Appendix 8-2

Glint and Glare Analysis

Riverside Solar Project

Riverside Solar, LLC

Jefferson County, New York

Glint & Glare Analysis

September 21, 2021

Capitol Airspace Group

capitolairspace.com

(703) 256 - 2485

5400 Shawnee Road, Suite 304
Alexandria, VA 22312
703-256-2485
capitolairspace.com

Summary

Riverside Solar, LLC is proposing to construct solar arrays in the towns of Lyme and Brownville in Jefferson County, New York (***Figure 1***). On behalf of Riverside Solar, LLC, Capitol Airspace performed a glint and glare analysis utilizing the Solar Glare Hazard Analysis Tool (SGHAT) to identify the potential for glare impacts. Specifically, this analysis considered the potential for glare impacts on Watertown International Airport (ART) approach paths. Additionally, this analysis considered the potential for glare impacts on nearby residences and roadways.

The results of the analysis indicate that there are no predicted glare occurrences for Watertown International Airport (ART) approaches as a result of the proposed single-axis tracking solar arrays. Since Watertown International Airport (ART) does not have an air traffic control tower (ATCT), an assessment for potential glare impacts on ATCT personnel was not required. These results conform to, and are in accordance with, the Federal Aviation Administration's (FAA) interim policy for *Solar Energy System Projects on Federal Obligated Airports*.

There are no predicted glare occurrences for nearby residences or roadways as a result of the proposed single-axis tracking solar arrays. These results are based on the application of FAA glint and glare standards in the absence of non-aviation regulatory guidelines.

