Landscape Character and Visual Impact Assessment

1955 Eumungerie Road
Burroway NSW

24001591

20 February 2023

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Landscape Character and Visual Impact Assessment

Kookaburra 1955 Eumungerie Road Burroway NSW

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1 INTRODUCTION

This Visual Impact Assessment has been prepared by Kleinfelder Australia Pty Ltd (Kleinfelder) on behalf of Edify Energy Pty Ltd (Edify) for the proposed Burroway solar farm and battery energy storage system (BESS).

1.1 PROJECT OVERVIEW

A Visual Impact Assessment is provided in this report to support a Development Application (DA) for the construction and operation of the utility-scale Burroway Solar Farm (Burroway SF) located north of Narromine in New South Wales (NSW). The Secretary's Environmental Assessment Requirements (SEARs) for the project, provided by the NSW Department of Planning, Industry and Environment, stipulates that the following environmental impact statement (EIS) requirements related to visual assessment be met:

- a landscape and visual impact assessment, prepared in accordance with the Solar Guideline and the Technical Supplement – Landscape and Visual Impact Assessment;
- a detailed assessment of the likely visual impacts (including night lighting) of all components of the project on surrounding residences (including approved developments, lodged development applications and dwelling entitlements), and key locations, scenic or significant vistas and road corridors in the public domain; and on the Siding Spring Observatory in accordance with the Dark Sky Planning Guideline (2016); and
- details of measures to mitigate and/or manage potential impacts (including a draft landscaping plan for on-site perimeter planting, with evidence it has been developed in consultation with affected landowners).

As part of the broader EIS for the project, a visual assessment of the proposed development has therefore been carried out to determine any likely visual impacts.

The objective of the visual assessment is to determine the likelihood and severity of potential impacts of the proposed works on the visual amenity of land uses surrounding the Site and, as appropriate or necessary, to identify safeguards to mitigate potential impacts. It is noted that there are no nighttime works proposed as part of this DA and as such there is no visual assessment for lighting in relation to AS/NZS 4282-2019 Control of the Obtrusive Effects of Outdoor Lighting.

1.2 PROPERTY DESCRIPTIONS AND ZONING

The Project is located within Lot 70 in DP1251856, known as 1955 Eumungerie Road, Burroway (the Site) and is in the Narromine Shire Council Local Government Area. The Site is located approximately 18 kilometres (km) north of Narromine and 2 km east of Burroway, NSW (Figure 1). The Site is approximately 470 hectares (ha) in size.

The Project aims to connect to an existing Essential Energy 132 kV line crossing the Site, via a new 132 kV substation. The Site is zoned RU1 Primary Production under the *Narromine Local Environmental Plan 2011*(LEP).

1.3 SITE / SURROUNDS DESCRIPTION

The proposed Impact Area is agricultural land comprising a large agricultural property, which includes paddocks that are generally flat and largely cleared, primarily for agricultural (cropping) purposes (Plate 1). The Site is neither regionally nor locally unique and is surrounded by comparable land in terms of topography, soils, lack of extensive native vegetation stands and land use.

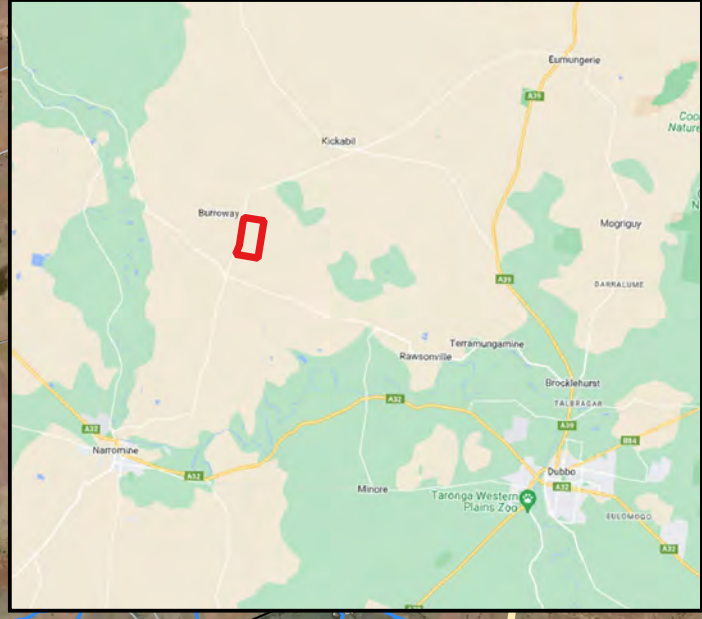
There are two areas where vegetation remains at the centre and in the southeast of the subject site, as well as mature vegetation in a continuous stand along the eastern boundary (Plate 2). Three dams have also been constructed within the Site. The only structures located within the Site are the remains of an early 20th century dwelling and its associated outbuildings.

Plate 1: Dam and Cropping within Project Site

Plate 2: Vegetation on East Boundary with Access Track

1.3.1 Topography

The topography of the area is generally flat plains landforms at an elevation of 270–285 m above sea level. Two portions of marginally increased elevation exist at the centre and north-eastern boundary of the area (Figure 1).



Legend
- Study Area
- hydroline
- ArterialRoad
- LocalRoad
- SubArterialRoad
- Track-Vehicular
- Narromine Council Area

0 0.5 1 1.5 2 km

Project Reference:	
Date Drawn: 2023-10-12	**Locality**
Drawn by: Jake Brown	Figure: **1**

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Data Source:
ESRI - 2023
Edify - 2023
Google - 2023
NSW Government - 2023

Burroway Solar Farm
Visual Impact Assessment
Edify Energy

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2 PROPOSED DEVELOPMENT AND DESIGN

2.1 THE PROPOSED DEVELOPMENT

2.1.1 Overview

The Project involves the construction of a 100-megawatt (MW) solar photovoltaic (PV) generator with an estimated 100 MW / 400 MWhr energy storage capacity. Solar panels will be mounted on frames which are able to track and absorb sunlight to generate energy which is increased to 33 kilovolt (kV) power by integrated transformers. This will require a new T-connection into the existing distribution line, and the construction of a new step-down substation from 132kV to 33kV. The Project incorporates a battery energy storage system into the solar generation facility to allow storage of energy on site that can be dispatched.

The Project is a major infrastructure development that is expected to create up to 250 jobs during construction. Access to the project area will be via Eumungerie Road.

General information about the Project is provided in Table 1 and the project layout is shown in Figure 3. Key visual elements include (Figure 2):

- solar panels interconnected to form solar arrays
- inverters and integrated transformers combined in prefabricated enclosures (one inverter and transformer for each solar array)
- metal mounting structures
- above-ground (and underground) DC cabling
- central 33 kV switchboard (ring main unit)
- battery energy storage system (BESS) units comprising sealed lithium-ion batteries housed in enclosures that resemble shipping containers in dimensions and appearance and are up to 3 m in height
- a high voltage (HV) substation, fitted with lightning rods, to connect the solar farm to the distribution network
- a prefabricated operations and maintenance (O&M) building
- permanent staff and contractor car parking area
- permanent all-weather site access (two options off Eumungerie Road) and an access road approximately 10m wide leading to the office and substation
- internal vehicle access tracks (4 m wide) leading to solar arrays and power control units (PCUs)
- perimeter safety fencing and a fixed, closed-circuit television (CCTV) system
- temporary site compound, lay-down area, and equipment storage areas during construction.

Figure 2: Visual Representation of Site Elements

The high voltage substation would be installed adjacent to an existing Essential Energy 132 kV distribution line that crosses the project site from east to west. The BESS units will either be distributed in groups throughout the Site (decentralised) or consolidated in a single location next to the substation (centralised).

Table 1: Project Details

Address	1955 Eumungerie Road, Burroway located approximately 18 kilometres (km) north of Narromine and 2 km east of Burroway, NSW.
Applicant	Edify Energy Pty Ltd, ABN 85 606 684 995 Level 1, 34-35 South Steyne, MANLY NSW 2095
Council	Narromine Shire Council Local Government Area
Lot Parcel	Lot 70 in DP1251856
Total area	470 ha
Land use / land zoning	Agricultural (cropping) land use / RU1- Primary Production
Proposed capacity	100 MW Solar Farm with 100MW/400MWhr BESS
Electricity Connection	Essential Energy 132 kV line (Line #94W/1)

2.1.2 Solar Arrays

The proposed solar arrays will be 70 to 90 m long and 7 m apart. The height of the solar panels will vary across the day as they track the path of the sun; however, the maximum height will not exceed 4.2 m. The solar arrays will be positioned in a north-south alignment and tilt along a single axis in an east to west movement. Each solar panel will be fixed to a metal mounting structure, piled or screwed into the ground without the need for any concrete.

2.1.3 Battery Energy Storage System

Lithium-ion batteries will be installed in a secure, climate-controlled BESS unit with a rating of up to 100 MW/400 MWhr. The BESS units shown in Figure 2 are an example of a centralised BESS.

2.1.4 Power Conversion Unit

Within each array block is a power conversion unit (PCU) which contains the central inverters, step-up transformers and switchgear which convert DC electricity collected from the panels into AC electricity for connection and distribution via the 132 kV Essential Energy distribution Line.

2.1.5 Substation

The high voltage substation will be located next to the existing 132 kV distribution line, on the eastern boundary of the site (Figure 3), and have a footprint of roughly 120 m x 120 m. The maximum height of the substation is not expected to exceed 10 m. The substation will have external lighting for security purposes.

2.1.6 System Monitoring

The performance of the solar farm will be monitored through a Supervisory Control and Data Acquisition system that will report to staff both on and offsite. The system will be capable of notifying staff of system issues and failures.

2.1.7 Site Access and Internal Roads

The Site entry point will be from one of two options off Eumungerie Rd (Figure 3).

Internal vehicle access tracks will be constructed to each inverter enclosure and to the substation to allow for site maintenance. On-site tracks will be constructed of compacted gravel and, where required, geotextile fabric will be laid between the soil and the gravel. Internal access tracks will be up to 4 m wide to allow for the safe delivery, unloading and installation of key components such as the solar panels, inverters, transformers and BESS units.

The access road leading to the substation will be designed in accordance with Essential Energy's requirements to enable access by their inspection and maintenance vehicles.

2.1.8 Operations and Maintenance Building

An operations and maintenance (O&M) building will be constructed at the Site. The dimensions of the building are expected to be approximately 10 m x 8 m and single storey, with a height of up to 5 m. The building is expected to be constructed using neutral Colourbond style materials.

