Dinawan Solar Farm

Scoping Report

Prepared for Spark Renewables Pty Limited

November 2022

Dinawan Solar Farm

Scoping Report

Spark Renewables Pty Limited

E220305 RP1

November 2022

Version	Date	Prepared by	Approved by	Comments
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Executive Summary

Spark Renewables Pty Limited (Spark Renewables) proposes to develop the Dinawan Solar Farm, a large-scale solar photovoltaic (PV) generation facility and battery energy storage system (BESS), supported by associated infrastructure (the project). The project will be located about halfway between the towns of Coleambally and Jerilderie and lies within the Murrumbidgee local government area (LGA) in New South Wales (NSW).

The project is within the South-West Renewable Energy Zone (REZ) and would connect to the Dinawan Substation, which is proposed to be built by Transgrid as part of the Project EnergyConnect interconnector that will run between Robertstown in South Australia and Wagga Wagga in NSW.

The project is part of the Dinawan Energy Hub, which comprises a hybrid wind and solar farm and BESS, and will be delivered through two separate, but related, State Significant Development (SSD) applications to the NSW Department of Planning and Environment (DPE). This report relates to the Dinawan Solar Farm (the project).

The project will have a generation capacity of up to approximately 1,000 MW(AC). The BESS will have a capacity of up to approximately 300 MW (AC or DC coupled) and will have provision for up to four hours of storage (1,200 MWh).

The project investigation area is approximately 4,500 hectares (ha). Within the project investigation area, the development footprint is expected to be around 2,500 ha. The final layout and capacity of the project will be selected on the basis of environmental constraints identification, outcomes of stakeholder engagement, engineering assessments and design of project infrastructure.

The land within the project investigation area is privately owned and is divided into two distinct sections, one to the west of Kidman Way and one to the east. It is proposed that the eastern and western areas are connected via an overhead or underground line (subject to detail design considerations).

The project aligns with the NSW and Commonwealth Government's objectives for energy security and reliability and emissions reductions. The project will contribute to the Commonwealth Government's plan to reduce Australia's greenhouse gas emissions by 43% by 2030, and net zero emissions by 2050. Once operational, the project could abate approximately 2 million tonnes of greenhouse gases annually and power up to 380,000 NSW households per year.

The project is SSD pursuant to Schedule 1 of *State Environmental Planning Policy (Planning Systems) 2021*. Accordingly, approval for the project is required under Part 4 of the NSW *Environmental Planning and Assessment Act 1979*.

This scoping report has been prepared to support a request for the Secretary's Environmental Assessment Requirements (SEARs) for the project. A preliminary environmental assessment has been carried out and is documented in this report to assist in the identification of matters that will require further assessment in the environmental impact statement (EIS), and the level of assessment that should be carried out for each matter.

This scoping report has been prepared in accordance with *State Significant Development Guidelines – Preparing a Scoping Report* (DPIE 2021a). The aspects identified as requiring detailed assessment in the EIS include visual, biodiversity, Aboriginal heritage, traffic and social. Aspects requiring standard assessment include historic heritage, land, water, noise and vibration, air quality and hazards and risk.

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1 Introduction

1.1 Project overview

Spark Renewables Pty Limited (Spark Renewables) proposes to develop the Dinawan Solar Farm, a large-scale solar photovoltaic (PV) generation facility and battery energy storage system (BESS), supported by associated infrastructure (the project). The project will be located about halfway between the towns of Coleambally and Jerilderie and lies within the Murrumbidgee local government area (LGA) in New South Wales (NSW). The regional context of the project is shown in Figure 1.1.

