



24th June 2024

**Dr. Sherry Mohajerani**

Senior Development Manager – REN Australia

**Total Energies Renewables**

Suite 2, Level 30, North Tower,  
80 Collins Street, Melbourne, AUSTRALIA

**Re: Middlebrook Solar Farm Glint and Glare Assessment**

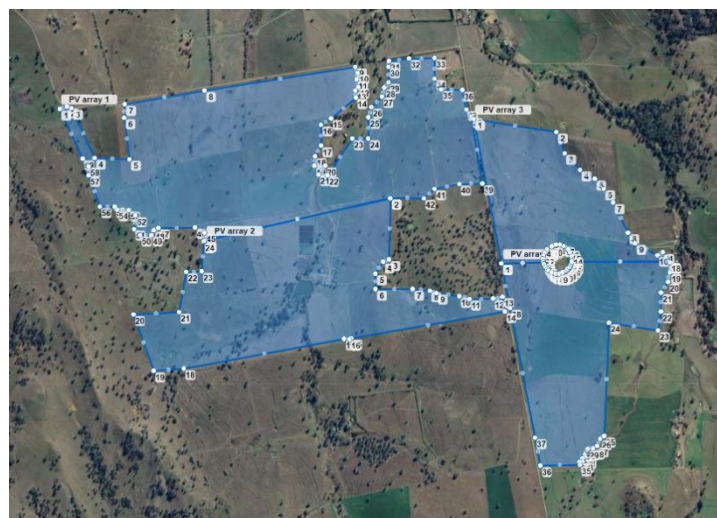
Dear Dr. Sherry Mohajerani,

This letter supports the measures suggested in the Landscape and Visual Impact Assessment (LVIA) for the proposed Middlebrook Solar Farm. Additional modelling has been undertaken, supplementing the Glint and Glare Assessment provided for the Project (Appendix D of the Landscape and Visual Assessment). It is still based on highly conservative assumptions:

- It assumes the overall Development footprint to have solar panels. This includes areas of access track, compound, substation and BESS locations that will not generate glare.
- The assessment is theoretical and does not consider existing riparian vegetation outside of the Development footprint or exclusion zones where vegetation will be retained.

Both factors can reasonably be expected to reduce the glare predicted by the model.

Due to the limitations provided by the assessment software, the overall Project has been divided into four (4) PV Areas.



*Figure 1 PV Areas*

The assessment assumes panels have a smooth glass surface with an anti-reflective coating (refer to Appendix D - Glint and Glare Assessment).

## Results

The Glint and Glare Assessment was undertaken with a tracking angle of 0° (degrees) (i.e., with the trackers aligned north-south, with the east-west-oriented panels tracking the sun). An area of panels can be identified that produces high levels of yellow glare on Middlebrook Road at specific times during the year under this scenario, around 90 minutes in the morning and 35 min in the evening, for approximately six (6) months of the year. Glare is not produced from other areas of the Project.

