

Visual Impact Assessment

SUNRAYSIA SOLAR FARM, BALRANALD

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1 INTRODUCTION

NGH Environmental completed a visual impact assessment of the proposed Sunraysia Solar Farm (Sunraysia SF), which is located around 17km south of the Balranald town centre and around 140km south east of Mildura, within the Balranald Shire Council Local Government Area (LGA) (refer Figure 1-1). This report has been prepared on behalf of the proponent, Sunraysia Solar Farm Two Pty Ltd (Sunraysia SFTPL), a subsidiary of Maoneng Australia Pty Ltd (Maoneng), to assess the potential visual impacts of the proposed Sunraysia SF. Visual amenity values and visual impacts are subjective, therefore the assessment included a transparent systematic evaluation to address subjectivity as much as possible.

1.1 PROJECT OVERVIEW

The Sunraysia SF would comprise the installation of a solar plant with a capacity of around 200 MWAC. Maoneng proposes to develop around 800 hectares of the 1,000 hectare proposal site. The Sunraysia SF would include the following elements:

- PV modules using crystalline or thin-film technology with solar tracking system.
- Energy storage
- A site office and maintenance building.
- An access road from Balranald-Tooleybuc Road to the site.
- Internal access tracks to allow for site maintenance.
- Perimeter security fencing.
- Grid connection to the substation to the north via an overhead line (220-330kv).
- Native vegetation screening, where required to break up views of infrastructure.

A concept layout is provided in Appendix A.

Environmental assessment in accordance with Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) is required for the proposal. The Secretary's Environmental Assessment Requirements (SEARs), provided by NSW Department of Planning and Environment (DPE) on 16 June 2016, specify the impacts to be considered in the environmental assessment. The SEARs relevant to the visual impacts are:

- Visual – including an assessment of the likely visual impacts of the development (including any glare, reflectivity and night lighting) on surrounding residences, scenic or significant vistas, air traffic and road corridors in the public domain, including a draft landscaping plan for on-site perimeter planting, with evidence to demonstrate it has been developed in consultation with affected landowners.

1.2 SITE CONTEXT

The proposed solar farm would be located on Lot 9,10,11 and 14 of DP 751179, which covers an area of approximately 1000 hectares. It is bounded by agricultural land (crops) to the north, west and south and by Crown Land (Traveling Stock Reserve) to the east. The site is accessed via Balranald-Tooleybuc Road (also known as Yanga Way and Mallee Highway) at the south eastern corner of the site. The Cut Line is an unsealed track running along the southern boundary of the site providing access to surrounding agricultural farm, including the proposal site.

The site is slightly undulating with the centre of the site being on slightly higher ground than the peripheries. (There is a difference of approximately 13 metres between the highest and lowest point of the proposal site.) The proposal site has been used for agriculture for several decades and is therefore highly modified from intensive farming including ploughing. Areas of native vegetation are, however, located

along the southern boundary and western boundary of the site, with some smaller patches and isolated trees located throughout the proposal site. One abandoned and derelict residential building is located on the proposal site.

1.3 OBJECTIVES OF THIS REPORT

This Visual Impact Assessment (VIA) includes a full assessment of the visual impacts associated with the Sunraysia SF. It includes an assessment of:

- Landscape character and scenic vistas (including significant or sensitive vistas).
- Potential impacts on representative viewpoints, including residences and road corridors.
- Potential impacts on air traffic

Study area	Defined as within 16km of the proposed solar farm site (maximum view distance).
Proposal site / site	The lot boundaries within which the solar farm development is proposed, excluding offsite infrastructure such as access upgrades or transmission lines and connections.
Proposal	All infrastructure and activities required for the construction, operation and decommissioning of the solar farm.
Landscape character unit (LCU)	LCUs take into account topography, vegetation, land use, and other distinct landscape features. They are a way to categorise the existing scenic quality of the receiving environment and consider the ability of the environment to absorb visual change at the landscape scale.
Landscape management zone (LMZ)	LMZs are derived by combining scenic quality with viewer sensitivity and proximity to the proposed infrastructure at the landscape scale. A three-tiered management hierarchy sets out appropriate management objectives for each zone.
Zone of Visual Influence (ZVI)	ZVI modelling uses GIS modelling and topography to determine areas which would be shielded from views of infrastructure at the proposed solar site. It does not take into account other existing or proposed screening features such as vegetation or built structures.



Figure 1-1 Location of the Sunraysia Solar Farm

2 METHODOLOGY

2.1 OVERVIEW

The visual impact assessment has been completed in the following stages:

- Background investigations, mapping and modelling
- Field survey including reconnaissance, ground truthing and photography
- Impact assessment
- Development of a visual impact mitigation strategy

These methods are detailed below.

2.2 BACKGROUND INVESTIGATIONS, MAPPING AND MODELLING

Background investigations included identifying key features within the landscape that may be affected by the visual impacts of the proposed solar farm. This was done using existing literature, tourism information, topographic maps and aerial photos.

Mapping and modelling were undertaken to:

- Identify and classify LCUs within 16km of the proposed solar farm. Sixteen kilometres is generally considered the maximum distance a viewer can see infrastructure similar to that proposed on a clear day. This was done based on aerial imagery and relevant GIS layers. LCUs are a way to summarise differences in landscape amenity and the sensitivity of different areas within the landscape to visual impacts.
- Define areas in which the infrastructure may be visible, using Zone of Influence (ZVI) modelling. A map identifying the ZVI (or viewshed) of the proposal was produced. This method uses topographic information to determine areas in which views of infrastructure would not be visible. It does not account for other features that may provide shielding such as vegetation or buildings. Topography was based on a 25m resolution Digital Elevation Model (DEM) sourced from Commonwealth of Australia (Geoscience Australia) (2016). Two ZVI models were prepared, one for the infrastructure located on the proposal site and one for the overhead powerline with up to 50 metre high poles. The infrastructure on the proposal site was modelled as 4m high rectangular blocks for the solar arrays/PV boxes and 8.5 metre high rectangular blocks for the buildings. This was undertaken to differentiate the impact as a result of the powerlines, which may be visible from a longer distance but may have a lower impact due to existing powerlines in the area, from the solar farm which covers a larger area and may have a higher impact at shorter distances. Following the field surveys (see below), existing vegetation screening were added to the ZVI modelling to refine the viewshed results.
- Identify key viewpoints such as major travel routes, public recreation areas, potential receivers (dwellings and other structures, within 2km of the proposed solar farm), and built up areas. This step generally excluded areas deemed not to be visible from the ZVI modelling.
- Understand the feasibility of screening to mitigate visual impacts.

The results were used to inform the field survey.

2.3 FIELD SURVEY

With reference to the mapping and modelling, field reconnaissance and ground truthing was undertaken to:

- Verify and document the existing LCUs in the study area (16km).
- Document representative viewpoints within the LCUs.
- Understand the likely sensitivity of the LCUs to views of the proposed solar farm.
- Determine existing landscape features that would offer a visual barrier from key viewpoints (e.g. vegetation). The average height of any visual barriers (e.g. vegetation) within the proposal site and along the periphery was estimated and added to the ZVI models.

Fieldwork consisted of driving along major and minor roads, investigating views from key local landscape features and general views from different distances from the site and from within different LCUs. Photographs were taken at representative locations, including road sides and near to residences.

Where photographs and panoramas were produced, these were taken from public roads. For residences, photos were generally taken near to residences, from the road, to maximise the view of the proposed solar farm site. Photos were, however, taken from the nearest private property located to the south of the proposal site.

2.4 IMPACT ASSESSMENT AND DEVELOPMENT OF A MITIGATION STRATEGY

The impact assessment methodology used in this Visual Impact Assessment has been adapted from the Bureau of Land Management (BLM) Visual Resource Management System, developed by the BLM, US Department of the Interior (n.d). The BLM developed a systematic process to analyse the visual impact of proposed developments. The basic philosophy states that the degree to which a development affects the visual landscape depends on the visual contrast imposed by the project.

Key steps undertaken to assess the visual impact are as follows:

- Define LMZ, for the representative viewpoints, based on:
 - The scenic quality of the study area's LCUs.
 - The expected sensitivity at representative viewpoints.
- Evaluate the degree of contrast the solar farm would result in at representative viewpoints and in consideration of the management objectives of the relevant LMZ.
- Determine the acceptability of the contrast with the management objectives of the relevant LMZ; this is the resultant visual impact, rated as high, medium or low.

Criteria for scenic quality, sensitivity, contrast and visual impact are included in the assessment, Section 5.

Mitigation measures are considered for impacts greater than medium visual impact; for a medium impact, the contrast is considered acceptable.

3 EXISTING ENVIRONMENT

3.1 STUDY AREA

The study area is dominated by agricultural land (crops) and isolated homesteads. Most of the homesteads are located along Wee Wee Creek (5 kilometres to the south west) and the Murrumbidgee River (11 kilometres to the north west). Supporting infrastructure is also dominant in the landscape (silos, irrigation canals, powerlines, roads). There are three residential properties within five kilometres of the proposal site (1.4km to the south, 4.6 to the north east and 6.3 kilometres to the north). The landscape in the study area is slightly undulating with a difference of around 26 metres between the lowest and highest points.

Native vegetation in the study area is generally restricted to nature reserves and riparian vegetation along the major creeks and rivers. The Murrumbidgee Valley National Park, Murray Regional Park and Murrumbidge Valley SCA are located to the north, north east and east of the proposal site, 5.5 kilometres from the proposal site at their closest point. However, there are large patches of native vegetation in the landscape including along property boundaries and within the Travelling Stock Reserve (TSR) running along Balranald-Tooleybuc Road from Balranald to Tooleybuc. TSRs are parcels of Crown land reserved under legislation for use by travelling stock, providing pasture reserves for travelling or grazing stock.