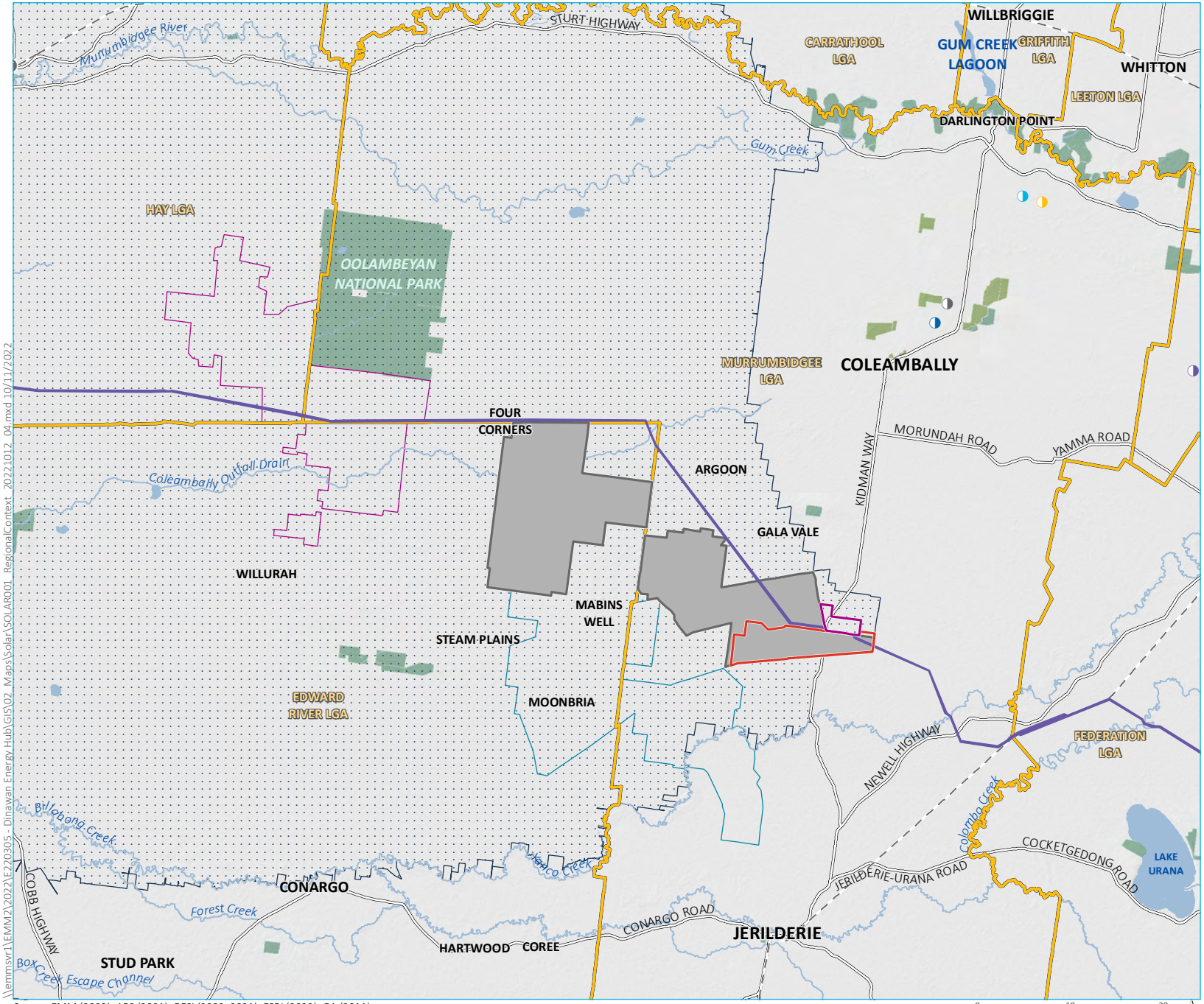
The project is part of the Dinawan Energy Hub (Section 1.3) and is within the South-West Renewable Energy Zone (REZ). The project would connect to the Dinawan Substation, which is proposed to be built by Transgrid as part of the Project EnergyConnect interconnector that will run between Robertstown in South Australia and Wagga Wagga in NSW.

The project will have a generation capacity of up to approximately 1,000 MW(AC). A project investigation area of 4,500 hectares (ha) has been the focus of preliminary baseline investigations. The BESS will have a capacity of up to approximately 300 MW (AC or DC coupled) and will have provision for up to four hours of storage (1,200 MWh).

The project will be designed to avoid and minimise impacts where possible. The exact land area to be covered by the project components (ie the development footprint) will be refined as the project design progresses and will be informed by the outcomes of community and stakeholder engagement and the findings of the environmental, social, and economic assessments.

The project is consistent with NSW Government policy for development of renewable energy generation and storage infrastructure. It will assist in meeting NSW and Australian Government emissions reduction targets.

The project is State Significant Development (SSD) pursuant to Schedule 1 of *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) and approval for the project is required under Part 4, Division 4.7 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).