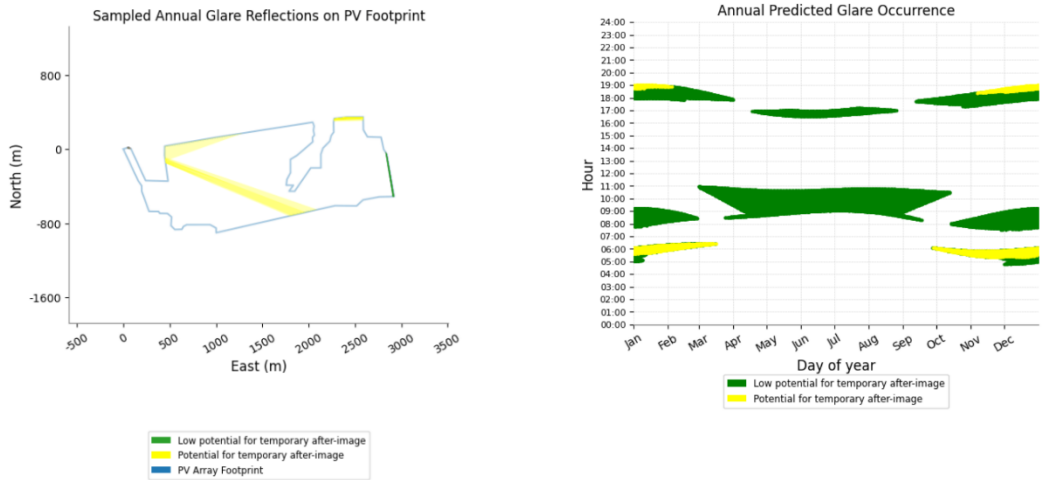


Figure 2 Pv Area 01

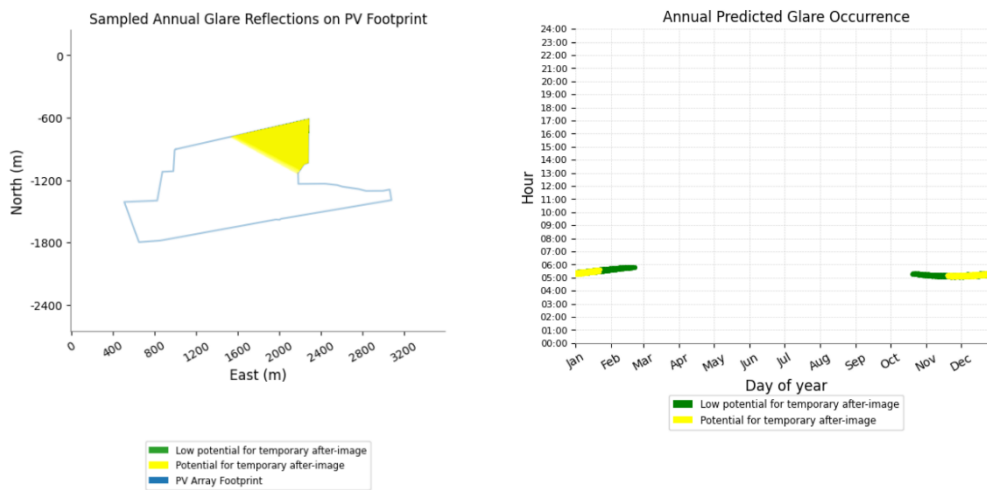


Figure 3 PV Area 02

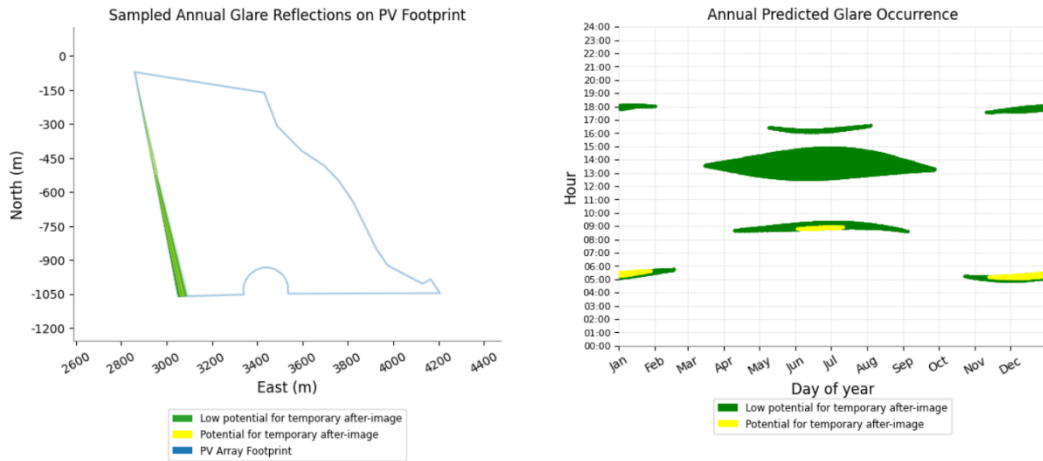


Figure 4 PV Area 03

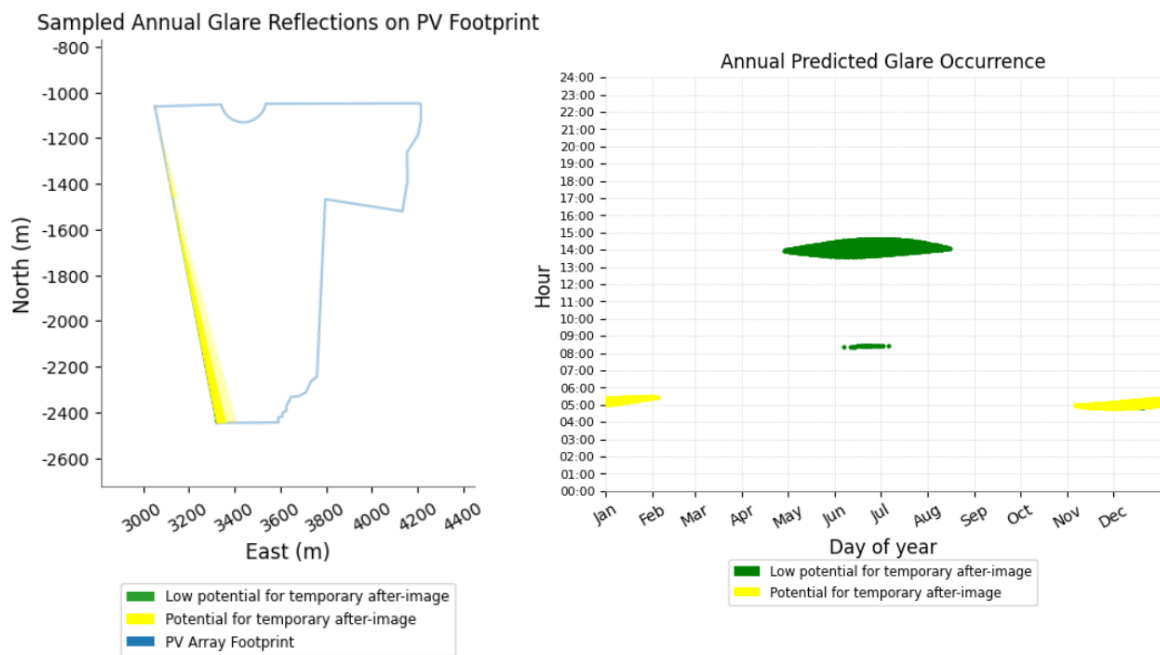


Figure 5 PV Area 04

The Appendix D assessment shows that an additional modelling scenario (modelling a resting angle of 22°) eliminated all glare along Middlebrook Road (Section 11.5 of the LVIA).

Therefore, glare can be eliminated by implementing a minimum tracking angle of 22° to this specific area during specific times during the year. This area represents around 20% of the proposed array area.

Restricting the resting angle of all panels is not required to eliminate glare. Restricting the resting angle of all panels may be expected to significantly affect the Project's generation capacity.

## Additional modelling scenarios to reduce the curtailment of restrictions

To reduce the curtailment effect of these restrictions, further modelling was undertaken in June 2024 to consider the area producing the glare (see Table 01 below). Varying resting angles were considered. These specific restrictions were intended to ensure all yellow glare on Middlebrook Road glare is eliminated.

Area	Resting Angles considered
PV Array 01	4, 6, 10, 15, 18, 20, 22 degrees
PV Array 02	4, 6, 10, 15, 18, 20, 22 degrees
PV Array 03	4, 6, 10, 15, 18, 20, 22 degrees
PV Array 04	4, 6, 10, 15, 18, 20, 22 degrees

Table 1

Based on conservative assumptions set out above, to eliminate glare, the following area-specific tracking restrictions must be applied:

PV Array 01 – Late September to mid-March for the approximate periods 0530 – 0630 and 1830 – 1905: minimum resting angle of 22 degrees.

PV Array 02 – Late September to mid-March for the approximate periods 0500 - 0550: minimum resting angle of 22 degrees.

PV Array 03 – Mid-November to Late January for the approximate periods 0505 – 0530: minimum resting angle of 22 degrees.