2.1.9 Internal Parking

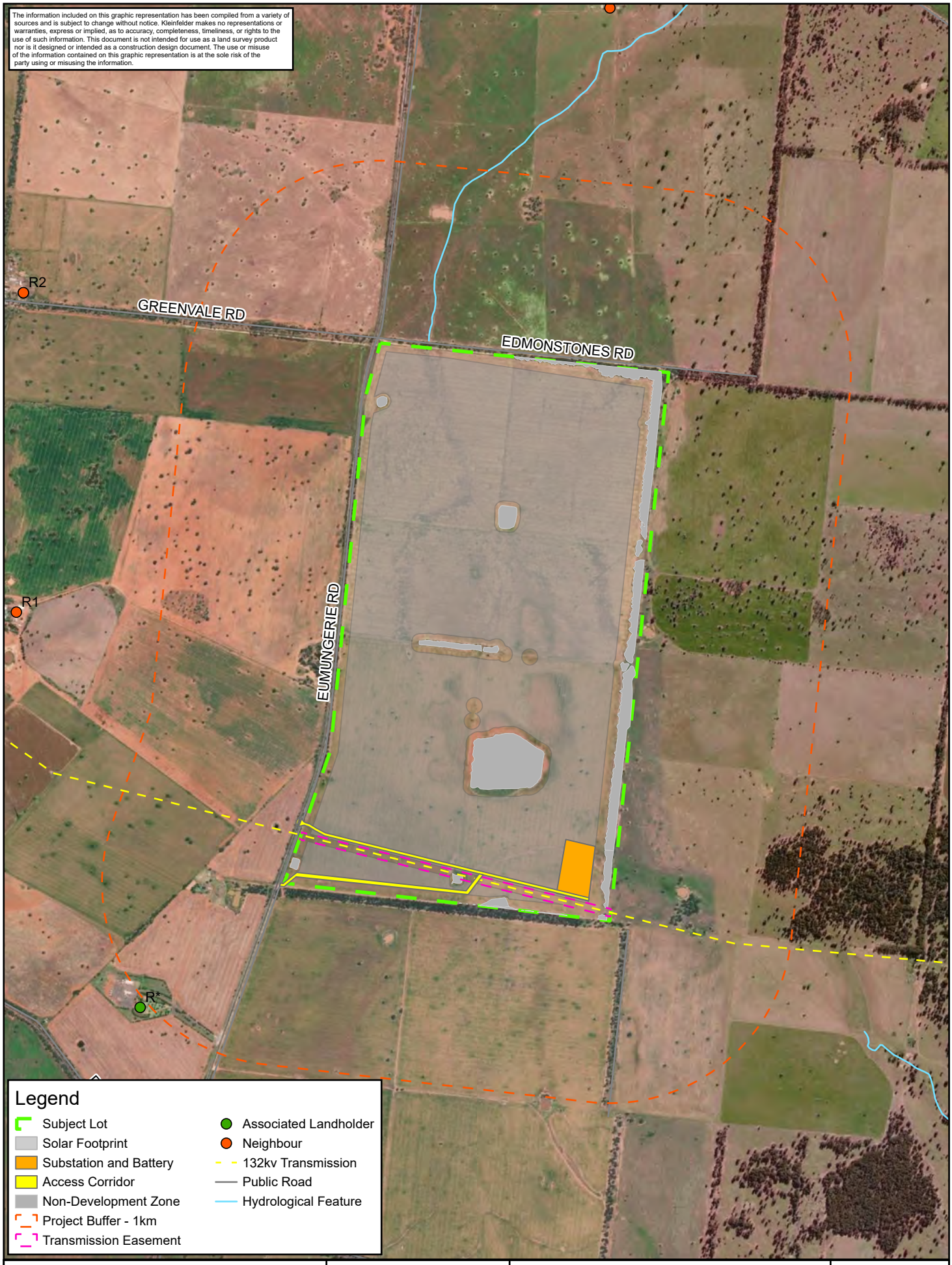
During operations, operational and maintenance staff vehicles will be accommodated on-site within a vehicle parking area located adjacent to the site office. During construction, vehicles will be parked either at designated laydown areas, storage locations, or where construction activities are occurring.

2.1.10 Security Fencing

To ensure public safety, security fencing will surround the project site using a single high security fence including screening around the entire project site. The height of the fence will be 2.3 m. In addition, to ensure public safety, the substation and the adjacent BESS (if centralised) would have its own security fence. Site fencing would feature CCTV security cameras mounted at regular intervals.

2.1.11 Lighting

Some minimal lighting will be required for ongoing site security such as the O&M Building and switch yard/substation. All external lighting around buildings will be faced downwards and inwards to minimise light spill impacts. All external lighting will be installed to comply with Australian Standard AS4282 – Control of Obtrusive Effects of Outdoor Lighting. In addition, all external lighting is proposed to not shine above the horizontal.



Legend

- Subject Lot
- Solar Footprint
- Substation and Battery
- Access Corridor
- Non-Development Zone
- Project Buffer - 1km
- Transmission Easement
- Associated Landholder
- Neighbour
- 132kv Transmission
- Public Road
- Hydrological Feature

0 125 250 500 750 1,000 1,250

Scale @ A4 1:27,000 Metres

GDA 1994 MGA Zone 56

N

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PROJECT REFERENCE:	24001591
DATE DRAWN: 5/03/2024	Version 1
DRAWN BY:	RHourigan
DATA SOURCE: Esri - 2023	

PROJECT INFRASTRUCTURE LAYOUT

EDIFY ENERGY PTYTD
BURROWAY SOLAR FARM EIS

FIGURE:

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2.2 PROJECT POTENTIAL VISUAL IMPACTS

Activities and structures associated with the phases of the proposed solar farm development have the potential to have a visual impact on sensitive receivers in the vicinity of the site. These are discussed below.

2.2.1 Construction

A number of activities that are likely to occur in the construction (or pre-construction) phase of the proposed development may be visible from areas surrounding the project site, including:

- ongoing detailed site assessment including technical investigations;
- various minor civil works on Eumungerie Road at and for the selected site access point;
- construction facilities, including portable structures and laydown areas;
- various construction and directional signage;
- excavations and earthworks;
- construction-related vehicles and equipment gaining access to site from Eumungerie Road;
- various construction activities such as erection of solar panels and associated electrical infrastructure works; and
- the potential use of lighting at night to assist with site security.

The majority of pre-construction and construction activities would be unlikely to result in an unacceptable level of visual impact due to their duration and temporary nature.

2.2.2 Operation

As the number/frequency and type of activities undertaken during the operational phase of the project are minimal, the impacts will be associated less with site activities and more with the presence of structures on site, as follows:

- the presence and operation of the solar arrays and their daily tracking of the sun;
- the presence of the BESS units and substation;
- the presence of associated infrastructure such as inverter enclosures, and operations and maintenance building;
- the presence of internal access roads;
- the presence of fencing and minor site signage; and
- vehicles and equipment gaining access to site for operations and undertaking maintenance activities.

As the operational phase of the proposed solar farm is expected to last for at least 30 years, visual impacts during operations need to be carefully assessed.

2.2.3 Decommissioning

At the end of the project's operational life, the project site will be decommissioned. During decommissioning, all infrastructure will be removed. Key elements of project decommissioning with associated visual impacts are expected to include:

- disconnection of the BESS from the Essential Energy connection point at the substation;
- disconnection and removal of the solar panels;
- removal of all buildings and equipment, with materials recycled wherever possible;
- removal of steel framework/supports and cabling for recycling;
- removal of underground infrastructure (to a depth of ~1000 mm);
- removal of fencing (unless requested otherwise by the landholder or relevant authorities); and
- site rehabilitation, remediation (if required), and return to pre-existing land use (unless otherwise agreed with the landholder or relevant authorities).

3 PLANNING CONSIDERATIONS

3.1 LOCAL

3.1.1 Narromine Local Strategic Planning Statement

The *Narromine Local Strategic Planning Statement* (LSPS) describes how Council will achieve their vision of:

- Vibrant Communities
- Growing Economy
- Protecting and Enhancing Our Environment.

The LSPS is not a detailed action plan but rather a vision document which outlines principles and priorities as future strategic planning for economic, social and environmental land use needs over the next 20 years.

3.1.2 Narromine Local Environmental Plan 2011

The subject site is zoned RU1 Primary Production under the *Narromine Local Environmental Plan 2011* (LEP).

The RU1 zone objectives are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

3.1.3 Narromine Development Control Plan 2011

Narromine Development Control Plan 2011 (DCP) applies to industrial and rural development. To encourage industrial development and consider the rural context of the development, the following DCP objectives are considered:

- To provide for a wide range of industrial land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.
- To ensure that rural or agricultural activities are not affected by land use conflict, unnecessary fragmentation or alienation of land uses.
- To protect and conserve the quality of the natural environment.

Table 2: Narromine DCP 2011 Standards for Rural and Industrial Development

DCP Reference	Standard	Edify Response
Chapter 5 c) Rural Development		
Building Envelopes	All land must have legal access to a public road. Usually this is in the form of direct vehicular access to a public road.	Two access options are proposed for the site off Eumungerie road, of which one is a pre-existing established access. Turn treatments will be constructed to ensure safe access and sight distance requirements are met. Car parking will be constructed for operational staff, with construction staff parking in designated areas.
	A minimum of 15,000 litres must be set aside for firefighting purposes.	Edify intends to supply 20,000L on the site at all times for fire-fighting purposes.
	Bushfire prone land is identified in Councils Bushfire Prone Land Mapping. If the development site is identified as bushfire prone, the development application may be referred to the Rural Fire Service and, if necessary, additional conditions placed on any consent granted. Development in areas identified as bushfire prone should consult with the NSW Rural Fire Service document Planning for Bushfire Protection for additional controls that may be applicable to the development.	The Scoping Report was referred to NSW RFS for EIS requirements which have been considered under a Bushfire Impact Assessment. A Bushfire Management Plan will be developed in consultation with NSW RFS for the Project.
Chapter 5 e) Industrial Development		
Building Layout and Design	Minimum site area is determined off the proposed use from the land and the type and requirements of the industry.	The use and requirements for the renewable energy facility have determined the site area.
	The setback requirements will be subject to the design of the development and the onsite vehicle manoeuvrability required for each development. The specified setback area is to be kept clear and maintained in an accessible manner at all times.	The setback distances are determined based on emergency access requirements and maintenance requirements for the development. The setback area will be kept clear and accessible at all times.
	As well as being functional, industrial developments should also be aesthetically pleasing.	The O&M building is expected to be constructed using neutral Colourbond style materials. Vegetation surrounding the lot alleviates views of the solar arrays.
	Landscaping can also play a major role in beautifying an industrial site. A landscaping plan, including location and species type, must be submitted with a development application.	Based on the findings of this assessment, landscaping is not required/ proposed. The naturally occurring vegetation surrounding the site and within the site softens the visual impact of the development.

DCP Reference	Standard	Edify Response
	All land must have legal access to a public road. Sufficient on-site car parking is to be provided for all development proposals.	Two access options are proposed for the site off Eumungerie road, of which one is a pre-existing established access. Turn treatments will be constructed to ensure safe access and sight distance requirements are met. Car parking will be constructed for operational staff, with construction staff parking in designated areas.
	All access ways, manoeuvring areas, parking areas and loading areas are to be readily accessible and adequate areas on site must be provided for the turning and manoeuvring of all vehicles. The loading, unloading and reversing of vehicles on Council's roads, footpaths or reserves is strictly prohibited.	On-site internal roads will cater to maneuverability standard requirements.
	All vehicle movements to, from and on site are to be clearly delineated.	Signage in line with the Standard will be provided on site.
	Open storage and loading areas are to be identified on the development application and are to be located behind the building line of the industrial development. Council approved screening devices (screen fencing, metal fencing, and walls) will be required to be provided to prevent open storage areas and loading areas from being viewed from a public place.	Storage and loading areas will be designated areas on site. Security fencing will be installed surrounding the development site.
	Provision is to be made for the storage on-site and disposal of all trade waste and refuse.	Waste will be stored in designated areas on site and lawfully disposed of in line with a Construction Waste Management Plan and Operation Waste Management Plan.

3.2 NSW GUIDELINES

3.2.1 Dark Sky Planning Guideline 2023

The Dark Sky Planning Guideline (2023) is a matter for consideration for all development under the *Environmental Planning and Assessment Act 1979* (EP&A Act) before development consent is granted within the Dark Sky Region. The subject site is within the Dark Sky Region which consists of the land within a 200-kilometre radius of Siding Spring Observatory.

