780.43
10	41.983435	-88.270893	779.25	3.00	782.25
11	41.983802	-88.271109	779.60	3.00	782.60
12	41.984128	-88.271254	779.44	3.00	782.44
13	41.984455	-88.271833	781.61	3.00	784.61

Route Receptors

Name: Dunham Rd

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



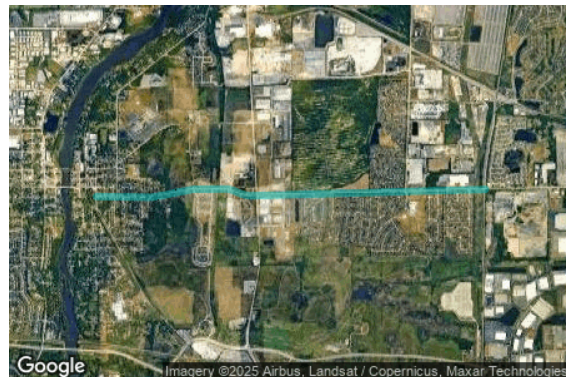
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.977800	-88.269093	742.15	8.00	750.15
2	41.975564	-88.267600	756.87	8.00	764.87
3	41.972868	-88.265454	755.29	8.00	763.29
4	41.969629	-88.263502	756.50	8.00	764.50
5	41.968704	-88.263180	742.30	8.00	750.30
6	41.968114	-88.263158	740.56	8.00	748.56
7	41.967125	-88.263309	752.45	8.00	760.45

Name: E Middle St

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



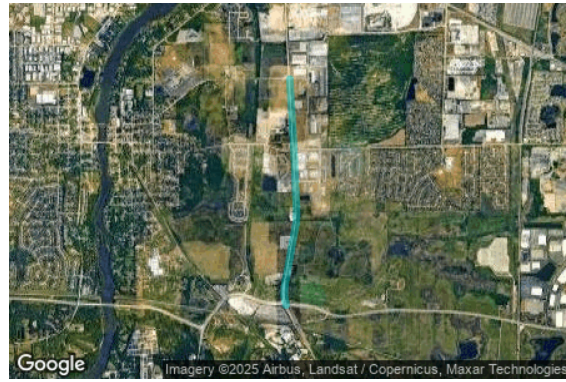
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.993396	-88.290122	735.00	8.00	743.00
2	41.993316	-88.282650	745.25	8.00	753.25
3	41.993547	-88.280805	741.41	8.00	749.41
4	41.993823	-88.279096	736.24	8.00	744.24
5	41.994134	-88.276767	743.08	8.00	751.08
6	41.994172	-88.272156	744.46	8.00	752.46
7	41.994028	-88.271416	743.43	8.00	751.43
8	41.993622	-88.270139	744.93	8.00	752.93
9	41.993470	-88.269119	751.69	8.00	759.69
10	41.994121	-88.236722	764.11	8.00	772.11

Name: IL-25 N-S

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



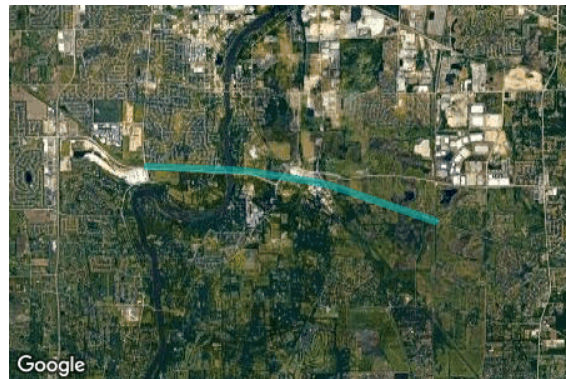
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.000820	-88.268570	759.42	8.00	767.42
2	41.993488	-88.267990	756.78	8.00	764.78
3	41.987105	-88.267628	757.22	8.00	765.22
4	41.986372	-88.267649	759.74	8.00	767.74
5	41.979687	-88.269275	751.93	8.00	759.93
6	41.978690	-88.269318	742.64	8.00	750.64
7	41.977795	-88.269087	742.15	8.00	750.15

Name: Railway 1

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



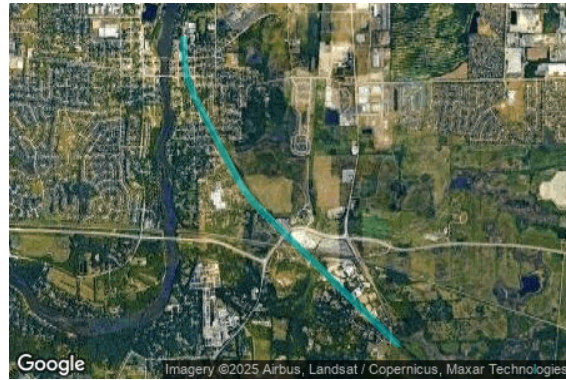
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.979232	-88.316262	755.21	15.00	770.21
2	41.978562	-88.294689	706.06	15.00	721.06
3	41.978418	-88.290054	724.87	15.00	739.87
4	41.978235	-88.288262	728.40	15.00	743.40
5	41.978035	-88.286535	723.15	15.00	738.15
6	41.977597	-88.283027	720.87	15.00	735.87
7	41.976257	-88.271826	735.80	15.00	750.80
8	41.975850	-88.268682	740.82	15.00	755.82
9	41.975427	-88.266332	744.01	15.00	759.01
10	41.974231	-88.261419	749.36	15.00	764.36
11	41.971088	-88.249045	760.11	15.00	775.11
12	41.968849	-88.240207	761.15	15.00	776.15
13	41.968083	-88.237139	762.57	15.00	777.57

Name: Railway 2

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	41.998064	-88.291800	731.02	15.00	746.02
2	41.995811	-88.291606	732.80	15.00	747.80
3	41.995002	-88.291461	733.27	15.00	748.27
4	41.994113	-88.291198	733.67	15.00	748.67
5	41.992431	-88.290361	732.96	15.00	747.96
6	41.990370	-88.288932	733.55	15.00	748.55
7	41.987391	-88.286840	735.31	15.00	750.31
8	41.983714	-88.284249	737.96	15.00	752.96
9	41.982607	-88.283289	738.39	15.00	753.39
10	41.981606	-88.282232	740.13	15.00	755.13
11	41.980510	-88.280859	743.47	15.00	758.47
12	41.978344	-88.277860	748.05	15.00	763.05
13	41.975805	-88.274386	749.77	15.00	764.77
14	41.974230	-88.272192	744.57	15.00	759.57
15	41.972806	-88.270288	744.34	15.00	759.34
16	41.970948	-88.267680	745.23	15.00	760.23
17	41.967091	-88.262405	745.68	15.00	760.68

Name: Railway 3

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



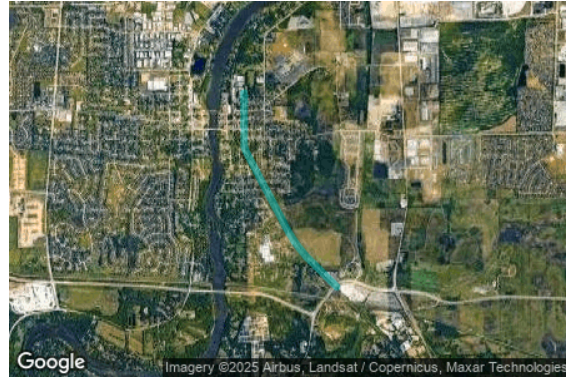
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.001700	-88.235437	770.58	15.00	785.58
2	41.995336	-88.236821	763.02	15.00	778.02
3	41.991022	-88.236831	765.79	15.00	780.79
4	41.985326	-88.236943	765.33	15.00	780.33
5	41.978451	-88.236976	769.38	15.00	784.38
6	41.971706	-88.237029	770.35	15.00	785.35
7	41.966789	-88.237165	771.10	15.00	786.10

Name: S Gilbert St

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	41.978322	-88.277403	733.89	8.00	741.89
2	41.981356	-88.281545	724.85	8.00	732.85
3	41.982550	-88.282867	728.90	8.00	736.90
4	41.983846	-88.283989	746.55	8.00	754.55
5	41.985999	-88.285513	740.07	8.00	748.07
6	41.989123	-88.287769	734.41	8.00	742.41
7	41.992101	-88.289867	731.19	8.00	739.19
8	41.992632	-88.290107	719.85	8.00	727.85
9	41.998035	-88.290101	729.78	8.00	737.78

Name: S Pointe Ave

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



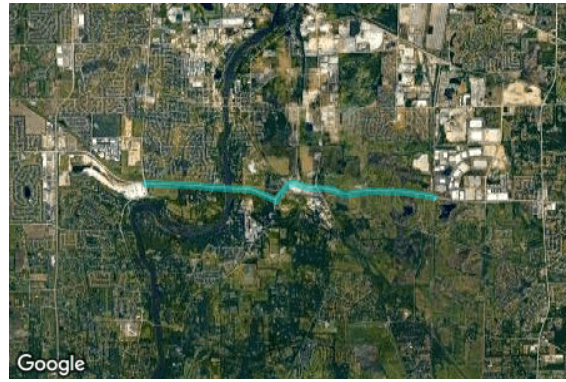
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.994154	-88.274178	746.80	8.00	754.80
2	41.991469	-88.274384	737.08	8.00	745.08
3	41.990951	-88.274545	730.77	8.00	738.77
4	41.990600	-88.274513	730.68	8.00	738.68
5	41.990377	-88.274470	736.91	8.00	744.91
6	41.987035	-88.274706	734.49	8.00	742.49
7	41.986820	-88.274781	735.08	8.00	743.08
8	41.986629	-88.275082	734.20	8.00	742.20
9	41.986589	-88.275618	734.03	8.00	742.03
10	41.986660	-88.276133	730.60	8.00	738.60
11	41.986884	-88.276337	730.32	8.00	738.32
12	41.987195	-88.276412	730.65	8.00	738.65
13	41.987968	-88.276305	730.70	8.00	738.70
14	41.988223	-88.276090	730.74	8.00	738.74
15	41.988327	-88.275682	732.16	8.00	740.16
16	41.990393	-88.275586	730.51	8.00	738.51
17	41.990672	-88.275843	730.53	8.00	738.53
18	41.990887	-88.276144	730.87	8.00	738.87
19	41.991248	-88.276144	745.41	8.00	753.41
20	41.991575	-88.276112	735.45	8.00	743.45
21	41.992038	-88.276240	735.56	8.00	743.56
22	41.993050	-88.276090	732.36	8.00	740.36
23	41.993887	-88.276702	739.84	8.00	747.84
24	41.994175	-88.276777	743.37	8.00	751.37