PV Array 04 – Early November to early February for the approximate periods 0500 - 0530: minimum resting angle of 22 degrees.

Implementing these specific restrictions eliminates all yellow glare on Middlebrook Road. These measures are in line with the Guidelines, August 2022. Additionally, eliminating potential 'yellow' glare along Middlebrook Road ensures that the Project may proceed without significantly impeding the safe operation of vehicles or interpreting signals and signage, if any.

## Suggested Restriction

The Applicant must limit the angle of solar panel backtracking as outlined in Table 02 below to eliminate generating yellow glare to Middlebrook Road unless otherwise agreed by the Secretary. The specific areas within each PV Array area that require restrictions are shown in yellow in Figures 2-5.

Area	Minimum Resting Angle	Restriction Applies
PV Array 01: for the yellow area only	22 degrees	Late September to mid-March for the approximate periods 0530 – 0630 and 1830 – 1905
PV Array 02: for the yellow area only	22 degrees	Late September to mid-March for the approximate periods 0500 - 0550
PV Array 03: for the yellow area only	22 degrees	Mid-November to Late January for the approximate periods 0505 – 0530
PV Array 04: for the yellow area only	22 degrees	Early November to early February for the approximate periods 0500 - 0530

Table 2

Attachment A to this letter illustrates the scenario with the 22-degree backtracking angle used to eliminate potential 'yellow' glare along Middlebrook Road.

Given the conservative assumptions of the assessment set above, it is recommended that the tracking restrictions be reviewed post-approval based on the final layout. It may be adjusted as long as the predicted yellow glare is still predicted to be eliminated on Middlebrook Road.

Kind Regards,



**Saurabh Wagh**  
Project Landscape Architect  
***Moir Landscape Architecture Pty Ltd***

**Attachment A: Glint and Glare Assessment – 22 Degrees Backtracking Angle**