Balranald is a small township located around 16km north from the proposal site with a population of 1200; the town crosses over the Murrumbidgee River and is a former paddle-steamer port (NSW Government 2016). Balranald is rich in Indigenous, Australian and European history (NSW Government 2016).

Local attractions include:

- Heritage Park
- Balranald heritage trail.

The biggest annual community event in Balranald is the Australia day celebrations, held on January 26th each year. It is a family day that celebrates not only the present it encompasses the rich heritage of the town (NSW Government 2016).

The small village of Kyalite is located 14km south from the proposal site. Kyalite is renowned as a fishing hotspot along the Murray River and is home to the largest commercial Pistachio farm in Australia (Discover Balranald and surrounds 2016). The Kyalite pub is an icon building in the village, even Burke and Wills stopped by in September 1860 (Kyalite Pub N.D). This is classed as an iconic Australian pub and is the heart of the community including the 'reading' of the pub wall (Kyalite Pub N.D). The pub's amenities include being a general store, deli, fishing shop, issuer of NSW fishing licenses, camping supplies, automotive supplies and general hardware (Kyalite Pub N.D). There is one caravan park located within the hotels vicinity (Kyalite Pub N.D). The annual Inter-club fishing competition on the long weekend in March is started by the pub releasing assorted native fingerlings into the river system (Kyalite Pub N.D).

The Balranald Aerodrome is a small country aerodrome located 1.9km north east of Balranald outside the study area. It sits at altitude of 64 m, and has two runways. Aerodrome facilities include lockable aircraft hangers, aircraft tie down points, pilot controlled landing lights, wet weather waiting area and toilet facilities.

Two private rural airstrips are located 3.6 kilometres south-west and the other approximately 8.5 kilometres south-east of the proposal site.

3.2 SIGNIFICANT VISTAS

Scenic vistas in the study area and their distance from the site include:

- Balranald-Tooleybuc Road is the main road located between Balranald to the north and Tooleybuc to the south. It is used by heavy and other vehicles travelling to and from Victoria, includes utility infrastructure (powerlines) but also provides views into working farms (crops), defining the productive focus of this area. The proposal site is located adjacent to this road. Views of the solar array, powerlines and other infrastructure would be visible from this road.
- A TSR runs along Balranald-Tooleybuc Road from Balranald to Tooleybuc. The reserve is vegetated and provides visual amenity. Views of the solar array, powerlines and other infrastructure would be visible from the TSR.
- Balranald and Kyalite are the two closest towns to the proposal site (16 kilometres to the north and 14 kilometres to the south respectively). Views of the solar array, powerlines and other infrastructure would not be visible from these towns.
- The Murrumbidgee Valley National Park, Murray Regional Park and Murrumbidgee Valley SCA are located to the north, north east and east of the proposal site, 5.5 kilometres from the proposal site at their closest point and offer nature based experiences and visual amenity. The solar array, powerlines and other infrastructure would not be visible from these areas.

3.3 COMMUNITY VALUES

3.3.1 General attitudes to solar infrastructure

Research indicates there is widespread support for solar energy as a source of energy for electricity generation in Australia (ARENA n.d); 78% of respondents are in favour of large scale solar energy facilities and 87% are in favour of domestic installations. The large scale solar energy sector is still at a relatively early stage of development in Australia, however. While most members of the community are aware of large scale solar energy, many do not know a great deal about their impacts (ARENA n.d.), including visual impacts.

Three approaches to improving community understanding of the visual impacts of large scale installations include:

- Provision of images (from many angles) of large scale solar facilities, particularly in the early stages of a proposal.
- Understanding the similarities between highly supported domestic scale installations and large scale facilities.
- Understanding the current function of the land proposed to hold the facility and the additional value the installation allows for.

(Source: extracted from ARENA n.d).

This report endeavours to address these issues.

3.3.2 Values of the local community to the proposal

Twenty people attended the Sunraysia SF information session held in Balranald on 6 October 2016. The attendees included a range of government authorities, interest groups and the wider community.

Government agencies that attended the information session included:

- Balranald Shire Council
- OEH

Representatives of the Balranald Aboriginal Land Council also attended.

Key messages received during the information session from the stakeholders included:

- Farming culture. It is important to support the community to maintain the farming culture of the Balranald regional area. This would include maintaining the existing public access track along the southern side of the proposal site for neighbours and to ensure that any construction or operational activity does not impede on the impacts of the farmer's day to day lifestyle.
- Growing tourism. The community wishes to promote its Discovery Centre with a potential add-on for a solar element.
- Growing local solar expertise. There is limited electrical contracting experience within the Balranald Shire to support basic electrical needs.
- Growing local jobs. Sunraysia Solar Farm is anticipated to have a 12-month construction period commencing around Quarter 4 of 2017. Balranald has limited accommodation mechanisms and the employees of Sunraysia (during the construction period) will have limited avenues as a result.
- Contentious land. It is important to seek approvals from relevant Aboriginal stakeholders so as to properly appreciate the significance and cultural heritage of the land.

Visual amenity was not specifically raised.

3.4 LANDSCAPE CHARACTER UNITS (LCU)

LCUs take into account topography, vegetation, land use, and other distinct landscape features. They are a way to summarise differences in the receiving environment that may affect the visual impact of the proposed solar farm at different locations.

Three key LCUs were identified within 16km of the proposal site:

- Agricultural land
- Nature reserves and natural landscapes
- Residential (rural village, peri urban, suburban).

They are characterised below in terms of their scenic quality. Scenic quality is rated as follows:

- A high scenic quality rating describes areas with outstanding, unusual or diverse features.
- A moderate scenic quality rating applies to areas with the features and variety normally present in the character type.
- A low scenic quality rating is given for areas lacking outstanding, unusual or diverse features or variety.

The three LCUs identified within 16km of the proposed solar farm site are characterised in Table 3-1 in terms of their scenic quality and illustrated in Appendix B.

Table 3-1 Landscape Characteristic Units within 16km of the Sunraysia Solar Farm

Landscape Character Unit	Key features
Agricultural	<p>Cropped and irrigated rectangular paddocks form a collection of intensively worked agricultural areas with various crops. This results in a mosaic of well-defined rectangular patches of varying colours (green to ochre) dependent on the season. The paddocks are often separated from one another by strips of remnant native vegetation. The proposed solar farm site is located within this LCU.</p> <p>The paddocks and their crops are of low relief on slightly undulating terrain, producing a uniform landscape. This is dissected by roads, sealed and unsealed, irrigation channels and powerlines that reinforce the linear patterns of the landscape and its key role as a primary production landscape. The powerlines provide a rare vertical element. Powerlines are relatively abundant in proximity of site, with at least 3 existing lines radiating from a substation in different directions. This includes a high voltage powerline cutting through the landscape. The substation is located about 2 kilometres north of the proposal site.</p> <p>This LCU also includes the vegetated TSR which runs along Balranald-Tooleybuc Road. TSRs are parcels of Crown land reserved under legislation for use by travelling stock, providing pasture reserves for travelling or grazing stock.</p> <p>Residences within this LCU are commonly well screened with vegetation whether planted or remnant native vegetation. Other infrastructure is clustered and includes sheds and silos and low fences.</p> <p>Scenic quality is generally low. These areas are generally uniform in colour and form, lacking variety. Elements are production related. Existing infrastructure mostly includes powerlines, roads, houses and farm buildings. This LCU is the most extensive in the study area.</p>
Nature reserves and natural landscapes	<p>The Murrumbidgee Valley National Park, Murray Regional Park and Murrumbidgee Valley SCA, Wee Wee Creek and the Murrumbidgee River are all located in the study area and offer nature based experiences and visual amenity. They include large expanses of remnant vegetation and wetlands. Isolated homesteads are also located along the boundaries of these areas.</p> <p>Scenic quality is considered moderate. These areas include large areas of native vegetation and scenic water views of wetlands, rivers and creeks. This LCU is common in the study area. The proposal is not visible from this LCU.</p>
Rural village, suburban areas	<p>Two small rural villages occur in the study area, Balranald and Kyalite. These are service hubs, with retail facilities and agricultural suppliers. Residences are well maintained with well-maintained yards and gardens. Outlooks on the outskirts of the towns are generally broad, onto low relief cropping paddocks. Views of powerlines and roads are common.</p> <p>Scenic quality is considered moderate. There is variety in colour and form throughout this character type. Elements include recreational aspects; parks and gardens. This LCU is not common in the study area. The proposal is not visible from this LCU.</p>

3.5 VIEWPOINTS AND EXPECTED SENSITIVITY

The BLM methodology requires identification of representative viewpoints in the study area. These may be travel routes such as roads, waterways and recreational tracks, residential areas, tourist facilities, houses and farmland.

The predicted sensitivity of each viewpoint can be determined, considering its proximity to the proposed solar farm site and factors such as use, scenic quality and regional significance.

Criteria for proximity and sensitivity are as follows:

- Proximity to the proposal site:
 - Foreground 0 – 1 kilometres
 - Middle ground 1 – 5 kilometres
 - Background 5 – 16 kilometres
- Potential sensitivity to visual impact:
 - High sensitivity:
 - high use routes or areas
 - routes or areas of national or state significance
 - areas with high scenic quality
 - Moderate sensitivity:
 - moderate use routes or areas, or where the duration of view is moderate
 - routes or areas of regional or local significance
 - areas with moderate scenic quality
 - Low sensitivity:
 - low use routes or areas, or where the duration of view is short or which will be seen by few people
 - routes or areas of low local significance
 - areas with low scenic quality

The ZVI modelling produced a set of maps that estimated the areas that would be shielded from views of infrastructure at the proposed solar farm site, based on topography, the location of existing visual barriers (eg vegetation) and the proposed height of infrastructure (refer to Section 2.2).