Name: Stearns Rd

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	41.978734	-88.316331	741.95	8.00	749.95
2	41.978279	-88.302459	729.60	8.00	737.60
3	41.977976	-88.298887	734.04	8.00	742.04
4	41.977483	-88.287600	701.83	8.00	709.83
5	41.977092	-88.285938	703.60	8.00	711.60
6	41.975274	-88.280401	726.52	8.00	734.52
7	41.976119	-88.279796	723.49	8.00	731.49
8	41.978512	-88.277157	737.31	8.00	745.31
9	41.978842	-88.275926	754.49	8.00	762.49
10	41.978667	-88.274553	755.25	8.00	763.25
11	41.978045	-88.272321	736.26	8.00	744.26
12	41.977849	-88.270219	742.77	8.00	750.77
13	41.977625	-88.265691	751.58	8.00	759.58
14	41.976924	-88.263288	760.38	8.00	768.38
15	41.976589	-88.261976	762.81	8.00	770.81
16	41.976589	-88.260367	764.54	8.00	772.54
17	41.977195	-88.254509	771.00	8.00	779.00
18	41.977195	-88.252793	766.48	8.00	774.48
19	41.976987	-88.245132	761.07	8.00	769.07
20	41.976496	-88.240946	762.77	8.00	770.77
21	41.975933	-88.237021	770.85	8.00	778.85

Flight Path Receptors

Name: FP 1

Description:

Threshold height: 50 ft

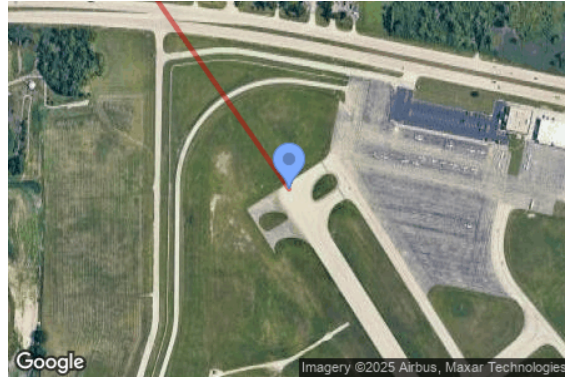
Direction: 145.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.919178	-88.245694	756.36	50.00	806.36
Two-mile	41.942862	-88.268007	773.62	586.16	1359.78

Name: FP 2

Description:

Threshold height: 50 ft

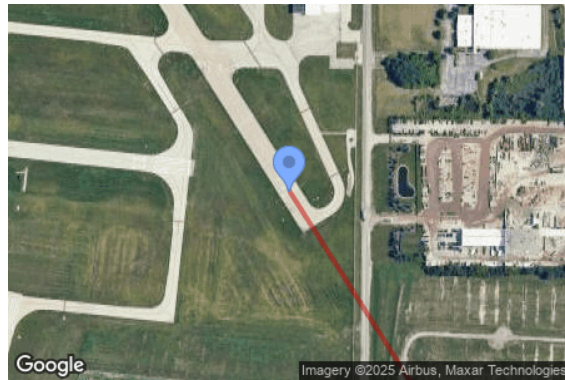
Direction: 327.5°

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	41.911818	-88.239432	755.05	50.00	805.05
Two-mile	41.887422	-88.218556	773.90	584.59	1358.48

Name: FP 3

Description:

Threshold height: 50 ft

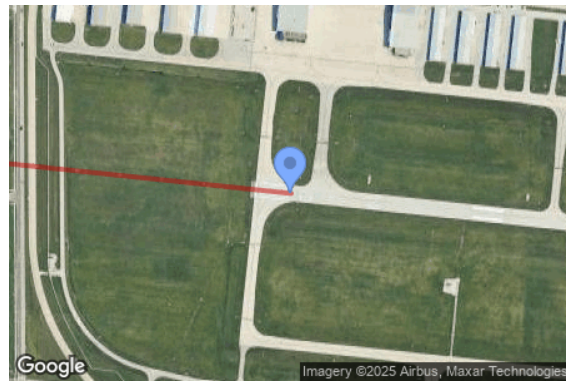
Direction: 96.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.913441	-88.257884	752.75	50.00	802.75
Two-mile	41.916458	-88.296570	728.15	628.02	1356.17

Name: FP 4

Description:

Threshold height: 50 ft

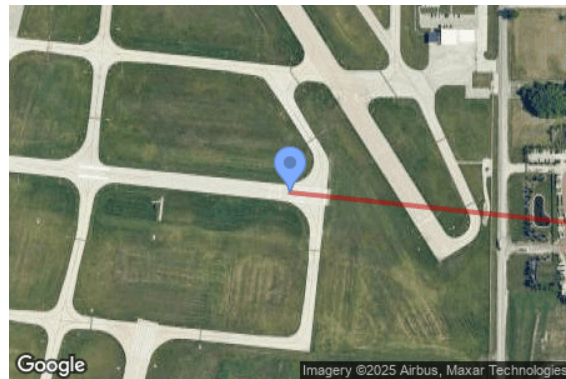
Direction: 276.1°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.912185	-88.241763	753.51	50.00	803.51
Two-mile	41.909097	-88.203088	770.34	586.60	1356.94

Name: FP 5

Description:

Threshold height: 50 ft

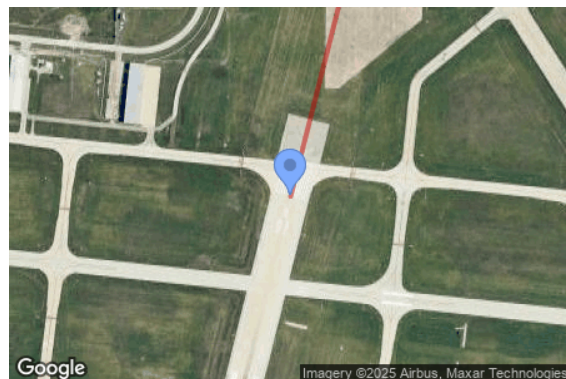
Direction: 194.2°

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	41.913752	-88.246971	754.65	50.00	804.65
Two-mile	41.941776	-88.237403	764.59	593.49	1358.08

Name: FP 6

Description:

Threshold height: 50 ft

Direction: 13.9°

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	41.894493	-88.253408	750.10	50.00	800.10
Two-mile	41.866421	-88.262717	752.80	600.73	1353.53

Name: FP 7

Description:

Threshold height: 50 ft

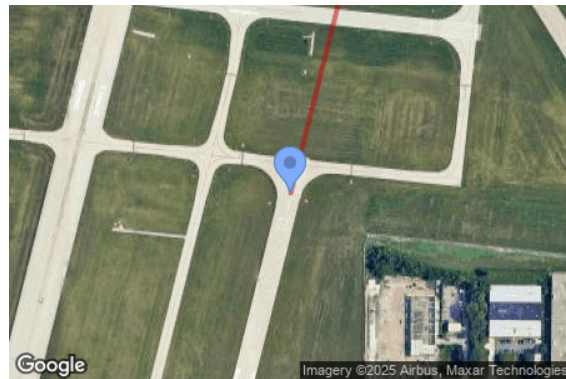
Direction: 194.1°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.910073	-88.244350	757.68	50.00	807.68
Two-mile	41.938112	-88.234861	759.43	601.67	1361.11

Name: FP 8

Description:

Threshold height: 50 ft

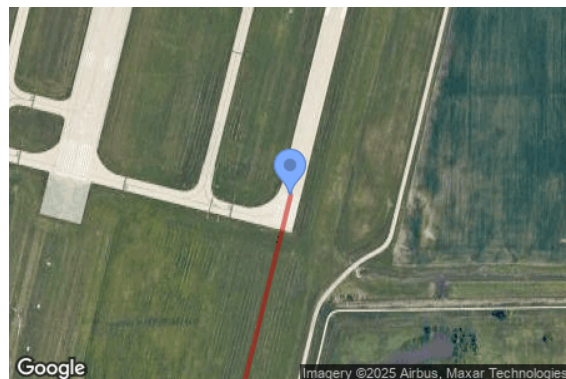
Direction: 13.9°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



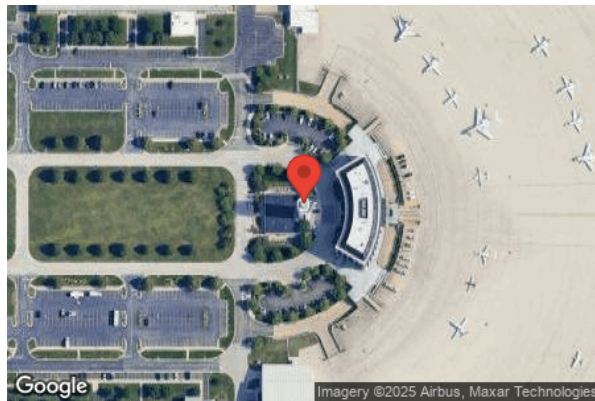
Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.893816	-88.249780	747.86	50.00	797.86
Two-mile	41.865755	-88.259148	752.03	599.26	1351.29

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
1-ATCT	1	41.906833	-88.255524	757.94	105.00
OP 2	2	42.036580	-88.326480	832.45	500.00
OP 3	3	41.981185	-88.268470	762.27	16.00
OP 4	4	41.983959	-88.268598	756.38	16.00
OP 5	5	41.984666	-88.268480	756.93	16.00
OP 6	6	41.986725	-88.268321	761.81	16.00
OP 7	7	41.988597	-88.264375	751.89	16.00
OP 8	8	41.990983	-88.266862	764.54	16.00
OP 9	9	41.989406	-88.269757	738.79	16.00
OP 10	10	41.986751	-88.274518	732.87	16.00
OP 11	11	41.986382	-88.275591	740.73	16.00
OP 12	12	41.986823	-88.276613	730.59	16.00
OP 13	13	41.988179	-88.274350	750.61	16.00
OP 14	14	41.990074	-88.274196	731.01	16.00
OP 15	15	41.992212	-88.274045	738.71	16.00
OP 16	16	41.993893	-88.273915	746.32	16.00
OP 17	17	41.980570	-88.274448	751.85	16.00
OP 18	18	41.979632	-88.278451	741.62	16.00
OP 19	19	41.979224	-88.277903	741.82	16.00
OP 20	20	41.979730	-88.277580	740.51	16.00
OP 21	21	41.979501	-88.276552	754.60	16.00
OP 22	22	41.974505	-88.268802	742.68	16.00
OP 23	23	41.978363	-88.256675	761.59	16.00
OP 24	24	41.980066	-88.254380	757.35	16.00
OP 25	25	41.976394	-88.265589	766.84	16.00
OP 26	26	41.976518	-88.264382	771.43	16.00
OP 27	27	41.974784	-88.265117	762.69	16.00
OP 28	28	41.972592	-88.270965	744.51	16.00
OP 29	29	41.973545	-88.272827	737.20	16.00
OP 30	30	41.973555	-88.280218	724.92	16.00
OP 31	31	41.977195	-88.274512	735.80	16.00
OP 32	32	41.982338	-88.283674	736.82	16.00
OP 33	33	41.980749	-88.269929	749.38	16.00
OP 34	34	41.989706	-88.261809	764.59	16.00
OP 35	35	41.988753	-88.260699	764.66	16.00
OP 36	36	41.988890	-88.258196	767.62	16.00
OP 37	37	41.988590	-88.255584	765.51	16.00
OP 38	38	41.988283	-88.253447	767.88	16.00
OP 39	39	41.987739	-88.252564	771.00	16.00
OP 40	40	41.987499	-88.251919	771.49	16.00
OP 41	41	41.987549	-88.248974	773.92	16.00
OP 42	42	41.987601	-88.246032	763.52	16.00
OP 43	43	41.987870	-88.242872	765.51	16.00
OP 44	44	41.987704	-88.239442	758.52	16.00
OP 45	45	41.984521	-88.236170	768.92	16.00
OP 46	46	41.982689	-88.236199	771.10	16.00
OP 47	47	41.981803	-88.234647	771.64	16.00
OP 48	48	41.979155	-88.234531	776.23	16.00
OP 49	49	41.977265	-88.239042	766.56	16.00
OP 50	50	41.984616	-88.285527	734.54	16.00
OP 51	51	41.985604	-88.286045	733.53	16.00