3.2.2 Large-Scale Solar Energy Guideline

This guideline provides the community, industry, applicants, and regulators with general guidance on the planning framework for the assessment and determination of State Significant large-scale solar energy projects under the EP&A Act. The key assessment issues identified in the Guideline addressed in this Landscape and Visual Impact Assessment include:

- Visual impacts: The impacts on landscape character and values and the visual amenity of landholders and communities; and
- Cumulative impacts: Any cumulative impacts from any other developments (proposed, approved, and operating), especially biodiversity, visual impacts, socio-economic and construction traffic impacts.

A technical supplement provides additional guidance for applicants, consent authorities and the community using the Large-Scale Solar Energy Guideline to understand the process and requirements for assessing visual and landscape character impacts of large-scale solar energy development in NSW.

4 LANDSCAPE CHARACTER

4.1 EXISTING LANDSCAPE CHARACTER

This section outlines the existing local landscape character (LSC) to gain a general understanding of the visual environment which influences the assessment of the Project.

4.1.1 Dominant Character

The dominant character of the surrounding area is a rural landscape characterised by a patchwork of extensive agricultural land and vast open spaces, predominantly focussed on cropping. Site investigations determined approximately 55% of the Subject land was classed as LSC 3 (high capability), 17% was LSC 4 (moderate capability), 19% was LSC 5 (moderately low capability) and 8.5% was LSC 6 (low capability).

One patch of native vegetation and one stand of planted vegetation exists (Plate 3) within the project area along with scattered paddock trees. Surrounding the Site along roadsides within the road corridor as well as along the fence lines are extensive stands of remnant and regrowth vegetation (Plate 4 to 7).

Three dams have also been constructed within the subject site. The only structures located within the Site are the remains of an early 20th century dwelling house and its associated outbuildings on the southern boundary.

Plate 3: Planted Stand of Vegetation in Centre of Lot

Plate 4: Southern Lot Boundary Mature Vegetation Stand

Plate 5: Edmonstones Road Corridor Vegetation (North)

Plate 6: Eastern Boundary Vegetation

Plate 7: Eumungerie Rd Vegetation (Southwestern View)

4.1.2 Topography

The landscape is characterised by open plains with a very gently undulating rise towards the centre of the Site. The lowest elevation is approximately 260m in the northeast and rises to 285m on a broad crest in the centre of the Project site. The Site is a free draining landform with 20 - 70% surface cover that has been highly disturbed in the past by land clearing for agriculture.

4.1.3 Existing Electrical Infrastructure

In addition to local power distribution lines to residences, the project site and broader area is also host to the Essential Energy 132 kV, Dubbo to Nevertire distribution line that runs east-west through the southern portion of the land parcel (Figure 3).

4.1.4 Adjacent Road Network

The local road network is primarily for access to rural properties and is not considered to be a sensitive receiver. However, selected viewpoints have been chosen along the road network to assess the visual impacts to local road users. The subject roads are:

- Eumungerie Road, which is a paved regional road running south to north adjacent the western portion of the project site.
- Edmonstones Road which is an unpaved local road running west-east and located to the north of the project site.
- Greenvale Road which is an unpaved local road running west-east before turning south located adjacent the northwestern corner of the project site.
- Dubbo Burroway Road which is a paved local road running east-west located approximately 2 km south of the project site.
- Emogandry Road which is an unpaved local road running east-west approximately 2.3 km north of the project site; and
- Merrits Lane which is an unsealed local road east-west located approximately 4.3 km south of the project site.

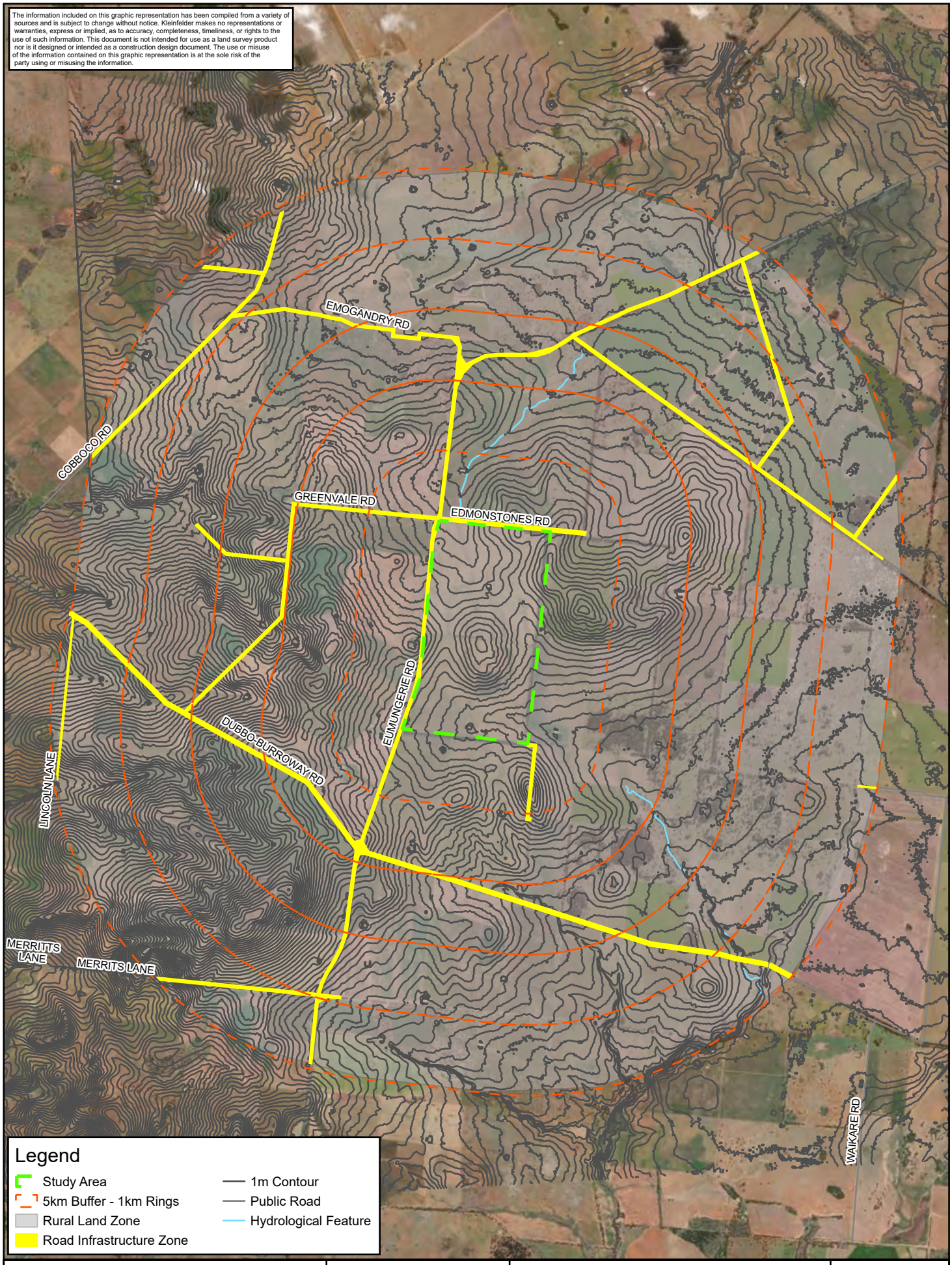
4.2 Character Zone Assessment

The landscape character zone assessment determined two zones occurring. They are Agricultural Zone and Road / Infrastructure Zone. See Table 3 for further details and Figure 4. The Zones were assessed using the NSW DPE (2022) Technical Supplement for Landscape and Visual Impact Assessment and their referenced source, Tudor (2019). Tudor (2019) lists key characteristics to consider for a landscape and visual baseline, whose overarching points are:

- Natural,
- Cultural / Social,
- Aesthetic and Perceptual,
- Landscape Condition, and
- Visual Characteristics.

Table 3: Landscape Character Zones

Landscape Character Zone	Sensitivity	Magnitude	Landscape Character Impact
LCZ 1 Agricultural	Moderate ▪ The landscape has been highly modified from its natural state. ▪ Human modifications are clearly evident through widespread clearance of native vegetation and the presence of roadways, dwellings, ancillary agricultural buildings and domestic scale electricity infrastructure. ▪ Though modified to the agricultural purpose, the area is broad and human infrastructure such as houses, sheds which have a presence on the landscape view are sparse, the solar farm would be of a large scale that is typically not seen in this LCZ in this area, however noting that the site is in a Renewable Energy Zone (REZ).	Moderate ▪ Views of the project are likely to be limited to close range where screening vegetation is absent. ▪ The project would occupy a relatively small portion of this LCZ. ▪ The project infrastructure will have an evident change in landscape characteristics in close range. However, the extent of this change is considered minor in relation to the extent of this LCZ. ▪ Supporting project infrastructure is of a scale and form that is commensurate with the existing built form typology of the rural landscape and could be adequately absorbed by the landscape.	Moderate
LCZ 2 Road / Infrastructure (powerline etc) Zone	Low ▪ No specific planning controls attribute special value to this landscape.	Low When viewed from afar, the project is not expected to compete visually with the landform. The vegetation in the landform will aid the project for visual screening.	Low



0 0.5 1 2 3 4

Scale @ A4 1:70,000 Km

N

GDA 1994 MGA Zone 56

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PROJECT REFERENCE:	24001591
DATE DRAWN: 5/03/2024	Version 1
DRAWN BY:	RHourigan
DATA SOURCE: Esri - 2023	

LAND ZONES AND TOPOGRAPHY

EDIFY ENERGY PTYTD
BURROWAY SOLAR FARM EIS

FIGURE:

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5 VISUAL IMPACT

5.1 VISUAL RECEIVERS AND VIEWPOINT SELECTION

In line with Chapter 3 of the Technical Supplement – Landscape and Visual Impact Assessment (DPIE- August 2022), a Preliminary Assessment was undertaken as part of the Scoping Report completed by Edify Energy in February 2023. Public roads and rail line viewpoints within 2.5 km and private viewpoints within 4.0 km were identified for this assessment and to allow targeted consultation with potentially affected landholders.

Four public viewpoints within 2 km were selected and 10 private residences occur within 4.0 km of the Project. The vertical and horizontal field of view that the development is likely to occupy when viewed from each viewpoint was calculated taking distance, height elevation changes, and width of the Project into account. Results are shown in the Figure 5 and Table 4 below.