Viewpoints were generally not selected in areas predicted to be shielded from views of the solar farm. Nine representative viewpoints were identified within the ZVI. The nine viewpoints are described in Table 3-2 in terms of their sensitivity, with the viewpoint locations illustrated in Appendix C.

Residences were assessed to have moderate sensitivity, even where they are located in areas of low scenic quality (agricultural areas). In agricultural areas, gardens and plantings have often been incorporated into house lots, most likely to provide shade as well as screening (views, dust, noise) from the intensively worked agricultural lands. These areas provide an 'oasis' within the broader LCU. They are also likely to offer some visual screening to views of the solar farm.

Similarly to residences, views from the TSR were assessed to have moderate sensitivity. While the TSR is agricultural in nature, providing pasture reserves for travelling or grazing stock, it provides visual amenity through its native vegetation which contrasts with the surrounding cropped land. The vegetated TSR would provide some visual screening to views of the solar farm dependent on the location of the viewer within the TSR (along the boundary of the proposal site vs closer to Balranald-Tooleybuc Road).

Table 3-2 Representative viewpoints (ID) with reference to the Sunraysia Solar Farm

Viewpoint ID	LCU	Scenic quality	Viewpoint	Proximity	Sensitivity
1	Agricultural	Low	Road	Foreground	Low
2	Agricultural	Low	Residence	Middle ground	Moderate
3	Agricultural	Low	Road	Middle ground	Low
4	Agricultural	Low	Road	Foreground	Low
5a	Agricultural	Low	TSR	Foreground	Moderate
5b	Agricultural	Low	TSR	Foreground	Moderate
5c	Agricultural	Low	TSR	Middle ground	Moderate
6	Agricultural	Low	Road	Foreground	Low
7	Agricultural	Low	Road	Middle ground	Low
8	Agricultural	Low	Road	Middle ground	Low
9	Agricultural	Low	Road	Background	Low

4 VISUAL CHARACTERISTICS OF KEY INFRASTRUCTURE COMPONENTS

The key infrastructure components of the Sunraysia SF, with reference to the stage of the project and the potential visual amenity impacts they may generate are discussed below and referenced in the visual impact assessment, Section 5.

4.1 INFRASTRUCTURE COMPONENTS

The proposed infrastructure components include:

- Solar arrays:
 - Piles driven or screwed to the ground.
 - Racking systems to allow the installation of solar panels.
- Solar panels, either:
 - North facing fixed tilt.
 - East-West facing fixed tilt
 - Single-axis trackers
- Up to 100 containerised PV boxes (either containerised or installed on a platform 'skid') each of them containing an inverter and a 22kV or 33kV transformer.
- Energy storage
- Connection infrastructure (cables) between solar arrays and panel inverters required to export power.
- Several containerised delivery station (no further voltage step-up being required, the delivery station will not contain any transformer).
- Cables & trenches.
- Internal access tracks to allow for site maintenance vehicles, and gravel access road and parking for staff and visitors.
- One permanent staff amenities, office and maintenance building.
- Perimeter security fencing, approximately 2.3m high.

The following elements would connect to the site:

- A 220kV to 330kV overhead power line will be installed to connect into the existing substation, approximately two kilometres north of the solar farm.

Ancillary facilities would be located within the site boundary and would include:

- Material laydown areas.
- Temporary construction site offices.
- Temporary car and bus parking areas for construction workers transportation. Once the plant has been commissioned a small car park would remain for the minimal staff required and occasional visitors.

These components are discussed in terms of their visual characteristics below.

4.1.1 Construction components

Construction impacts would be temporary, confined to approximately 10 months. Visual impacts could be generated during this time by:

- Development of site compound areas, site offices and stock piles, located within the site boundaries. Steel sheds can generate reflectivity and glare although would be a similar look to existing farm sheds. Material stockpiles may detract from visual amenity, particularly if dispersed across broad areas.
- Construction traffic would increase visual impacts and add to dust on unsealed roads.
- Areas of bare soil created through trenching cables could contribute to dust and detract from visual amenity until they are rehabilitated.

4.1.2 Operational components

Operational impacts relate to the look of the solar farm, once construction is complete.

- The solar arrays would be no higher than 3m.
- Several different solar PV mounting technology options are still being considered:
 - North facing fixed tilt.
 - East-West facing fixed tilt.
 - Single-axis trackers.

This will affect the views of infrastructure, that is whether panels or mountings are the dominant element from a specific viewing location.

The potential for glare associated with non-concentrating photovoltaic systems which do not involve mirrors or lenses is relatively limited. PV solar panels are designed to reflect as little sunlight as possible (generally around 2% of the light received; Spaven Consulting 2011), resulting in negligible glare. The reason for this is that PV panels are designed to absorb as much solar energy as possible in order to generate the maximum amount of electricity or heat. The panels will not generally create noticeable glare compared with an existing roof or building surfaces (NSW Department of Planning 2010).

Other onsite infrastructure that may cause glare or reflections depending on the sun angle, include:

- Steel array mounting - array mounting would be steel or aluminium.
- Temporary site offices, sheds, containerised PV boxes.
- Battery storage
- Permanent staff amenities, office and maintenance building.
- Permanent staff amenities, office and maintenance building. This building located on site would be the highest structure and be up to 8.5 metres high.
- Containerised PV boxes would contain the inverter and transformer stations and could be up to four metres high. Up to boxes would be located across the proposal site and would be visible above the panels.
- Electricity cables would be installed between the array modules, either underground or mounted to the underside of the array, producing negligible additional visual impact.
- Overhead electrical transmission to the substation. These would be visible from a distance and it would add to existing powerlines in the locality. Pole heights are likely to be up to 50 metres high.
- The substation is existing and would not have any additional visual impact.

- Fencing would be 2.5m high security fencing along the site boundaries. Views would be afforded beyond the fence.
- Access to the site during construction would be from Balranald-Tooleybuc Road. Access upgrades may create additional bare areas prior to rehabilitation.
- An area for parking would be included within the site boundaries. This would accommodate a small number of vehicles and have negligible visual impact.

Examples of the look of some of the key infrastructure components are provided below.



a) Tracking piles, during construction.



b) Solar arrays



c) Example of a PV Box



d) Example of energy storage (Hydrogen fuel cell)

Figure 4-1 Images representative of infrastructure components proposed

5 VISUAL IMPACT ASSESSMENT

The visual impact assessment was undertaken considering the:

- a) Infrastructure components proposed (set out in Section 4).
- b) Their potential impact on landscape character units and representative viewpoints.
- c) The degree of contrast the development would have within the identified Visual Landscape Management Zones and if these are considered acceptable.

This section defines the LMZs for the study area and assesses the contrast with the LMZ management objectives to determine the level of visual impact. The potential for mitigation is then discussed for higher impacted viewpoints, to reduce them to an acceptable impact level.

5.1 DEFINITION OF LANDSCAPE MANAGEMENT ZONES

Visual Landscape Management Zones (LMZ) were developed for the study area. These zones were derived by combining information about scenic quality (from the LCU, Section 3.2), viewer sensitivity and the distance of the area from viewpoints (section 3.3). Combined they produce a three-tiered management hierarchy: A – C, as shown in Table 5-1.

Table 5-1 Visual Landscape Management Zone decision matrix

		Proximity / sensitivity						
		Foreground High	Middle ground High	Background High	Foreground Moderate	Middle ground Moderate	Background Moderate	Foreground Low
Scenic quality	High	A	A	A	A	B	B	B
	Moderate	A	B	B	B	B	C	C
	Low	B	B	B	B	C	C	C

Each zone has associated objectives to guide management of visual change and to help evaluate proposed project impacts. These are shown in Table 5-2:

Table 5-2 Visual Landscape Management Zone management objectives

Management priority	Management objectives
A	Maximise retention of existing visual amenity. Landscapes are least able to absorb change. Developments may lead to a major change.
B	Maintain existing visual amenity, where possible. Protect dominant visual features. Developments may be allowed to be visually apparent.
C	Less importance for retaining existing visual amenity. Landscapes are able to absorb change. Developments may be allowed to dominate but should reflect existing forms and colours where possible.

5.2 EVALUATING VISUAL IMPACTS

The ratings for the degree of contrast created by the proposed solar farm infrastructure in each viewpoint have the following definitions (BLM n.d.).

- High contrast: the proposal would be dominant within the landscape and generally not overlooked by the observer, the visual change would not be absorbed.
- Medium contrast: the proposal would be moderately dominant and noticed, the visual change would be partially absorbed.
- Low contrast: the proposal would be seen but would not attract attention, the visual change would be well absorbed.
- Indistinct: contrast would not be seen or would not attract attention, the visual change would be imperceptible.

To determine if the objectives for the LMZ are met, the contrast rating for the viewpoint is compared with the relevant management objectives to give a visual impact level. The visual impact level is consequently defined as:

- High impact: contrast is greater than what is acceptable.
- Medium impact: contrast is acceptable.
- Low impact: visual contrast is little or not perceived and is acceptable.

5.3 VISUAL IMPACT ASSESSMENT OF THE PROPOSAL EXCLUDING TRANSMISSION LINE

Table 5-3 below evaluates the visual impact on the representative viewpoints to the proposal site. Visual impacts are also illustrated in Appendix D.

