Appendix I

Visual Impact Assessment

Edify Energy

Darlington Point Solar Farm

Visual Impact Assessment

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1.0 Introduction

This report has been prepared to support the Environmental Impact Statement of the proposed Darlington Point Solar Farm (DPSF) site. The purpose of this report is to identify potential landscape and visual effects that could arise as a result of the solar farm and provide a summary of matters which will require further assessment, management and mitigation in future stages of the project. In addition, a high-level external glare assessment was undertaken for the proposed DPSF site. The assessment addressed the likely visual impacts of the development related to glare and reflectivity (reflected glare).

Edify Energy Pty Ltd (Edify Energy) is proposing to develop, construct and operate a large-scale solar farm approximately 10 km south of Darlington Point within the Murrumbidgee Local Government Area (LGA) in Western NSW. The Darlington Point Solar Farm (DPSF) has the potential to accommodate up to 275 megawatts (MW) alternating current (AC) of solar generated electricity and would connect to the adjacent TransGrid Darlington Point 330 kV substation and supply power to the National Electricity Market (NEM). The DPSF would be located entirely on private agricultural land, which has historically been used for grazing.

1.1 Methodology

The landscape and visual appraisal has been undertaken using the methodology outlined below and meets the requirements of the SEARs.

1.1.1 Visual landscape assessment

1.1.1.1 Defining the study area

The study area has been defined through the preparation of a Visual Envelope Map (VEM) and includes areas within and external to the site. The VEM represents the zone of theoretical view of the development based on the topography of the site and view from the surrounding terrain. Mitigating factors such as vegetation or other visual obstructions are not considered for the VEM, and hence it represents the worst-case scenario in this aspect. Existing mitigations are however taken into consideration in step 3 baseline assessment (refer Section 2).

Using GIS, a VEM is generated using digital terrain data sourced from Geoscience Australia (2010), an eye-level of 1.7m above the ground, and the 3D polylines associated with the proposed solar farm.

The visual study area has been defined by the VEM to illustrate the potential extent of visibility of the proposed DPSF. The theoretical extent is based on 164 points located around the perimeter of the DPSF site based on an eye level of 1.7m. The VEM is shown and further defined in Section 4.2.

The VEM is, by its nature, approximate only and may exclude areas of existing intervening features such as built form, vegetation or localised variations in topography, representing the greatest extent of potential visual effect.

The underlying data used to run the analysis is based on a 1 arc second (25metre) resolution Digital Elevation Model so there will be localised inaccuracies. 13 representative viewpoints have been selected through a review of the sensitivity of the visual amenity and interrogation of the VEM.

1.1.1.2 Selecting viewpoint locations

Thirteen (13) viewpoints were selected to represent the range of viewpoints of the site within the VEM and using the sensitivity of the potential receptors. Potential sensitive receptors include residential properties located within close proximity to the DPSF site at adjacent poultry farms on Donald Ross Drive.

The viewpoints are the locations from which landscape and visual impacts have been assessed.

1.1.1.3 Baseline

A baseline visual assessment of the site was undertaken using both desktop analysis and site research. A description of the existing landscape and visual conditions of the site and the surrounding context is provided with reference to the VEM and the thirteen representative viewpoints. A summary of the character of the landscape is provided, with a focus on the landscape characteristics that inform the extent of potential views. For example, comparisons were made between the landform and extent of vegetation cover that could limit views as opposed to visually open landscapes where widespread inter-visibility between communities and visual features exists.

1.1.1.4 Assessment of visual effects

The assessment of visual effects relates to the changes that would arise in the composition of available views as a result of the introduction of the development. The two principle factors which influence the assessment of potential effects include the sensitivity of the view point and the magnitude of the anticipated change. The criteria used for this assessment are described in Section 3.

1.1.1.5 Mitigation

Should significant visual impacts be identified, mitigation measures to manage the potential impact would be proposed.

The mitigation measures are accompanied by a description and an assessment of the expected or predicted effectiveness of the mitigation measures. The summary of mitigation can be found in Section 5.

1.1.2 Reflected glare assessment

1.1.2.1 Solar reflections

Sunlight reflects off all surfaces that it hits. Most of these reflections are easily viewed and do not present a risk to vision.

Sunlight reflects off surfaces that are not shiny in a diffuse way. These surfaces reflect sunlight into a wide range of reflected directions. In spreading the reflected sunlight over a wide range of directions, the intensity of the reflected sunlight is significantly reduced. Such reflections can be considered similar to sunlight patches on grass or carpet – they are generally bright but not uncomfortable.

Sunlight reflects off smooth, shiny surfaces, such as glass, in a specular (mirror-like) way. The intensity of specular reflections are much stronger than diffuse reflections, and such reflections are generally uncomfortable to view. Most often, this type of visual discomfort is known as 'discomfort glare'. Discomfort glare causes psychological annoyance, but is not considered to present a risk to vision as it does not require the observer to immediately turn away from the glare source.

When sunlight reflections are strong and close to the observer's direction of view, and the observer is performing detailed visual tasks that require concentration in a given direction of view, this is known as 'disability glare'. It causes the observer to be unable to perform a visual task such as driving without taking evasive action (such as turning away or raising a hand to shield the eyes). It temporarily degrades the observer's ability to perform the visual task on which they are focused. Disability glare does not imply long-term disability in any form.

1.1.2.2 Reflected glare

Reflected glare has the potential to cause uncomfortable and potentially unsafe visual impacts in the built environment. This may impact on transport operators who require a high degree of concentration while operating vehicles and adjacent residential properties.

This assessment of reflected glare risks is focused on identifying the risk of disability glare for relevant observers (glare receptors).

The potential impact of a solar reflection is based on several considerations:

- The intensity of the glare source: the degree to which the reflective surface reflects direct sunlight
- The distance from which the solar reflection is observed: if the observer is far away from the glare source, the impact on vision is reduced
- The size of the reflector: if the reflector is small or far away, a reflection of the sun's full disk will not visible, and the impact on vision is reduced
- The position of the reflection in the observer's field of vision: reflections that appear close to the direction of the observer's view will have a much stronger impact on vision

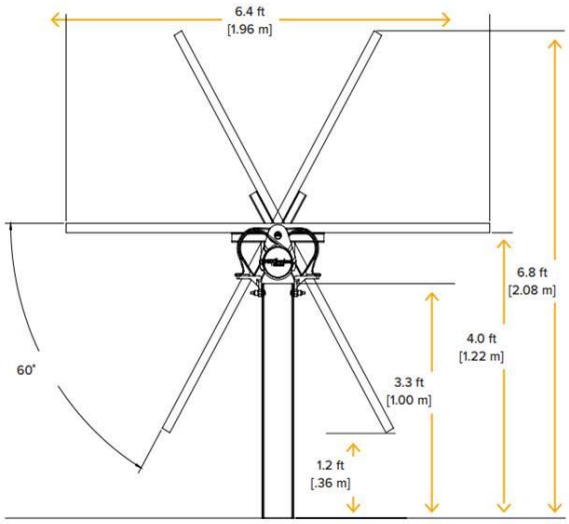
This assessment considers all of the above factors in estimating the likely impact of potential solar reflections on all identified glare receptors. This is based largely on understanding of the sun's path through the sky at the site's location.

1.1.2.3 Basis of the glare assessment

This assessment focuses on potential risks relating to reflected glare from the photovoltaic (PV) panels.