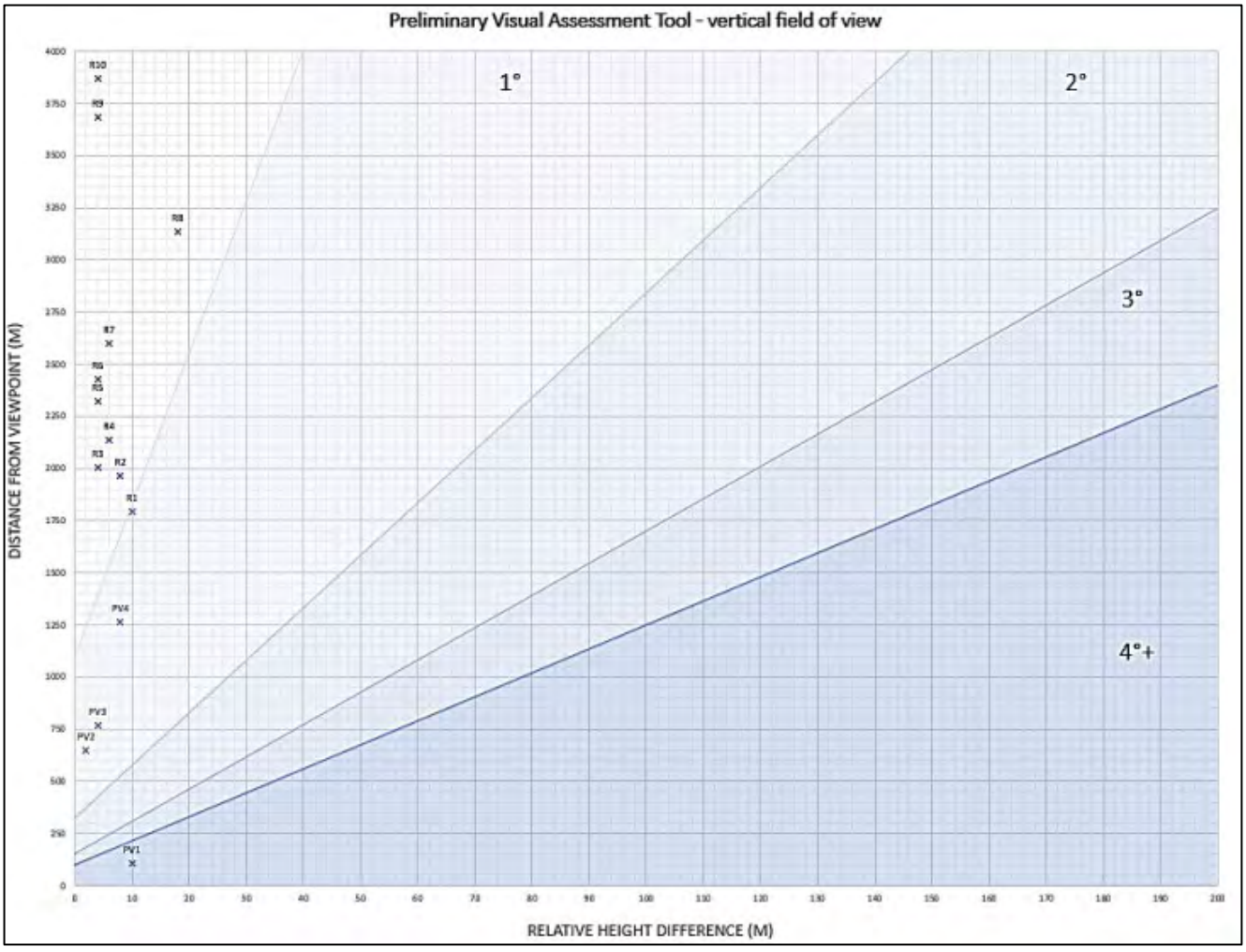

Figure 5: Preliminary Visual Assessment Tool

Table 4: Private Receiver Preliminary Assessment

Receiver	Horizontal Field of View	Vertical Field of View	Assessment Required
R1	41-50°	1°	No assessment required
R2	11-20°	0°	No assessment required
R3	11-20°	0°	No assessment required
R4	11-20°	0°	No assessment required

Receiver	Horizontal Field of View	Vertical Field of View	Assessment Required
R5	11-20°	0°	No assessment required
R6	21-30°	0°	No assessment required
R7	21-30°	0°	No assessment required
R8	21-30°	0°	No assessment required
R9	21-30°	0°	No assessment required
R10	11-20°	0°	No assessment required

Section 3.1.2 of the Technical Supplement – Landscape and Visual Impact Assessment (DPIE- August 2022), states:

> *Viewshed mapping can be achieved by using geographic information systems (GIS) that account for topography and line of sight between viewpoints and the project, which can be used to further eliminate viewpoints from requiring detailed assessment.*

The viewshed analysis was undertaken to illustrate the potential visibility of the project site and proposed facilities from the private residences. By considering lines of sight from the surrounding topography, the analysis shows the potential 'visual catchment' of the Project, and exclusively assess the topographical relationship between the Site and the receivers.

Figure 6 displays the associated landholders, 10 private receptors and 12 public viewpoints assessed as part of this report.

Section 5.3 contains viewshed mapping for all 10 private receptors as well as descriptions of the likely views between the residence and Project. The viewshed mapping was undertaken for each private viewpoint with the following key considerations:

- Topography was the main constraint for the analysis between the site and viewpoint;
- Viewshed was considered at 1.8 m height at the viewpoint; and
- Existing structures and vegetation were not taken into account due to a lack of current data (e.g., tree composition and height), therefore not accounting for the 'line of sight' aspect of viewshed mapping.

As part of this viewshed mapping task, a further 12 viewpoints were selected accounting for public receivers, that complement the original four selected as part of the Scoping Report preliminary visual assessment.

Section 5.3 details the viewshed and visual impact for the public viewpoints of the Project locality.

5.2 METHODOLOGY

The methodology of the visual impact assessment includes a desktop component along with a field component.

The desktop analysis includes using a viewshed analysis with a presumed height of 1.8 m above ground level. The ground level has been determined using Lidar data and NSW government contour layers (1m contours) as necessary. The viewshed algorithm were set to 5000 m maximum distance.

The digital elevation model (DEM) data was downloaded from ELVIS. The multiple DEMs covering the potential viewshed area were combined into one DEM GeoTIFF for the analysis to occur. For the viewshed the Geospatial Data Abstraction Library (GDAL) application in QGIS was used to determine visibility. The outcome of the GIS analysis was to identify viewshed corridors into the site for assessment and to undertake the fieldwork.

5.2.1 Sensitivity

Visual sensitivity refers to the character of a setting, the quality of the view, and how sensitive it is to the proposed change. Combined with magnitude, sensitivity provides a measure of impact. Visual sensitivity relates to the

direction and the composition of the view. Views from habitable room windows, and principal outdoor yard areas of the residence are treated as sensitive receivers. Views from residual land beyond the home yard area (such as cropping/grazing land, recreational land etc.) are treated as less-sensitive receivers. The greater the distance between the visual receiver and the proposal, the lesser the visual sensitivity of that visual receiver.

Visual receptors most susceptible to change include residents at home. The users of Eumungerie Road and Edmonstones Road abutting the west and north of the Project site, respectively, are also considered sensitive receivers although, based on the GLVIA3 guidance, they are less susceptible to visual change than people living within residences.

5.2.2 Magnitude

The visual magnitude is classified into one of 5 ratings (very high, high, moderate, low and very low) and provides an indication of the apparent size of the solar array from each viewpoint.

Visual impact can be assessed by identifying the 'magnitude' of a development against the 'sensitivity' of the existing area to 'absorb' that magnitude (Table 5).

Table 5: Visual Impact Matrix (Source – DPE 2022)

		Sensitivity			
		High	Moderate	Low	Very Low
Magnitude	Very High	High	High	Moderate	Moderate
	High	High	Moderate	Moderate	Low
	Moderate	Moderate	Moderate	Low	Low
	Low	Moderate	Low	Low	Very Low
	Very Low	Low	Low	Very Low	Very Low

0 0.5 1 2 3 4 Km

Scale @ A4 1:70,000

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DATA SOURCE: Esri - 2023	

PRIVATE AND PUBLIC VIEWPOINTS

EDIFY ENERGY PTYTD
BURROWAY SOLAR FARM EIS

FIGURE:

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\BurrowaySolarFarm\Mapping\240222_BurrowaySolarFarm_EIS_v1.aprx (6)

5.3 VISUAL IMPACT ASSESSMENT

5.3.1 Private Receptors

The subject land is owned by one family group. The family resides proximate to the Project site and continues to utilise the site and various surrounding lots for agricultural (cropping) purposes. Regarding the adjacent community members, 10 non-associated dwellings, and no industry stakeholders are located within 4.0 km of the Impact Area (Figure 6).

Viewshed mapping was completed for all 10 private receptors within 4.0 km of the Project to confirm the findings of the Preliminary Visual Impact Assessment that identified none of the 10 receptors would require detailed assessment.

All private receptors within 4.0 km of the Project have existing vegetation in the form of landscape plantings or scattered trees surrounding the residence, including between the houses and the project site which would reduce the visual impacts of the Project. Notably, the closest non-associated residence is 1.8 km from the Site and the project location is relatively flat with only a minor crest in the centre, allowing the distances for all the private residences to alleviate their potential views of the Project.

Viewshed mapping indicated R4, R5, R6 and R8 could have some views of the Project based exclusively on the topography of the locality.

Scattered tree lines along Eumungerie Road and Edmonstones Road adjacent to the Site boundaries soften views of the northern and western portions of the lot for R1, R2, R4, R9 and R10. These areas of the Site are further visually obscured by a topographical ridgeline west of the Project and local vegetated road corridors such as Greenvale Road and Dubbo-Burroway Road.

A dense tree line along the eastern and southern boundaries would be expected to almost exclude visibility of the southern and eastern section totally, for which stands of vegetation surrounding R3, R5, R6, R7, R8 and R10 add further visual obscuring.

Table 6 below details the descriptions of line of site, elevation and distance to the Project boundary for R1 to R10.

Table 6: Private Receptor Analysis

Receptor and Viewshed Mapping Reference	Location	Description of view	Elevation of residence (mAHD) and distance to Project site (m)	Relevant Photomontage
R1 (Figure 6)	This residence occurs directly west from the centre of the Project site, off Greenvale Road.	A small ridgeline extends south to north ~440m east of the residence with the highest point of elevation at 289m. Existing vegetation surrounding the residence, scattered paddock trees and the stands of vegetation in the Eumungerie Rd Corridor further restrict views of the Project site.	281 1795	
R2 (Figure 7)	This residence occurs directly west from the northern boundary of the Project site, on Greenvale Road.	A slight rise in elevation occurs ~440m east of the residence with the highest point in elevation at 280m (aligning with the ridgeline for R1). Vegetation associated with the residence and Greenvale Road corridor further screens views of the Project site.	276 1962	
R3 (Figure 8)	This residence occurs directly east from the northern boundary of the Project site, on Edmonstones Road.	Existing vegetation at the residence and in between the residence and project site alleviates views of the Project. The northeast boundary of the Project site will have views alleviated by the stands of mature vegetation along the lot boundary.	274 2002	
R4 (Figure 9)	This residence occurs north of the northern boundary of the Project site, off Eumungerie Road.	The higher elevation in the southern portion of the R4 lot parcel will alleviate views of the Project from the residence. The view of the broad crest in the centre of the Project site will be fragmented by the Eumungerie Road corridor vegetation, and the retention of the stand of planted vegetation and patch of remnant woodland vegetation within the Project site.	264 2134	Photomontage 3 of the Preparation of Photomontages Report (Appendix A) provides a representative view of the Project site in the general locality of R4.
R5 (Figure 10)	This residence occurs south of the southern boundary of the Project site, off Dubbo-Burroway Road.	The elevational range between this residence and the site is negligible which offers visual relief due to the distance to site. The existing landscaping at the residence, line of vegetation running parallel to the southern boundary of the project lot, as well as the vegetation of the Dubbo-Burroway Road corridor also screens views of the Project.	275 2322	Photomontage 7 of the Preparation of Photomontages Report (Appendix A) provides a representative view of the Project site from the general locality of R5, along Merrits Lane.