Table 5-3 Visual impact at representative viewpoints with reference to the Sunraysia Solar Farm

View ID	Viewing opp.	Scenic quality	Proximity	Sensitivity	LMZ	Objective	Contrast	Visual Impact
1	Road	Low	Foreground	Low	C	Reflect existing forms and colours	Medium	Medium impact Given the 100km/hr speed limit along Balranald-Tooleybuc Road and existing vegetation screening on the proposal site that may filter the views of the solar farm, the contrast is considered to be acceptable. There is an opportunity to improve screening of the solar farm from the road, if required.
2	Residence	Low	Middle ground	Moderate	C	Reflect existing forms and colours	Medium	Medium impact The residents have a panoramic view of the southern boundary of the proposal site. However, existing vegetation along the southern side of the proposal site boundary would screen views from the residence itself to some extent. The distance of the residence to the proposal site (around 1.4 kilometres) would also minimise visual impacts. The contrast is considered to be acceptable but there is an opportunity to improve the vegetation screening of the solar farm to the residence, if required.
3	Road	Low	Middle ground	Low	C	Reflect existing forms and colours	Medium	Medium impact Given the 100km/hr speed limit along Balranald-Tooleybuc Road, distance from the proposal site and existing vegetation screening on the proposal site, the contrast is considered to be acceptable. Reducing visual impacts is not considered necessary.
4	Road	Low	Foreground	Low	C	Reflect existing forms and colours	Low	Low impact Given the 100km/hr speed limit along Balranald-Tooleybuc Road and existing vegetation screening between the road and the solar farm which would filter the views, the contrast is considered to be acceptable. There is an opportunity to improve screening of the solar farm from the road, if required.
5a	TSR track	Low	Foreground	Moderate	C	Reflect existing forms and colours	Medium	Medium impact The vegetation of the TSR would filter the views of any temporary users as they pass through the TSR. The contrast is considered to be acceptable. Reducing visual impacts is not considered necessary.
5b	TSR track	Low	Foreground	Moderate	C	Reflect existing forms and colours	Medium	Medium impact The vegetation of the TSR would filter the views of any temporary users as they pass through the TSR. The contrast is considered to be acceptable. Reducing visual impacts is not considered necessary.

View ID	Viewing opp.	Scenic quality	Proximity	Sensitivity	LMZ	Objective	Contrast	Visual Impact
5c	TSR track	Low	Middle ground	Moderate	C	Reflect existing forms and colours	Medium	Medium impact The vegetation of the TSR would filter the views of any temporary users as they pass through the TSR. The contrast is considered to be acceptable. Reducing visual impacts is not considered necessary.
6	Road	Low	Foreground	Low	C	Reflect existing forms and colours	Low	Low impact The contrast is considered to be acceptable.
7	Road	Low	Middle ground	Low	C	Reflect existing forms and colours	Low	Low impact The contrast is considered to be acceptable.
8	Road	Low	Middle ground	Low	C	Reflect existing forms and colours	Low	Low impact The contrast is considered to be acceptable.
9	Road	Low	Back ground	Low	C	Reflect existing forms and colours	Indistinct	Low impact Visual contrast is unlikely to be perceived due to distance from the viewpoint, existing powerpoles in the landscape and vegetation between the viewpoint and the proposal site.

5.3.1 Results summary

Medium impact – mitigation could be considered

Medium impacts are seen from:

- The residence 1.4 kilometres to the south. Located away from the site, the intervening vegetation along the southern boundary of the proposal site would partially obscure the view such that the low height infrastructure proposed is not likely to be dominant. Some additional vegetation screening has been proposed to further minimise visual impacts, however, this requirement would need to be confirmed following the construction of the proposal.
- The TSR along the eastern boundary of the site. The vegetation would partially obscure the proposal site from users of the TSR. There is limited opportunity to further reduce the impacts. The impacts, however, are considered acceptable.
- Users of Balranald-Tooleybuc Road approaching the proposal site from the south. Given the 100km/hr speed limit on the road and existing vegetation screening, impacts would already be minimised but additional onsite screening has the potential to further reduce impacts if required.

A suggested screening plan has been developed (refer Appendix E) that includes screening. This is discussed further in Section 6.

Low impact – no mitigation

Low impacts are seen for roads and sheds to the solar farm site. The short duration of views (experienced from moving vehicles or while working on nearby farms), as well as existing screening, represented by buildings and vegetation, existing built structures (such as powerlines) ensure the views of the site will be acceptable in these areas. General measures to reduce visual impacts are recommended for these locations. This is discussed further in Section 6.

5.4 VISUAL IMPACTS OF THE PROPOSED OVERHEAD POWERLINE

In regards to the overhead powerlines which would be visible from a greater distance than the proposed solar farm (Appendix E), the visual impacts are considered to be low from all viewpoints for the following reasons:

- Powerlines are not uncommon in the study area.
- A high voltage powerline with large truss towers cuts through the landscape from east to west in proximity to the proposed powerline which dominates the landscape.
- The proposed powerline would run parallel to Balranald-Tooleybuc Road which would minimise visual impacts from road users coming from the north or south.
- The length of the proposed powerline has been minimised as far as practicable to two kilometres (i.e. it starts at the most north eastern corner of the proposal site and takes the shortest route possible to the substation).

5.5 CUMULATIVE IMPACTS

Adverse cumulative impacts occur when the infrastructure or activities at the proposal site exacerbate the negative impacts of other infrastructure or activities occurring nearby.

During construction, the additional traffic impact is probably the greatest potential for cumulative visual impacts. Balranald-Tooleybuc Road is a high use road corridor carrying a large proportion of heavy vehicles, particularly in harvest periods. The visual impact of increased traffic movements to the site would be predominantly limited to construction period. During operation, excepting unusual maintenance operations such as inverter or transformer replacement, a small maintenance team using standard vehicles are all that will be required.

The operational view of the solar farm may generate a cumulative impact with the existing substation and powerlines. Both facilities would have security fencing and steel dominated infrastructure and be visible from Balranald-Tooleybuc Road. The additional powerlines would exacerbate impacts in some locations though the cumulative impacts would be considered minor.

It is possible another large scale development could be approved within view of the proposed solar farm, including a proposed large scale solar farm immediately to the north of the proposal site which is in planning phase at time of writing (Limondale Solar Farm).

Generally, adverse cumulative visual impacts are anticipated to be manageable due to the ability to effectively screen infrastructure in this low relief landscape.

5.6 GLARE, REFLECTIVITY AND NIGHT LIGHTING IMPACTS

The Balranald Aerodrome is located around 1.9 kilometres north east of Balranald with two small private air strips located within 10 kilometres of the site. The identified risk to aviation from the Sunraysia SF is glint and glare. Glint is a quick reflection that occurs when the sun is reflected on a smooth surface. Glare is a longer reflection.

Onsite infrastructure that may cause glare or reflections depending on the sun angle, include:

- Solar panels.
- Steel array mounting - array mounting would be steel or aluminium.
- Temporary and permanent site buildings.

The potential for glint or glare associated with non-concentrating PV systems which do not involve mirrors or lenses is relatively limited. PV solar panels are designed to absorb as much solar energy as possible in order to generate the maximum amount of electricity or heat. As such, they reflect only around 2% of the light received (Spaven Consulting 2011).

A comparative reflection analysis against other surfaces is shown in Figure 5-1. The figure shows that in relation to water and snow, a solar panel (with a reflectivity coating) reflects a much lower percentage of light. In addition, The Department of Planning (2010) in their discussion paper on planning for renewable energy generation, stated that solar panels will not generally create noticeable glare compared with an existing roof or building surfaces.

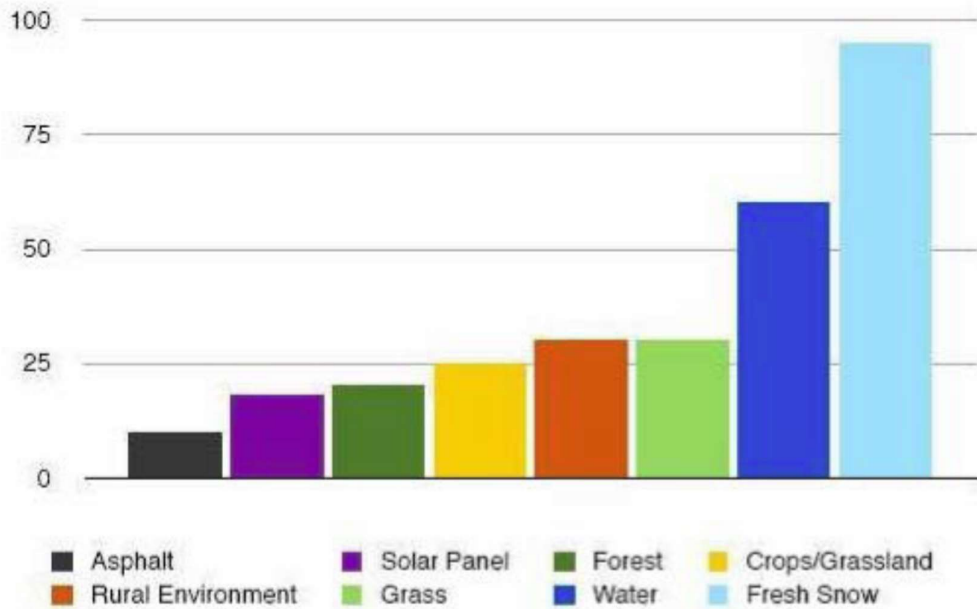


Figure 3: Comparative reflection analysis

Figure 5-1 Comparative reflection analysis (Spaven 2011)

For other infrastructure on site such as the buildings and steel support posts, impacts from glint and glare is considered minor due to their small size and low surface area. Careful design and colour schemes can further reduce any potential reflection problems.

It should be noted that considering the distance of the proposed solar farm to the airport, impacts are likely to be negligible. Therefore, impacts of glare and glint on aviation as a result of the Sunraysia SF infrastructure are considered to be minor and can be effectively managed with the implementation of the mitigation measure outlined below.