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 52	52	41.987670	-88.283466	735.17	16.00
OP 53	53	41.980295	-88.282847	719.85	16.00
OP 54	54	41.983403	-88.285283	741.60	16.00
OP 55	55	41.990332	-88.284079	747.10	16.00
OP 56	56	41.981744	-88.286841	712.01	16.00
OP 57	57	41.982893	-88.240992	768.10	16.00
OP 58	58	41.982410	-88.241019	767.29	16.00

Map image of 1-ATCT



Glare Analysis Results

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV Array 1	SA tracking	SA tracking	0	0.0	0	0.0	-

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
Dunham Rd	0	0.0	0	0.0
E Middle St	0	0.0	0	0.0
IL-25 N-S	0	0.0	0	0.0
Railway 1	0	0.0	0	0.0
Railway 2	0	0.0	0	0.0
Railway 3	0	0.0	0	0.0
S Gilbert St	0	0.0	0	0.0
S Pointe Ave	0	0.0	0	0.0
Stearns Rd	0	0.0	0	0.0
FP 1	0	0.0	0	0.0
FP 2	0	0.0	0	0.0
FP 3	0	0.0	0	0.0
FP 4	0	0.0	0	0.0
FP 5	0	0.0	0	0.0
FP 6	0	0.0	0	0.0
FP 7	0	0.0	0	0.0
FP 8	0	0.0	0	0.0
1-ATCT	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
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 58	0	0.0	0	0.0

PV: PV Array 1 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Dunham Rd	0	0.0	0	0.0
E Middle St	0	0.0	0	0.0
IL-25 N-S	0	0.0	0	0.0
Railway 1	0	0.0	0	0.0
Railway 2	0	0.0	0	0.0
Railway 3	0	0.0	0	0.0
S Gilbert St	0	0.0	0	0.0
S Pointe Ave	0	0.0	0	0.0
Stearns Rd	0	0.0	0	0.0
FP 1	0	0.0	0	0.0
FP 2	0	0.0	0	0.0
FP 3	0	0.0	0	0.0
FP 4	0	0.0	0	0.0
FP 5	0	0.0	0	0.0
FP 6	0	0.0	0	0.0
FP 7	0	0.0	0	0.0
FP 8	0	0.0	0	0.0
1-ATCT	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
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0
OP 58	0	0.0	0	0.0

PV Array 1 and Route: Dunham Rd

No glare found

PV Array 1 and Route: E Middle St

No glare found

PV Array 1 and Route: IL-25 N-S

No glare found

PV Array 1 and Route: Railway 1

No glare found

PV Array 1 and Route: Railway 2

No glare found

PV Array 1 and Route: Railway 3

No glare found

PV Array 1 and Route: S Gilbert St

No glare found

PV Array 1 and Route: S Pointe Ave

No glare found

PV Array 1 and Route: Stearns Rd

No glare found

PV Array 1 and FP: FP 1

No glare found

PV Array 1 and FP: FP 2

No glare found

PV Array 1 and FP: FP 3

No glare found

PV Array 1 and FP: FP 4

No glare found

PV Array 1 and FP: FP 5

No glare found

PV Array 1 and FP: FP 6

No glare found

PV Array 1 and FP: FP 7

No glare found

PV Array 1 and FP: FP 8

No glare found

PV Array 1 and 1-ATCT

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 Array 1 and OP 7

No glare found

PV Array 1 and OP 8

No glare found

PV Array 1 and OP 9

No glare found

PV Array 1 and OP 10

No glare found

PV Array 1 and OP 11

No glare found

PV Array 1 and OP 12

No glare found

PV Array 1 and OP 13

No glare found

PV Array 1 and OP 14

No glare found

PV Array 1 and OP 15

No glare found

PV Array 1 and OP 16

No glare found

PV Array 1 and OP 17

No glare found

PV Array 1 and OP 18

No glare found

PV Array 1 and OP 19

No glare found

PV Array 1 and OP 20

No glare found

PV Array 1 and OP 21

No glare found

PV Array 1 and OP 22

No glare found

PV Array 1 and OP 23

No glare found

PV Array 1 and OP 24

No glare found

PV Array 1 and OP 25

No glare found

PV Array 1 and OP 26

No glare found

PV Array 1 and OP 27

No glare found

PV Array 1 and OP 28

No glare found

PV Array 1 and OP 29

No glare found

PV Array 1 and OP 30

No glare found

PV Array 1 and OP 31

No glare found

PV Array 1 and OP 32

No glare found

PV Array 1 and OP 33

No glare found

PV Array 1 and OP 34

No glare found

PV Array 1 and OP 35

No glare found

PV Array 1 and OP 36

No glare found

PV Array 1 and OP 37

No glare found

PV Array 1 and OP 38

No glare found

PV Array 1 and OP 39

No glare found

PV Array 1 and OP 40

No glare found

PV Array 1 and OP 41

No glare found

PV Array 1 and OP 42

No glare found

PV Array 1 and OP 43

No glare found

PV Array 1 and OP 44

No glare found

PV Array 1 and OP 45

No glare found

PV Array 1 and OP 46

No glare found

PV Array 1 and OP 47

No glare found

PV Array 1 and OP 48

No glare found

PV Array 1 and OP 49

No glare found

PV Array 1 and OP 50

No glare found

PV Array 1 and OP 51

No glare found

PV Array 1 and OP 52

No glare found

PV Array 1 and OP 53

No glare found

PV Array 1 and OP 54

No glare found

PV Array 1 and OP 55

No glare found

PV Array 1 and OP 56

No glare found

PV Array 1 and OP 57

No glare found

PV Array 1 and OP 58

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

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FORGESOLAR GLARE ANALYSIS

Project: **Tri-County Solar**

Site configuration: **Rev 02 - Scenario 3**

Site description: Scenario 3 - 9ft panel height and 4ft vehicle height

Created 10 Oct, 2025

Updated 10 Oct, 2025

Time-step 1 minute

Timezone offset UTC-6

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 5 MW to 10 MW

Site ID 161574.27066

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 No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV Array 1	SA tracking	SA tracking	0	0.0	0	0.0	-

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
Dunham Rd	0	0.0	0	0.0
E Middle St	0	0.0	0	0.0
IL-25 N-S	0	0.0	0	0.0
Railway 1	0	0.0	0	0.0
Railway 2	0	0.0	0	0.0
Railway 3	0	0.0	0	0.0
S Gilbert St	0	0.0	0	0.0
S Pointe Ave	0	0.0	0	0.0
Stearns Rd	0	0.0	0	0.0
FP 1	0	0.0	0	0.0
FP 2	0	0.0	0	0.0
FP 3	0	0.0	0	0.0
FP 4	0	0.0	0	0.0
FP 5	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
FP 6	0	0.0	0	0.0
FP 7	0	0.0	0	0.0
FP 8	0	0.0	0	0.0
1-ATCT	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
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0
OP 58	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV Array 1

Axis tracking: Single-axis rotation

Backtracking: Shade-slope

Tracking axis orientation: 180.0°

Max tracking angle: 60.0°

Resting angle: 6.0°

Ground Coverage Ratio: 0.4

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	41.984454	-88.273527	769.08	9.00	778.08
2	41.983485	-88.273528	766.62	9.00	775.62
3	41.982465	-88.273456	765.56	9.00	774.56
4	41.981773	-88.273312	765.24	9.00	774.24
5	41.981447	-88.273095	765.16	9.00	774.16
6	41.981445	-88.269664	761.14	9.00	770.14
7	41.981771	-88.269591	763.21	9.00	772.21
8	41.982414	-88.269589	769.54	9.00	778.54
9	41.983108	-88.270241	777.43	9.00	786.43
10	41.983435	-88.270893	779.25	9.00	788.25
11	41.983802	-88.271109	779.60	9.00	788.60
12	41.984128	-88.271254	779.44	9.00	788.44
13	41.984455	-88.271833	781.61	9.00	790.61

Route Receptors

Name: Dunham Rd

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



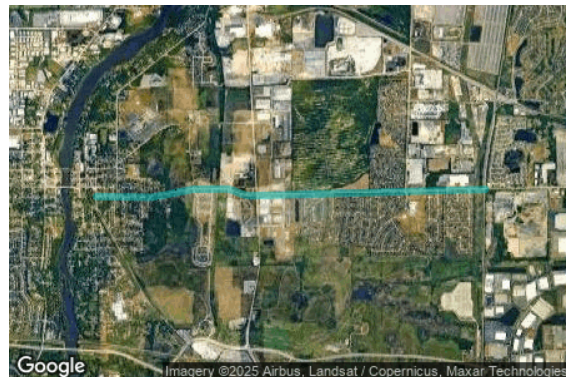
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.977800	-88.269093	742.15	4.00	746.15
2	41.975564	-88.267600	756.87	4.00	760.87
3	41.972868	-88.265454	755.29	4.00	759.29
4	41.969629	-88.263502	756.50	4.00	760.50
5	41.968704	-88.263180	742.30	4.00	746.30
6	41.968114	-88.263158	740.56	4.00	744.56
7	41.967125	-88.263309	752.45	4.00	756.45

Name: E Middle St

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



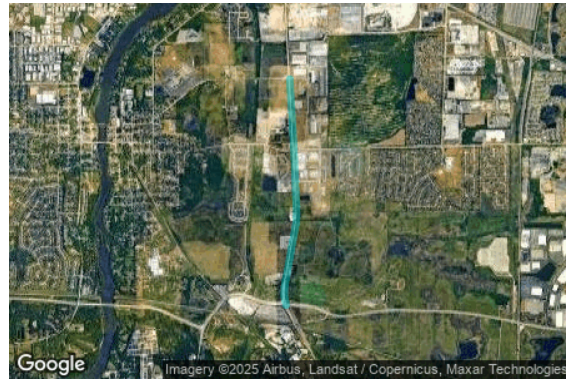
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.993396	-88.290122	735.00	4.00	739.00
2	41.993316	-88.282650	745.25	4.00	749.25
3	41.993547	-88.280805	741.41	4.00	745.41
4	41.993823	-88.279096	736.24	4.00	740.24
5	41.994134	-88.276767	743.08	4.00	747.08
6	41.994172	-88.272156	744.46	4.00	748.46
7	41.994028	-88.271416	743.43	4.00	747.43
8	41.993622	-88.270139	744.93	4.00	748.93
9	41.993470	-88.269119	751.69	4.00	755.69
10	41.994121	-88.236722	764.11	4.00	768.11