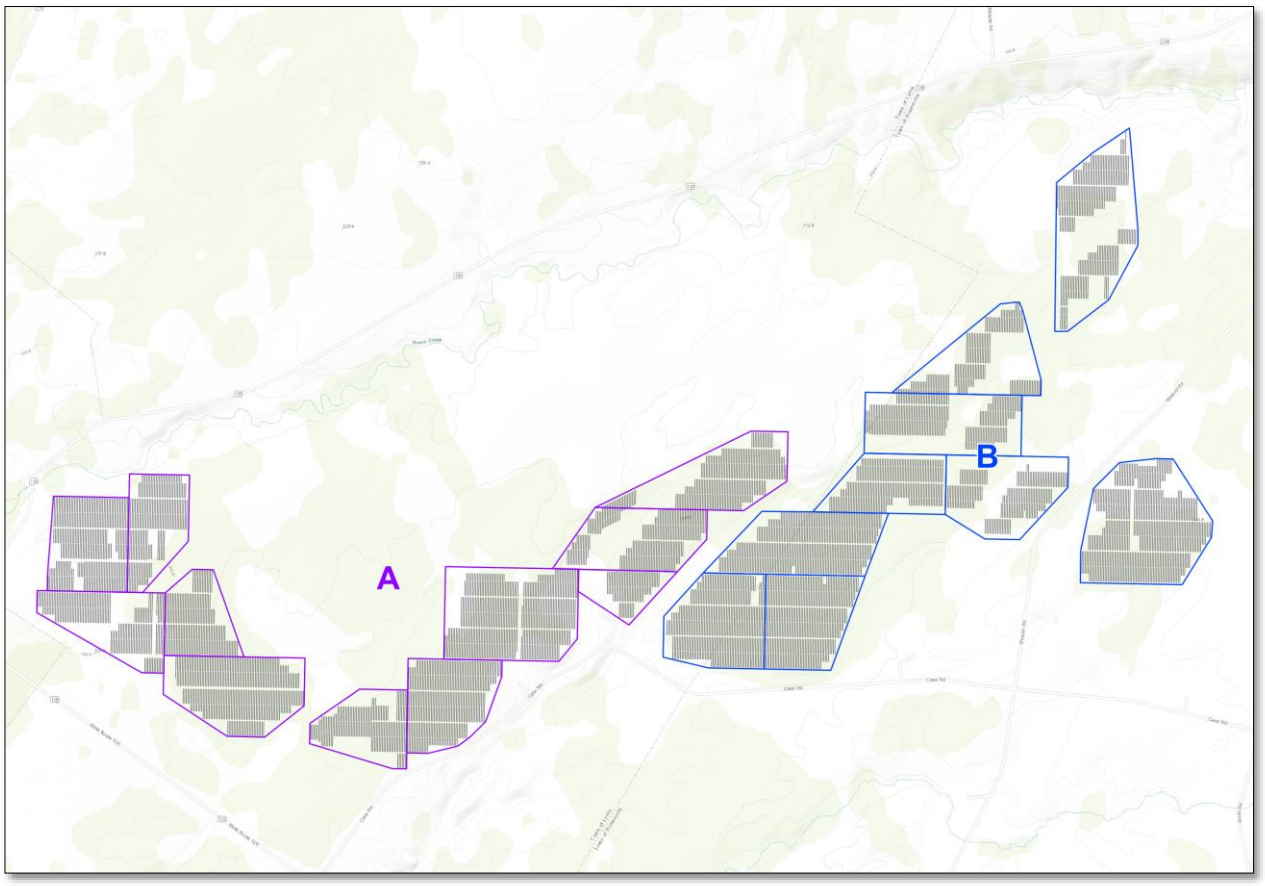

Figure 1: Location and identification of Riverside Solar Project arrays

Methodology

In cooperation with the Department of Energy (DOE), the FAA developed and validated the Sandia National Laboratories SGHAT, now licensed through ForgeSolar. The FAA requires the use of the SGHAT to enhance safety by providing standards for measuring the ocular impact of proposed solar energy systems on pilots and air traffic controllers. ForgeSolar has enhanced the SGHAT for glare hazard analysis beyond the aviation environment. These enhancements include a route module for analyzing roadways as well as an observation point module for analyzing residences. However, it should be noted that the SGHAT does not account for physical obstructions between reflectors and receptors.

The SGHAT analyzes the potential for glare over the entire calendar year in one-minute intervals from when the sun rises above the horizon until the sun sets below the horizon. The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. This analysis utilized the FAA approved default SGHAT setting which simulates the pilot's view from the cockpit. When the SGHAT identifies glare, the associated ocular impact is classified into three categories:

Green: Low potential for temporary after-image
Yellow: Potential for temporary after-image
Red: Potential for permanent eye damage

The FAA interim policy for *Solar Energy System Projects on Federally Obligated Airports* requires the absence of red or yellow predicted glare occurrences in the cockpit. At airports with an ATCT, no glare occurrences of any category are allowed for ATCT personnel. Currently, there are no defined standards for acceptable ocular impact on residences or roadways.

Data

Solar array specifications (***Table 1***) as well as location and height information were provided by Riverside Solar, LLC. Runway end coordinates, elevations, threshold crossing heights (TCH), and visual glidepath angles (VGPA) were obtained from the FAA National Flight Data Center (NFDC) National Airspace System Resource (NASR) dataset. When the NASR dataset did not contain TCH or VGPA data for a runway end, the FAA approved defaults settings (TCH: 50, VGPA: 3.00 degrees) were used.

Table 1: Riverside Solar Project array specifications

Parameter	Value
Unit Height	9 feet
Axis Tracking	Single-axis rotation
Tracking Axis Orientation	180°
Tracking Axis Tilt	0°
Tracking Axis Panel Offset	0°
Max Tracking Angle	±52°
Resting Angle	52°
Panel Material	Smooth glass with anti-reflection coating
Reflectivity	Varies with sun
Slope Error	Correlates with material

Results

Watertown International Airport (ART)

Runway 07/25

The SGHAT results do not predict glare occurrences along the Runway 07 or Runway 25 approach paths (***Figure 2***).

Runway 10/28

The SGHAT results do not predict glare occurrences along the Runway 10 or Runway 28 approach paths (***Figure 2***).