6 MITIGATION MEASURES

A Landscape Management Plan is recommended to address the 'as built' visual impacts of the proposed solar farm. The plan would include:

- Onsite vegetation screening for viewers for which a medium impact is confirmed following construction of the solar farm (refer to verification process below). This would be aimed at 'breaking up' not blocking views of onsite infrastructure.
- General methods to reduce visual impact. This would centre on the colour, form and positioning of infrastructure, to reduce the overall visual contrast of the project.
- A process for verification of predicted and actual impacts. This would improve the reliability of the measures and provide a trigger to undertake additional mitigation if required.

These measures are outlined below. They are considered feasible, in that the proponent has agreed the measures can be implemented as part of the project. They are considered effective, as the measures would be implemented post construction and in consultation with affected landholders (where relevant). It is noted that vegetation screens can take time to grow, grow differently than expected or expire before

effective height is achieved. Furthermore, the as built infrastructure may differ from that assessed in this report, predicted impacts may be found to be different to actual impacts. For this reason, a verification process is included in the plan.

6.1 SCREENING

6.1.1 Screen location

One residence has been identified with potential for medium impacts (Viewpoints 2). Onsite planting within the solar farm boundaries is expected to screen views effectively for this receiver. A suggested onsite planting layout is provided in Appendix E.

Additionally, a short section of screening is shown onsite near the Balranald-Tooleybuc Road entrance to the site. Given the 100km/hr speed limit on the road, there is a short duration for motorists to view the solar site and slowing vehicles may cause a hazard. Onsite screening could be considered in this location.

6.1.2 Screen requirements

- Planting would be more than one row deep and be located on the outside of the security fence, so that it breaks up views of the fencing as well as onsite infrastructure. The final location of planting and density would be undertaken following verification of actual impacts.
- The plant species to be used in the screen are to be native and consistent with existing vegetation types on the proposal site. They should be fast growing, with spreading habitat. Species selection should be undertaken in consultation with a botanist.
- The timing is recommended to be within 2 months of completion of construction so that actual and not predicted impacts of infrastructure are mitigated.
- The screen would be maintained for the operational life of the solar farm. Dead plants would be replaced. Pruning and weeding would be undertaken as required to maintain the screens visual amenity and effectiveness in breaking up views.

It is noted that the aim of plant screens is to break up the view and not eliminate it entirely. Partial views are considered likely, particularly while vegetation is developing to maturity.

6.2 GENERAL MEASURES

The following measures are recommended to reduce the general visual impact of the development for all other receivers:

6.2.1 Design

- Solar Farm infrastructure should be reduced in height as far as practicable.
- Security fencing should be located behind existing retained vegetation (i.e. vegetation to be located between viewpoints and the fence) where feasible to reduce the visual impacts of the fence.
- 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:

- Buildings and other infrastructure will be non-reflective and in eucalypt green, beige or muted brown.
- Pole mounts will be non-reflective.
- Security fencing posts and wire would be non-reflective; green or black rather than grey would reduce the industrial character of the fence.

6.2.2 Construction

- During construction, dust must be controlled.
- Parking areas, material stock piles and other construction activities would be located as far as practical from nearby residences and roads or screened (by existing vegetation) for the period of construction.
- Areas of soil disturbed by the project would be rehabilitated progressively or immediately post-construction, reducing views of bare soil.
- Ground cover would be maintained beneath the panels and within the site boundary, to break up views of the infrastructure from the side view.
- Night lighting would be minimised to the maximum extent possible (i.e. manually operated safety lighting at main component locations).

6.3 VERIFICATION OF ACTUAL IMPACTS

A verification process would be implemented within 2 months of the completion of the construction phase.

A Visual Verification Report and Landscape Plan would:

- Confirm the assumptions of this assessment by ground based assessment and ensure medium impacts are mitigated.
- Finalise the location and species for proposed screening, in consultation with nearest affected landholders.
- Detail planting methods and maintenance requirements of the screen planting.

7 CONCLUSION

This report has been prepared to assess the potential visual impacts of the proposed Sunraysia SF. A systematic evaluation has been undertaken to address subjectivity as much as possible. The report was informed by background investigations, mapping and modelling, field survey including reconnaissance, ground truthing and photography and the results of project-specific community consultation.

The proposed Sunraysia SF would be located in an agricultural area of generally low scenic quality. However, the visual characteristics of this rich farming land are important to members of the local community. The solar farm site is located next to a high use transport corridor (road), a travelling Stock Reserve and in proximity to one residence (1.4 km), meaning views of the proposal would not be overlooked. A medium impact was determined for these receivers as existing vegetation on the proposal site and in surrounding land would partially screen the proposal. This existing vegetation screening is also likely to screen the proposal from receivers beyond 5 kilometres.

General measures to reduce impacts for all receivers have also been recommended. These centre on use of design elements to reduce visual contrast, mitigation of construction impacts such as dust that may reduce visual amenity and mitigation of operation impacts, such as maintain ground cover beneath the panels, to break up side on views of infrastructure and soften the appearance of the facility.

Large scale solar panels are still relatively new in Australia. While they enjoy support from many in the community, provision of information on expected visual impacts and involvement in mitigating impacts (for affected receivers) is considered very important to obtaining social license to operate. With the involvement of the affected landowners in the mitigation strategy set out in Section 6, the visual impacts of the proposal are considered acceptable and manageable.

8 REFERENCES

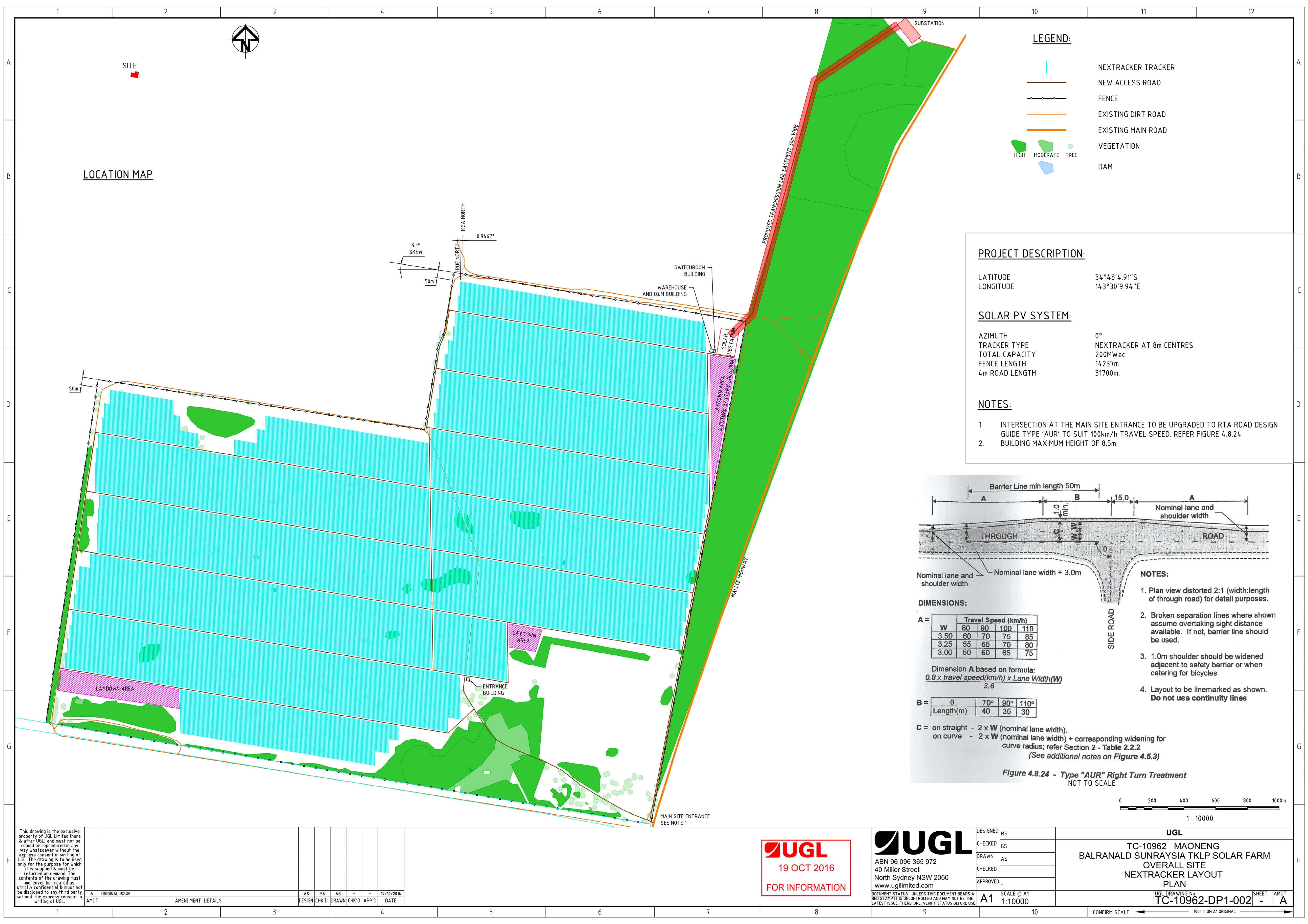
Australian Renewable Energy Agency (ARENA) no date. Establishing the social licence to operate large scale facilities in Australia; insights from social research for industry.

BLM (n.d.) BLM Visual Resource Management System. Available online from the Bureau of Land Management, US Department of the Interior. (www.blm.gov)

NSW Department of Planning (2010). Discussion Paper On Planning For Renewable Energy Generation - Solar Energy, prepared April, 2010.

Spaven Consulting (2011). Solar Photovoltaic Energy Facilities: Assessment of potential for impact on aviation. Report prepared January 2011, for RPS Planning and Development.