The assessment was conducted based on the following relevant information provided by the project team and client regarding the proposed design:

- The DPSF will cover the majority of the site footprint and will consist of a single-axis tracking system
- The panels will track over a horizontal (north-south) axis, turning from east to west (refer to Figure 1)



- Figure 2 shows a cross-section of the concept PV array; the rotation in each direction is limited to approximately 60° from the horizontal
- The PV panels were assumed to comprise polycrystalline panels with an aluminium frame
- The site is largely comprised of flat land
- Solar patterns, or sun path, which refers to the path of the sun through the sky. The site is located at Darlington Point, latitude 34.6° south. A sun path diagram for this latitude was referenced.

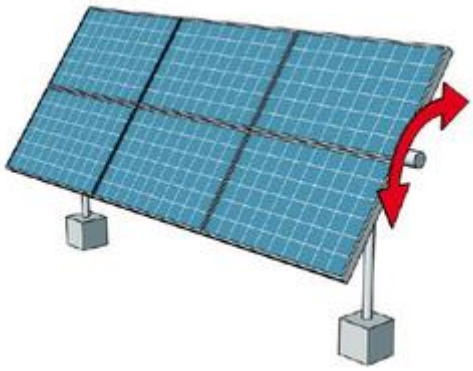


Figure 1 Horizontal single axis tracking modules (Evolve Solar, 2015)

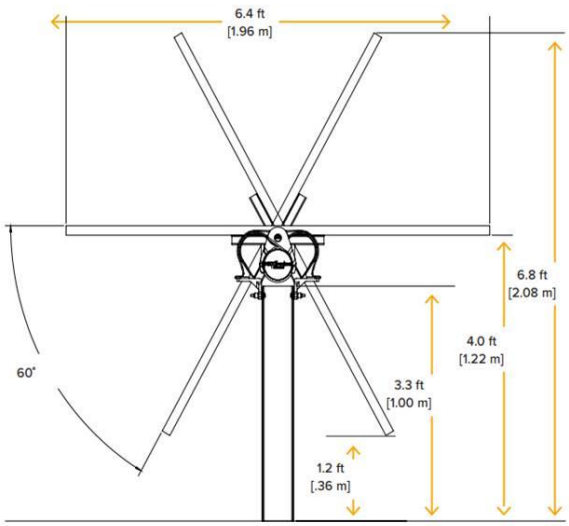


Figure 2 Indicative PV array cross-section showing limits of rotation around the axis

1.1.2.4 Potential reflected glare risks

Sunlight reflector types

This assessment considers the potential for reflected sunlight glare from the PV panels that form part of the proposed solar farm.

Identification of glare receptors

The following potential glare receptors have been identified: road corridors in the public domain, air traffic and surrounding residences. These are discussed further in Section 2.2.

1.2 Assumptions and technical limitations

The purpose of the Visual Impact Assessment is to support the Environmental Impact Statement and to inform where visual effects may change due to the

proposed development of the DPSF. The assessment has been made based on the information available at the time of the assessment and relies on the accuracy of this information.

2 Baseline conditions

2.1 Visual amenity

The visual amenity and scenic value within the study area is influenced by the topography, vegetation cover and land use. A summary of these key components is provided below.

2.1.1 Topography

The proposed development is situated approximately 1.6km south of the Murrumbidgee River within a topographical depression within the Murrumbidgee plains. Shallow drainage lines and natural depressions intercept the low-relief alluvial clay and loamy landscape.

Mapped soils within the site are predominately characterised as grey, brown and red clays with red brown earths located in the northwest portion of the study area. The primarily low-lying, flat open grassland allows for distant views stretching across the pastoral landscape.

The topography of the study area is shown in Figure 3.

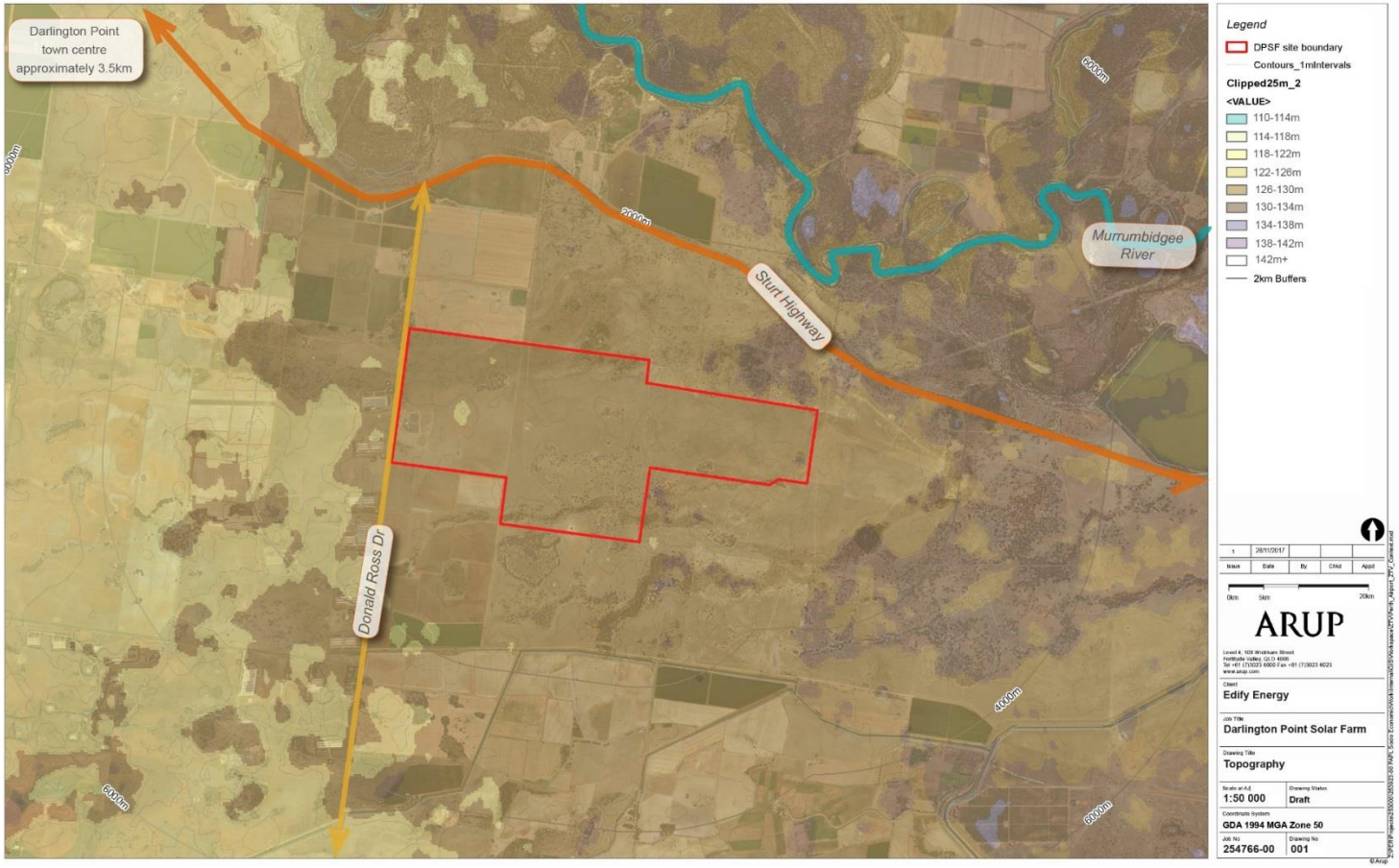


Figure 3 Topography

2.1.2 Vegetation cover

The vegetation cover of the DPSF site and immediate surrounds are mapped by NSW government to be dominated by cleared areas with patches of woodland and forest largely associated with waterways and drainage features as shown in Figure 4.

Biodiversity field assessments of the DPSF site undertaken as part of this EIS (refer to Section 7.1 of the EIS) are generally in alignment with the government mapping. The mapping identified that the DPSF site is dominated by Plains Grassland with scattered patches of woodland and forest, including Black Box grassy open woodland, Weeping Myall open woodland, White Cypress pine open woodland and Yellow Box-white cypress pine grassy woodland as shown in Figure 4.

