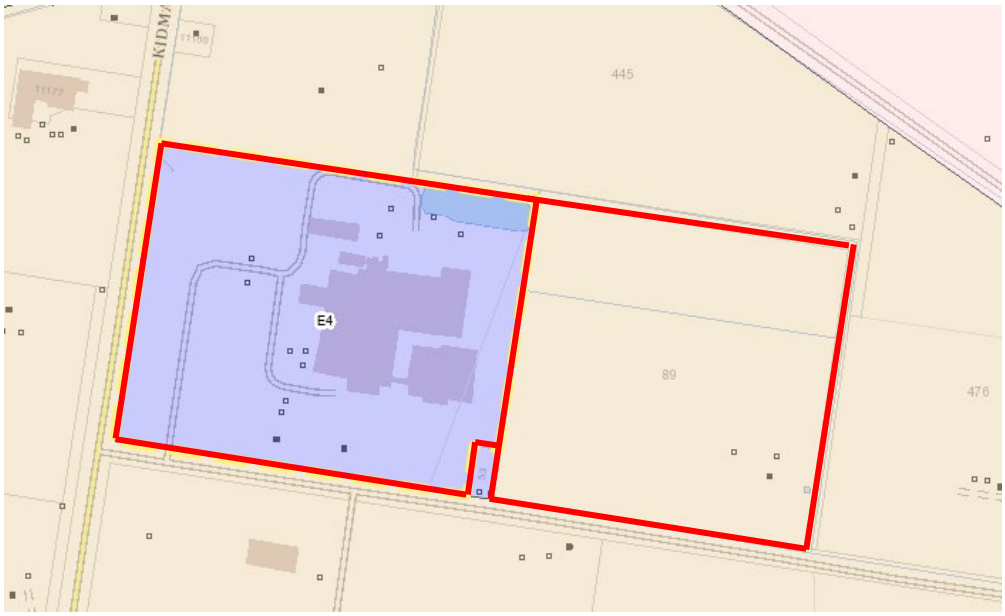
Glare Assessment of Ground-Mounted Solar System

IN SUPPORT OF A DEVELOPMENT APPLICATION

Baiada Poultry- Hanwood Processing Plant

9 MURPHY ROAD, HANWOOD,NSW 2680

89 MURPHY ROAD, HANWOOD,NSW 2680



Prepared For:

SAMS Solar Pty Ltd

October 2024

Table of Contents

This report has been prepared by Kean Energy Pty Ltd (Kean Energy) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Sams Solar (the Client).

The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

Kean Energy accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

1. Executive Summary

Kean Energy has been commissioned by Sam Solar Pty Ltd (Sam Solar) to prepare a Glare Assessment to accompany a Development Application (DA) for a proposed 8.351 megawatt (MW) electricity generating works (solar energy system) located at 9 Murphy Road, Hanwood NSW 2680 on 'Lot/Section/Plan no: 162/-/DP751709' and 89 Murphy Road, Hanwood NSW 2680 on 'Lot/Section/Plan no: 2/-/DP808077'.

The Project is located approximately 11 kms north of the threshold of Runway 06-24 at Griffith Airport and would feature ground-mounted PV solar panels located at the site.

The following potential glare conditions have been considered:

- Daytime- Reflective glare (and glint) arising from the ground-mounted solar PV panels 11 kms from facility at nearby Griffith Airport.
- Daytime- Reflective glare (and glint) arising from the ground-mounted solar PV panels on Hanwood Avenue.
- Daytime- Reflective glare (and glint) arising from the ground-mounted solar PV panels on Kidman Way.
- Daytime- Reflective glare (and glint) arising from the ground-mounted solar PV panels on Old Willbriggie Road.

2. The Site & Its Locality

2.1. The Site

The site of the proposed development is formed of Lot 162/DP775807, at 9 Murphy Road Hanwood and Lot 2/DP808077, at 89 Murphy Road Hanwood .

In accordance with Griffith Council Solar Energy Farms and Battery Energy Storage Systems (BESS) Policy SD-CP-202, the project is co-located with a large-scale electricity user such as an industry (Baiada Poultry Processing Plant).