Receptor and Viewshed Mapping Reference	Location	Description of view	Elevation of residence (mAHD) and distance to Project site (m)	Relevant Photomontage
R6 (Figure 11)	This residence occurs southeast of the southern boundary of the Project site, off Dubbo-Burroway Road.	Patches and corridors of existing vegetation in the neighboring land parcels obscure the views of the Project from this residence. A crest with an elevation of 278m in between the site and residence also alleviates the view of the Project.	264 2426	Photomontage 4 of the Preparation of Photomontages Report (Appendix A) provides a representative view of the Project site from the general locality of R6, along Dubbo-Burroway Road.
R7 (Figure 12)	This residence occurs south of the southern boundary of the Project site, off Eumungerie Road.	The elevational range between this residence and the site is negligible which offers visual relief due to the distance to site. The existing landscaping at the residence, line of vegetation running parallel to the southern boundary of the project lot, as well as the vegetation of the Dubbo-Burroway Road corridor also alleviates views of the Project.	275 2602	Photomontage 7 of the Preparation of Photomontages Report (Appendix A) provides a representative view of the Project site from the general locality of R7 along Merrits Lane.
R8 (Figure 13)	This residence occurs southwest of the southern boundary of the Project site, off Eumungerie Road.	This residence sits at the base of the north to south ridgeline also intersecting R1 and R2 views. The elevation varies most for this viewpoint between the site and this residence however the impact is negligible due to the distance to site. Existing vegetation within the neighbouring properties and road corridors for Eumungerie Road and Dubbo-Burroway Road screen views of the Project.	284 3137	Photomontage 7 of the Preparation of Photomontages Report (Appendix A) provides a representative view of the Project site from the general locality of R8 along Merrits Lane.
R9 (Figure 14)	This residence occurs northwest of the northern boundary of the Project site, off Cobboco Road.	The ridgeline occurring east of R1 and R2 restricts views of the Project site, as well as extensive stands and corridors of vegetation associated with R9's land parcel, neighboring land parcels and road corridors.	267 3685	
R10 (Figure 15)	This residence occurs west- southwest of the southern boundary of the Project site, off Lincoln Lane.	This land parcel has extensive stands of vegetation surrounding it on the northwest, west and southwest sides which restricts views to the Project site. Existing vegetation within the neighbouring properties and road corridors for Eumungerie Road and Dubbo-Burroway Road screen views of the Project. The ridgeline extending south of R1 and R2 also restricts views in the direction of the project area.	268 3868	Photomontage 5 of the Preparation of Photomontages Report (Appendix A) provides a representative view of the Project site from the general locality of R10, along Dubbo-Burroway Road.

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION R1

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
6
R1

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION R2

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
7
R2

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION R3

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
8
R3

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

0 250 500 1,000 1,500 2,000 2,500
Scale @ A4 1:50,000 Metres
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VIEWSHED LOCATION R4

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
9
R4

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION R5

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
10
R5

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION R6

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
11
R6

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION R7

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
12
R7

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION R8

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
13
R8

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

0 250 500 1,000 1,500 2,000 2,500
Scale @ A4 1:50,000 Metres
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VIEWSHED LOCATION R9

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
14
R9

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

0 300 600 1,200 1,800 2,400 3,000

Scale @ A4 1:60,000 Metres

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VIEWSHED LOCATION R10

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
15
R10

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

5.3.2 Public Viewpoints Analysis

5.3.2.1 Assessment Locations

Viewshed mapping and visual impact analysis was undertaken for 12 public viewpoints from the various local and regional roads within 5.0 km of the Project site. This included panoramic view photographs for context of visual amenity of the area.

Photomontages were completed for eight of the public viewpoints. These were undertaken to align with the Public Viewpoints assessed in the Preliminary Visual Assessment as well as provide context for private receptors from accessible public locations. These photomontages allow a level of due diligence and will aid in further public consultation with the community.

The locations are detailed in Table 6 and Figure 6.

Table 7: Locations for Public Viewpoint Analysis

Location	Street Name	Longitude	Latitude
1	Edmonstones Rd	148.3535872	-32.06696674
2	Eumungerie Rd and Edmonstones Rd	148.3445657	-32.06578492
3	Eumungerie Rd	148.3376149	-32.09251982
4	Eumungerie Rd	148.3541528	-32.04501751
5	Dubbo Burroway Rd	148.3442409	-32.11197302
6	Eumungerie Rd and Dubbo Burroway Rd	148.3298703	-32.1078809
7	Dubbo Burroway Rd	148.3544621	-32.11492755
8	Dubbo Burroway Rd	148.3023396	-32.08737053
9	Eumungerie Rd	148.3791952	-32.0384822
10	Eumungerie Rd	148.3409551	-32.0825053
11	Merrits Lane	148.3104456	-32.12434361
12	Emogandry Rd	148.3378238	-32.04126351

Location 1: Edmonstones Rd

Viewpoint	Edmonstones Rd
Description of setting	Local unsealed road (opposite the northern boundary of the site)
Potential Impact	Road users, acting as access road to one private residence (R3)
View Shed Analysis	Views, although obscured into the northern part of the site
Visual sensitivity	Very Low
Sensitivity due to:	Low use and low concern viewpoint / travel route.
Magnitude of visual effect	Moderate
Visual impact	Low
Comments	This local road / track has trees lining along most of the length of the Project northern boundary. The density varies. Given the flat nature of the surrounding terrain, the solar farm would be visible, although partly obscured from the existing vegetation.

Figure 17: Edmonstone Road panoramic photograph

Figure 18: Edmonstone Road Location Photograph

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION 1

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
18
1

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

Location 2: Eumungerie Rd and Edmonstones Rd

Viewshed analysis and detailed photomontages were undertaken for this Public Viewpoint to align with the Public Viewpoints assessed as part of the Preliminary Visual Assessment. Refer Page 2 of the Preparation of Photomontages Report in Appendix A.

Viewpoint	Eumungerie Rd and Edmonstones Rd
Description of setting	Intersection of regional road and local unsealed road (opposite northwest corner of the site)
Potential Impact	Road users
View Shed Analysis	Views into the northern part of the site.
Visual sensitivity	Very Low
Sensitivity due to:	Unpaved local and regional road and future inland rail route utilized intermittently by public.
Magnitude of visual effect	Moderate
Visual impact	Low
Comments	The intersection is generally open, with good visibility of the northern extent of the Project, photomontages demonstrate moderate magnitude due to views. Existing vegetation to be retained within the project site and surrounding the site will alleviate and fragment the views of the solar arrays.

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION 2

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
19
2

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

Location 3: Eumungerie Rd

Viewshed analysis and detailed photomontages were undertaken for this Public Viewpoint to align with the Public Viewpoints assessed as part of the Preliminary Visual Assessment. Refer Page 3 of the Preparation of Photomontages Report in Appendix A.

Viewpoint	Eumungerie Rd
Description of setting	Local Main Road, one of the proposed accesses (opposite southwest corner of the site)
Potential Impact	Road users
View Shed Analysis	Views into the southern part of the site.
Visual sensitivity	Very Low
Sensitivity due to:	Regional road and future inland rail route utilized intermittently by public.
Magnitude of visual effect	Moderate
Visual impact	Low
Comments	This location has some screening through vegetation in the paddock and on the road reserve. It would provide some visual relief. Photomontage demonstrates view of site, however viewpoint is of lessened sensitivity being a public road.

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION 3

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
20
3

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

Location 4: Eumungerie Rd

Viewshed analysis and detailed photomontages were selected for this site to allow context for the Public Viewpoints in the northern locality of the Project site. Refer Page 4 of the Preparation of Photomontages Report in Appendix A.

Viewpoint	Eumungerie Rd
Description of setting	Regional road (approx. 2.5km north)
Potential Impact	Road users, one residential dwelling access from this section of the road.
View Shed Analysis	Limited views of the raised crest in the centre of the site.
Visual sensitivity	Very Low
Sensitivity due to:	Change of land use and character of area. Regional public road.
Magnitude of visual effect	Very Low
Visual impact	Very Low
Comments	The view has screening and distance from the site, which lowers the visual impact. No views of the site, viewshed identifies a small crest in the Project site center as visible however the photomontage demonstrates no view of the Project.

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION 4

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
21
4

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

Location 5: Dubbo Burroway Rd

Viewpoint	Dubbo Burroway Rd
Description of setting	Local road (approx. 2km south)
Potential Impact	Road Users
View Shed Analysis	No view into the site
Visual sensitivity	Very Low
Sensitivity due to:	Change of land use and character of area. Local road for intermittent public use.
Magnitude of visual effect	Very Low
Visual impact	Very Low
Comments	No views of the site as per the viewshed mapping. Distance and existing vegetation screens views.

Figure 23: Panoramic Photograph, Dubbo Burroway Rd

Figure 24: Location Photograph, Dubbo Burroway Rd

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION 5

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
24
5

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

Location 6: Eumungerie Rd and Dubbo Burroway Rd

Viewpoint	Eumungerie Rd and Dubbo Burroway Rd
Description of setting	Regional and local road intersection (approx. 2km to southwest)
Potential Impact	Road users, dwelling
View Shed Analysis	Views into most of the site, without considering existing vegetation screening views into the site.
Visual sensitivity	Very Low
Sensitivity due to:	Minor change of land use and character of area. Public local and regional roads.
Magnitude of visual effect	Very Low
Visual impact	Very Low
Comments	The view has screening and distance which obscures views of the project site.

Figure 26: Panoramic Photograph, Eumungerie Rd and Dubbo Burroway Rd

Figure 27: Location Photograph, Eumungerie Rd and Dubbo Burroway Rd

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION 6

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
27
6

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

Location 7: Dubbo Burroway Rd

Viewshed analysis and detailed photomontages were selected for this site to allow context for the Public Viewpoints in the southeastern locality of the Project site. Refer Page 5 of the Preparation of Photomontages Report in Appendix A.

Viewpoint	Dubbo Burroway Rd
Description of setting	Local main road (approx. 2km southwest)
Potential Impact	Road Users
View Shed Analysis	No view into the site.
Visual sensitivity	Very Low
Sensitivity due to:	Change of land use and character of area. Local public road.
Magnitude of visual effect	Very Low
Visual impact	Very Low
Comments	No views of the site as per the viewshed mapping and montages.

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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NSW Spatial Services - 2024

VIEWSHED LOCATION 7

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
28
7

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

Location 8: Dubbo Burroway Rd

Viewshed analysis and detailed photomontages were selected for this site to allow context for the Public Viewpoints in the western locality of the Project site. Refer Page 6 of the Preparation of Photomontages Report in Appendix A.

Viewpoint	Dubbo Burroway Rd
Description of setting	Local road (approx. 3km to the west/southwest)
Potential Impact	Road Users
View Shed Analysis	No view into the site
Visual sensitivity	Very Low
Sensitivity due to:	Minor change of land use and character of area. Public local road.
Magnitude of visual effect	Very Low
Visual impact	Very Low
Comments	No views of the site as per the viewshed mapping and montages. Distance and existing vegetation screens views.

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

GDA 1994 MGA Zone 55

N

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DATA SOURCE: ESRI - 2024 NSW Spatial Services - 2024	

VIEWSHED LOCATION 8

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
29
8

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

Location 9: Eumungerie Rd

Viewshed analysis and detailed photomontages were selected for this site to allow context for the Public Viewpoints in the northeastern locality of the Project site. Refer Page 7 of the Preparation of Photomontages Report in Appendix A.

Viewpoint	Eumungerie Rd
Description of setting	Local Main Road (approx. 3.5km to the northeast)
Potential Impact	Road users, dwelling
View Shed Analysis	No views of the site.
Visual sensitivity	Very Low
Sensitivity due to:	Rural landscape minor land use change and visual interlude for area character. Public regional road.
Magnitude of visual effect	Very Low
Visual impact	Very Low
Comments	This location has screening through vegetation in the paddock and on the road reserve, which combine with the distance obscures the project site. Viewshed and photomontages demonstrate this.