KEY

- Project investigation area
- Dinawan Wind Farm

Project EnergyConnect (Transgrid)

- Dinawan Substation
- Transmission line

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest
- Local government area

Neighbouring renewable energy developments

- Bullawah Wind Farm (proposed)
- Yanko Delta Wind Farm (proposed)
- Renewable Energy Zone
- Yarrabee Solar Farm (approved)
- Woodland BESS (proposed)
- Darlington Point Solar Farm (operating)
- Coleambally Solar Farm (operating)
- Coleambally BESS (proposed)

INSET KEY

- Renewable Energy Zone
- NPWS reserve
- State forest

Source: EMM (2022); ABS (2021); DFSI (2020, 2021); ESRI (2022); GA (2011)

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Regional context

Dinawan Solar Farm
Scoping Report
Figure 1.1

EMM
creating opportunities

1.2 The applicant

Spark Renewables is a wholly owned business within the Spark Infrastructure Group (Spark Infrastructure). Spark Infrastructure was founded in 2005 and is an owner of critical energy infrastructure, including generation, transmission and distribution infrastructure across Australia. The objective of Spark Infrastructure is to provide energy system stability, reliability and minimise electricity costs to customers.

Spark Infrastructure was acquired in 2021 by a consortium of global infrastructure investors including KKR and two Canadian pension funds, Ontario Teacher's Pension Plan and the Public Sector Plan. Between them, they manage nearly one trillion dollars of investment funds.

Spark Infrastructure owns interests in $18 billion of electricity network and generation assets across Australia. Spark Infrastructure's investment portfolio comprises regulated electricity transmission and distribution assets in New South Wales (NSW) (TransGrid, 15.01%), Victoria (CitiPower and Powercor, together known as Victoria Power Networks, 49%) and South Australia (SA Power Networks, 49%). These core assets comprise 85% of their investment portfolio.

These assets deliver energy to more than 5 million customers in Victoria, South Australia, NSW and the Australian Capital Territory and transport energy across the National Electricity Market (NEM).

Spark Renewables is a leading developer, long-term owner, and operator of renewable energy projects. The company's portfolio comprises the Bomen Solar Farm, operational since 2020, and Spark Renewables is currently developing in excess of 3 GW of solar, wind, and renewable storage projects across the NEM, including the Dinawan Energy Hub, Mallee Wind Farm and Mates Gully Solar Farm, within NSW.

Details for Spark Renewables are provided in Table 1.1.

Table 1.1 Summary of applicant details

Company name	Spark Renewables Pty Limited (Spark Renewables)
ACN	632 860 023
Address	Level 4, 1A Rialto Lane Manly NSW 2095 Australia

1.3 Related development

The project is part of the Dinawan Energy Hub, a hybrid wind and solar farm and BESS within the Murrumbidgee and Edwards River LGAs of NSW. Dinawan Energy Hub has the potential to be up to 2.5 gigawatts (GW) in capacity based on the land available and capacity of the Dinawan Substation. Preliminary resource monitoring indicates that a mix of approximately 70% wind and 30% solar results in a relatively flat, diurnal generation profile.

Dinawan Energy Hub will be delivered through two separate, but related, SSD applications to the NSW Department of Planning and Environment (DPE):

- Dinawan Solar Farm – comprising a large-scale solar development up to 1 GW, including a BESS; and
- Dinawan Wind Farm – comprising a large-scale wind development up to 1.5 GW, including a BESS.

This scoping report addresses the Dinawan Solar Farm (the project). A separate scoping report addresses the Dinawan Wind Farm.

1.4 Purpose of this report

The project is SSD pursuant to Schedule 1 of the Planning Systems SEPP and approval for the project is required under Part 4, Division 4.7 of the EP&A Act. An SSD application for the project is to be accompanied by an environmental impact statement (EIS).

This scoping report supports a request to DPE for the Secretary's Environmental Assessment Requirements (SEARs) in relation to the project. The SEARs will identify the matters to be assessed in the EIS and the level of assessment required.

This report has been prepared by EMM Consulting Pty Limited (EMM) on behalf of Spark Renewables in accordance with the *State Significant Development Guidelines – Preparing a Scoping Report* (DPIE 2021a) (Scoping Report Guidelines). Other NSW Government SSD technical guidelines have been considered where applicable, as well as the *Large-scale Solar Energy Guideline for State Significant Development* (DPE 2022a).

This scoping report provides a high-level description of the project, including the project investigation area and its surroundings, the environmental planning pathway for approval and the identification of key potential environmental issues that may be associated with the project.