Name: IL-25 N-S

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



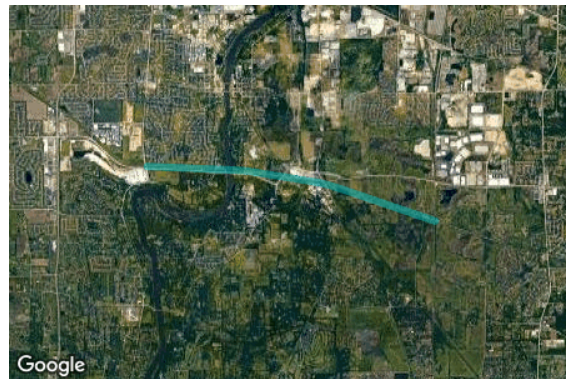
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.000820	-88.268570	759.42	4.00	763.42
2	41.993488	-88.267990	756.78	4.00	760.78
3	41.987105	-88.267628	757.22	4.00	761.22
4	41.986372	-88.267649	759.74	4.00	763.74
5	41.979687	-88.269275	751.93	4.00	755.93
6	41.978690	-88.269318	742.64	4.00	746.64
7	41.977795	-88.269087	742.15	4.00	746.15

Name: Railway 1

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



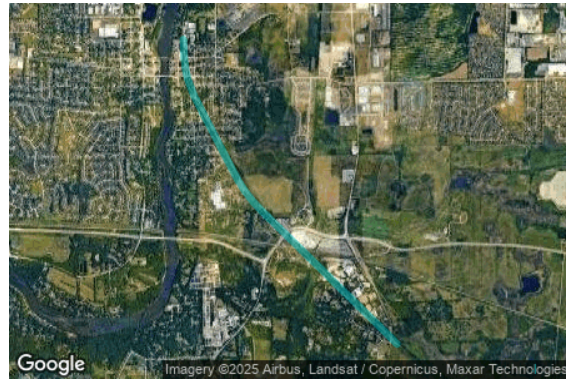
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.979232	-88.316262	755.21	15.00	770.21
2	41.978562	-88.294689	706.06	15.00	721.06
3	41.978418	-88.290054	724.87	15.00	739.87
4	41.978235	-88.288262	728.40	15.00	743.40
5	41.978035	-88.286535	723.15	15.00	738.15
6	41.977597	-88.283027	720.87	15.00	735.87
7	41.976257	-88.271826	735.80	15.00	750.80
8	41.975850	-88.268682	740.82	15.00	755.82
9	41.975427	-88.266332	744.01	15.00	759.01
10	41.974231	-88.261419	749.36	15.00	764.36
11	41.971088	-88.249045	760.11	15.00	775.11
12	41.968849	-88.240207	761.15	15.00	776.15
13	41.968083	-88.237139	762.57	15.00	777.57

Name: Railway 2

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	41.998064	-88.291800	731.02	15.00	746.02
2	41.995811	-88.291606	732.80	15.00	747.80
3	41.995002	-88.291461	733.27	15.00	748.27
4	41.994113	-88.291198	733.67	15.00	748.67
5	41.992431	-88.290361	732.96	15.00	747.96
6	41.990370	-88.288932	733.55	15.00	748.55
7	41.987391	-88.286840	735.31	15.00	750.31
8	41.983714	-88.284249	737.96	15.00	752.96
9	41.982607	-88.283289	738.39	15.00	753.39
10	41.981606	-88.282232	740.13	15.00	755.13
11	41.980510	-88.280859	743.47	15.00	758.47
12	41.978344	-88.277860	748.05	15.00	763.05
13	41.975805	-88.274386	749.77	15.00	764.77
14	41.974230	-88.272192	744.57	15.00	759.57
15	41.972806	-88.270288	744.34	15.00	759.34
16	41.970948	-88.267680	745.23	15.00	760.23
17	41.967091	-88.262405	745.68	15.00	760.68

Name: Railway 3

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



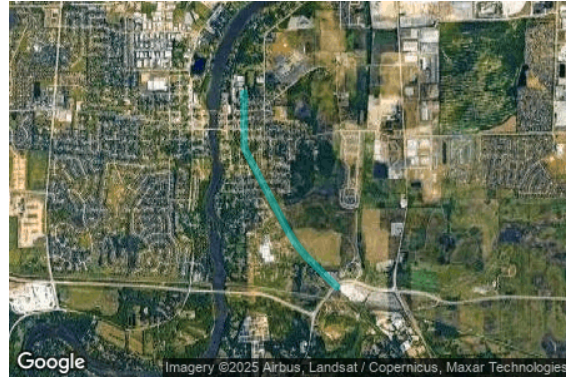
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.001700	-88.235437	770.58	15.00	785.58
2	41.995336	-88.236821	763.02	15.00	778.02
3	41.991022	-88.236831	765.79	15.00	780.79
4	41.985326	-88.236943	765.33	15.00	780.33
5	41.978451	-88.236976	769.38	15.00	784.38
6	41.971706	-88.237029	770.35	15.00	785.35
7	41.966789	-88.237165	771.10	15.00	786.10

Name: S Gilbert St

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	41.978322	-88.277403	733.89	4.00	737.89
2	41.981356	-88.281545	724.85	4.00	728.85
3	41.982550	-88.282867	728.90	4.00	732.90
4	41.983846	-88.283989	746.55	4.00	750.55
5	41.985999	-88.285513	740.07	4.00	744.07
6	41.989123	-88.287769	734.41	4.00	738.41
7	41.992101	-88.289867	731.19	4.00	735.19
8	41.992632	-88.290107	719.85	4.00	723.85
9	41.998035	-88.290101	729.78	4.00	733.78

Name: S Pointe Ave

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



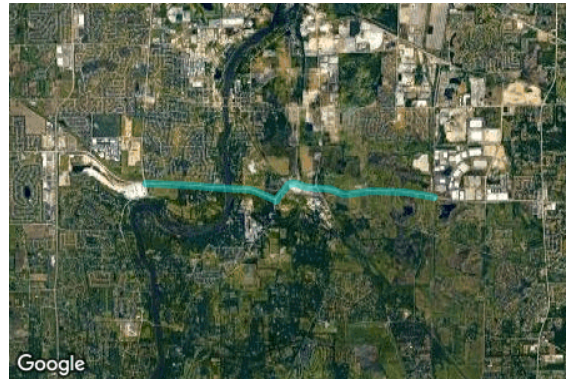
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.994154	-88.274178	746.80	4.00	750.80
2	41.991469	-88.274384	737.08	4.00	741.08
3	41.990951	-88.274545	730.77	4.00	734.77
4	41.990600	-88.274513	730.68	4.00	734.68
5	41.990377	-88.274470	736.91	4.00	740.91
6	41.987035	-88.274706	734.49	4.00	738.49
7	41.986820	-88.274781	735.08	4.00	739.08
8	41.986629	-88.275082	734.20	4.00	738.20
9	41.986589	-88.275618	734.03	4.00	738.03
10	41.986660	-88.276133	730.60	4.00	734.60
11	41.986884	-88.276337	730.32	4.00	734.32
12	41.987195	-88.276412	730.65	4.00	734.65
13	41.987968	-88.276305	730.70	4.00	734.70
14	41.988223	-88.276090	730.74	4.00	734.74
15	41.988327	-88.275682	732.16	4.00	736.16
16	41.990393	-88.275586	730.51	4.00	734.51
17	41.990672	-88.275843	730.53	4.00	734.53
18	41.990887	-88.276144	730.87	4.00	734.87
19	41.991248	-88.276144	745.41	4.00	749.41
20	41.991575	-88.276112	735.45	4.00	739.45
21	41.992038	-88.276240	735.56	4.00	739.56
22	41.993050	-88.276090	732.36	4.00	736.36
23	41.993887	-88.276702	739.84	4.00	743.84
24	41.994175	-88.276777	743.37	4.00	747.37

Name: Stearns Rd

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	41.978734	-88.316331	741.95	4.00	745.95
2	41.978279	-88.302459	729.60	4.00	733.60
3	41.977976	-88.298887	734.04	4.00	738.04
4	41.977483	-88.287600	701.83	4.00	705.83
5	41.977092	-88.285938	703.60	4.00	707.60
6	41.975274	-88.280401	726.52	4.00	730.52
7	41.976119	-88.279796	723.49	4.00	727.49
8	41.978512	-88.277157	737.31	4.00	741.31
9	41.978842	-88.275926	754.49	4.00	758.49
10	41.978667	-88.274553	755.25	4.00	759.25
11	41.978045	-88.272321	736.26	4.00	740.26
12	41.977849	-88.270219	742.77	4.00	746.77
13	41.977625	-88.265691	751.58	4.00	755.58
14	41.976924	-88.263288	760.38	4.00	764.38
15	41.976589	-88.261976	762.81	4.00	766.81
16	41.976589	-88.260367	764.54	4.00	768.54
17	41.977195	-88.254509	771.00	4.00	775.00
18	41.977195	-88.252793	766.48	4.00	770.48
19	41.976987	-88.245132	761.07	4.00	765.07
20	41.976496	-88.240946	762.77	4.00	766.77
21	41.975933	-88.237021	770.85	4.00	774.85

Flight Path Receptors

Name: FP 1

Description:

Threshold height: 50 ft

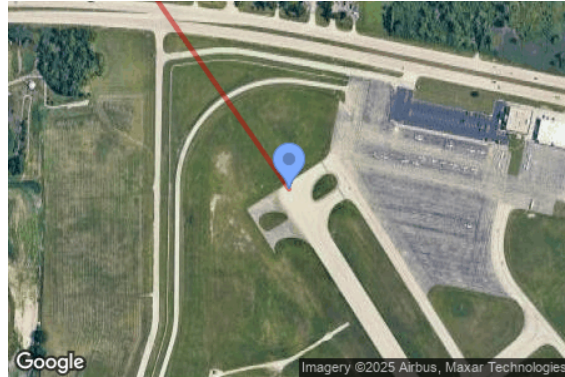
Direction: 145.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.919178	-88.245694	756.36	50.00	806.36
Two-mile	41.942862	-88.268007	773.62	586.16	1359.78

Name: FP 2

Description:

Threshold height: 50 ft

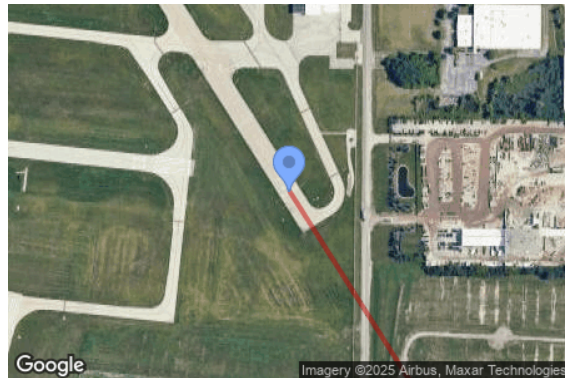
Direction: 327.5°

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	41.911818	-88.239432	755.05	50.00	805.05
Two-mile	41.887422	-88.218556	773.90	584.59	1358.48

Name: FP 3

Description:

Threshold height: 50 ft

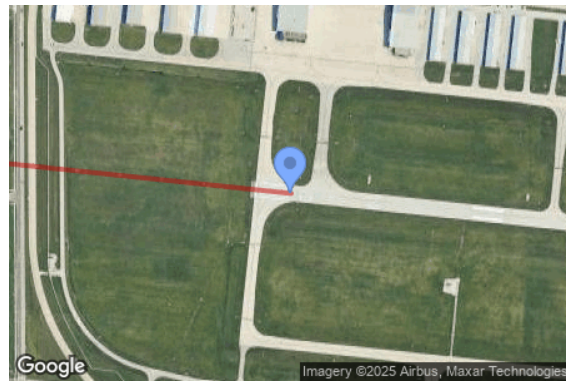
Direction: 96.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.913441	-88.257884	752.75	50.00	802.75
Two-mile	41.916458	-88.296570	728.15	628.02	1356.17