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION 9

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
30
9

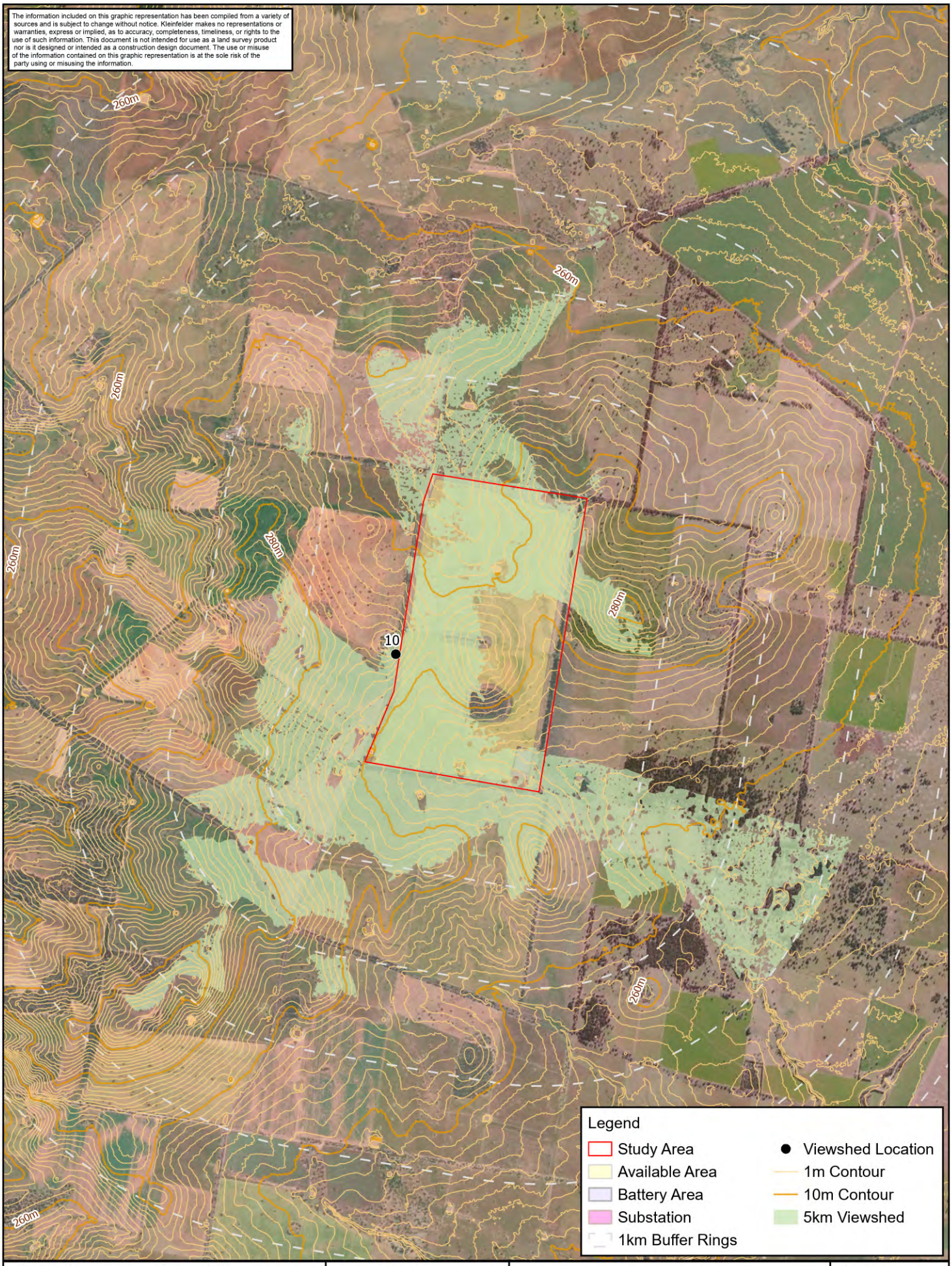
Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

Location 10: Eumungerie Rd

Viewpoint	Eumungerie Rd
Description of setting	Regional Road (adjacent to proposed driveway entrance)
Potential Impacts	Road users
View Shed Analysis	Views into the site
Visual sensitivity	Very Low
Sensitivity due to:	Low use and low concern viewpoint / travel route.
Magnitude of visual effect	Moderate
Visual impact	Low
Comments	This road has trees lining along most of the length of the Project western boundary. The density varies. Given the flat nature of the surrounding terrain, the solar farm would be visible, although obscured from the existing vegetation. Retention of vegetation within the project site will fragment views of the Project.

Figure 32: Panoramic Photograph, Eumungerie Rd

Figure 33: Location Photograph, Eumungerie Rd



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Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION 10

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
33
10

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

Location 11: Merrits Lane

Viewshed analysis and detailed photomontages were selected for this site to allow context for the Public Viewpoints in the southeastern locality of the Project site. Refer Page 8 of the Preparation of Photomontages Report in Appendix A.

Viewpoint	Merrits Lane
Description of setting	Local Main Road (approx. 4.5km to the south)
Potential Impact	Road users, dwelling
View Shed Analysis	No view into the site.
Visual sensitivity	Very Low
Sensitivity due to:	Change of land use and character of area. Local unsealed road.
Magnitude of visual effect	Very Low
Visual impact	Very Low
Comments	No views of the site as per the viewshed mapping and photomontages. Distance and existing vegetation screens views.

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Scale @ A4 1:50,000 Metres
GDA 1994 MGA Zone 55

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VIEWSHED LOCATION 11

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
34
11

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

Location 12: Emogandry Road

Viewshed analysis and detailed photomontages were selected for this site to allow context for the Public Viewpoints in the northwestern locality of the Project site. Refer Page 9 of the Preparation of Photomontages Report in Appendix A.

Viewpoint	Emogandry Road
Description of setting	Local Road (approx. 2km to northwest)
Potential Impact	Road users
View Shed Analysis	No view into the site
Visual sensitivity	Very Low
Sensitivity due to:	Change of land use and character of area. Local unsealed road.
Magnitude of visual effect	Very Low
Visual impact	Very Low
Comments	No views of the site as per the viewshed mapping and photomontages. Distance and existing vegetation screens views.

0 250 500 1,000 1,500 2,000 2,500

Scale @ A4 1:50,000 Metres

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VIEWSHED LOCATION 12

BURROWAY SOLAR FARM
VISUAL IMPACT ASSESSMENT
EDIFY ENERGY

FIGURE:
35
12

Path: J:\00 CLIENT FILES\137540_EdifyEnergyPtytd\24001591_BurrowaySolarFarm\24001591_BurrowaySolarFarm.aprx (1)

6 CONCLUSION

Ten private residences within 4.0 km of the Project and 12 public viewpoints within 5.0 km of the Project were assessed using a combination of desktop analyses and field observations. The closest of the private residences is location ~1.8km from the Project boundary.

The following considerations are common to all the assessed receivers:

- The duration of construction-related visual impacts will be temporary in nature, lasting for a relatively short 15-18 months (approximately).
- Operational impacts will occur over 30 years or more and are expected to fluctuate with changes to the surrounding natural and built environment.
- Night-lighting impacts during operation associated with security are expected to be readily manageable.
- More visual impacts are expected due to construction traffic utilising the road network and entering the site however this is temporary in nature. Operational traffic will be negligible.

It is anticipated that decommissioning activities would be similar in nature and duration to those during the construction phase. At the completion of rehabilitation, the project site would have been returned to its existing rural landscape character.

6.1 PRIVATE RECEPTORS

It is noted that there are a minimal number of residential dwellings in the area. Views from existing residential dwellings will be limited or obscured. The existing environment with road reserve vegetation, stands of vegetation on neighbouring properties and paddock trees on other properties will largely obscure the impacts of the proposal as well.

Based on the desktop viewshed analysis, the solar arrays and the substation were potentially visible from residences R4, R5, R6 and R8 (i.e. the view of the site is not fully obscured by topography). The distances from the Project site to these receivers ranges from approximately 2.1 km to 3.1 km for which the greater the distance between the visual receiver and the proposal, the lesser the visual sensitivity is for that visual receiver. Photomontages completed for public viewpoints in the localities of these private receptors demonstrate that distance and existing vegetation will obscure views for the residences, without factoring in landscape planting present around the residences.

The remaining private receptors, R1, R2, R3, R7, R9 and R10 will not have any views of the Project site due to the topographical features of the locality, as demonstrated in the viewshed analyses.

No specific mitigation measures such as visual screening in the form of landscaping is considered to be required based on the findings of this report.

6.2 PUBLIC VIEWPOINTS

As the 12 viewpoints were located on sealed and unsealed local roads, the sensitivity of the impacts was identified as low. Based on the visibility determined through site inspection, viewshed analysis and assessment against the visual criteria, the overall visual impact is expected to be very low – low (Table 7). Existing visual screening from structures or vegetation as well as distance to the site are factors that will further ameliorate public view of the Project infrastructure.

The visual impact for motorists will be tapered by a road condition such as speed and angle of the road towards the Site. All of the viewshed analysis indicates that the Site has partial visibility from the immediate surrounding areas, however, visibility reduces from further afield and with the presence of existing vegetation.

Table 8: Summary of Visual Impact

Viewpoint	Location	Visual Sensitivity	Magnitude of Visual Effect	Visual Impact
1	Edmonstones Rd	Very Low	Moderate	Low
2	Eumungerie Rd and Edmonstones Rd	Very Low	Moderate	Low
3	Eumungerie Rd	Very Low	Moderate	Low
4	Eumungerie Rd	Very Low	Very Low	Very Low
5	Dubbo Burroway Rd	Very Low	Very Low	Very Low
6	Eumungerie Rd and Dubbo Burroway Rd	Very Low	Very Low	Very Low
7	Dubbo Burroway Rd	Very Low	Very Low	Very Low
8	Dubbo Burroway Rd	Very Low	Very Low	Very Low
9	Eumungerie Rd	Very Low	Very Low	Very Low
10	Eumungerie Rd	Very Low	Moderate	Low
11	Merrits Lane	Very Low	Very Low	Very Low
12	Emogandry Rd	Very Low	Very Low	Very Low

Overall, the proposed development will have a very low to low visual impact exclusively on road users and future inland rail users. No specific mitigation measures such as visual screening zones are considered to be required for the viewpoints.

6.3 Dark Sky

The Burroway Solar Farm is located within the 200 km dark sky region from the Siding Spring observatory. Based on the design of the solar farm, there will be no permanent night lighting installed within the solar farm array. It is expected that night lighting will only be used in the case of maintenance and in the event of an emergency. It is recommended that any lighting to be installed for safety and security on site is in accordance with AS4282-1997 - Control of Obtrusive Effects of Outdoor Lighting. Lighting would be designed to ensure reduced disturbance to neighbouring properties. Lighting is also to be designed with regard to principles identified within the Dark Sky Planning Guidelines Part 4 (2022), which are:

- Light must have a clear purpose;
- Eliminate upward spill light;
- Direct light downward, and avoid light trespass;
- Use shielded fittings;
- Avoid excess lighting;
- Switch lights off when not needed;
- Use energy efficient bulbs;
- Use asymmetric beams;
- Direct lights away from reflective surfaces; and
- Use warm white colours.

6.4 Cumulative Impacts

Based on a review of other identified projects in the region as identified in Table 8 below there is unlikely to be any cumulative visual impacts of the proposed development. The other major projects in the area are of sufficient distance that there will be no cumulative visual impacts.

Table 9: Major Projects in the Region

Name	Distance from Burroway SF
Inland Rail- Narromine to Narrabi	Corridor runs parallel to Eumungerie Road, adjacent Burroway SF.
Narromine BESS	20km South
Wallaby Creek Wind Farm	~35km South
Forest Glen Solar Farm	~25km southeast
Dubbo Firming Power Station	~30km east, southeast
Dubbo Quarry and South Keswick Quarry	~40-45km southeast
Dubbo Project	~50km southeast
Nevertire Solar Farm (BESS modification)	~60km west, northwest

7 MITIGATION MEASURES

7.1 DESIGN

No specific landscaping or visual screening treatments are proposed in relation to private receivers.