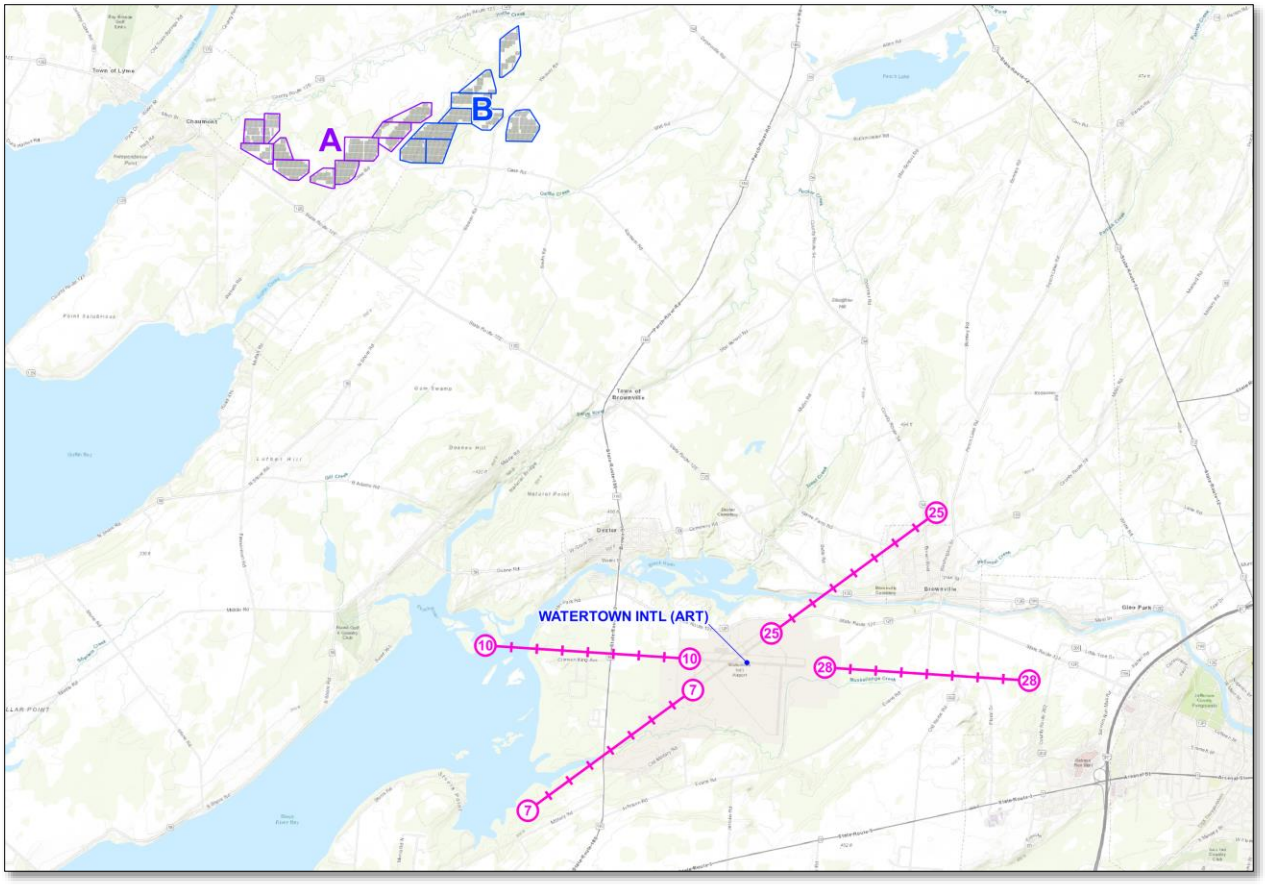

Figure 2: Watertown International Airport (ART) approach paths (hashed pink lines)

Residences

The SGHAT assessed the potential for glare occurrences at 120 discrete observation point receptors (black points, ***Figure 3***). Each observation point was assessed at an eight-foot first story viewing height and a 16-foot second story viewing height. The SGHAT results do not predict glare occurrences for any of the 120 observation points at either viewing height as a result of single-axis tracking arrays.