Figure 1 depicts the subject site.

Left- Lot 162/DP775807- 9 Murphy Road Hanwood

Right- Lot 2/DP808077- 89 Murphy Road Hanwood

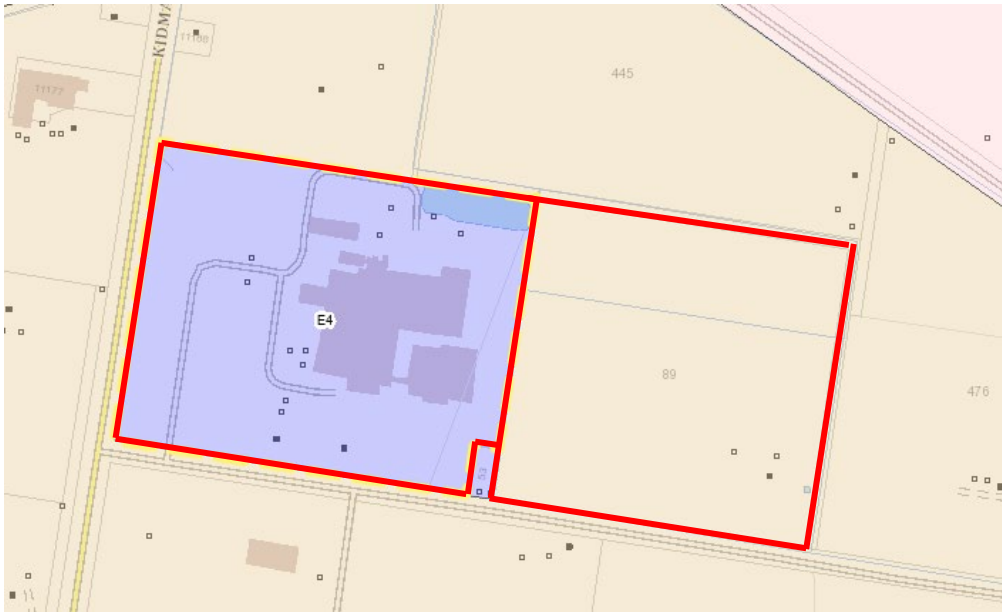


Figure 1: Subject Site (Source: NSW Planning Portal Spatial Viewer)

2.2. The Locality

The subject site is located approximately 2 kms South of Hanwood NSW and 11kms Griffith Airport.

Figure 2 depicts the site in the context of the surrounding locality.