Name: FP 4

Description:

Threshold height: 50 ft

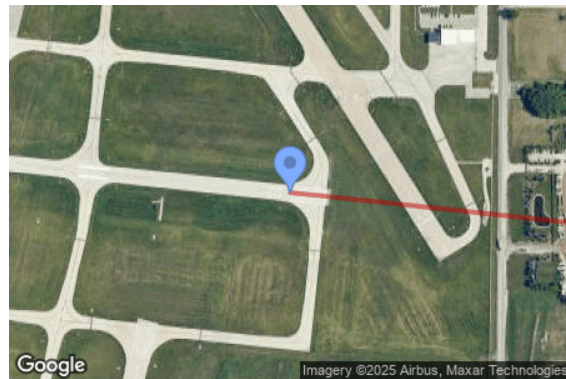
Direction: 276.1°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.912185	-88.241763	753.51	50.00	803.51
Two-mile	41.909097	-88.203088	770.34	586.60	1356.94

Name: FP 5

Description:

Threshold height: 50 ft

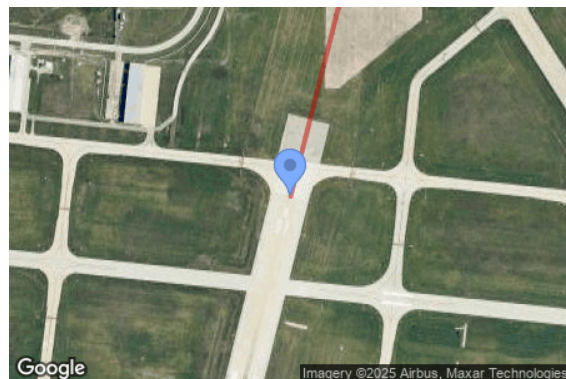
Direction: 194.2°

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	41.913752	-88.246971	754.65	50.00	804.65
Two-mile	41.941776	-88.237403	764.59	593.49	1358.08

Name: FP 6

Description:

Threshold height: 50 ft

Direction: 13.9°

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	41.894493	-88.253408	750.10	50.00	800.10
Two-mile	41.866421	-88.262717	752.80	600.73	1353.53

Name: FP 7

Description:

Threshold height: 50 ft

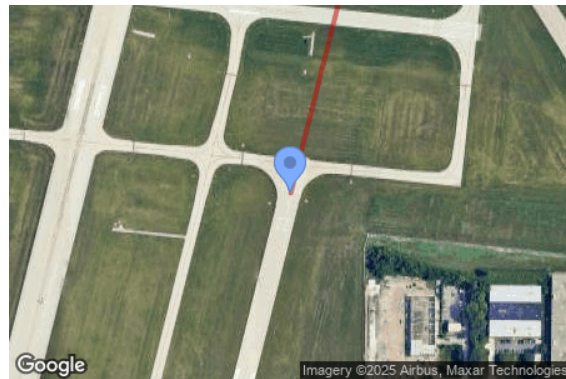
Direction: 194.1°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.910073	-88.244350	757.68	50.00	807.68
Two-mile	41.938112	-88.234861	759.43	601.67	1361.11

Name: FP 8

Description:

Threshold height: 50 ft

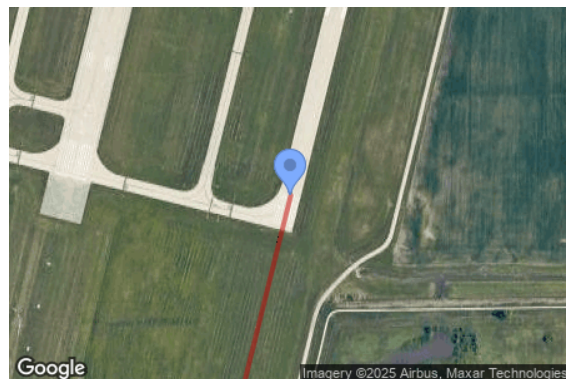
Direction: 13.9°

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	41.893816	-88.249780	747.86	50.00	797.86
Two-mile	41.865755	-88.259148	752.03	599.26	1351.29

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
1-ATCT	1	41.906833	-88.255524	757.94	105.00
OP 2	2	42.036580	-88.326480	832.45	500.00
OP 3	3	41.981185	-88.268470	762.27	16.00
OP 4	4	41.983959	-88.268598	756.38	16.00
OP 5	5	41.984666	-88.268480	756.93	16.00
OP 6	6	41.986725	-88.268321	761.81	16.00
OP 7	7	41.988597	-88.264375	751.89	16.00
OP 8	8	41.990983	-88.266862	764.54	16.00
OP 9	9	41.989406	-88.269757	738.79	16.00
OP 10	10	41.986751	-88.274518	732.87	16.00
OP 11	11	41.986382	-88.275591	740.73	16.00
OP 12	12	41.986823	-88.276613	730.59	16.00
OP 13	13	41.988179	-88.274350	750.61	16.00
OP 14	14	41.990074	-88.274196	731.01	16.00
OP 15	15	41.992212	-88.274045	738.71	16.00
OP 16	16	41.993893	-88.273915	746.32	16.00
OP 17	17	41.980570	-88.274448	751.85	16.00
OP 18	18	41.979632	-88.278451	741.62	16.00
OP 19	19	41.979224	-88.277903	741.82	16.00
OP 20	20	41.979730	-88.277580	740.51	16.00
OP 21	21	41.979501	-88.276552	754.60	16.00
OP 22	22	41.974505	-88.268802	742.68	16.00
OP 23	23	41.978363	-88.256675	761.59	16.00
OP 24	24	41.980066	-88.254380	757.35	16.00
OP 25	25	41.976394	-88.265589	766.84	16.00
OP 26	26	41.976518	-88.264382	771.43	16.00
OP 27	27	41.974784	-88.265117	762.69	16.00
OP 28	28	41.972592	-88.270965	744.51	16.00
OP 29	29	41.973545	-88.272827	737.20	16.00
OP 30	30	41.973555	-88.280218	724.92	16.00
OP 31	31	41.977195	-88.274512	735.80	16.00
OP 32	32	41.982338	-88.283674	736.82	16.00
OP 33	33	41.980749	-88.269929	749.38	16.00
OP 34	34	41.989706	-88.261809	764.59	16.00
OP 35	35	41.988753	-88.260699	764.66	16.00
OP 36	36	41.988890	-88.258196	767.62	16.00
OP 37	37	41.988590	-88.255584	765.51	16.00
OP 38	38	41.988283	-88.253447	767.88	16.00
OP 39	39	41.987739	-88.252564	771.00	16.00
OP 40	40	41.987499	-88.251919	771.49	16.00
OP 41	41	41.987549	-88.248974	773.92	16.00
OP 42	42	41.987601	-88.246032	763.52	16.00
OP 43	43	41.987870	-88.242872	765.51	16.00
OP 44	44	41.987704	-88.239442	758.52	16.00
OP 45	45	41.984521	-88.236170	768.92	16.00
OP 46	46	41.982689	-88.236199	771.10	16.00
OP 47	47	41.981803	-88.234647	771.64	16.00
OP 48	48	41.979155	-88.234531	776.23	16.00
OP 49	49	41.977265	-88.239042	766.56	16.00
OP 50	50	41.984616	-88.285527	734.54	16.00
OP 51	51	41.985604	-88.286045	733.53	16.00

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 52	52	41.987670	-88.283466	735.17	16.00
OP 53	53	41.980295	-88.282847	719.85	16.00
OP 54	54	41.983403	-88.285283	741.60	16.00
OP 55	55	41.990332	-88.284079	747.10	16.00
OP 56	56	41.981744	-88.286841	712.01	16.00
OP 57	57	41.982893	-88.240992	768.10	16.00
OP 58	58	41.982410	-88.241019	767.29	16.00

Map image of 1-ATCT



Glare Analysis Results

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV Array 1	SA tracking	SA tracking	0	0.0	0	0.0	-

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
Dunham Rd	0	0.0	0	0.0
E Middle St	0	0.0	0	0.0
IL-25 N-S	0	0.0	0	0.0
Railway 1	0	0.0	0	0.0
Railway 2	0	0.0	0	0.0
Railway 3	0	0.0	0	0.0
S Gilbert St	0	0.0	0	0.0
S Pointe Ave	0	0.0	0	0.0
Stearns Rd	0	0.0	0	0.0
FP 1	0	0.0	0	0.0
FP 2	0	0.0	0	0.0
FP 3	0	0.0	0	0.0
FP 4	0	0.0	0	0.0
FP 5	0	0.0	0	0.0
FP 6	0	0.0	0	0.0
FP 7	0	0.0	0	0.0
FP 8	0	0.0	0	0.0
1-ATCT	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
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 58	0	0.0	0	0.0

PV: PV Array 1 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Dunham Rd	0	0.0	0	0.0
E Middle St	0	0.0	0	0.0
IL-25 N-S	0	0.0	0	0.0
Railway 1	0	0.0	0	0.0
Railway 2	0	0.0	0	0.0
Railway 3	0	0.0	0	0.0
S Gilbert St	0	0.0	0	0.0
S Pointe Ave	0	0.0	0	0.0
Stearns Rd	0	0.0	0	0.0
FP 1	0	0.0	0	0.0
FP 2	0	0.0	0	0.0
FP 3	0	0.0	0	0.0
FP 4	0	0.0	0	0.0
FP 5	0	0.0	0	0.0
FP 6	0	0.0	0	0.0
FP 7	0	0.0	0	0.0
FP 8	0	0.0	0	0.0
1-ATCT	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
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0
OP 58	0	0.0	0	0.0