A summary of the five native vegetation classifications dominating the DPSF site is provided below and illustrated on Figure 5. Further detail on the vegetation classification is provided within the Biodiversity Assessment Report (refer to Chapter 7.1 of the EIS).

- Black Box grassy open woodland wetland of rarely flooded depression in south western NSW (PCT16)
- Weeping Myall open woodland of the Riverina bioregion and NSW south western slopes (PCT26)
- White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone (PCT28)
- Yellow Box - White Cypress Pine grassy woodland on deep sandy loam alluvial soils of the eastern Riverina bioregion and NSW south western slopes (PCT75)
- Plains Grassland on alluvial mainly clay soils in the Riverina bioregion and NSW south western slopes (moderate and poor quality) (PCT45)

Patches of wooded vegetation dispersed across the site allow for framed and intermittent views stretching east across the low-lying fields, from adjacent Donald Ross Drive. These distributed patches, with the addition of roadside buffer vegetation, limit views towards the proposed DPSF site from by-passers travelling along the Sturt Highway. Vegetation cover is shown in Figure 4.

Figure 4 Vegetation cover (Murrumbidgee CMA, 2011)

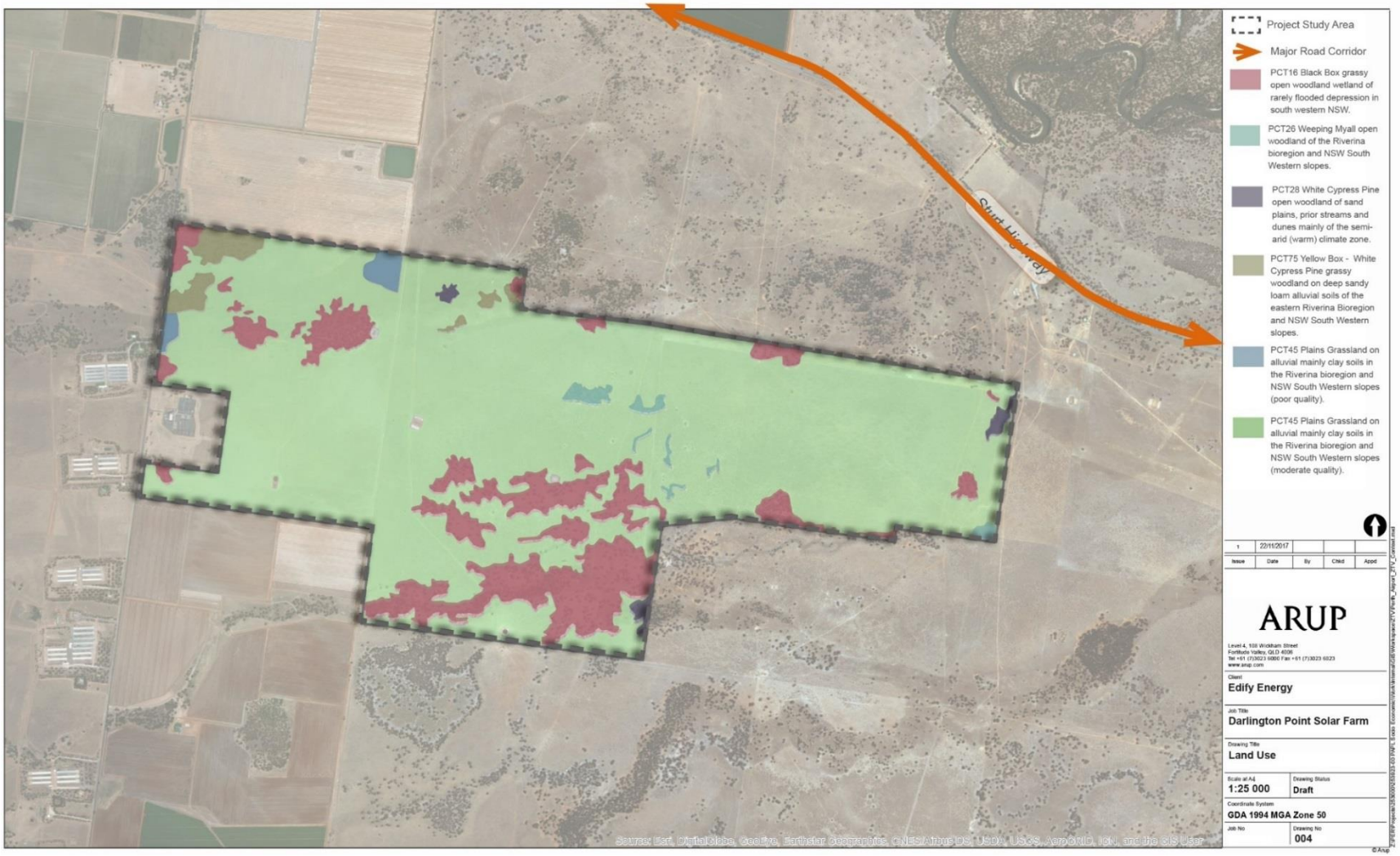


Figure 5 Vegetation classifications within the study area (note: figure based on Biodiversity Assessment Report figures).

2.1.3 Land Use

The DPSF site is zoned RU1 - Primary Production under the Murrumbidgee Local Environmental Plan 2013 (Murrumbidgee LEP) (refer Figure 6). The site is currently used for sheep and cattle grazing and it is understood that the historic use of the site has also been for livestock grazing (refer to Section 7.5 of the EIS).

A TransGrid substation is located adjacent to the proposed DPSF site along Donald Ross drive as shown in. The site is dissected by a 330kV and two 132kV TransGrid overhead transmission lines from the substation along the western site boundary traversing west to east. A 33kV Essential Energy overhead transmission line runs north-south near the eastern boundary, intersecting the 330kV line.

The site is surrounded by land zoned RU1 – Primary Production accommodating farming, agribusinesses and some private residences. A series of poultry farms are situated immediately west of the site along Donald Ross Drive. Some workers' accommodation is provided at the Baiada Farm, the nearest of which is located approximately 100m to the west of the site. The nearest private residence is located approximately 800m to the north of the site.