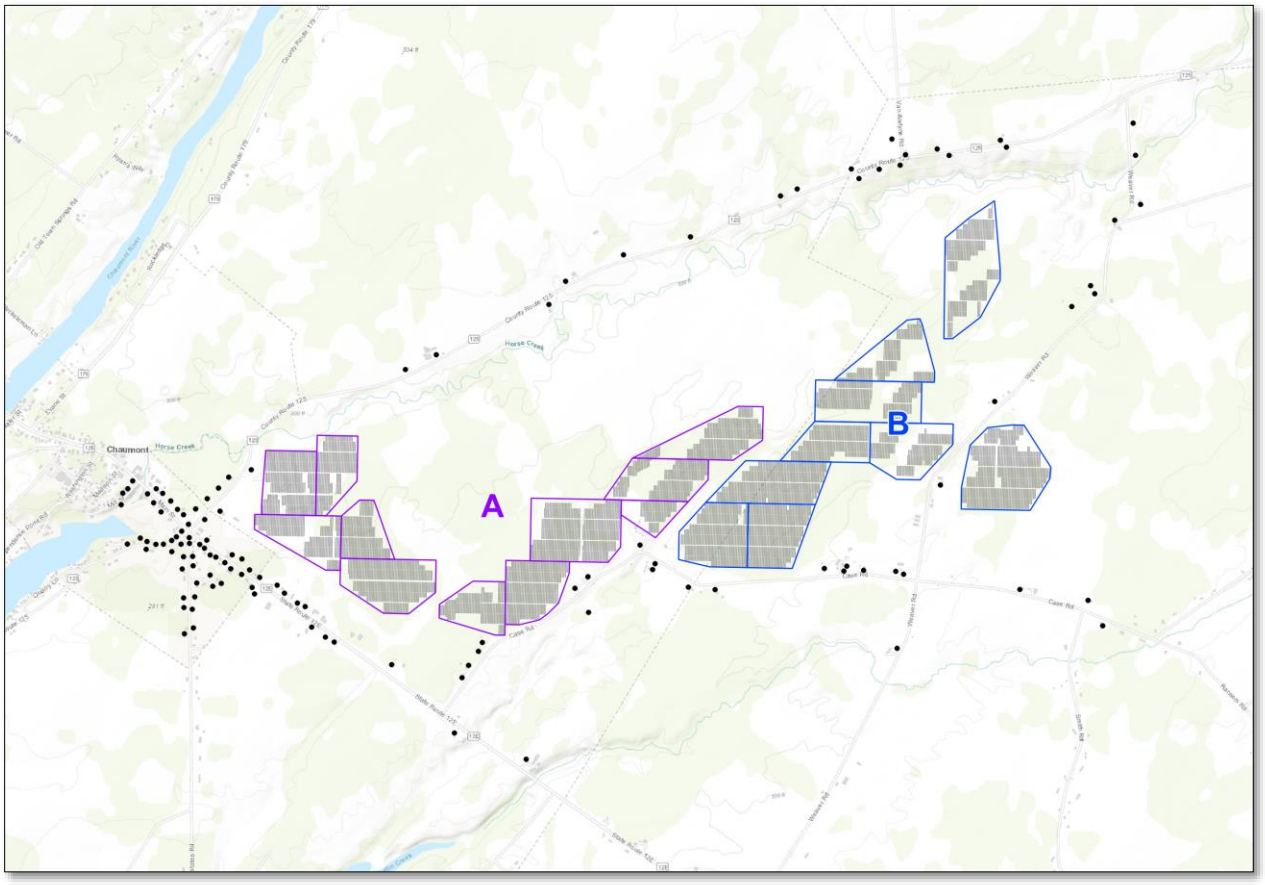

Figure 3: Discrete observation point receptors (black points) in proximity to Riverside Solar Project

Routes

The SGHAT assessed the potential for glare occurrences along seven route receptors (dashed black lines, ***Figure 4***). Each roadway was assessed at a four-foot car viewing height and an eight-foot truck viewing height. The SGHAT results do not predict glare occurrences for any of the seven roadways at either viewing height as a result of single-axis tracking arrays.