Good design principles can reduce the visual impact. For the proposal this includes:

- The design will retain the existing roadside planting along the boundaries of the site to reduce the overall visual impact.
- The small patch of remnant woodland, stand of planted vegetation and scattered paddock trees will be retained as part of the development to fragment the views of the development across the site.
- Consideration will be given to the colours of the PCUs, the battery facility, O&M buildings and storage shed to ensure minimal contrast and to help blend into the surrounding landscape to the extent practicable.
- Apply urban design principles and objectives during detailed design phase.
- For ancillary structures minimise reflective surfaces with a preferred use of muted colours.

7.2 CONSTRUCTION, OPERATION AND DECOMMISSIONING

Construction

The following measures will be implemented to minimise visual impacts during construction:

- Demarcation and exclusion fencing will be installed around trees and vegetation to be retained.
- Limiting disturbance and rehabilitating disturbed areas.
- Minimising light spill from the development into adjacent properties and road corridors by directing construction lighting into the construction areas and ensuring the site is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution.
- Temporary hoardings, barriers, traffic management and signage should be removed when no longer required.
- The site to be kept tidy and well maintained, including removal of all rubbish at regular intervals.
- There should be no storage of materials beyond the construction boundaries.

Operation

The following measures will be taken to minimise visual impacts during the operation phase of the project:

- Restrict external lighting to the area where the maintenance shed, permanent site office, and switch yard are located.
- All external lighting around buildings to be faced downwards and inwards to minimise impacts to neighbouring properties.

Decommissioning

The following measures will be taken to minimise visual impacts during the decommissioning phase of the project:

- A rehabilitation and decommissioning strategy will be implemented to return the site to its pre-existing condition.

REFERENCES

Elvis - Elevation and Depth - Foundation Spatial Data (n.d.), Intergovernmental Committee on Surveying and Mapping (ICSM) < Elvis (fsdf.org.au)>.

NSW Department of Planning and Environment (2023), Dark Sky Planning Guideline. NSW Government.

NSW Department of Planning and Environment (2022), Large-Scale Solar Energy Guideline. NSW Government.

NSW Department of Planning and Environment (2022), Technical Supplement - Landscape and Visual Impact Assessment. NSW Government.

Standards Australia, Australian Standard 4282-1997: Control of obtrusive effects of outdoor lighting

Transport for NSW (2020), Guideline for Landscape Character and Visual Impact Assessment, EIA-N04, Version 2.2, Centre for Urban Design.

GLVIA (2013). Guidelines for Landscape and Visual Impact Assessment. Third edition. Landscape Institute and Institute of Environmental Management & Assessment.

APPENDIX A – PHOTOMONTAGES

PREPARATION OF PHOTOMONTAGES
for a Visual Impact Assessment (VIA)

Burroway Solar Farm – Edify Energy

CONTENTS

(refer Kleinfelder's 'Landscape Character Map' for viewport locations)

Indicative Image: Example Solar Farm provided by Edify Energy

PHOTOMONTAGES for a Visual Impact Assessment (VIA)

PROJECT
BURROWAY SOLAR FARM
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B	16.02.24	Minor revisions	Amy Bishop	AB
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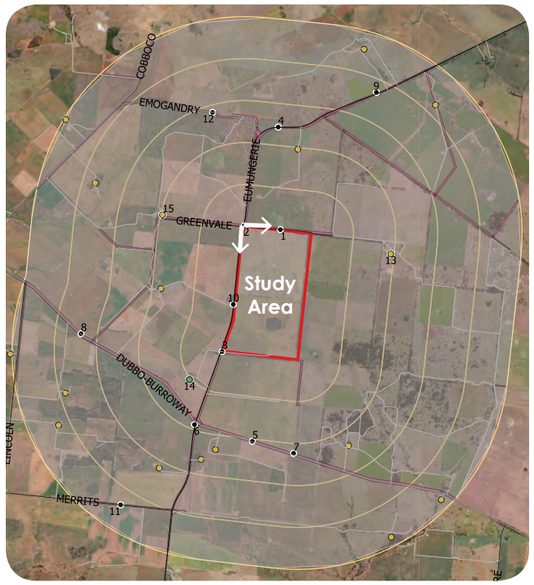
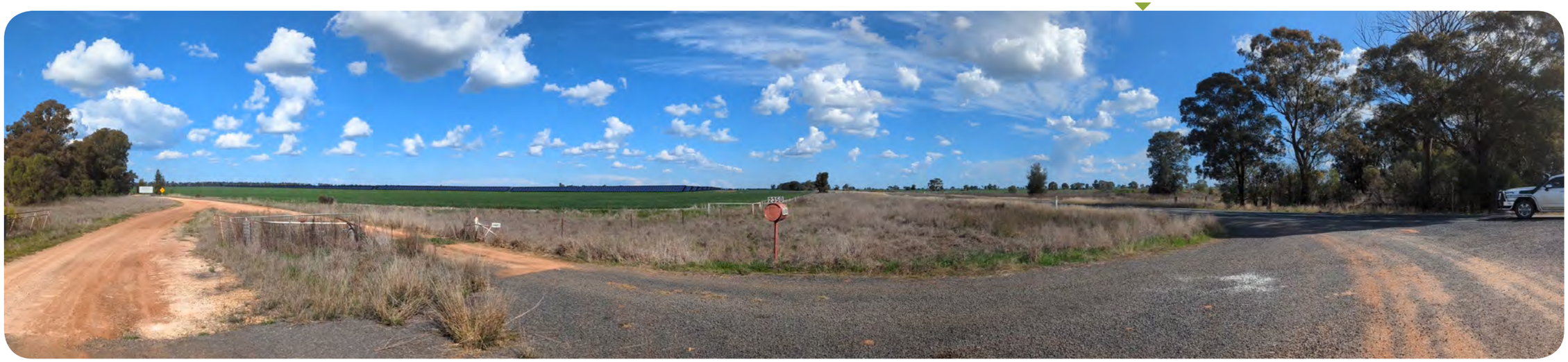


VIEWPOINT REFERENCE MAP
by Kleinfelder (Landscape Character Map)
Figure 2 (2023-10-17) NTS @ A3

PANORAMA SITE PHOTO
provided by Kleinfelder
File Name: PXL_20230828_042252235.PANO – View 2

S



PHOTOMONTAGE 1 – VIEWPOINT 02 View south east from corner of Greenvale Road and Eumungerie Road

NOTE: This photograph was taken at a distance of approx 100m from the development site.
The panels in the visualisation have been arranged in a north south orientation as per Edify specifications and can be considered as having a moderate/high visibility from viewpoint 3.

PHOTOMONTAGE – VIEWPOINT 2

PHOTOMONTAGES
for a Visual Impact Assessment (VIA)

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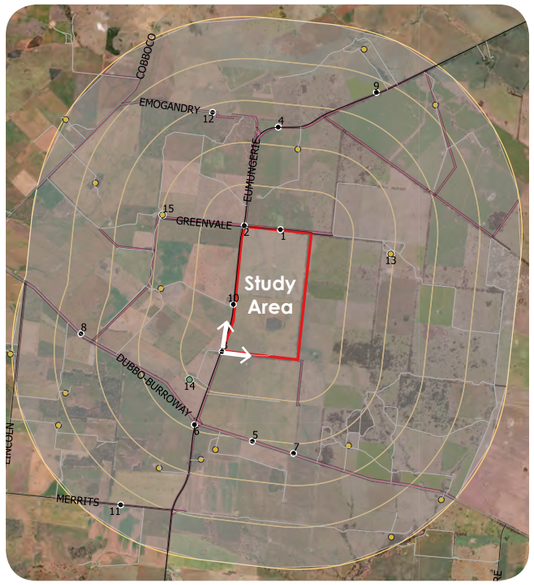

VIEWPOINT REFERENCE MAP
by Kleinfelder (Landscape Character Map)
Figure 2 (2023-10-17) NTS @ A3

PANORAMA SITE PHOTO
provided by Kleinfelder
File Name: PXL_20230828_045045611.PANO – View 3

PHOTOMONTAGE 2 – VIEWPOINT 03 View north east from corner of Subject Site

NOTE: This photograph was taken at a distance of approx 60m from the development site.
The panels in the visualisation have been arranged in a north south orientation as per Edify specifications and can be considered as having a high visibility from viewpoint 3.

PHOTOMONTAGE – VIEWPOINT 3

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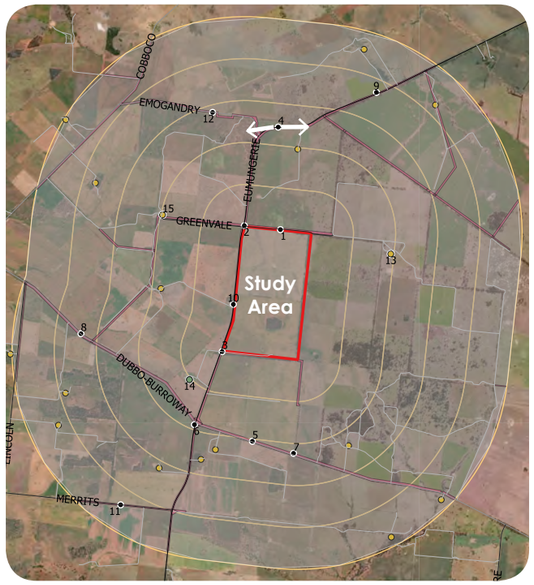

VIEWPOINT REFERENCE MAP
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Figure 2 (2023–10–17) NTS @ A3

PANORAMA SITE PHOTO
provided by Kleinfelder
File Name: PXL_20230828_045749428.PANO – View 4

Approximate location of Site

S

PHOTOMONTAGE 3 – VIEWPOINT 04 View south from Eumungerie Road

NOTE: This photograph was taken at a distance of approx 2600m from the development site.
Given the distance and the presence of scattered trees and screening vegetation between properties, visibility to the proposed development may be considered negligible from viewpoint 4.

PHOTOMONTAGE – VIEWPOINT 4

PHOTOMONTAGES
for a Visual Impact Assessment (VIA)

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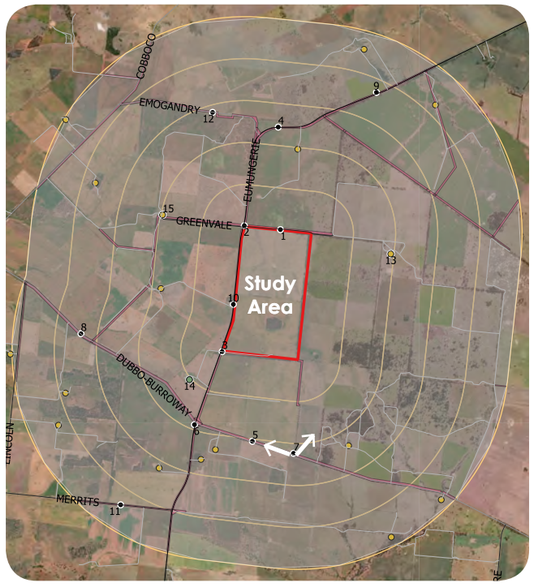

VIEWPOINT REFERENCE MAP
by Kleinfelder (Landscape Character Map)
Figure 2 (2023–10–17) NTS @ A3

PANORAMA SITE PHOTO
by Kleinfelder
File: PXL_20230828_054335625.PANO – View 7

Approximate location of Site

N

PHOTOMONTAGE 4 – VIEWPOINT 07 View north from Dubbo–Burroway Road

NOTE: This photograph was taken at a distance of approx 2200m from the development site.
Given the distance and the presence of scattered trees and screening vegetation between properties, visibility to the proposed development may be considered negligible from viewpoint 7.