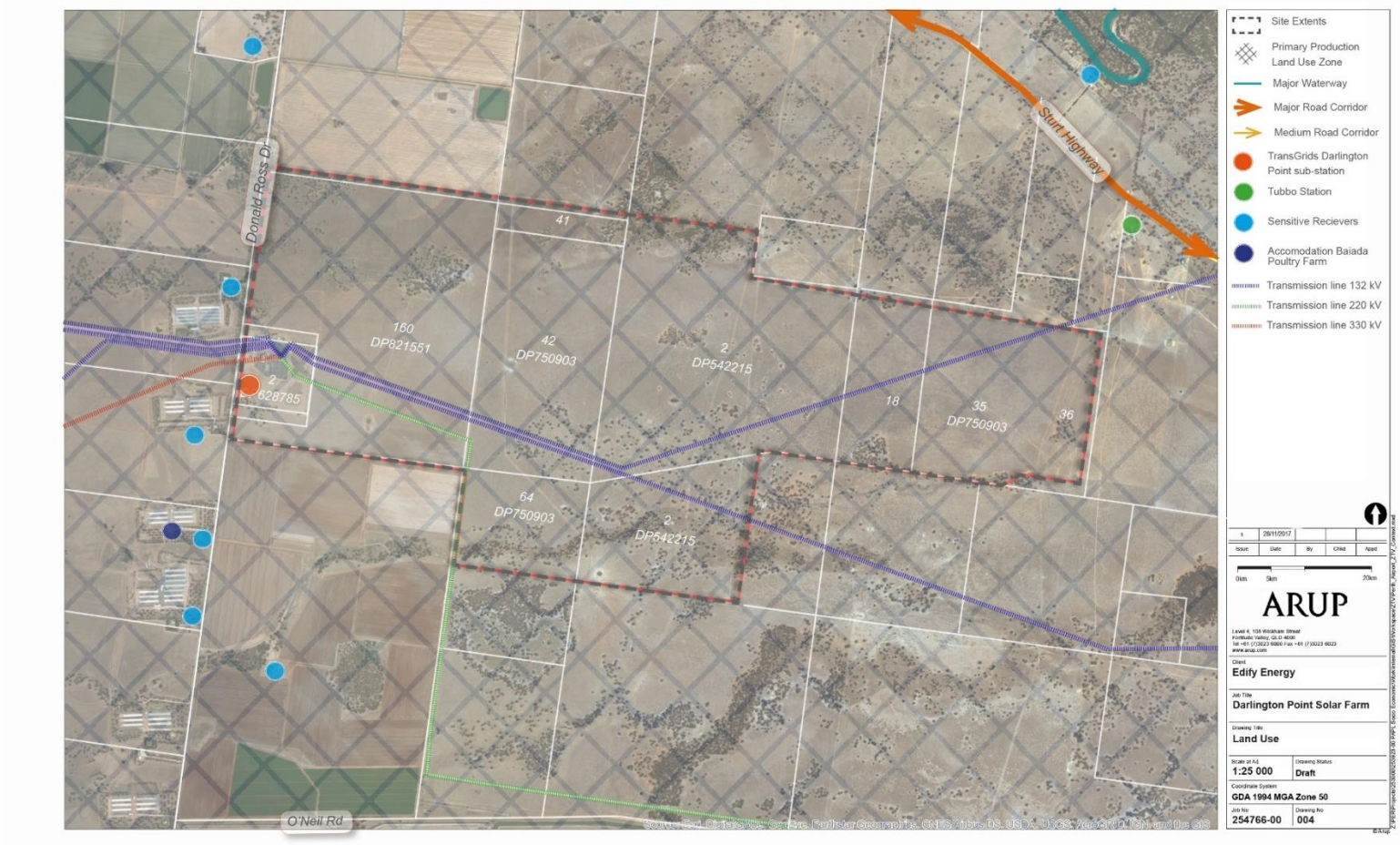


Figure 6 Land use

2.2 Reflected glare

2.2.1 Road corridors

There are a number of road corridors in the vicinity of the proposed DPSF site.

The Sturt Highway, a major road, is located to the north of the site. The distance between the highway and the northern boundary of the site varies approximately between 1.5km and 6km. Potential glare receptors would be travelling in a westerly to north-westerly direction or in a south-easterly direction.

Donald Ross Drive, a minor road, runs in a north-south direction (in the vicinity of the site) and is adjacent to the western boundary of the site. Potential glare receptors would be travelling in a northerly or southerly direction due to the orientation of Donald Ross Drive.

Other road corridors are considered to be sufficiently far from the proposed site that solar reflection impacts are not anticipated.

2.2.2 Air traffic

Solar reflection impacts on aircraft flying over or in the vicinity of the proposed site were not considered. This matches guidance in Guideline E of the National Airports Safeguarding Framework, as quoted below:

> *The potential for glare caused by reflected sunlight from structures such as buildings has been raised in some quarters as a potential source of distraction to pilots. However, CASA has advised that glare from buildings tend to be momentary and therefore unlikely to be a source of risk. The potential for risk from building glare is further attenuated by the use of sunglasses which pilots normally wear in bright daylight.*

For the purposes of this assessment, air traffic has been considered in the context of nearby airports. Aircraft that are landing and taking off are considered to be the most susceptible to reflected glare impacts, due to their proximity to the ground, and the detailed visual tasks being undertaken.

The two nearest airports are at Griffith and Narrandera. Griffith Airport is located to the north of the site, approximately 49km away. Narrandera Airport is located to the south-east of the site, approximately 45km away. Both airports are considered to be sufficiently far from the proposed site that solar reflection impacts are not anticipated.

2.2.3 Surrounding residences

As per Figure 7, the eight nearest residential receivers to the proposed DPSF site range in proximity to the site boundary, from approximately 100m up to 1.5 km. Five of these residences are to the west and north-west of the site; two are to the south of the site; and one to the north-east of the site.

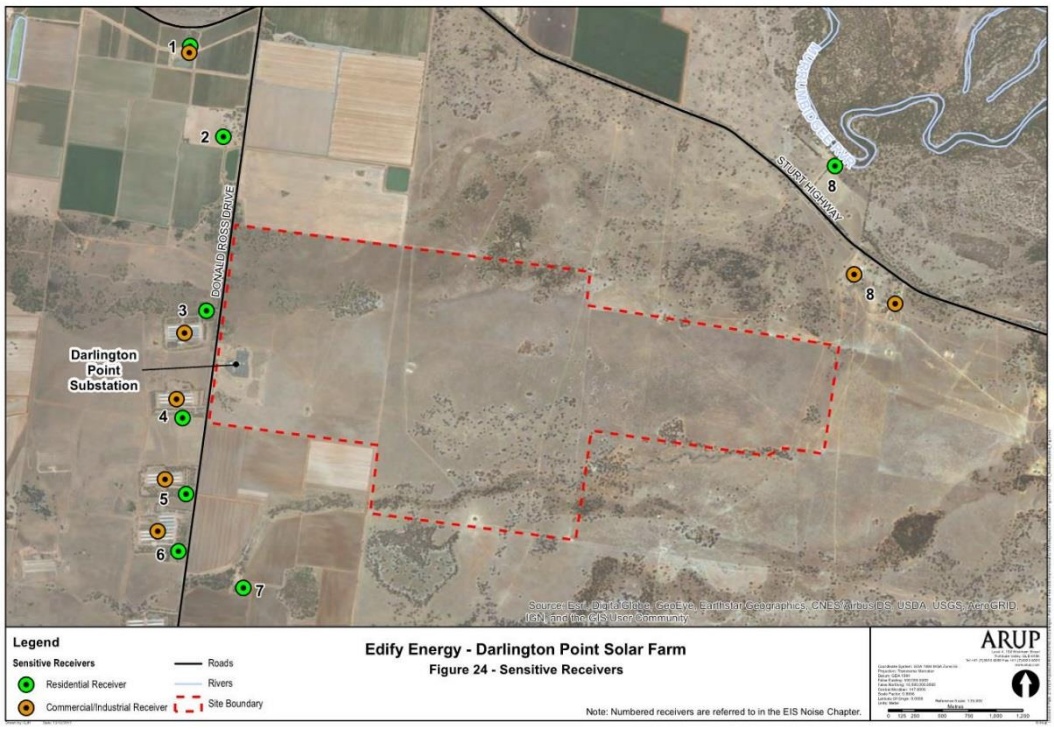


Figure 7 Sensitive receivers (Note: Figure 24 in the EIS).

2.3 Visual amenity summary

The relatively flat agricultural landscape offers expansive views with intervening vegetation transitioning with the seasons as colours and vegetative forms change.

The Sturt Highway and Donald Ross Drive road corridors provide the main vantage points from which to view the agricultural landscape, although views are frequently filtered by road-side vegetation. Some road-side patches are dense with a well-established understorey; in other areas vegetation is limited where wide pastoral views are afforded.

Existing overhead transmission lines and substation infrastructure are visible from both the Sturt Highway and Donald Ross Drive corridors. Surrounding residences are sparsely distributed. Generally, neighbouring dwellings are associated with screen planting from adjacent road corridors or differential private planting that disconnects the residence from paddocks or industrial land use.