2 Strategic context

2.1 Site and surrounds

2.1.1 Regional context

The project investigation area is within the Murrumbidgee LGA and NSW's Riverina region, approximately 500 km south-west of Sydney and 320 km north of Melbourne. The Sturt Highway, approximately 55 km north of the project investigation area, connects the region to major population centres in NSW, Victoria and South Australia. The regional context of the project is shown on Figure 1.1.

i Towns and population centres

The nearest towns to the project investigation area are Coleambally (29 km north) and Jerilderie (30 km south). Other major population centres in the vicinity of the project include Griffith (85 km north) and Wagga Wagga (135 km east).

ii Natural resources

The nearest national parks, nature reserves and state forest areas are:

- Oolambeyan National Park approximately 46 km to the north-west;
- South-West Woodland Nature Reserves, comprising of:
  - Edgar and Puckawidgee precincts approximately 38 km to the west; and
  - Kulki precinct approximately 12 km to the north;
- Murrumbidgee Valley National Park, approximately 54 km to the north-east; and
- Bretts State Forest, approximately 31 km north.

The largest nearby watercourse is Yanco Creek, approximately 6 km south of the project investigation area, which flows south-west toward the Murray River.

iii Renewable energy and other developments

The project is within the South-West REZ, which has an intended network capacity of 2.5 GW, and has been identified as a key location in NSW for the delivery of renewable energy infrastructure. There are a number of operating, approved and proposed renewable energy developments, and infrastructure to facilitate these developments, in the region, summarised in Table 2.1.

Table 2.1 Surrounding renewable developments and infrastructure

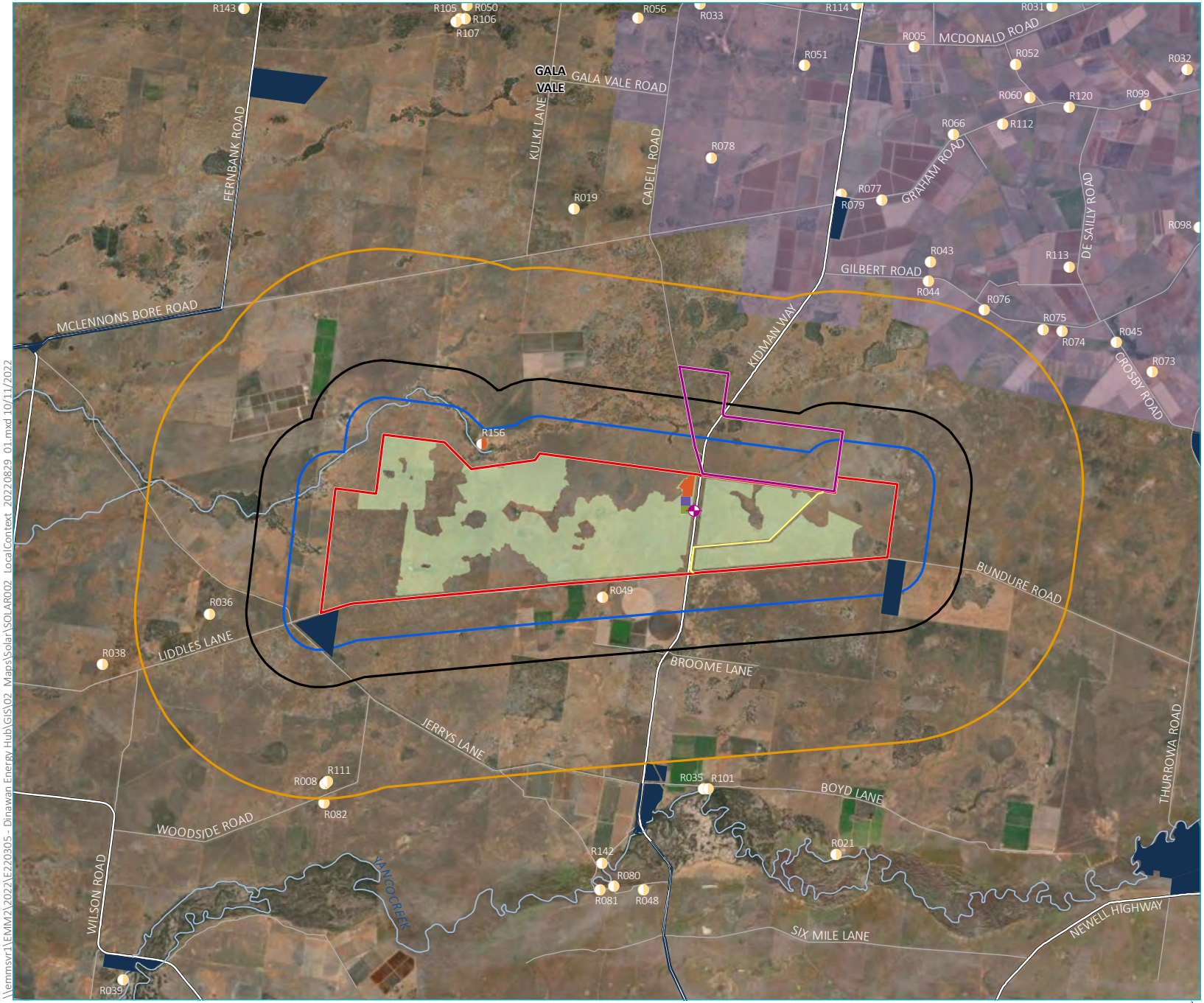
Project	Development type	Proximity to the Dinawan Energy Hub[1]	Status
Project EnergyConnect	Electricity transmission	Adjacent – proposed transmission line and Dinawan Substation adjacent to project investigation area.	Approved – not constructed
Dinawan Wind Farm	Wind farm	Adjacent – located adjacent to the project investigation area and forms part of the Dinawan Energy Hub.	Proposed – EIS in preparation
Yanco Delta Wind Farm	Wind farm	Adjacent – adjoining the project investigation area for the Dinawan Wind Farm to the south and approximately 1 km south-west of the project investigation area for the project.	Proposed – EIS in preparation
Bullawah Wind Farm	Wind farm	Nearest boundary approximately 9 km west of the project investigation area for the Dinawan Wind Farm and approximately 38 km north-west of the project investigation area for the project.	Proposed – pre-scoping stakeholder engagement
Coleambally Solar Farm	Solar farm	30 km north of the project investigation area.	Operating
Coleambally BESS	BESS	30 km north of the project investigation area.	Proposed – EIS in preparation
Darlington Point Solar Farm	Solar farm and BESS	45 km north of the project investigation area.	Operating (BESS under construction)
Woodland Battery Energy Storage System	BESS	45 km north of the project investigation area.	Proposed – EIS in preparation
Yarrabee Solar Farm	Solar farm and BESS	45 km north-east of the project investigation area.	Approved – not constructed
Currawarra Solar Farm	Solar farm	60 km south of the project investigation area.	Approved
Tarleigh Park Solar Farm	Solar farm	75 km south-west of the project investigation area.	Approved – not constructed
Baldon Wind Farm	Wind farm	100 km west of the project investigation area.	Proposed – EIS in preparation