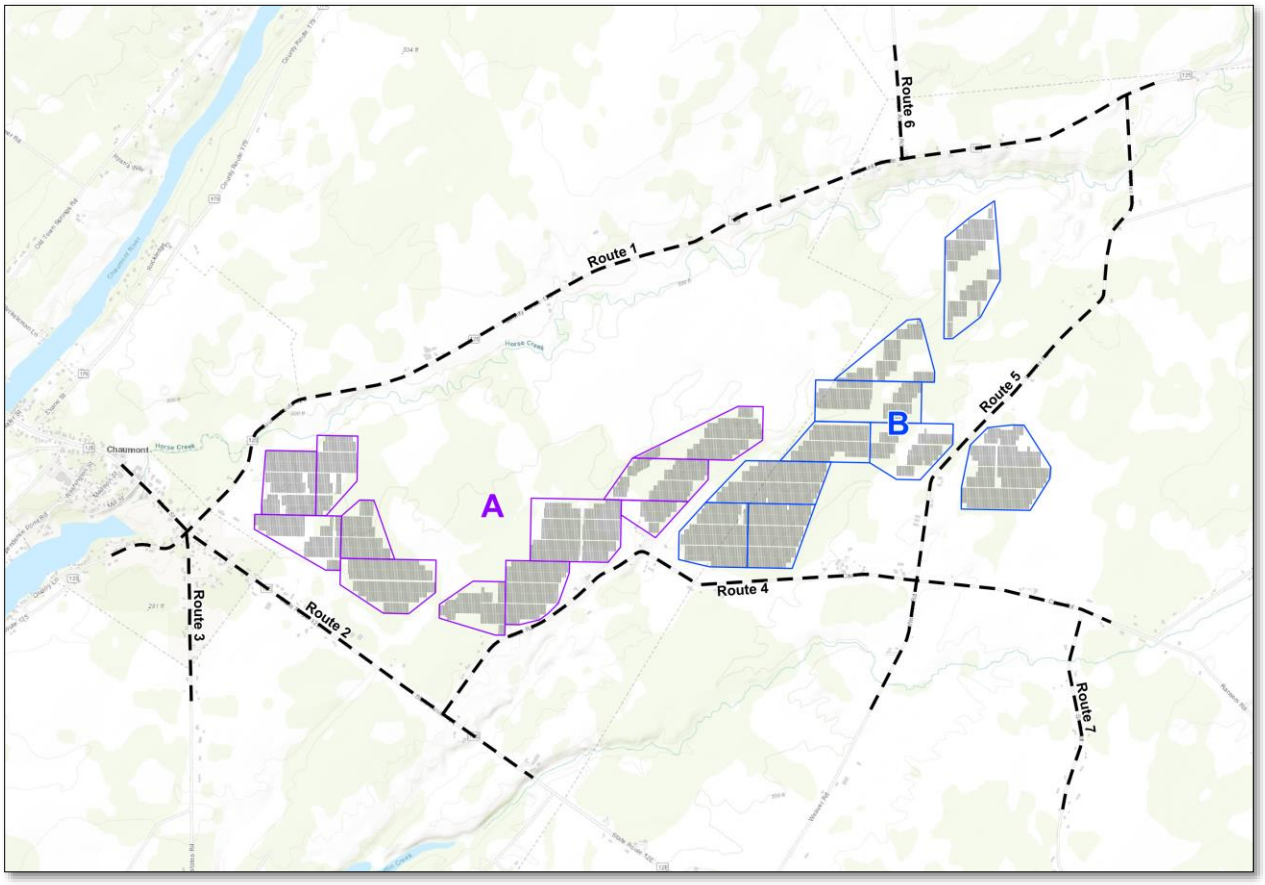

Figure 4: Roadway receptors (dashed black lines) in proximity to Riverside Solar Project

Conclusion

The SGHAT does not predict any glare occurrences for Watertown International Airport (ART) approaches as a result of proposed single-axis tracking solar arrays (***Table 2***). Since Watertown International Airport (ART) does not have an air traffic control tower (ATCT), an assessment for potential glare impacts on ATCT personnel was not required. These findings are compliant with the FAA interim policy for *Solar Energy System Projects on Federally Obligated Airports*.

Additionally, the SGHAT does not predict any glare occurrences for nearby residences or roadways as a result of single-axis tracking arrays. These results are based on the application of FAA glint and glare standards in the absence of non-aviation regulatory guidelines. As noted in the assumptions, the glint and glare analysis does not consider vegetation, fencing, or other natural obstructions. This glint and glare analysis takes the most conservative approach in assessing the possibility of glare occurrences.

Table 2: Annual glare occurrence summary

Receptor	Green Glare (Hours:Minutes)	Yellow Glare (Hours:Minutes)	Red Glare (Hours:Minutes)
ART – Runway 07	0:00	0:00	0:00
ART – Runway 25	0:00	0:00	0:00
ART – Runway 10	0:00	0:00	0:00
ART – Runway 28	0:00	0:00	0:00
Residences (120)	0:00	0:00	0:00
Route 1	0:00	0:00	0:00
Route 2	0:00	0:00	0:00
Route 3	0:00	0:00	0:00
Route 4	0:00	0:00	0:00
Route 5	0:00	0:00	0:00
Route 6	0:00	0:00	0:00
Route 7	0:00	0:00	0:00

If you have any questions regarding the findings in this analysis, please contact ***Rick Coles*** or ***Jason Auger*** at (703) 256-2485.