Scenic amenity is rated as low to moderate sensitivity. Built infrastructure includes; production related infrastructure and buildings, farm fence structures, powerlines, roads and tracks, rural residences. Where remnant vegetation frames views across the pastoral land, scenic amenity increases.

3 Significance criteria

The assessment of visual effect relates to the changes that would arise in the composition of available views as a result of the introduction of the DPSF development. The two principle factors which influence the assessment of potential effects include the sensitivity of the view point and the magnitude of the anticipated change as described below. The following significance criteria have been drawn from the Landscape Institute and the Institute of Environmental Management and Assessment's *Guidelines for Landscape and Visual Impact Assessment: third edition* (LIIEMA, n.d.).

3.1 Sensitivity

Visual sensitivity refers to the nature, duration and quality of a view. In order to assist in the assessment of visual effects, the sensitivity of a viewpoint is considered in the broadest context, from those of national importance through to those considered to have a local visual importance. The terminology in Table 1**Error! Reference source not found.** describes the visual sensitivity criteria.

Table 1 Visual sensitivity

Level of visual sensitivity	**Description**
National	Heavily experienced, high quality view to a national icon.
State	Heavily experienced, high quality view to a feature or landscape that is iconic to the State, e.g. views from National Parks and scenic lookouts or views of state significance. May also be less frequently visited if the iconic visual feature is viewed from a designated viewpoint such as that included in a National Park.
Regional	Heavily experienced, high quality view to a feature or landscape that is iconic to a major portion of a city or a non-metropolitan region, or an important view from an area of regional open space and regional park.
Local	High quality view experienced by concentrations of residents and/or local recreational users, and/or large numbers of road or rail users, e.g. expansive urban or bushland views from residential areas or local open space.
Neighbourhood	Views from locations where visual amenity is not a key feature or not important to the viewer; these may be lesser quality views, or where views are glimpsed. These may include views briefly glimpsed from roads, those which currently include visual detractors, places where there is no designated protection for visual amenity.

3.2 Magnitude of change

Visual magnitude of change refers to the degree of change that could occur as a result of the project. A high magnitude of change could occur if the development contrasts strongly with the existing visual amenity. A low magnitude of change could occur if there is minimal visual contrast and a high level of integration of form, line and scale between the proposed options and the existing environment. In this situation the option may be noticeable, but does not markedly contrast with the existing visual amenity. The terminology in Table 2 describes the visual magnitude of change criteria.

Table 2 Visual magnitude of change

Magnitude of Change	**Description**
High	Considerable reduction or improvement in visual amenity. Substantial part of the view is altered.
Moderate	Noticeable reduction or improvement in visual amenity. Alteration to the view is clearly visible.
Low	No perceived reduction or improvement in visual amenity. Either the development is not visible, or if it is, the change in the view is generally unlikely to be perceived by viewers.

3.3 Visual assessment significance criteria

Although there are no recognised standards for determining the significance of visual effect, a level of significance has been assigned as part of the assessment in order to provide a clear and consistent means of evaluating visual effect. The significance criteria for the visual effects has been adapted in Table 3 from the sensitivity criteria and visual magnitude of change detailed in Table 1 and Table 2.

Table 3 Visual assessment significance criteria

Visual Significance	**Criteria**
Major Adverse	These impacts are considered critical to the decision making process. They tend to be permanent, or irreversible, or otherwise long term, and can occur over large scale areas. Receptors are extremely sensitive, and/or the impacts are of national significance.
High Adverse	These impacts are likely to be of importance in the decision making process. They tend to be permanent, or otherwise long to medium term, and can occur over large or medium scale areas. Receptors are high to moderately sensitive, and/or the impacts are of State significance.
Moderate Adverse	These impacts are relevant to decision making, particularly for determination of environmental management requirements. These impacts tend to range from long to short term, and occur over medium scale areas or focused within a localised area. Receptors are moderately sensitive, and/or the impacts are of regional or local significance.

Visual Significance	Criteria
Minor Adverse	These impacts are recognisable, but acceptable within the decision making process. They are still important in the determination of environmental management requirements. These impacts tend to be short term, or temporary and/or at the local scale.
Negligible	Minimal change to the existing situation. No adverse or beneficial change is likely to be perceived by viewers.
Beneficial	The project results in an improvement in the baseline situation, for example, improved landscape and visual amenity.

3.4 Visual modification assessment criteria

Table 4 shows how visual sensitivity and visual modification have been combined to determine significance of impacts specific to this assessment.

Table 4 Visual assessment matrix

	Visual Sensitivity					
Visual Modification		**National**	**State**	**Regional**	**Local**	**Neighbourhood**
	Considerable reduction (high)	Major adverse	Major adverse	High Adverse	Moderate Adverse	Minor Adverse
	Noticeable reduction (moderate)	Major adverse	High Adverse	Moderate Adverse	Minor Adverse	Negligible
	No perceived reduction or improvement (Low)	Negligible	Negligible	Negligible	Negligible	Negligible
	Noticeable improvement (Moderate)	Very high Beneficial	High Beneficial	Moderate Beneficial	Minor Beneficial	Negligible
	Considerable improvement (high)	Very high Beneficial	Very high Beneficial	High Beneficial	Minor Beneficial	Minor Beneficial

4 Impact appraisal

4.1 Proposal key components

The proposed development has the potential to accommodate up to 275 MW (AC) of solar generated electricity, including the provision for battery technology for energy storage (battery energy storage system – BESS) and resupply during peak demand. Key features of the DPSF will include:

- Photovoltaic (PV) solar panels
- Steel mounting frames with piled foundations
- A single-axis tracking system
- Direct current (DC) / alternating current (AC) inverter stations
- Medium voltage electrical reticulation network
- A 33/132kV switchyard and internal switchroom
- A battery yard (BESS facility), consisting of individual power pack cubicles or skid-mounted/containerised power packs and modular inverters and MV transformers, including a connection to the above switchyard
- Internal access tracks for operational maintenance and housekeeping
- Security fencing
- Staff car park and small amenities building.

The DPSF will consist of solar arrays comprising PV solar panels mounted on frames with a single-axis tracking system to follow the sun and optimise energy generation.

Whilst the final design of the DPSF development will not be finalised until the detailed design phase, the following key elements are expected to be relatively standard:

The arrays will be arranged in a series of long rows (see Figure 8), which will interconnect to form a block of likely either 2.5 MW (AC) or 5 MW (AC). Each block will contain an inverter station (see

- Figure 9), consisting of an inverter and a transformer, to convert DC to AC and step up the output voltage level.
- The steel mounting frames and inverter stations will be installed on piles and will sit above ground level and the modelled flood levels (ie.up to 1 metre above ground level).
- The wooded areas of the site are largely being avoided by the development and it is expected that the existing grassland would be retained below the panels.

Figure 8 Example array arrangement

Figure 9 Example inverter station

Ground disturbance will be kept to a minimum. The solar farm design will follow the existing contours of the land and the level of the site would not be substantially altered. The one exception is that the proposed new 132 kV switchyard (an area of approximately 75x75m) would likely need to be benched to match the level of the TransGrid substation.

The main site access will be at the location of the existing unsealed farm access track off Donald Ross Drive, located around 20m north of the TransGrid substation boundary fence and 3km south of the Sturt Highway.

Subject to staging, construction is expected to take around 12 months and it is anticipated that the peak workforce would comprise approximately 300 personnel. Construction of the BESS facility would follow immediately after the 12 month solar farm construction period, and would run for a period of 3 to 6 months (e.g. Q3 to Q4 (August to December) 2020). It is expected that 10 to 20 personnel, reaching a peak of 20 personnel, would be required over the 3 to 6 month period.