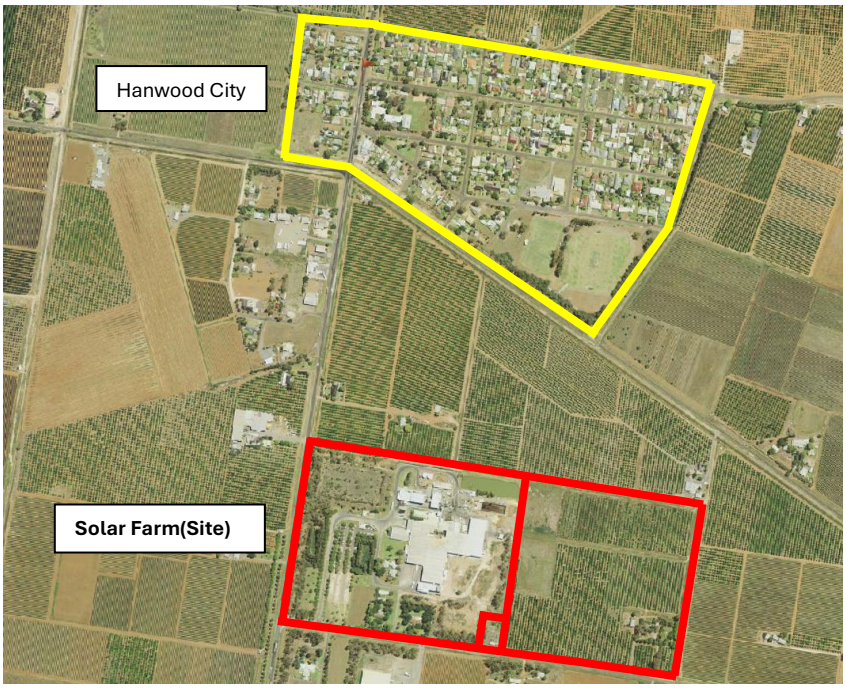


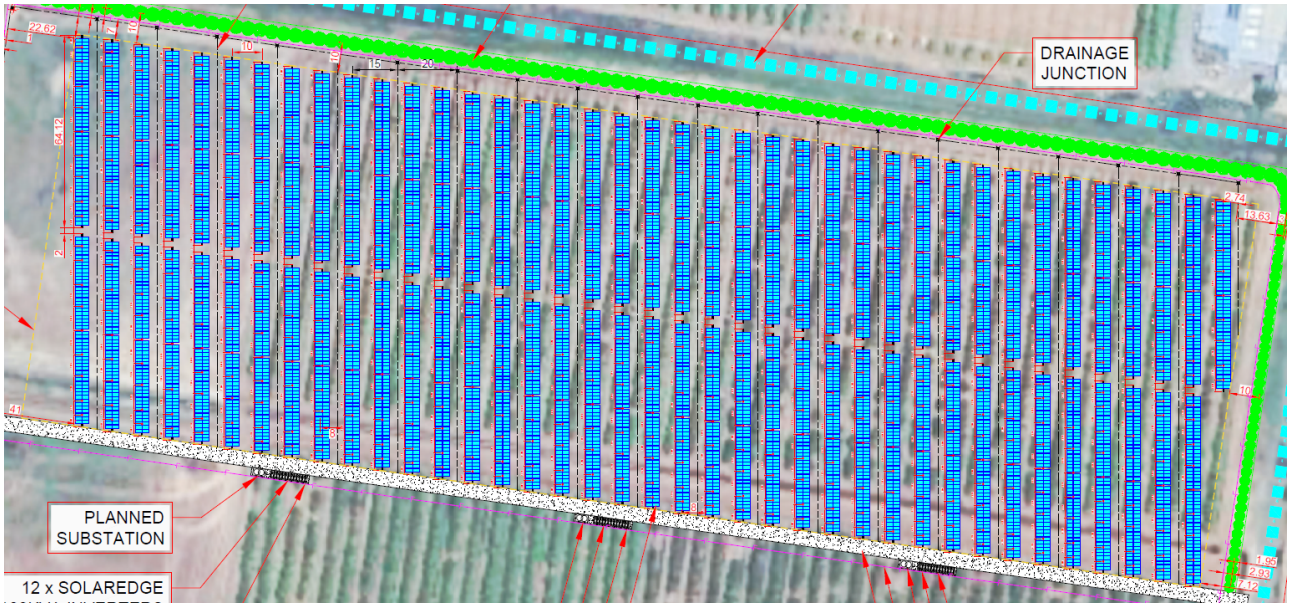
Figure 2: Subject Site Locality#1 (Source: SixMaps)

Figure 3: Subject Site Locality#2 (Source: SixMaps)

2.3. Panel layout

Lot 162/DP775807- 9 Murphy Road Hanwood-

Lot 2/DP808077- 89 Murphy Road Hanwood-



3. Glare Hazard Analysis

The ForgeSolar Tool is a model used to identify the potential occurrence of glare to observation points in the surrounding landscape. It is noted that the ForgeSolar Tool analysis takes into account the ground elevation and height of the solar farm as well as the ground elevation and view height of observation points, vegetation and factory buildings.

The outputs of the ForgeSolar Tool report against potential ocular impacts; ranging from temporary distraction and temporary disability (i.e. after image) to, in its most extreme, permanent eye damage (i.e. retinal burn) (refer –**Figure 4**).