APPENDIX A PROPOSED INFRASTRUCTURE LAYOUT



LEGEND:

- NEXTRACKER TRACKER
- NEW ACCESS ROAD
- FENCE
- EXISTING DIRT ROAD
- EXISTING MAIN ROAD
- VEGETATION
 - HIGH
 - MODERATE
 - TREE
- DAM

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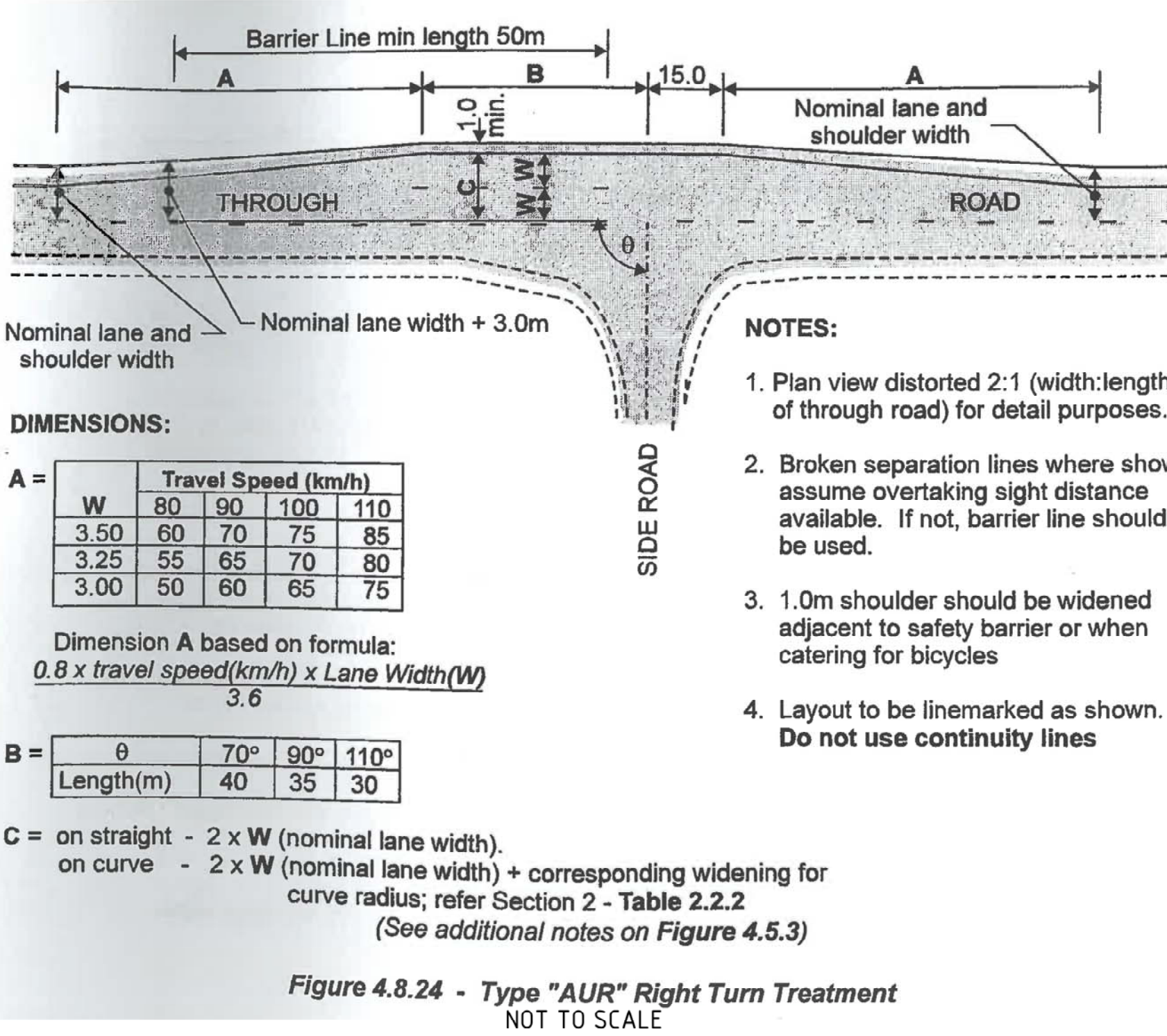
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LONGITUDE 143°30'9.94"E

SOLAR PV SYSTEM:

AZIMUTH 0°
TRACKER TYPE NEXTRACKER AT 8m CENTRES
TOTAL CAPACITY 200MWac
FENCE LENGTH 14237m
4m ROAD LENGTH 31700m.

NOTES:

- INTERSECTION AT THE MAIN SITE ENTRANCE TO BE UPGRADED TO RTA ROAD DESIGN GUIDE TYPE 'AUR' TO SUIT 100km/h TRAVEL SPEED. REFER FIGURE 4.8.24
- BUILDING MAXIMUM HEIGHT OF 8.5m



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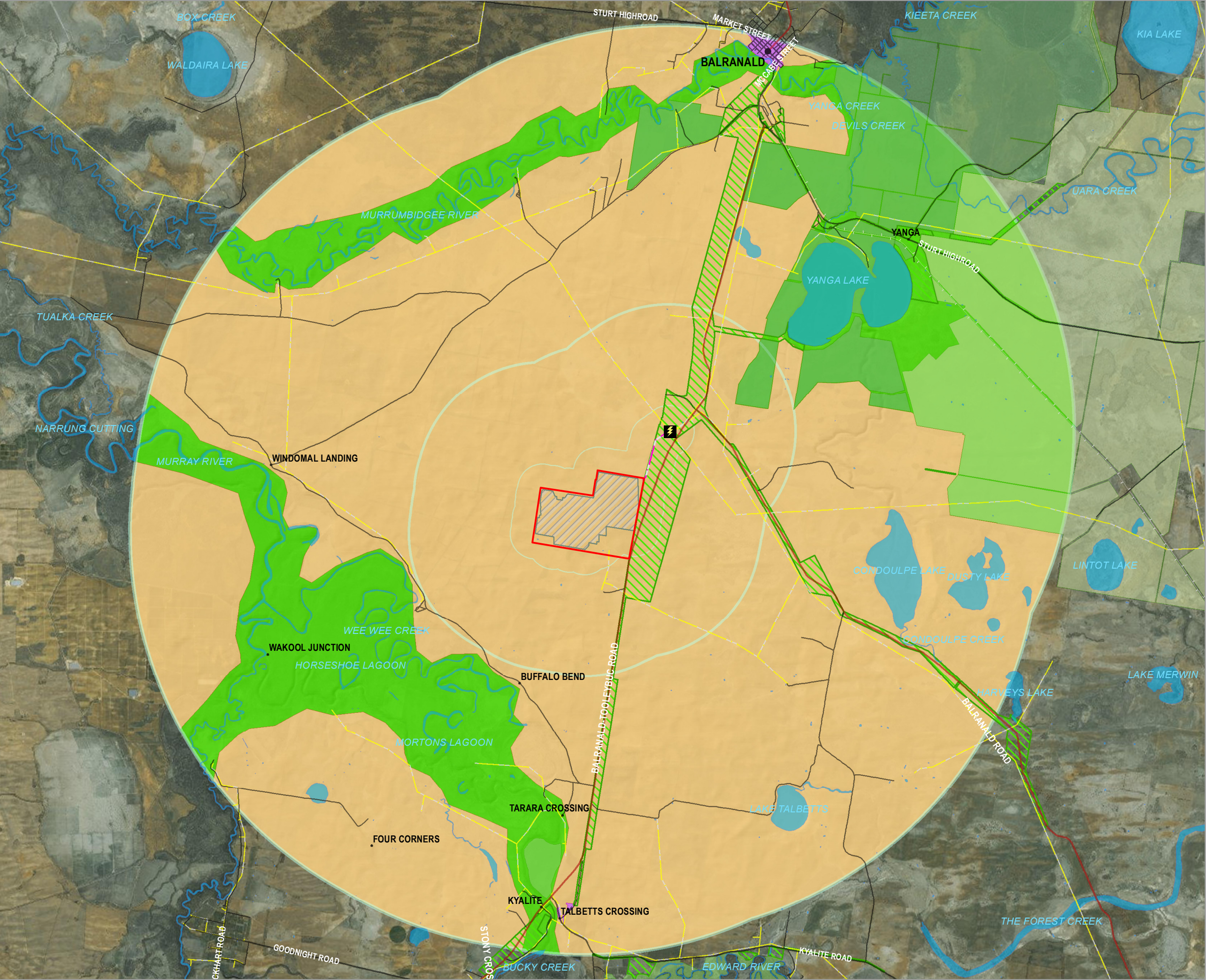
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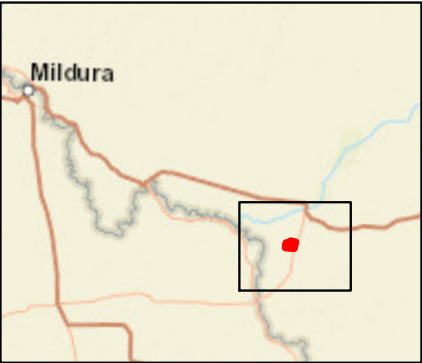
APPENDIX B LANDSCAPE CHARACTER UNITS

SUNRAYSIA SOLAR FARM

Landscape Character Units



- Substation
- Proposal site
- Proposed transmission line
- Proposed extent of solar arrays
- Locality
- Town
- Main road
- Primary road
- Local road
- Existing transmission lines
- Railway
- Farm dam or other water body
- Murrumbidgee Valley National Park
- Murray Regional Park
- Murrumbidgee Valley SCA
- Travelling Stock Reserve
- Foreground (1km)
- Midground (5km)
- Background (16km)
- Landscape Character Unit (LCU)
- Agricultural land
- Nature reserves and natural landscapes
- Rural village suburban areas