Notes: 1. Distances are measured from closest boundary points based on publicly available information at the time of preparation.

2.1.2 Local context

The project investigation area is divided into two distinct sections, one to the west of Kidman Way and one to the east (Figure 2.1). Kidman Way is a regional road linking the Newell Highway (approximately 19 km south of the project investigation area) with the Sturt, Mid-Western, Barrier, Mitchell and Kamilaroi highways.

With a population 1,152, Coleambally is approximately 29 km north of the project investigation area and contains residential, general industrial and forestry land uses. Jerilderie has a population of 922 and is approximately 30 km south of the project investigation area. Like Coleambally, Jerilderie contains residential and general industrial land uses as well as public recreation and infrastructure. The area surrounding both towns is primarily used for agriculture.



KEY

- Project investigation area

Solar farm infrastructure

- O&M facilities
- On-site substation
- Development footprint
- Battery energy storage system
- Site access point

Project EnergyConnect (Transgrid)

- Dinawan Substation

Residence

- Associated residence
- Non-associated residence
- Buffer (1km)
- Buffer (2km)
- Buffer (5km)

Existing environment

- Watercourse (third order and higher)
- Major road
- Minor road
- Coleambally irrigation area
- Travelling stock reserves
- Coleambally irrigation channel

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Source: EMM (2022); DFSI (2020, 2021); ESRI (2022); GA (2011)

0 2.5 5 km

GDA2020 MGA Zone 55

N

Local context

Dinawan Solar Farm
Scoping Report
Figure 2.1

EMM
creating opportunities

North-east of the project investigation area is the Coleambally Irrigation Area (Figure 2.1), which is run by the Coleambally Irrigation Co-operative Limited and supplies irrigation and drainage services to nearly 500 farms. The Coleambally Irrigation Co-operative Limited area of operations spans across over 400,000 ha including over 300,000 ha which is serviced by the West Coleambally Outfall Channel. The water supply is from the regulated Murrumbidgee River and access to water is based on the Murrumbidgee Regulated River Water Sharing Plan (2016) (CICL 2021).