It is expected that during operation, the grasslands will be retained under panels and will be maintained in accordance with the requirements of the biodiversity and fire management plans. It is expected that grasslands will be kept lower in the summer fire season, using sheep grazing and/or manual slashing, and longer in the winter months. Operational activities will include routine inspections, grassland management to prevent overgrowth including bushfire risk management, and repair and replacement of equipment as required.

4.2 Representative viewpoint appraisal

As described in Section 1.1.2, 13 representative viewpoints have been selected from within the visual envelope (refer to VEM, Figure 10) to inform the visual appraisal. The VEM allowed for a viewpoint assessment identifying unmitigated effects that could arise from these viewpoint locations. Mitigation measures and the residual impacts (impacts occurring after the implementation of mitigation measures) are discussed in Section 5.

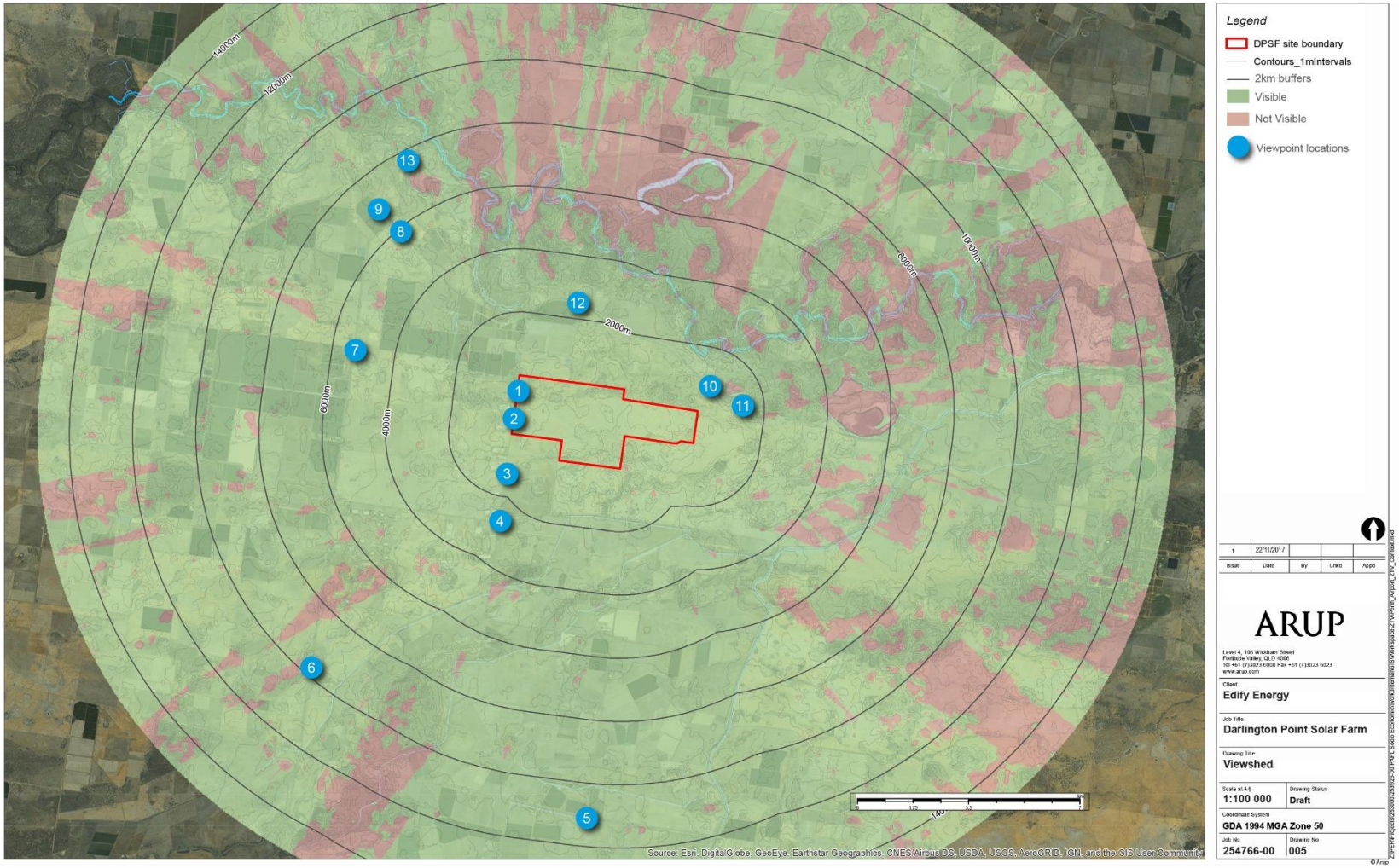


Figure 10 Visual Envelope Map

Viewpoint 1

Baseline Description: Donald Ross Drive, Anderson property gate, looking east towards the proposed solar farm (directly adjacent to the site boundary).

The view is relatively contained with mature vegetation either side of the entrance. The existing industrial TransGrid substation infrastructure, located to the south of the view, detracts from the viewpoint amenity. Other visual elements include the metal gate, dirt track and existing vegetation with occasional low-medium dense trees dispersed throughout the cleared landscape. Mature vegetation is evident in the distance.

Sensitivity	Magnitude of Change	Effect
Views would be primarily experienced by passing motorists and employees in the context of the existing agricultural infrastructure and the TransGrid substation **Sensitivity:** ***Neighbourhood***	Considerable reduction in visual amenity will occur during and after the construction of the proposed solar farm and BESS facility. **Magnitude of Change:** ***High***	The neighbourhood sensitivity and high magnitude of change would result in a **minor adverse** effect during construction and operation.

Viewpoint 2

Baseline Description: Donald Ross Drive, TransGrid substation gate, looking east towards proposed solar farm. (distance from the site)

The views extend towards distinctively dominant substation and linear electrical infrastructure that greatly contrasts against the flat, low-lying landscape. Trees are intermittently dispersed across the predominately cleared and grassy landscape. Other viewpoint features include electrical infrastructure within the background and foreground, brick fence and metal gate, an asphalt road leading to the substation and a densely vegetated backdrop.

Sensitivity	Magnitude of Change	Effect
The viewpoint is adjacent to an existing TransGrid substation and would primarily be experienced by road users and employees of the industrial and agricultural properties. **Sensitivity:** ***Neighbourhood***	It is anticipated that views towards the project would be partially screened by the existing industrial infrastructure. Due to the similar nature of the proposal to the existing infrastructure and limited visibility towards the DPSF project, the magnitude of change is assessed to be moderate. **Magnitude of Change:** ***Moderate***	The neighbourhood sensitivity and moderate magnitude of change would result in a **negligible effect** during construction and operation.

Viewpoint 3

Baseline Description: Donald Ross Drive, looking north-east towards proposed development. Approximately 3km away from the site.

Views are expansive across the agricultural landscape as soft, low-lying vegetation dominates the vista. Other visual elements include a fence to the left that has minimal impact to the viewpoint and separates the fields from the road. The established vegetation along Donald Ross Drive encloses the western side of the road. Transmission towers can be viewed at particular intervals in the background breaking up the densely vegetated backdrop.

Sensitivity	Magnitude of Change	Effect
Views are predominately focussed on the imminent surrounds i.e. agricultural landscape and would be experienced mostly by motorists utilising the adjacent road corridor. **Sensitivity:** ***Neighbourhood***	It is anticipated that there will be no reduction or improvement in visual amenity with the construction and operation of the proposed solar farm. The vegetated backdrop in this view is situated in front of the proposed, low-lying solar panels and will obstruct the majority of views. **Magnitude of Change:** ***Low***	The neighbourhood sensitivity and low magnitude of change would result in a **negligible effect** during construction and operation.