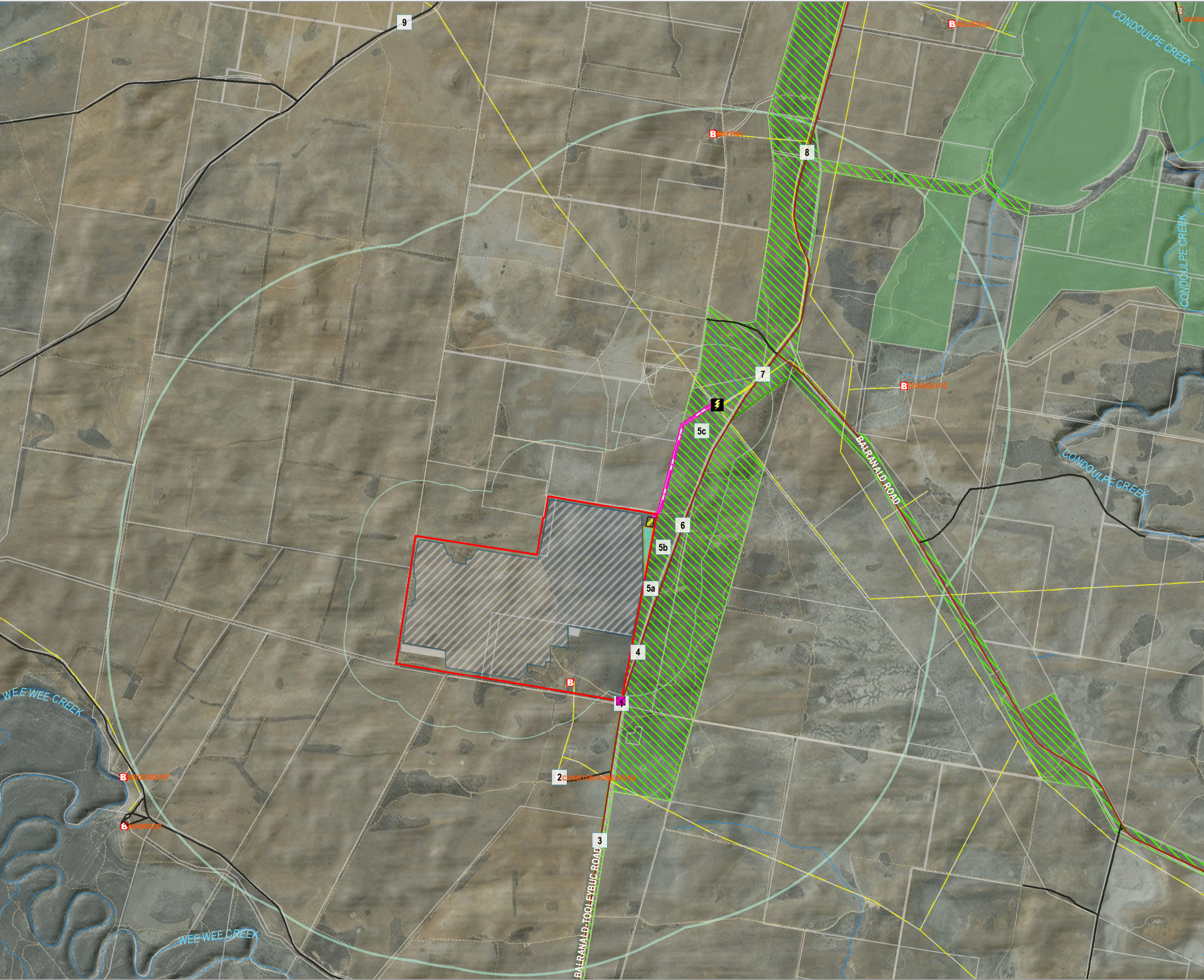


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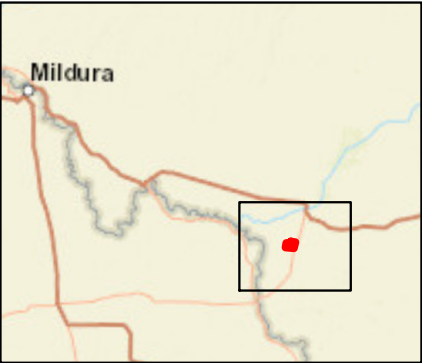
APPENDIX C REPRESENTATIVE VIEW POINTS



SUNRAYSIA SOLAR FARM

Viewpoints

- Site main entrance
- Viewpoints
- Substation
- Proposal site
- Proposed building
- Proposed internal substation
- Proposed transmission line
- Proposed transmission line easement
- Proposed extent of solar arrays
- Proposed laydown area
- Proposed laydown area / future battery storage
- Main road
- Local road
- Vehicular track
- Existing transmission lines
- Watercourse
- Cadastre
- Murrumbidgee Valley National Park
- Potential residence or other structure
- Travelling Stock Reserve
- Foreground (1km)
- Midground (5km)



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Key viewpoint 1 – Road. Looking north from Balranald-Tooleybuc Road from the Cut Line entrance towards the proposal site and proposed proposal site entry.



Key viewpoint 2 – Road. Private residence. Looking north from the residence towards the proposal site located in the far background of the image.



Key viewpoint 3 – Road. Looking north from Balranald-Tooleybuc Road towards the proposal site located in the far background.



Key viewpoint 4 – Road. Looking west from Balranald-Tooleybuc Road towards the proposal site located behind the trees.



Key viewpoint 5a – TSR. Looking west from the centre of the TSR towards the proposal site located behind the trees.



Key viewpoint 5b – TSR. Looking west from the centre of the TSR towards the proposal site located behind the trees.



Key viewpoint 5c – TSR. Looking south west from the centre of the TSR towards the proposal site located behind the trees.



Key viewpoint 6 – Road. Looking south west from Balranald-Tooleybuc Road towards the proposal site located behind the trees.



Key viewpoint 7 – Road. Looking south west from Balranald-Tooleybuc Road towards the proposal site and substation. Proposal site is not visible from here.



Key viewpoint 8 – Road. Looking south west from Balranald-Tooleybuc Road towards the proposal site and substation. Proposal site is not visible from here.



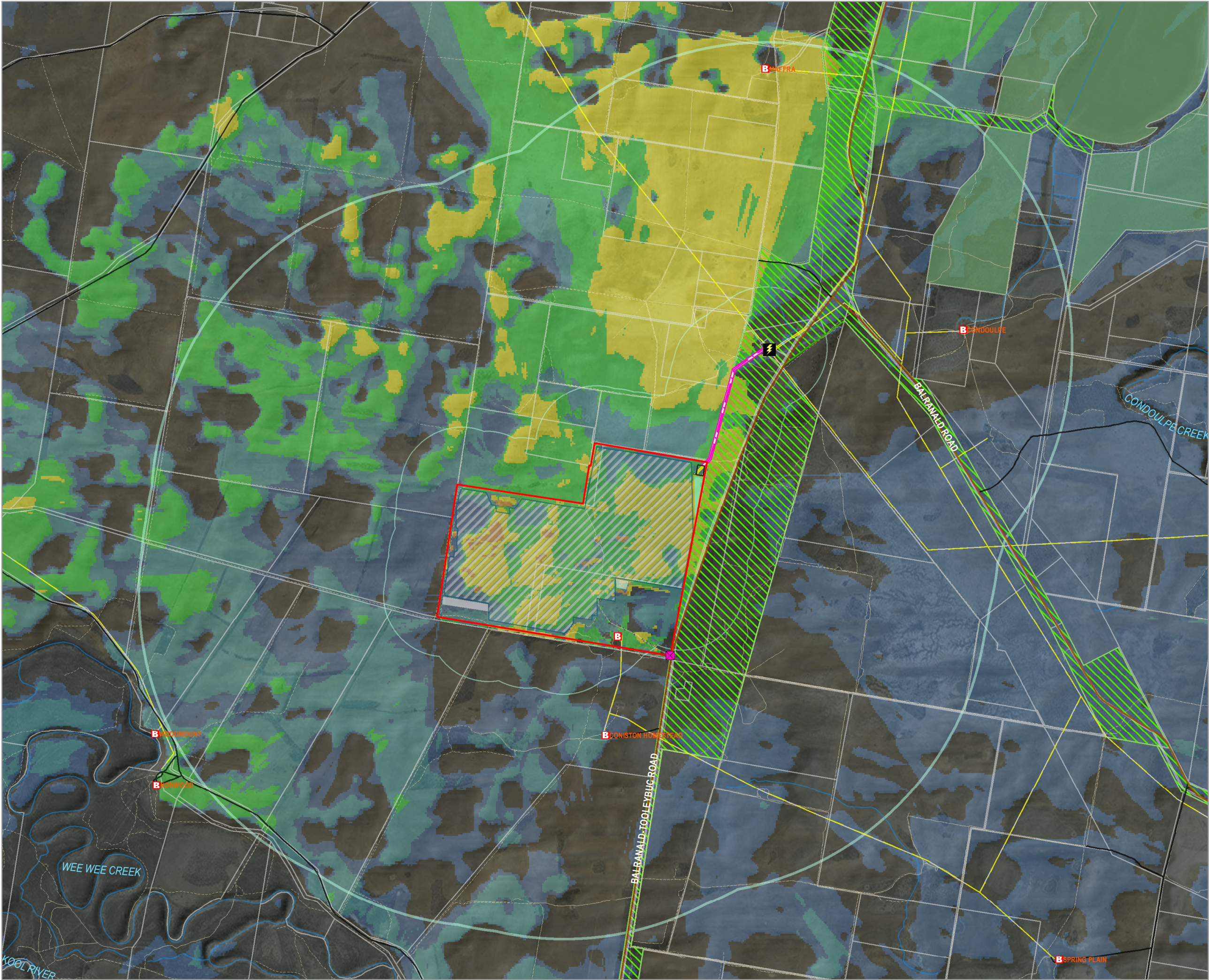
Key viewpoint 9 – Road. Looking south east from Windomal Road Road towards the proposal site and substation located in the far background.