The project investigation area is adjacent to the proposed site of the Dinawan Substation, which forms part of Project EnergyConnect (Figure 2.1). Project EnergyConnect includes the construction and operation of a new high voltage (HV) interconnector between NSW and South Australia, with an additional connection to north-west Victoria. Project EnergyConnect aims to reduce the cost of providing secure and reliable electricity transmission between NSW and South Australia in the near term, while facilitating the longer-term transition of the energy sector across the National Electricity Market (NEM) to low emission energy sources.

The area surrounding the project investigation area is sparsely populated. There are only 4 non-associated residences within 5 km of the project investigation area, including 1 within 500 m of the project investigation area (R049 on Figure 2.1).

No mining tenements within the project investigation area were identified in a search of MinView. The closest is Exploration Lease (EL) 9366, approximately 25 km east of the project investigation area.

2.1.3 Project investigation area

The land within the project investigation area is currently used for sheep and cattle grazing.

The project investigation area is approximately 4,500 ha and encompasses 62 land parcels. Within the project investigation area, the development footprint is expected to be around 2,500 ha. The land within the project investigation area is privately-owned and is divided into two distinct areas, one to the west of Kidman Way and one to the east. Access to the project investigation area will be direct from Kidman Way.

Elevation within the project investigation area is approximately 110 m above sea level and is characterised by flat terrain. There are four first order watercourses and one second order watercourse mapped within the project investigation area; however, all are ephemeral. Coleambally irrigation channel runs through the project investigation area east of Kidman Way (Figure 2.1).

The preferred point of connection to Transgrid's network is via the Dinawan Substation, which forms part of Project EnergyConnect and will be constructed on land adjacent to the project investigation area. An overhead transmission line will connect the project's on-site substation to the Dinawan Substation.

A summary of the key features of the project investigation area and surrounds is provided in Table 2.2.

Table 2.2 Key features of the project investigation area and surrounds

Aspect	Description
LGA	The project investigation area is within the Murrumbidgee LGA.
Land zoning	The project investigation area is zoned RU1 Primary Production under the *Jerilderie Local Environmental Plan 2012* (Jerilderie LEP). Kidman Way is zoned SP2 – Infrastructure (Classified Road) under the Jerilderie LEP.
Nearby townships	Coleambally and Jerilderie are within approximately 30 km of the project investigation area.
Landscape	The landscape within the project investigation area is largely flat with some minor drainage depressions that hold water during rainfall and flooding.
Land use	Land use within the project investigation area includes agricultural operations (sheep and cattle grazing).

Table 2.2 Key features of the project investigation area and surrounds

Aspect	Description
Site history	The project investigation area is on Wiradjuri Country. The project investigation area forms part of pastoral stations established following European settlement in the area from around the 1850s. In particular, the project investigation area is closely associated with Yanko Station and later the Goolgumbla property.
Land ownership	Land within the project investigation area is privately-owned.
Residences	There are only 4 non-associated residences within 5 km of the project investigation area, including 1 within 500 m of the project investigation area (R049 on Figure 2.1).
Nearby natural features	Yanco Creek is approximately 6 km south of the project investigation area.
Nearby infrastructure	Kidman Way is a sealed regional road that bisects the project investigation area. It runs from the Newell Highway to the south and north towards Coleambally. The project investigation area is directly north of Liddles Lane, heading west from Kidman Way, and Bundure Road, heading east from Kidman Way. Both roads are unsealed. Coleambally irrigation channel runs through the project investigation area east of Kidman Way and delivers water to irrigated properties within the Coleambally irrigation area.
Surrounding development	The project investigation area is within the South-West REZ. Other renewable energy and transmission developments within close proximity to the project include: • Dinawan Wind Farm (within and adjacent to the project investigation area); • Project EnergyConnect (adjacent to the project investigation area); • Yanco Delta Wind Farm (1 km south-west of the project investigation area); • Coleambally BESS (30 km north of the project investigation area); • Coleambally Solar Farm (30 km north of the project investigation area); and • Bullawah Wind Farm (38 km north-west of the project investigation area). Where relevant, cumulative impacts from the project and surrounding developments will be assessed in accordance with the *Cumulative Impact Assessment Guidelines for Significant Projects* (DPIE 2021b). Cumulative impacts are discussed in Section 6.12.
Planning context	The project investigation area is not within any land identified as: • biophysical strategic agricultural land (BSAL); • flood planning area; or • bushfire prone land. Parts of the project investigation area are mapped as 'environmentally sensitive – biodiversity', 'environmentally sensitive – wetland' and 'environmentally sensitive – groundwater vulnerable' on the Jerilderie LEP. There are no travelling stock reserves within the project investigation area.