Viewpoint 4

Baseline Description: Donald Ross Drive, further towards McGrath Road, looking north-east towards the proposed development. Approximately 5.5km away from the site. The views expand across the road corridor, turfed road verge, agricultural landscape and out towards the extensively vegetated backdrop. The road corridor is lined with evenly dispersed telephone poles and transmission power-lines. A fence separates the fields with the verge. Road users and passer-byers experience expansive agricultural views across the landscape.

Sensitivity	**Magnitude of Change**	**Effect**
Views are predominately focussed on the imminent surrounds i.e. agricultural landscape and would be experienced mostly by motorists utilising the adjacent road corridor. - Potential affected land owner close-by **Sensitivity:** ***Neighbourhood***	It is anticipated that there will be no reduction or improvement in visual amenity with the construction and operation of the proposed solar farm. The vegetated backdrop will obstruct views of the low-lying solar panels. **Magnitude of Change:** ***Low***	The neighbourhood sensitivity and low magnitude of change would result in a **negligible effect** during construction and operation.

Viewpoint 5

Baseline Description: Intersection of Donald Ross Drive and Eulo Road, looking north towards the proposed solar farm. (Approximately 11km away from DPSF boundary.)

The viewpoint is channelled towards the centre of the horizon, down the road corridor towards the proposed development site. The western side of the corridor is dominated by low-lying agricultural fields, back-dropped by intermittently dispersed mature thicket vegetation. Linear electrical transmission infrastructure assists in drawing the view towards the horizon as they evenly punctuate the low-lying fields. Contrastingly, the eastern side of the corridor features a timber plantation with tall, clear stemmed trees planted in rows creating a strong juxtaposed form and shape.

Sensitivity	Magnitude of Change	Effect
Views towards the solar farm are obstructed by patches of dense vegetation situated in the distance on agricultural landscape types. Motorists using the corridor may experience views towards this area. **Sensitivity: *Neighbourhood***	It is anticipated that there will be no reduction or improvement in visual amenity with the construction and operation of the proposed solar farm. The vegetated backdrop and warehouse structures will obstruct views of the low-lying solar panels. **Magnitude of Change: *Low***	The neighbourhood sensitivity and low magnitude of change would result in a **negligible effect** during construction and operation.

Viewpoint 6

Baseline Description: Intersection of Kidman Way and McGrath Road, looking north-east towards proposed development (approximately 10km from DPSF boundary).

The views are dominated by grassy, scrubby heath located in the foreground, middle and background. Vertically contrasting electrical transmission towers and infrastructure punctuate the landscape at particular intervals dispersing north, from the middle ground towards the background. The mature vegetation is dense and creates a backdrop to the viewpoint along the horizon. A fence separating the road corridor from the verge has minimal impact to the view.

Sensitivity	Magnitude of Change	Effect
Views are predominately focussed on the imminent surrounds i.e. vegetated landscape and would be experienced mostly by motorists utilising the adjacent road corridor. **Sensitivity: *Neighbourhood***	It is anticipated that there will be no reduction or improvement in visual amenity with the construction and operation of the proposed solar farm. The vegetated backdrop will obstruct views of the low-lying solar panels. **Magnitude of Change: *Low***	The neighbourhood sensitivity and low magnitude of change would result in a **negligible effect** during construction and operation.

Viewpoint 7

Baseline Description: Kidman Way, approximately 5.8km south of the Sturt Highway, looking east towards the proposed development.

The focal point of the view is dominated by thin, linear electrical transmission infrastructure, starkly contrasting against the low-lying, grassy landscape in the foreground and middle ground. The vegetated backdrop restricts majority of views through to the landscapes situated behind. Adjacent roadside signage and boundary fencing has minimal impact to the viewpoint.

Sensitivity	Magnitude of Change	Effect
The densely established vegetation acts as a visual buffer to any views experienced of the proposed solar farm. Motorists using the corridor and approaching Sturt Highway would potentially view this area. **Sensitivity:** ***Neighbourhood***	It is anticipated that there will be no reduction or improvement in visual amenity with the construction and operation of the proposed solar farm. The vegetated backdrop and warehouse structures will obstruct views of the low-lying solar panels. **Magnitude of Change:** ***Low***	The neighbourhood sensitivity and low magnitude of change would result in a **negligible effect** during construction and operation.

Viewpoint 8

Baseline Description: Intersection of Sturt Highway and Kidman Way, looking south-east towards the proposed development (approximately 7km from DPSF boundary).

The views are dominated by a residential property directly adjacent to the highway with mature, large and extremely dense vegetation acting as a visual buffer from the corridor. The low-lying residential buildings are situated within the screened vegetation. Other visual features within the viewpoint include the asphalt road, low-lying grassy road verge and consistently dispersed transmission poles lining the road corridor.

Sensitivity	Magnitude of Change	Effect
Views are predominately focussed on the imminent surrounds. Motorists using the corridor would experience the view. The residential property may potentially view the area to the south-east, however, may be screened by screening vegetation **Sensitivity: *Neighbourhood***	It is anticipated that there will be no reduction or improvement in visual amenity with the construction and operation of the solar farm. The vegetated backdrop will obstruct views of the solar panels. **Magnitude of Change: *Low***	The local sensitivity and low magnitude of change would result in a **negligible effect** during construction and operation.

Viewpoint 9

Baseline Description: Sturt Highway, from the BP service station, looking south-east towards the proposed development (approximately 7.5km from DPSF boundary).

The view extends across the expansive agricultural landscape and is broken up by intermittent roadside vegetation that is situated directly past the grassed road verge. The viewpoint includes a backdrop with sparsely dispersed mature native vegetation. A subtle boundary fence and property sign are evident in the view.

Sensitivity	Magnitude of Change	Effect
The roadside vegetation filters views from the road corridor. The area would be experienced by motorists using the corridor and approaching Sturt Highway. **Sensitivity:** ***Neighbourhood***	It is anticipated that there will be minimal reduction in visual amenity with the construction and operation of the proposed solar farm. The roadside vegetated buffer will filter views of the low-lying solar panels. **Magnitude of Change:** ***Low***	The neighbourhood sensitivity and high magnitude of change would result in a **negligible effect** during construction and operation.

Viewpoint 10

Baseline Description: Tubbo Homestead (listed under the Murrumbidgee LEP as local heritage) entrance off Sturt Highway, looking south-west towards the proposed development (approximately 7.5km from DPSF boundary).

The views are dominated by sparsely dispersed mature thicket vegetation. The road corridor is bound by tall grasses as the verge within the foreground before changing to intermittent established trees and shrubs scattered throughout the middle and background of the viewpoint.

Sensitivity	Magnitude of Change	Effect
Views are predominately focussed on the roadside and scattered native vegetation within the landscape, adjacent to the corridor. The area would be experienced by motorists using the corridor and approaching Sturt Highway. - No residents on-site at this location. Potential minor effect to the amenity associated with the heritage listing of the homestead. **Sensitivity: *Neighbourhood***	It is anticipated that there will be minimal reduction in visual amenity with the construction and operation of the solar farm. The vegetated backdrop will obstruct the majority of views to the solar farm, including from the Tubbo Homestead. **Magnitude of Change: *Low***	The local sensitivity and low magnitude of change would result in a **negligible effect** during construction and operation.

Viewpoint 11

Baseline Description: Sturt Highway, approximately 3km east of the Tubbo Woolshed (listed under the Murrumbidgee LEP as local heritage), looking south-east towards the proposed solar farm.
The view extends across the expansive agricultural landscape typology and is broken up by intermittent roadside vegetation that is situated directly past the grassed road verge. The viewpoint includes a backdrop with sparsely dispersed mature native vegetation. A subtle boundary fence and property sign is evident in the view.