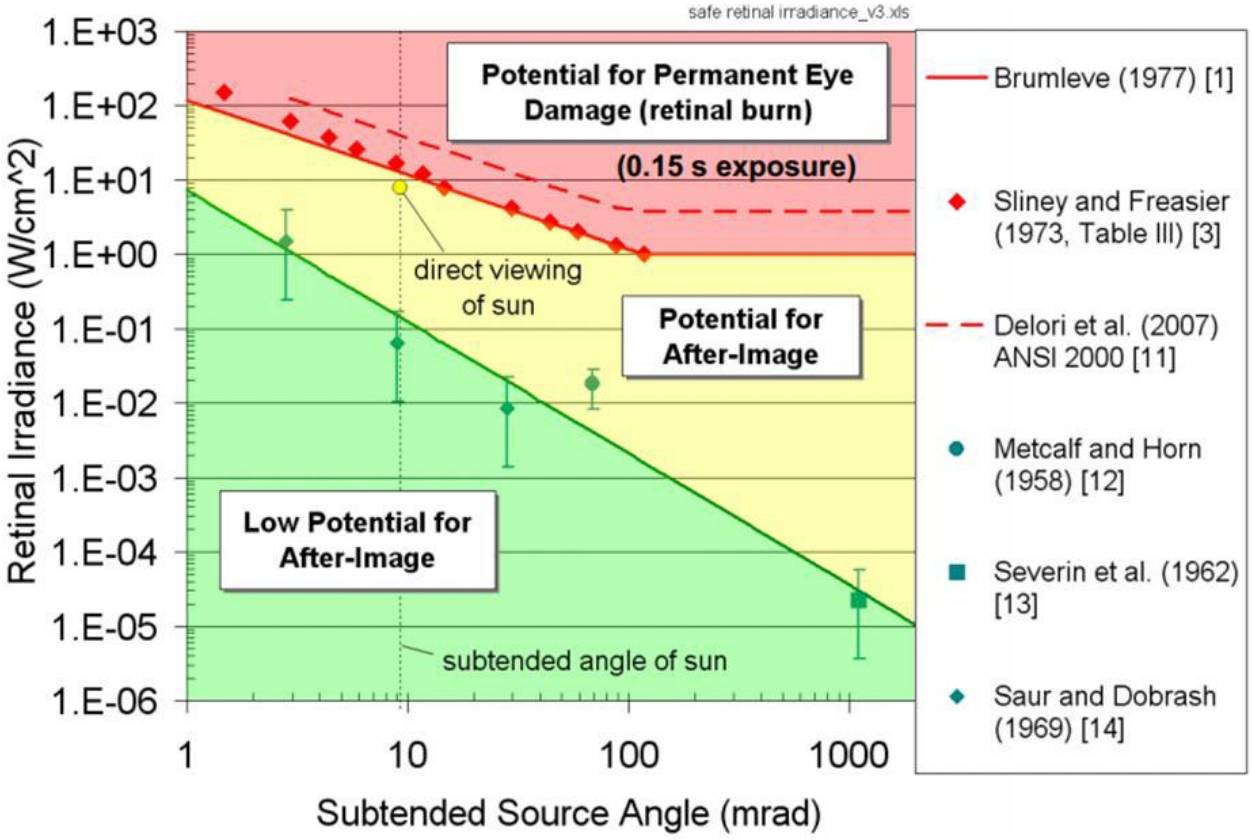


Figure 4: Potential Ocular Impacts and Hazard Ranges (Sandia National Laboratories, n.d.)

Table 1 – ForgeSolar Tool Analysis Input Data

Time Zone	UTC +11
Axis Tracking	Single-Axis
Orientation	0 degrees
Panel Tilt	60 degrees
Module Surface Material	Smooth Glass with Anti-reflective coating
Height of panels above ground	2 meters
Observation Point Eye-Level Height Above Ground	20m (Observation-Griffith Airport) 1.5 m (road user)

	2-Mile Flight Path Receptor(s)-Runway 06 15.24m (Threshold) 185.81m (2-mile point) 2-Mile Flight Path Receptor(s)-Runway 24 15.24m (Threshold) 186.03m (2-mile point)

Table 2 – Typical ForgeSolar Tool Analysis Input Data

Subtended angle of the sun (mrad)	9.3 mrad
Ocular transmission coefficient	0.5
Pupil diameter (m)	0.002 m
Eye focal length (m)	0.017 m
Time interval (min)	1