2.2 Strategic planning framework

An overview of relevant key policies, plans and strategies, and how the project aligns with these, is provided in Table 2.3.

Table 2.3 Alignment with key strategic planning frameworks

Plan, policy or strategy	Description	Alignment with strategic framework
International context		
The Paris Agreement	*The Paris Agreement* is a legally binding international treaty on climate change adopted by 196 parties in 2015. As a signatory to the agreement, the Australian Government has committed to reduce greenhouse gas (GHG) emissions by 26–28% on 2005 levels by 2030.	The project will contribute to meeting Australia's commitments under the Paris Agreement by reducing the NEM's annual GHG emissions. Once operational, the project could abate approximately 2 million tonnes of GHG annually and power up to 380,000 NSW households per year.
National context		
Large-scale Renewable Energy Target	The Australian Government Clean Energy Regulator administers the Large-scale Renewable Energy Target which incentivises investment in renewable energy power stations such as wind and solar farms. The Large-scale Renewable Energy Target of 33,000 GW hours of additional renewable electricity generation was met at the end of January 2021 (Clean Energy Regulator 2021). The annual target will remain at 33,000 GW hours until the scheme ends in 2030.	It is noted that the annual target has been met and will remain at 33,000 GW hours until the scheme ends in 2030.
Integrated System Plan 2022	The *Integrated Systems Plan 2022* (ISP 2022) prepared by the Australia Energy Market Operator (AEMO) is an: "Actionable roadmap for eastern Australia's power system to optimise consumer benefits through a transition period of great complexity and uncertainty."	Renewable Energy Zones (REZs) are identified in the ISP 2022 as "high-quality resource areas where clusters of large-scale renewable energy projects can be developed using economies of scale" (AEMO 2022). ISP 2022 identifies that significant investment in the NEM is necessary, requiring a nine-fold increase in utility-scale variable renewable energy (VRE) and that: "much of this resource will be built in renewable energy zones (REZs) that coordinate network and renewable investment, and foster a more holistic approach to regional employment, economic opportunity and community participation". The project will contribute to the development of the South-West REZ.
Net Zero 2050	In October 2021, the Australian government released its *Long-Term Emissions Reduction Plan* to achieve net zero emissions by 2050. The Plan aims at reaching a net zero economy through a technology-based approach, whilst protecting relevant industries, regions and jobs. It is part of an overarching strategy for emission reduction, based on a technology-led approach which includes a Technology Investment Roadmap and its Low Emissions Technology Statements.	The project will reduce GHG emissions associated with energy generation over its operational life. The project will contribute to the Commonwealth Government's plan to reduce Australia's greenhouse gas emissions by 43% by 2030, and net zero emissions by 2050, with 82% of Australia's energy to be derived from renewables by 2030. The incorporation of a BESS into the project will enable the storage of renewable energy to increase market efficiency and enable greater penetration of renewables in the electricity grid. Once operational, the project could abate approximately 2 million tonnes of GHG annually and power up to 380,000 NSW households per year.