PV Array 1 and Route: Dunham Rd

No glare found

PV Array 1 and Route: E Middle St

No glare found

PV Array 1 and Route: IL-25 N-S

No glare found

PV Array 1 and Route: Railway 1

No glare found

PV Array 1 and Route: Railway 2

No glare found

PV Array 1 and Route: Railway 3

No glare found

PV Array 1 and Route: S Gilbert St

No glare found

PV Array 1 and Route: S Pointe Ave

No glare found

PV Array 1 and Route: Stearns Rd

No glare found

PV Array 1 and FP: FP 1

No glare found

PV Array 1 and FP: FP 2

No glare found

PV Array 1 and FP: FP 3

No glare found

PV Array 1 and FP: FP 4

No glare found

PV Array 1 and FP: FP 5

No glare found

PV Array 1 and FP: FP 6

No glare found

PV Array 1 and FP: FP 7

No glare found

PV Array 1 and FP: FP 8

No glare found

PV Array 1 and 1-ATCT

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 Array 1 and OP 7

No glare found

PV Array 1 and OP 8

No glare found

PV Array 1 and OP 9

No glare found

PV Array 1 and OP 10

No glare found

PV Array 1 and OP 11

No glare found

PV Array 1 and OP 12

No glare found

PV Array 1 and OP 13

No glare found

PV Array 1 and OP 14

No glare found

PV Array 1 and OP 15

No glare found

PV Array 1 and OP 16

No glare found

PV Array 1 and OP 17

No glare found

PV Array 1 and OP 18

No glare found

PV Array 1 and OP 19

No glare found

PV Array 1 and OP 20

No glare found

PV Array 1 and OP 21

No glare found

PV Array 1 and OP 22

No glare found

PV Array 1 and OP 23

No glare found

PV Array 1 and OP 24

No glare found

PV Array 1 and OP 25

No glare found

PV Array 1 and OP 26

No glare found

PV Array 1 and OP 27

No glare found

PV Array 1 and OP 28

No glare found

PV Array 1 and OP 29

No glare found

PV Array 1 and OP 30

No glare found

PV Array 1 and OP 31

No glare found

PV Array 1 and OP 32

No glare found

PV Array 1 and OP 33

No glare found

PV Array 1 and OP 34

No glare found

PV Array 1 and OP 35

No glare found

PV Array 1 and OP 36

No glare found

PV Array 1 and OP 37

No glare found

PV Array 1 and OP 38

No glare found

PV Array 1 and OP 39

No glare found

PV Array 1 and OP 40

No glare found

PV Array 1 and OP 41

No glare found

PV Array 1 and OP 42

No glare found

PV Array 1 and OP 43

No glare found

PV Array 1 and OP 44

No glare found

PV Array 1 and OP 45

No glare found

PV Array 1 and OP 46

No glare found

PV Array 1 and OP 47

No glare found

PV Array 1 and OP 48

No glare found

PV Array 1 and OP 49

No glare found

PV Array 1 and OP 50

No glare found

PV Array 1 and OP 51

No glare found

PV Array 1 and OP 52

No glare found

PV Array 1 and OP 53

No glare found

PV Array 1 and OP 54

No glare found

PV Array 1 and OP 55

No glare found

PV Array 1 and OP 56

No glare found

PV Array 1 and OP 57

No glare found

PV Array 1 and OP 58

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

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FORGESOLAR GLARE ANALYSIS

Project: **Tri-County Solar**

Site configuration: **Rev 02 - Scenario 4**

Site description: Scenario 4 - 9ft panel height and 8ft vehicle height

Created 10 Oct, 2025

Updated 10 Oct, 2025

Time-step 1 minute

Timezone offset UTC-6

Minimum sun altitude 0.0 deg

DNI peaks at 1,000.0 W/m²

Category 5 MW to 10 MW

Site ID 161575.27066

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 No glare predicted

PV Array	Tilt °	Orient °	Annual Green Glare		Annual Yellow Glare		Energy
			min	hr	min	hr	kWh
PV Array 1	SA tracking	SA tracking	0	0.0	0	0.0	-

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
Dunham Rd	0	0.0	0	0.0
E Middle St	0	0.0	0	0.0
IL-25 N-S	0	0.0	0	0.0
Railway 1	0	0.0	0	0.0
Railway 2	0	0.0	0	0.0
Railway 3	0	0.0	0	0.0
S Gilbert St	0	0.0	0	0.0
S Pointe Ave	0	0.0	0	0.0
Stearns Rd	0	0.0	0	0.0
FP 1	0	0.0	0	0.0
FP 2	0	0.0	0	0.0
FP 3	0	0.0	0	0.0
FP 4	0	0.0	0	0.0
FP 5	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
FP 6	0	0.0	0	0.0
FP 7	0	0.0	0	0.0
FP 8	0	0.0	0	0.0
1-ATCT	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
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0
OP 58	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV Array 1

Axis tracking: Single-axis rotation

Backtracking: Shade-slope

Tracking axis orientation: 180.0°

Max tracking angle: 60.0°

Resting angle: 6.0°

Ground Coverage Ratio: 0.4

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	41.984454	-88.273527	769.08	9.00	778.08
2	41.983485	-88.273528	766.62	9.00	775.62
3	41.982465	-88.273456	765.56	9.00	774.56
4	41.981773	-88.273312	765.24	9.00	774.24
5	41.981447	-88.273095	765.16	9.00	774.16
6	41.981445	-88.269664	761.14	9.00	770.14
7	41.981771	-88.269591	763.21	9.00	772.21
8	41.982414	-88.269589	769.54	9.00	778.54
9	41.983108	-88.270241	777.43	9.00	786.43
10	41.983435	-88.270893	779.25	9.00	788.25
11	41.983802	-88.271109	779.60	9.00	788.60
12	41.984128	-88.271254	779.44	9.00	788.44
13	41.984455	-88.271833	781.61	9.00	790.61

Route Receptors

Name: Dunham Rd

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



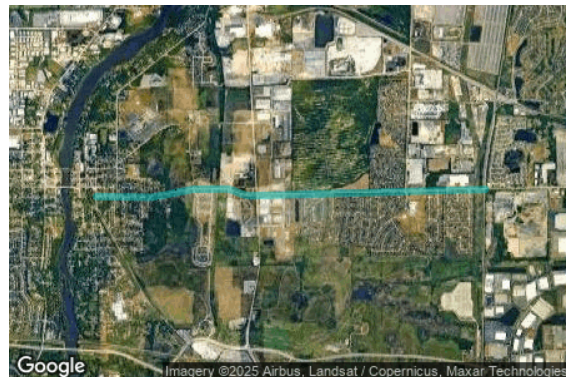
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.977800	-88.269093	742.15	8.00	750.15
2	41.975564	-88.267600	756.87	8.00	764.87
3	41.972868	-88.265454	755.29	8.00	763.29
4	41.969629	-88.263502	756.50	8.00	764.50
5	41.968704	-88.263180	742.30	8.00	750.30
6	41.968114	-88.263158	740.56	8.00	748.56
7	41.967125	-88.263309	752.45	8.00	760.45

Name: E Middle St

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



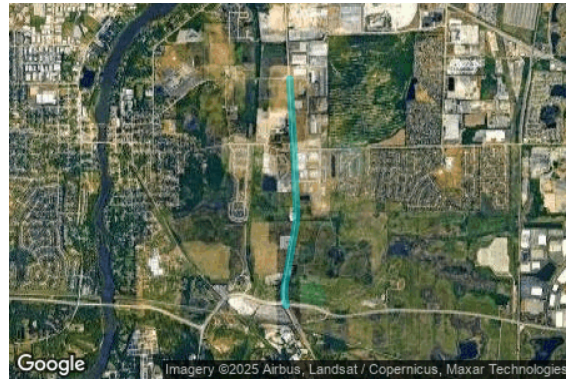
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.993396	-88.290122	735.00	8.00	743.00
2	41.993316	-88.282650	745.25	8.00	753.25
3	41.993547	-88.280805	741.41	8.00	749.41
4	41.993823	-88.279096	736.24	8.00	744.24
5	41.994134	-88.276767	743.08	8.00	751.08
6	41.994172	-88.272156	744.46	8.00	752.46
7	41.994028	-88.271416	743.43	8.00	751.43
8	41.993622	-88.270139	744.93	8.00	752.93
9	41.993470	-88.269119	751.69	8.00	759.69
10	41.994121	-88.236722	764.11	8.00	772.11

Name: IL-25 N-S

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



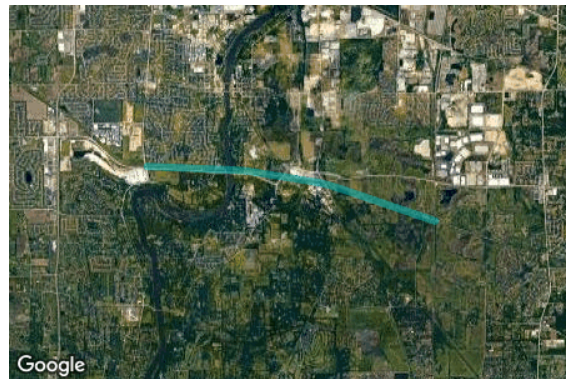
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.000820	-88.268570	759.42	8.00	767.42
2	41.993488	-88.267990	756.78	8.00	764.78
3	41.987105	-88.267628	757.22	8.00	765.22
4	41.986372	-88.267649	759.74	8.00	767.74
5	41.979687	-88.269275	751.93	8.00	759.93
6	41.978690	-88.269318	742.64	8.00	750.64
7	41.977795	-88.269087	742.15	8.00	750.15

Name: Railway 1

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



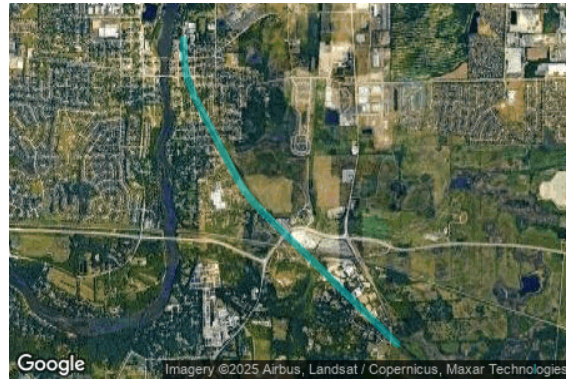
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.979232	-88.316262	755.21	15.00	770.21
2	41.978562	-88.294689	706.06	15.00	721.06
3	41.978418	-88.290054	724.87	15.00	739.87
4	41.978235	-88.288262	728.40	15.00	743.40
5	41.978035	-88.286535	723.15	15.00	738.15
6	41.977597	-88.283027	720.87	15.00	735.87
7	41.976257	-88.271826	735.80	15.00	750.80
8	41.975850	-88.268682	740.82	15.00	755.82
9	41.975427	-88.266332	744.01	15.00	759.01
10	41.974231	-88.261419	749.36	15.00	764.36
11	41.971088	-88.249045	760.11	15.00	775.11
12	41.968849	-88.240207	761.15	15.00	776.15
13	41.968083	-88.237139	762.57	15.00	777.57

Name: Railway 2

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	41.998064	-88.291800	731.02	15.00	746.02
2	41.995811	-88.291606	732.80	15.00	747.80
3	41.995002	-88.291461	733.27	15.00	748.27
4	41.994113	-88.291198	733.67	15.00	748.67
5	41.992431	-88.290361	732.96	15.00	747.96
6	41.990370	-88.288932	733.55	15.00	748.55
7	41.987391	-88.286840	735.31	15.00	750.31
8	41.983714	-88.284249	737.96	15.00	752.96
9	41.982607	-88.283289	738.39	15.00	753.39
10	41.981606	-88.282232	740.13	15.00	755.13
11	41.980510	-88.280859	743.47	15.00	758.47
12	41.978344	-88.277860	748.05	15.00	763.05
13	41.975805	-88.274386	749.77	15.00	764.77
14	41.974230	-88.272192	744.57	15.00	759.57
15	41.972806	-88.270288	744.34	15.00	759.34
16	41.970948	-88.267680	745.23	15.00	760.23
17	41.967091	-88.262405	745.68	15.00	760.68

Name: Railway 3

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



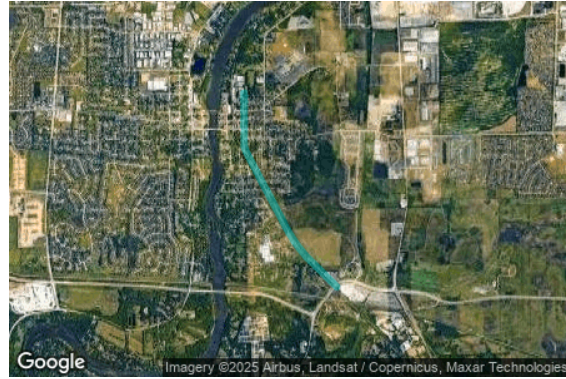
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.001700	-88.235437	770.58	15.00	785.58
2	41.995336	-88.236821	763.02	15.00	778.02
3	41.991022	-88.236831	765.79	15.00	780.79
4	41.985326	-88.236943	765.33	15.00	780.33
5	41.978451	-88.236976	769.38	15.00	784.38
6	41.971706	-88.237029	770.35	15.00	785.35
7	41.966789	-88.237165	771.10	15.00	786.10