3.1. Assessment results

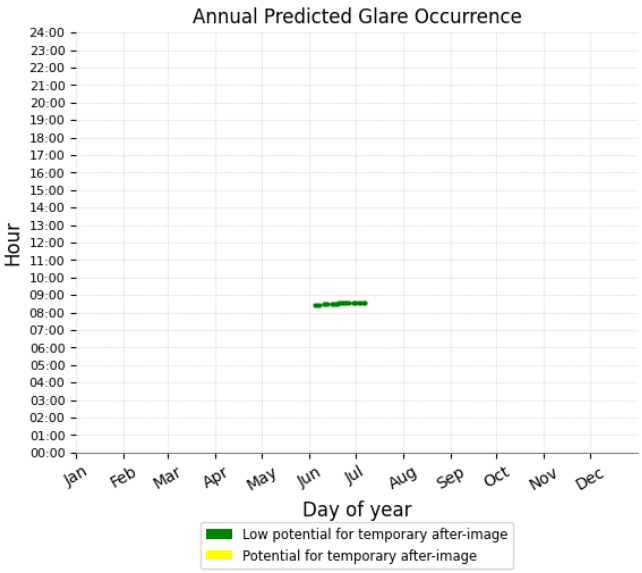
The analysis identifies how many minutes of each type of glare hazard would be experienced at each observation point during a one-year period. The results are provided below in Table 3.

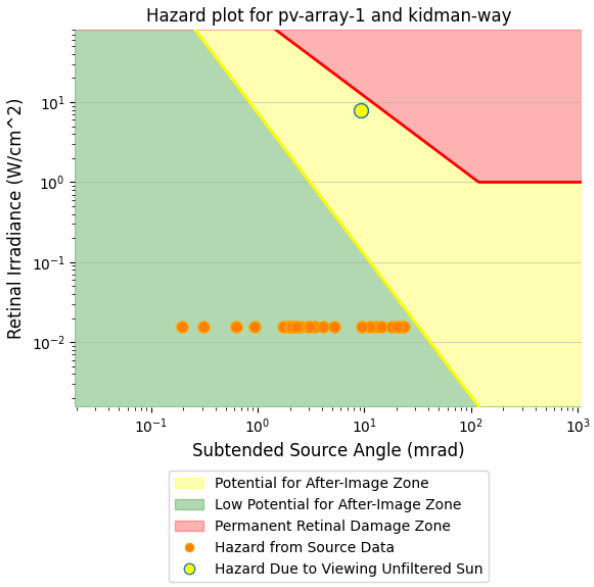
Table 3 – Glare Hazard Analysis Results

Observation Point	Glare Hazard Duration over a 1-Year Period (Minutes)	
	Low Potential for Temporary After Image	Potential for Temporary After Image
Flight path 06	0	0
Flight path 24	0	0
OP 1- (Flight Control centre)	0	0
Route: Hanwood Ave	0	0
Route: Kidman Way	25	0
Route: Old Willbriggie Rd	0	0

Modelling of potential glare impacts using the ForgeSolar Tool indicates that there is potential for glint or glare nuisance (i.e. temporary distraction and temporary disability from temporary after image) but no potential for hazards resulting in permanent eye damage for the observation points assessed.

Potential glare hazards occur at observation 'Route: Kidman Way'.





Based on assumptions and parameters of this assessment, the modelling results identifies at 'Route: Kidman Way', there is a low potential for the generation of low intensity and short duration potential glare hazards to nearby road users. Apart from that, there is no glare found.

3.2. Mitigation Measures

Potential impacts for temporary after image glare hazards to surrounding viewpoints are expected to be alleviated by the existing landscape screening. On this basis it is considered that the impacts are manageable and are acceptable.

There are vegetation and trees around the Solar Farm for which only a small part of it has been considered. So, this report is conservative and possible glares can be mitigated.

Lot 162/DP775807- 9 Murphy Road Hanwood is around 3m below the ground level and will have no direct visibility from Kidman way. There are also vegetations around the site that screen any visibility.

Lot 2/DP808077- 89 Murphy Road Hanwood will have new vegetations planted around the north and east boundaries to screen any visibility of the panels as shown on the site plan included with this report.