Sensitivity	Magnitude of Change	Effect
The roadside vegetation acts as a visual buffer to views experienced of the proposed solar farm. The area would be experienced by motorists using the corridor and approaching Sturt Highway. Seasonal farm worker users of the Tubbo Woolshed may experience minor impact to the amenity of views towards the proposed solar farm. **Sensitivity:** ***Neighbourhood***	It is anticipated that there will be minimal reduction in visual amenity with the construction and operation of the proposed solar farm. The roadside vegetated buffer will obstruct dominate views of the low-lying solar panels. **Magnitude of Change:** ***Low***	The neighbourhood sensitivity and low magnitude of change would result in a **negligible effect** during construction and operation.

Viewpoint 12

Baseline Description: Sturt Highway, near the Altina Wildlife Park, looking south towards the proposed solar farm.

The view extends across pastoral landscape with mature native vegetation in the foreground that frames the middle and background views. Other visual elements include a low-lying grassed road verge, a boundary fence, expansive taller grasses against a backdrop of established vegetation.

Sensitivity	Magnitude of Change	Effect
Views are focussed on the roadside buffer vegetation that encloses the road corridor for this section of the Sturt Highway. As one of the leading tourist attractions for the Darlington Point area, tourists and highway motorists would experience this viewpoint frequently. **Sensitivity: *Local***	It is anticipated that there will be minimal reduction in visual amenity with the construction and operation of the solar farm. The vegetated backdrop will obstruct majority of views to the solar farm. **Magnitude of Change: *Low***	The local sensitivity and low magnitude of change would result in a **negligible effect** during construction and operation.

Viewpoint 13

Baseline Description: Kidman Way, southern city limits of Darlington Point, looking south-east towards the proposed solar farm.

The view extends across the expansive, low-lying, cleared agricultural landscape. The dominant focal point of the viewpoint is the large native tree adjacent to the road corridor. Extensively established, mature vegetation creates a backdrop to the viewpoint, offering a contrast in colour, shape and form to the under-storey of grasses situated in the middle ground.

Sensitivity	Magnitude of Change	Effect
Kidman Way changes to Carrington St as the speed allocated to the highway is dropped to 50km/hr on approach to Darlington Point town's centre. This section of the highway experiences users and motorists entering and exiting Darlington Point. **Sensitivity: *Local***	It is anticipated that there will be no reduction in visual amenity with the construction and operation of the proposed solar farm. A combination of dense patches of established vegetation and the flat terrain restrict views of the solar farm from this distance. **Magnitude of Change: *Low***	The local sensitivity and low magnitude of change would result in a **negligible effect** during construction and operation.

4.3 Reflected glare

4.3.1 Road traffic

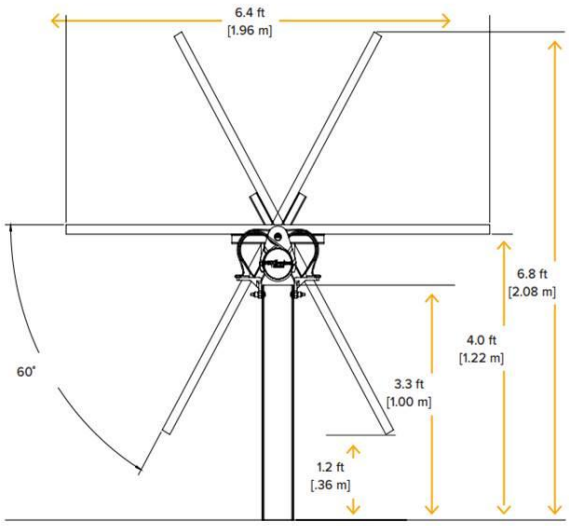


Figure 2 illustrates that the maximum tilt of the PV panels is approximately 60° from the horizontal. When the altitude of the sun is less than 30° in the morning or the evening, any direct sunlight incident on the panels will be reflected upwards to the sky and away from the identified glare receptors.

Once the sun altitude is above 30°, the panels will track to face the sun as it moves across the sky from east to west. Any incident direct sunlight will continue to be reflected upwards and away from the identified glare receptors.

Based on consideration of the geometry of the tracking PV panels and the location's sun path, it is determined that no solar reflections will be directed toward glare receptors travelling on Sturt Highway or Donald Ross Drive. This implies that no reflected glare risks are anticipated for these glare receptors.

4.3.2 Air traffic

Both Griffith and Narranderra airports are considered to be sufficiently far from the proposed site that solar reflection impacts are not anticipated.

4.3.3 Surrounding residences

As explained in Section 4.3.1, due to the limits of the PV array axis rotation and tracking during the day, any incident direct solar radiation will be reflected upwards to the sky and away from the identified glare receptors.

No solar reflection impacts are anticipated for glare receptors in surrounding residences.

4.4 Results summary

Industrial sheds and power substation and transmission infrastructure within a predominantly agricultural setting dominate the proposed solar farm site and surrounds.

The low profile of the proposed solar array infrastructure combined with the ability of existing woodland vegetation within the landscape to screen views from the surrounding area, will result in the proposed solar farm development not causing a dominant or unacceptable contrast to the surrounding landscape from the available views.

The operational view of the DPSF from Donald Ross Drive, will mainly be visible to motorists and site workers. The proposed substation, BESS facility, and maintenance facilities will be sited adjacent to the existing TransGrid substation and fencing will be contiguous along the perimeter to minimise the cumulative visual intrusion for this infrastructure.

The potential impacts from the 13 representative views were assessed to be minor adverse to negligible during operation of the solar farm development. The highest impacts (rated minor adverse impact) were identified from Donald Ross Drive – to the immediate east of the site where vegetation screening is limited (viewpoint 1). Donald Ross Drive motorists and local industry workers will be the main receivers of this visual impact. The existing view of expansive agricultural landscape will be replaced by the DPSF infrastructure visible from the adjacent road corridor, producing a high magnitude of change to existing views.

During construction, the additional traffic impact has potential for cumulative temporary visual impacts. Donald Ross Drive will be highly utilised, expected to carry a large proportion of heavy and over-sized vehicles. The visual impact of increased traffic movements to the site would be predominately limited to construction (approximately 12 months), and a 3 to 6 month period for the BESS facility, albeit with lesser traffic volumes. Impacts would be managed as part of the construction traffic management plan that will be developed to minimise vehicle movements as much as possible for construction.

The geometry of the proposed single-axis tracking PV panels is such that any incident direct sunlight will be reflected upwards to the sky and away from the identified glare receptors. There are not expected to be any potential reflected glare impacts on the identified glare receptors due to the development of the DPSF.

5 Mitigation strategy

5.1 General measures

The following measures are recommended to reduce the general visual impact of the development. There were no specific viewpoints identified in the visual impact assessment that require site specific mitigation.

5.1.1 Design

The materials and colour of onsite infrastructure will, where practical, be non-reflective and in keeping with the materials and colouring of existing infrastructure or of a colour that will blend with the landscape. Where practical:

- Pole mounts will be non-reflective
- Security fencing posts and wire would be non-reflective.
- Screening vegetation will be considered and agreed with adjacent landowners if required.

5.1.2 Construction and decommissioning

- During construction, dust will be controlled in response to visual cues.
- Areas of soils disturbed by the project would be rehabilitated progressively or immediately post-construction.
- Night lighting would be minimised to the maximum extent possible (i.e. manually operated safety lighting at the main component locations). It would be directed away from Donald Ross Drive, so as not to cause light spill that may be hazardous to drivers.

6 List of references

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