APPENDIX D ZONE OF VISUAL INFLUENCE

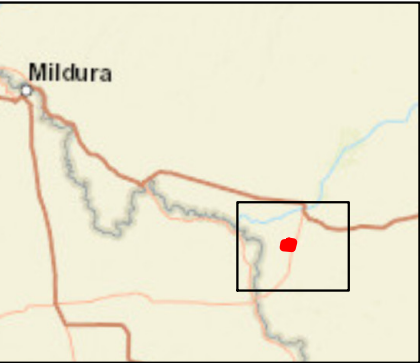
ZVI

The ZVI (or viewshed) of the proposal was produced using topographic information. A height of 4m was used to model onsite infrastructure. This is realistic approximation of the height of panels and PV containers, which may be 3m and 4m, respectively. Separate viewsheds were also prepared to address power pole heights (50 metres). Topography was based on a 25m resolution Digital Elevation Model (DEM) derived from 25m contours. The ZVI takes into account existing vegetation screening around the periphery of the proposal site.

SUNRAYSIA SOLAR FARM



- Site main entrance
- Substation
- Proposal site
- Proposed building
- Proposed internal substation
- Proposed transmission line
- Proposed transmission line easement
- Proposed extent of solar arrays
- Proposed laydown area
- Proposed laydown area / future battery storage
- Potential residence or other structure
- Airport
- Natural Waterbody
- Main road
- Primary road
- Local road
- Vehicular track
- Existing transmission lines
- Watercourse
- Cadastre
- Murrumbidgee Valley National Park
- Travelling Stock Reserve
- Foreground (1km)
- Midground (5km)
- Visibility index
 - 0 : Not visible
 - 1-5 : Low visibility
 - 6-15
 - 16-25
 - 26-35
 - 35-43 : High visibility



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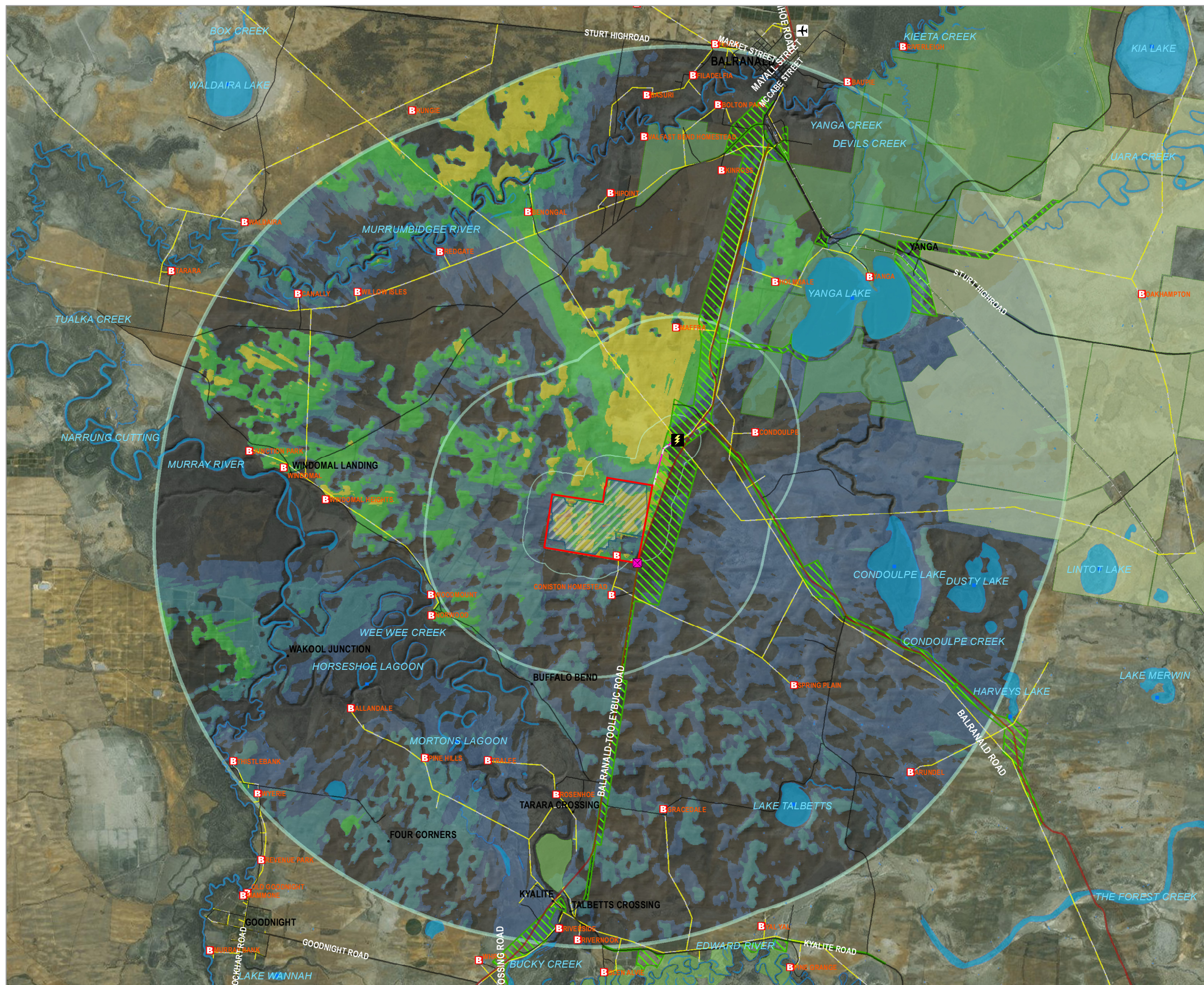
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






















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SUNRAYSIA SOLAR FARM



-  Site main entrance
-  Substation
-  Proposal site
-  Proposed transmission line
-  Proposed extent of solar arrays
-  Potential residence or other structure
-  Airport
-  Natural Waterbody
-  Locality
-  Town
-  Main road
-  Primary road
-  Local road
-  Existing transmission lines
-  Railway
-  Farm dam or other water body
-  Murrumbidgee Valley National Park
-  Murray Regional Park
-  Murrumbidgee Valley SCA
-  Travelling Stock Reserve
-  Foreground (1km)
-  Midground (5km)
-  Background (16km)
- Visibility index
-  0 : Not visible
-  1-5 : Low visibility
-  6-15
-  16-25
-  26-35
-  35-43 : High visibility



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SUNRAYSIA SOLAR FARM

- Site main entrance
- Substation
- Proposed site
- Proposed building
- Proposed internal substation
- Proposed transmission line
- Proposed transmission line easement
- Proposed extent of solar arrays
- Proposed laydown area
- Proposed laydown area / future battery storage
- Potential residence or other structure
- Airport
- Natural Waterbody
- Main road
- Primary road
- Local road
- Vehicular track
- Existing transmission lines
- Watercourse
- Cadastral
- Murrumbidgee Valley National Park
- Travelling Stock Reserve
- Foreground (1km)
- Midground (5km)
- Visibility index
 - 0 - Not visible
 - 1 - Low visibility
 - 2
 - 3
 - 4
 - 5
 - 6 - High visibility



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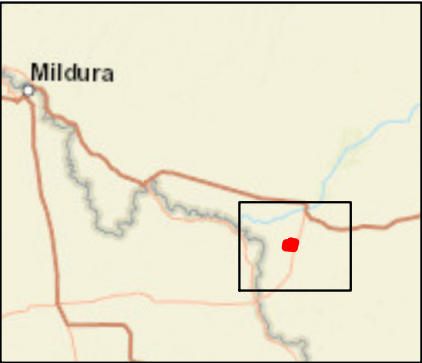
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SUNRAYSIA SOLAR FARM



- Site main entrance
- Substation
- Proposal site
- Proposed transmission line
- Proposed extent of solar arrays
- Potential residence or other structure
- Airport
- Natural Waterbody
- Locality
- Town
- Main road
- Primary road
- Local road
- Existing transmission lines
- Railway
- Farm dam or other water body
- Murrumbidgee Valley National Park
- Murray Regional Park
- Murrumbidgee Valley SCA
- Travelling Stock Reserve
- Foreground (1km)
- Midground (5km)
- Background (16km)
- Visibility index
- 0 - Not visible
- 1 - Low visibility
- 2
- 3
- 4
- 5
- 6 - High visibility



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APPENDIX E PROPOSED ONSITE SCREENING

Screening requirements would be confirmed post construction however, sections of the site boundary that could be targeted for planting are indicated below, to mitigate impacts to medium impact receivers and additionally from the closest section of Balranald-Tooleybuc Road.

SUNRAYSIA SOLAR FARM

Landscape Plan



- ◆ Site main entrance
- ⚡ Substation
- Proposal site
- Proposed building
- ▨ Proposed internal substation
- Proposed transmission line
- ▭ Proposed transmission line easement
- ▨ Proposed extent of solar arrays
- Proposed laydown area
- Proposed laydown area / future battery storage
- Main road
- Primary road
- Local road
- Vehicular track
- Existing transmission lines
- Watercourse
- Cadastre
- Existing vegetation
 - < 5 m high
 - 5-10 m high
 - >10 m high
- Vegetation screening opportunity
- ▣ Potential residence or other structure
- ✈ Airport
- Natural Waterbody
- ▨ Travelling Stock Reserve
- Foreground (1km)



0 0.25 0.5 1 Kilometres

A3 @ 1:26000
Ref: SW095_VIA
Author: SP

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