Name: S Gilbert St

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	41.978322	-88.277403	733.89	8.00	741.89
2	41.981356	-88.281545	724.85	8.00	732.85
3	41.982550	-88.282867	728.90	8.00	736.90
4	41.983846	-88.283989	746.55	8.00	754.55
5	41.985999	-88.285513	740.07	8.00	748.07
6	41.989123	-88.287769	734.41	8.00	742.41
7	41.992101	-88.289867	731.19	8.00	739.19
8	41.992632	-88.290107	719.85	8.00	727.85
9	41.998035	-88.290101	729.78	8.00	737.78

Name: S Pointe Ave

Path type: Two-way

Azimuthal view angle: 50.0°

Downward view angle: 90.0°



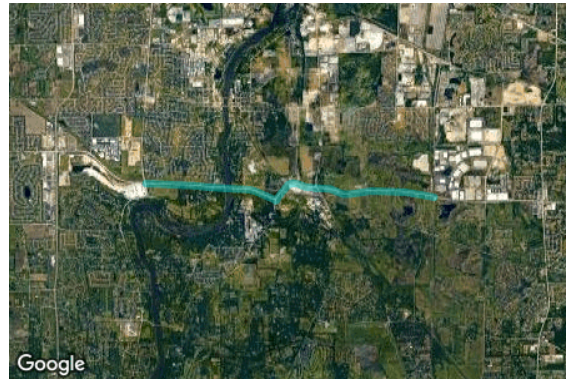
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	41.994154	-88.274178	746.80	8.00	754.80
2	41.991469	-88.274384	737.08	8.00	745.08
3	41.990951	-88.274545	730.77	8.00	738.77
4	41.990600	-88.274513	730.68	8.00	738.68
5	41.990377	-88.274470	736.91	8.00	744.91
6	41.987035	-88.274706	734.49	8.00	742.49
7	41.986820	-88.274781	735.08	8.00	743.08
8	41.986629	-88.275082	734.20	8.00	742.20
9	41.986589	-88.275618	734.03	8.00	742.03
10	41.986660	-88.276133	730.60	8.00	738.60
11	41.986884	-88.276337	730.32	8.00	738.32
12	41.987195	-88.276412	730.65	8.00	738.65
13	41.987968	-88.276305	730.70	8.00	738.70
14	41.988223	-88.276090	730.74	8.00	738.74
15	41.988327	-88.275682	732.16	8.00	740.16
16	41.990393	-88.275586	730.51	8.00	738.51
17	41.990672	-88.275843	730.53	8.00	738.53
18	41.990887	-88.276144	730.87	8.00	738.87
19	41.991248	-88.276144	745.41	8.00	753.41
20	41.991575	-88.276112	735.45	8.00	743.45
21	41.992038	-88.276240	735.56	8.00	743.56
22	41.993050	-88.276090	732.36	8.00	740.36
23	41.993887	-88.276702	739.84	8.00	747.84
24	41.994175	-88.276777	743.37	8.00	751.37

Name: Stearns Rd

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	41.978734	-88.316331	741.95	8.00	749.95
2	41.978279	-88.302459	729.60	8.00	737.60
3	41.977976	-88.298887	734.04	8.00	742.04
4	41.977483	-88.287600	701.83	8.00	709.83
5	41.977092	-88.285938	703.60	8.00	711.60
6	41.975274	-88.280401	726.52	8.00	734.52
7	41.976119	-88.279796	723.49	8.00	731.49
8	41.978512	-88.277157	737.31	8.00	745.31
9	41.978842	-88.275926	754.49	8.00	762.49
10	41.978667	-88.274553	755.25	8.00	763.25
11	41.978045	-88.272321	736.26	8.00	744.26
12	41.977849	-88.270219	742.77	8.00	750.77
13	41.977625	-88.265691	751.58	8.00	759.58
14	41.976924	-88.263288	760.38	8.00	768.38
15	41.976589	-88.261976	762.81	8.00	770.81
16	41.976589	-88.260367	764.54	8.00	772.54
17	41.977195	-88.254509	771.00	8.00	779.00
18	41.977195	-88.252793	766.48	8.00	774.48
19	41.976987	-88.245132	761.07	8.00	769.07
20	41.976496	-88.240946	762.77	8.00	770.77
21	41.975933	-88.237021	770.85	8.00	778.85

Flight Path Receptors

Name: FP 1

Description:

Threshold height: 50 ft

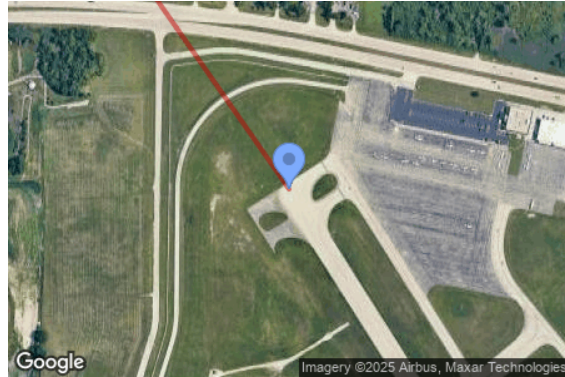
Direction: 145.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.919178	-88.245694	756.36	50.00	806.36
Two-mile	41.942862	-88.268007	773.62	586.16	1359.78

Name: FP 2

Description:

Threshold height: 50 ft

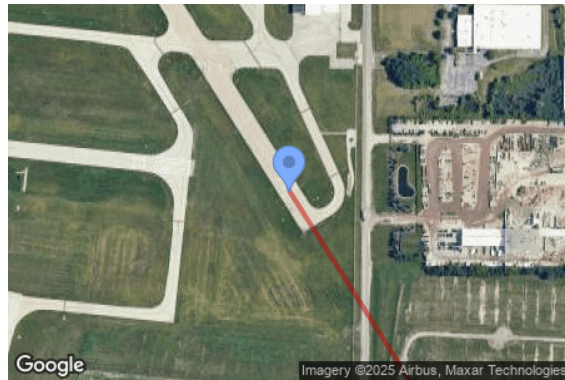
Direction: 327.5°

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	41.911818	-88.239432	755.05	50.00	805.05
Two-mile	41.887422	-88.218556	773.90	584.59	1358.48

Name: FP 3

Description:

Threshold height: 50 ft

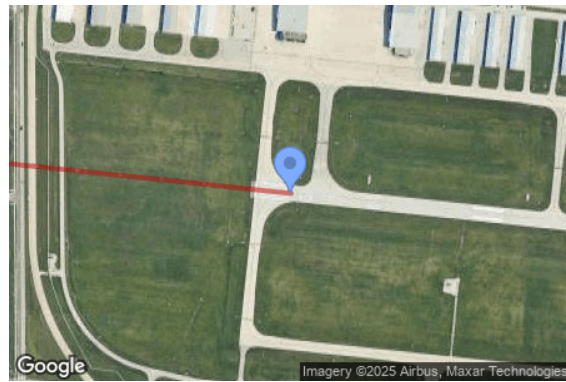
Direction: 96.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.913441	-88.257884	752.75	50.00	802.75
Two-mile	41.916458	-88.296570	728.15	628.02	1356.17

Name: FP 4

Description:

Threshold height: 50 ft

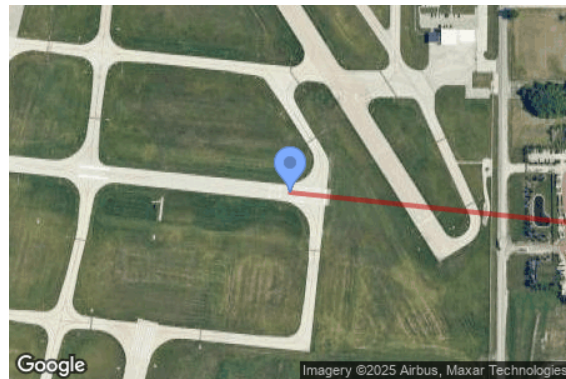
Direction: 276.1°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.912185	-88.241763	753.51	50.00	803.51
Two-mile	41.909097	-88.203088	770.34	586.60	1356.94

Name: FP 5

Description:

Threshold height: 50 ft

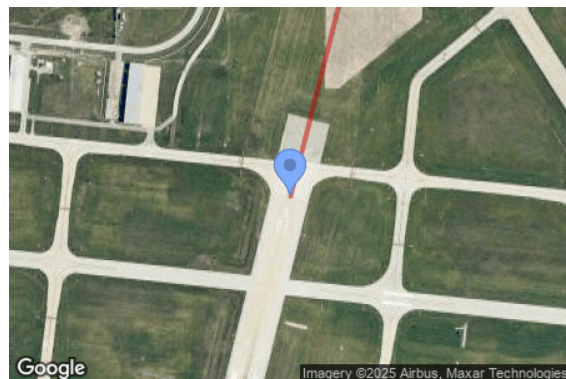
Direction: 194.2°

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	41.913752	-88.246971	754.65	50.00	804.65
Two-mile	41.941776	-88.237403	764.59	593.49	1358.08

Name: FP 6

Description:

Threshold height: 50 ft

Direction: 13.9°

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	41.894493	-88.253408	750.10	50.00	800.10
Two-mile	41.866421	-88.262717	752.80	600.73	1353.53

Name: FP 7

Description:

Threshold height: 50 ft

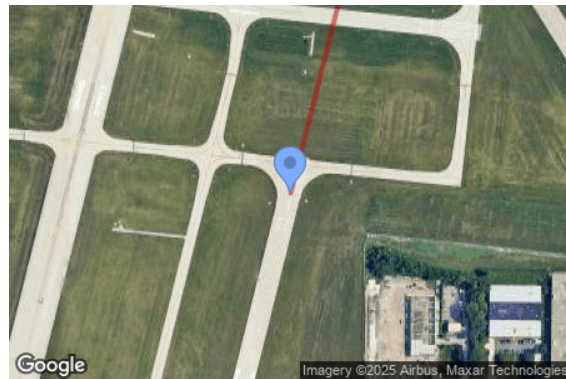
Direction: 194.1°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	41.910073	-88.244350	757.68	50.00	807.68
Two-mile	41.938112	-88.234861	759.43	601.67	1361.11

Name: FP 8

Description:

Threshold height: 50 ft

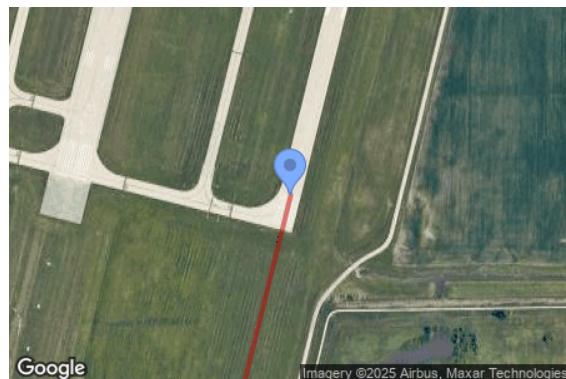
Direction: 13.9°

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	41.893816	-88.249780	747.86	50.00	797.86
Two-mile	41.865755	-88.259148	752.03	599.26	1351.29