PHOTOMONTAGE – VIEWPOINT 7

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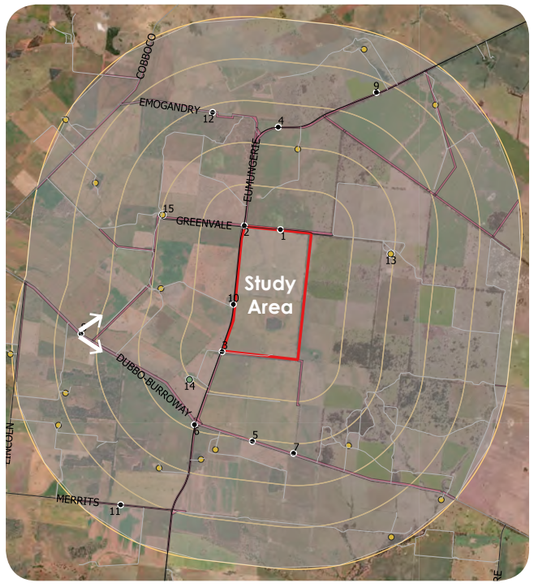

VIEWPOINT REFERENCE MAP
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Figure 2 (2023–10–17) NTS @ A3

PANORAMA SITE PHOTO
provided by Kleinfelder
File Name: PXL_20230828_052258626.PANO – View 8

Approximate location of Site

E

PHOTOMONTAGE 5 – VIEWPOINT 08 View east from Dubbo–Burroway Road

NOTE: This photograph was taken at a distance of approx 3600m from the development site.
Given the distance and the presence of scattered trees and screening vegetation between properties, visibility to the proposed development may be considered negligible from viewpoint 8.

PHOTOMONTAGE – VIEWPOINT 8

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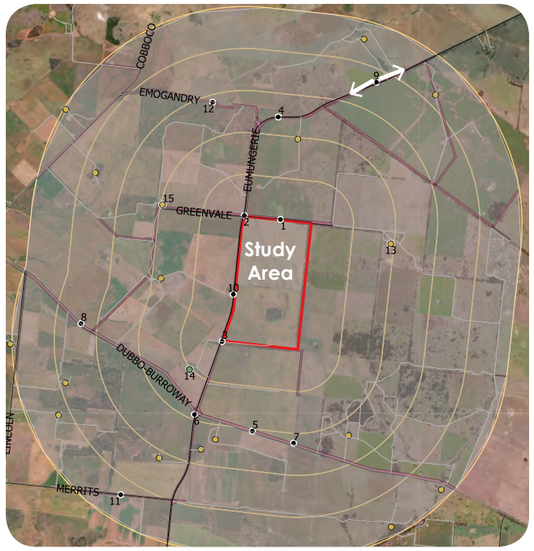

VIEWPOINT REFERENCE MAP
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Figure 2 (2023–10–17) NTS @ A3

PANORAMA SITE PHOTO
provided by Kleinfelder
File Name: PXL_20230828_050131283.PANO – View 9

PHOTOMONTAGE 6 – VIEWPOINT 09 View s/west from Eumungerie Road

NOTE: This photograph was taken at a distance of approx 3700m from the development site.
Given the distance and the presence of scattered trees and screening vegetation between properties, visibility to the proposed development may be considered negligible from viewpoint 9.

PHOTOMONTAGE – VIEWPOINT 9

PHOTOMONTAGES
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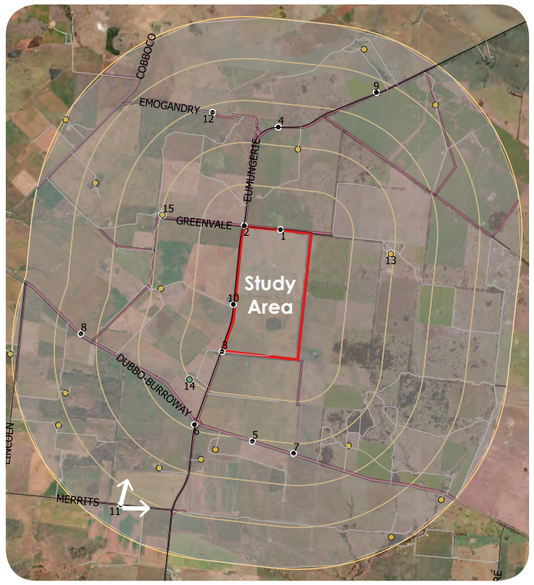

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Figure 2 (2023–10–17) NTS @ A3

PANORAMA SITE PHOTO
provided by Kleinfelder
File Name: PXL_20230828_053304019.PANO – View 11

N

Approximate location of Site

PHOTOMONTAGE 7 – VIEWPOINT 11 View north from Dubbo–Burroway Road

NOTE: This photograph was taken at a distance of approx 4400m from the development site.
Given the distance and the presence of scattered trees and screening vegetation between properties, visibility to the proposed development may be considered negligible from viewpoint 11.

PHOTOMONTAGE – VIEWPOINT 11

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Rev	Date	Description	Drawn	Check
A	31.01.24	For client review	Amy Bishop	AB
B	16.02.24	Minor revisions	Amy Bishop	AB
C	22.02.24	FOR SUBMISSION	Amy Bishop	AB

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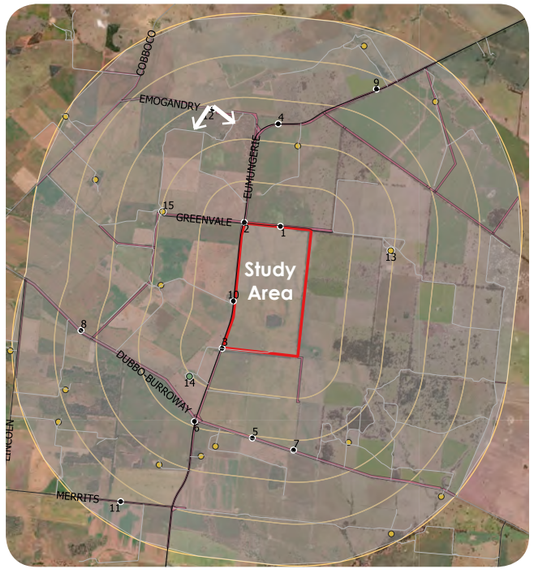

VIEWPOINT REFERENCE MAP
by Kleinfelder (Landscape Character Map)
Figure 2 (2023-10-17) NTS @ A3

PANORAMA SITE PHOTO
provided by Kleinfelder
File Name: PXL_20230828_051026131.PANO – View 12

PHOTOMONTAGE – VIEWPOINT 12

PHOTOMONTAGE 8 – VIEWPOINT 12 View south/east from Emogandry Road

NOTE: This photograph was taken at a distance of approx 2800m from the development site.
Given the distance and the presence of scattered trees and screening vegetation between properties, visibility to the proposed development may be considered negligible from viewpoint 12.

PHOTOMONTAGES
for a Visual Impact Assessment (VIA)

PROJECT
BURROWAY SOLAR FARM
Visual Impact Assessment
(photomontages only)

CLIENT
Edify Energy
C/O Kleinfelder

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SUMMARY

Photomontage 1: Viewpoint 2 – Visibility to the proposed development is considered to be moderate/high.
Photomontage 2: Viewpoint 3 – Visibility to the proposed development is considered to be high.
Photomontage 3: Viewpoint 4 – Visibility to the proposed development is considered to be negligible.
Photomontage 4: Viewpoint 7 – Visibility to the proposed development is considered to be negligible.
Photomontage 5: Viewpoint 8 – Visibility to the proposed development is considered to be negligible.
Photomontage 6: Viewpoint 9 – Visibility to the proposed development is considered to be negligible.
Photomontage 7: Viewpoint 11 – Visibility to the proposed development is considered to be negligible.
Photomontage 8: Viewpoint 12 – Visibility to the proposed development is considered to be negligible.

PUBLICATIONS & REPORTS

- Angus Jeffery (2019) *Photomontages for LVIA and TVIA*, Landscape Visual Limited, accessed 25/01/24
- Scottish Natural Heritage (2017) *Visual Representation of Wind Farms – Guidance*, Version 2.2, accessed 25/01/24
- Land Environment Court (2023) *Photomontage Policy*, accessed 25/01/24

METHOD

The photomontages in this report were prepared using the following computer generated programs and resources: ArcGIS Pro, AutoCAD 2D & 3D, Google Earth. All data was provided by Kleinfelder including panoramas, data, viewpoint map and solar panel layout specifications.

DISCLAIMER

The information included in these photomontages are a graphic representation based on the data provided by Kleinfelder and a variety of sources.
All panoramas were collected in the field by Kleinfelder. A panorama is an image covering a horizontal field of view wider than a single 50mm frame.
Panoramas can create parallax and distortion to the landscape in a photo.
The panoramas were used as a base from which to superimpose a representation of the development.
The provided photomontages in this report have been developed to provide an indicative view of the proposed development from viewports selected by Kleinfelder.
EcoResolve makes no representations or warranties, express or implied, as to accuracy, completedness, timelines or rights to the use of such information. This document is not intended for use as construction design documentation, is conceptual and for reference only to be used as a reference for Kleinfelder's Visual Impact Assessment for the proposed Burroway Solar Farm.
The use or misuse of the information contained within this report is at the sole risk of the party using or misusing the information.

LIMITATIONS OF VISUALISATION

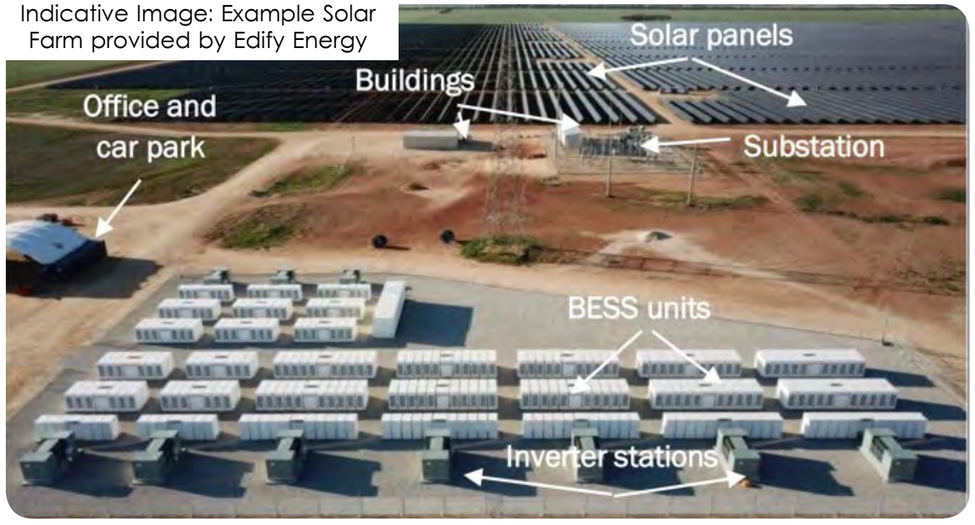
A visualisation can never show exactly what a proposed development will look like in reality due to factors such as lighting, weather and seasonal conditions. The images provided give a reasonable impression of the scale and orientation of the solar farm but can never be 100% accurate.
(adapted from Scottish Natural Heritage; 2017).

END OF ECORESOLVE REPORT

EcoResolve certifies that to the best of our knowledge; that the information included in this report is true and accurate. This report is based on the information provided by Kleinfelder and conducted as a desktop assessment.

Amy Bishop
Principal Landscape Architect (BLArch)
22 February, 2024

Indicative Image: Example Solar Farm provided by Edify Energy



SUMMARY & END OF REPORT

PHOTOMONTAGES for a Visual Impact Assessment (VIA)

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