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
1-ATCT	1	41.906833	-88.255524	757.94	105.00
OP 2	2	42.036580	-88.326480	832.45	500.00
OP 3	3	41.981185	-88.268470	762.27	16.00
OP 4	4	41.983959	-88.268598	756.38	16.00
OP 5	5	41.984666	-88.268480	756.93	16.00
OP 6	6	41.986725	-88.268321	761.81	16.00
OP 7	7	41.988597	-88.264375	751.89	16.00
OP 8	8	41.990983	-88.266862	764.54	16.00
OP 9	9	41.989406	-88.269757	738.79	16.00
OP 10	10	41.986751	-88.274518	732.87	16.00
OP 11	11	41.986382	-88.275591	740.73	16.00
OP 12	12	41.986823	-88.276613	730.59	16.00
OP 13	13	41.988179	-88.274350	750.61	16.00
OP 14	14	41.990074	-88.274196	731.01	16.00
OP 15	15	41.992212	-88.274045	738.71	16.00
OP 16	16	41.993893	-88.273915	746.32	16.00
OP 17	17	41.980570	-88.274448	751.85	16.00
OP 18	18	41.979632	-88.278451	741.62	16.00
OP 19	19	41.979224	-88.277903	741.82	16.00
OP 20	20	41.979730	-88.277580	740.51	16.00
OP 21	21	41.979501	-88.276552	754.60	16.00
OP 22	22	41.974505	-88.268802	742.68	16.00
OP 23	23	41.978363	-88.256675	761.59	16.00
OP 24	24	41.980066	-88.254380	757.35	16.00
OP 25	25	41.976394	-88.265589	766.84	16.00
OP 26	26	41.976518	-88.264382	771.43	16.00
OP 27	27	41.974784	-88.265117	762.69	16.00
OP 28	28	41.972592	-88.270965	744.51	16.00
OP 29	29	41.973545	-88.272827	737.20	16.00
OP 30	30	41.973555	-88.280218	724.92	16.00
OP 31	31	41.977195	-88.274512	735.80	16.00
OP 32	32	41.982338	-88.283674	736.82	16.00
OP 33	33	41.980749	-88.269929	749.38	16.00
OP 34	34	41.989706	-88.261809	764.59	16.00
OP 35	35	41.988753	-88.260699	764.66	16.00
OP 36	36	41.988890	-88.258196	767.62	16.00
OP 37	37	41.988590	-88.255584	765.51	16.00
OP 38	38	41.988283	-88.253447	767.88	16.00
OP 39	39	41.987739	-88.252564	771.00	16.00
OP 40	40	41.987499	-88.251919	771.49	16.00
OP 41	41	41.987549	-88.248974	773.92	16.00
OP 42	42	41.987601	-88.246032	763.52	16.00
OP 43	43	41.987870	-88.242872	765.51	16.00
OP 44	44	41.987704	-88.239442	758.52	16.00
OP 45	45	41.984521	-88.236170	768.92	16.00
OP 46	46	41.982689	-88.236199	771.10	16.00
OP 47	47	41.981803	-88.234647	771.64	16.00
OP 48	48	41.979155	-88.234531	776.23	16.00
OP 49	49	41.977265	-88.239042	766.56	16.00
OP 50	50	41.984616	-88.285527	734.54	16.00
OP 51	51	41.985604	-88.286045	733.53	16.00

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 52	52	41.987670	-88.283466	735.17	16.00
OP 53	53	41.980295	-88.282847	719.85	16.00
OP 54	54	41.983403	-88.285283	741.60	16.00
OP 55	55	41.990332	-88.284079	747.10	16.00
OP 56	56	41.981744	-88.286841	712.01	16.00
OP 57	57	41.982893	-88.240992	768.10	16.00
OP 58	58	41.982410	-88.241019	767.29	16.00

Map image of 1-ATCT



Glare Analysis Results

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV Array 1	SA tracking	SA tracking	0	0.0	0	0.0	-

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
Dunham Rd	0	0.0	0	0.0
E Middle St	0	0.0	0	0.0
IL-25 N-S	0	0.0	0	0.0
Railway 1	0	0.0	0	0.0
Railway 2	0	0.0	0	0.0
Railway 3	0	0.0	0	0.0
S Gilbert St	0	0.0	0	0.0
S Pointe Ave	0	0.0	0	0.0
Stearns Rd	0	0.0	0	0.0
FP 1	0	0.0	0	0.0
FP 2	0	0.0	0	0.0
FP 3	0	0.0	0	0.0
FP 4	0	0.0	0	0.0
FP 5	0	0.0	0	0.0
FP 6	0	0.0	0	0.0
FP 7	0	0.0	0	0.0
FP 8	0	0.0	0	0.0
1-ATCT	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
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 58	0	0.0	0	0.0

PV: PV Array 1 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Dunham Rd	0	0.0	0	0.0
E Middle St	0	0.0	0	0.0
IL-25 N-S	0	0.0	0	0.0
Railway 1	0	0.0	0	0.0
Railway 2	0	0.0	0	0.0
Railway 3	0	0.0	0	0.0
S Gilbert St	0	0.0	0	0.0
S Pointe Ave	0	0.0	0	0.0
Stearns Rd	0	0.0	0	0.0
FP 1	0	0.0	0	0.0
FP 2	0	0.0	0	0.0
FP 3	0	0.0	0	0.0
FP 4	0	0.0	0	0.0
FP 5	0	0.0	0	0.0
FP 6	0	0.0	0	0.0
FP 7	0	0.0	0	0.0
FP 8	0	0.0	0	0.0
1-ATCT	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
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 21	0	0.0	0	0.0
OP 22	0	0.0	0	0.0
OP 23	0	0.0	0	0.0
OP 24	0	0.0	0	0.0
OP 25	0	0.0	0	0.0
OP 26	0	0.0	0	0.0
OP 27	0	0.0	0	0.0
OP 28	0	0.0	0	0.0
OP 29	0	0.0	0	0.0
OP 30	0	0.0	0	0.0
OP 31	0	0.0	0	0.0
OP 32	0	0.0	0	0.0
OP 33	0	0.0	0	0.0
OP 34	0	0.0	0	0.0
OP 35	0	0.0	0	0.0
OP 36	0	0.0	0	0.0
OP 37	0	0.0	0	0.0
OP 38	0	0.0	0	0.0
OP 39	0	0.0	0	0.0
OP 40	0	0.0	0	0.0
OP 41	0	0.0	0	0.0
OP 42	0	0.0	0	0.0
OP 43	0	0.0	0	0.0
OP 44	0	0.0	0	0.0
OP 45	0	0.0	0	0.0
OP 46	0	0.0	0	0.0
OP 47	0	0.0	0	0.0
OP 48	0	0.0	0	0.0
OP 49	0	0.0	0	0.0
OP 50	0	0.0	0	0.0
OP 51	0	0.0	0	0.0
OP 52	0	0.0	0	0.0
OP 53	0	0.0	0	0.0
OP 54	0	0.0	0	0.0
OP 55	0	0.0	0	0.0
OP 56	0	0.0	0	0.0
OP 57	0	0.0	0	0.0
OP 58	0	0.0	0	0.0

PV Array 1 and Route: Dunham Rd

No glare found

PV Array 1 and Route: E Middle St

No glare found

PV Array 1 and Route: IL-25 N-S

No glare found

PV Array 1 and Route: Railway 1

No glare found

PV Array 1 and Route: Railway 2

No glare found

PV Array 1 and Route: Railway 3

No glare found

PV Array 1 and Route: S Gilbert St

No glare found

PV Array 1 and Route: S Pointe Ave

No glare found

PV Array 1 and Route: Stearns Rd

No glare found

PV Array 1 and FP: FP 1

No glare found

PV Array 1 and FP: FP 2

No glare found

PV Array 1 and FP: FP 3

No glare found

PV Array 1 and FP: FP 4

No glare found

PV Array 1 and FP: FP 5

No glare found

PV Array 1 and FP: FP 6

No glare found

PV Array 1 and FP: FP 7

No glare found

PV Array 1 and FP: FP 8

No glare found

PV Array 1 and 1-ATCT

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 Array 1 and OP 7

No glare found

PV Array 1 and OP 8

No glare found

PV Array 1 and OP 9

No glare found

PV Array 1 and OP 10

No glare found

PV Array 1 and OP 11

No glare found

PV Array 1 and OP 12

No glare found

PV Array 1 and OP 13

No glare found

PV Array 1 and OP 14

No glare found

PV Array 1 and OP 15

No glare found

PV Array 1 and OP 16

No glare found

PV Array 1 and OP 17

No glare found

PV Array 1 and OP 18

No glare found

PV Array 1 and OP 19

No glare found

PV Array 1 and OP 20

No glare found

PV Array 1 and OP 21

No glare found

PV Array 1 and OP 22

No glare found

PV Array 1 and OP 23

No glare found

PV Array 1 and OP 24

No glare found

PV Array 1 and OP 25

No glare found

PV Array 1 and OP 26

No glare found

PV Array 1 and OP 27

No glare found

PV Array 1 and OP 28

No glare found

PV Array 1 and OP 29

No glare found

PV Array 1 and OP 30

No glare found

PV Array 1 and OP 31

No glare found

PV Array 1 and OP 32

No glare found

PV Array 1 and OP 33

No glare found

PV Array 1 and OP 34

No glare found

PV Array 1 and OP 35

No glare found

PV Array 1 and OP 36

No glare found

PV Array 1 and OP 37

No glare found

PV Array 1 and OP 38

No glare found

PV Array 1 and OP 39

No glare found

PV Array 1 and OP 40

No glare found

PV Array 1 and OP 41

No glare found

PV Array 1 and OP 42

No glare found

PV Array 1 and OP 43

No glare found

PV Array 1 and OP 44

No glare found

PV Array 1 and OP 45

No glare found

PV Array 1 and OP 46

No glare found

PV Array 1 and OP 47

No glare found

PV Array 1 and OP 48

No glare found

PV Array 1 and OP 49

No glare found

PV Array 1 and OP 50

No glare found

PV Array 1 and OP 51

No glare found

PV Array 1 and OP 52

No glare found

PV Array 1 and OP 53

No glare found

PV Array 1 and OP 54

No glare found

PV Array 1 and OP 55

No glare found

PV Array 1 and OP 56

No glare found

PV Array 1 and OP 57

No glare found

PV Array 1 and OP 58

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

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Assumptions & Limitations

1. Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
2. Result data files and plots are retained for two years after analysis completion. Files must be downloaded and saved if additional persistence is required.
3. 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.
4. 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.
5. 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.
6. 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.)
7. The algorithm assumes that the PV array is aligned with a plane defined by the approximate total heights of the PV vertices. For increased accuracy, the user should perform runs using minimum and maximum values for the vertex heights to bound the height of the plane containing the solar array. Doing so will expand the range of observed solar glare when compared to results using a single height value.
8. The algorithm 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.
9. 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.
10. 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.
11. 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.



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12. Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
 13. Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