Table 2.3 Alignment with key strategic planning frameworks

Plan, policy or strategy	Description	Alignment with strategic framework
State context		
Net Zero Plan Stage 1: 2020–2030 (DPIE 2020a)	The *Net Zero Plan Stage 1 2020–2030* (DPIE 2020a) outlines the NSW Government's plan to grow the economy and create jobs while helping the state to deliver a 35% cut in emissions compared to 2005 levels.	The project contributes to Priority 1 of the Net Zero Plan: "Drive uptake of proven emissions reduction technologies that grow the economy, create new jobs or reduce the cost of living." The project will fall within the South-West REZ. The region has been identified as an ideal location to play a key role in a renewable energy future for NSW due to its good renewable energy resources and opportunity to utilise electricity network infrastructure. The project will utilise these benefits to contribute to the NSW Net Zero Plan.
NSW Electricity Infrastructure Investment Roadmap (DPIE 2020b)	The Electricity Infrastructure Roadmap coordinates investment in transmission, generation, storage and firming infrastructure as ageing coal-fired generation plants retire. The roadmap includes actions that will deliver "whole-of system" benefits. The roadmap sets out a plan to deliver the state's first five REZs in the Central-West Orana, New England, South-West, Hunter-Central Coast, and Illawarra regions.	The project is within the South-West REZ and is ideally placed to contribute to the success of the roadmap. Once operational, the project could power up to 380,000 NSW households per year.
Large-Scale Solar Energy Guideline (DPE 2022a)	The *Large-Scale Solar Energy Guideline* (DPE 2022a) provides the community, industry, applicants and regulators with guidance on the planning framework for the assessment of large-scale solar projects and identifies the key planning considerations relevant to solar energy development in NSW.	Site selection and impact assessment considerations detailed in the guideline have been and will continue to be used to inform the project and will be considered in the EIS.
Local and regional context		
Riverina Murray Regional Plan 2036	The *Riverina Murray Regional Plan 2036* (DPIE 2017) (the Regional Plan) is currently being reviewed to reset priorities and extend its reach to 2041 before being put on exhibition in mid-2022. Direction 11 of Goal 1 of the Regional Plan is to promote the diversification of energy supplies through renewable energy generation. The Regional Plan acknowledges that the region has significant potential for renewable energy industries, with vast open spaces and a strategic advantage in hydro-electric energy generating capacity.	The project directly contributes to Direction 11 of the Regional Plan by: • contributing to the national renewable energy target; • promoting energy security through a more diverse energy mix; • investigating areas within the region with renewable energy potential and ready access to connect with the electricity network; • increasing energy efficiency; and • moving to lower emission energy sources.

Table 2.3 Alignment with key strategic planning frameworks

Plan, policy or strategy	Description	Alignment with strategic framework
Murrumbidgee Council Economic Development Strategy	The *Murrumbidgee Council Economic Development Strategy* (Murrumbidgee EDS) (Murrumbidgee Council 2018) aims to guide economic development activity in the Murrumbidgee LGA. To support its implementation, six strategic themes were identified: • attract new business investment; • support existing business to grow and diversify; • education, training and skills development; • grow the population; • infrastructure; and • develop and promote tourism.	The project will bring new investment opportunities to Murrumbidgee LGA and facilitate the delivery of energy infrastructure to support new development.
Murrumbidgee Council Local Strategic Planning Statement	The *Murrumbidgee Local Strategic Planning Statement* (Murrumbidgee Council 2020) is an important and significant step in planning for the future of the Murrumbidgee LGA. It will inform and guide Murrumbidgee Council's decision-making on planning matters and outlines a vision for a thriving and prosperous region over the next 20 years. The Statement sets out specific agenda items that are nominated under one of four broad categories in the built environment, the natural environment, infrastructure and economic growth.	The Statement aims to support projects for renewable energy and in particular solar farms. The project aligns with this objective and Spark Renewables will continue to engage with Murrumbidgee Council throughout the assessment process.
Murrumbidgee Council Community Strategic Plan 2017–2027	The *Murrumbidgee Council Community Strategic Plan 2017-2027* (Murrumbidgee CSP) (Murrumbidgee Council 2017) aims to prepare a shared vision for the communities over the 10 years to 2027. The five key strategic themes of the Murrumbidgee CSP are: • protecting existing regional natural environment for future generations; • exploring and promoting alternative, sustainable energy sources and practices; • maintaining a balance between growth, development and environmental protection; • welcoming and supporting our business and industries growth, diversity and productivity; and • promoting and supporting a regional economy and growth.	The project will support economic and industrial growth and diversification in the Murrumbidgee LGA and will seek to maximise environmental protection while developing new renewable energy generation and storage potential.

2.3 Project justification

2.3.1 Project benefits

The proposed project location is within the South-West REZ and would form an important part of Australia's response to climate change and Commonwealth and NSW Government commitments in the reduction of GHG emissions from the electricity industry. The project aligns with government objectives for energy security and reliability and will contribute to the continued growth of renewable energy generation and storage capacity.

The project is consistent with the principles of Ecologically Sustainable Development, as defined by Clause 193 of the NSW *Environmental Planning and Assessment Regulation 2021*, particularly in relation to climate change reduction and intergenerational equity. The project is in the public interest as it meets a demonstrated need and provides public benefits.

The project will:

- contribute to and support the development of the South-West REZ by providing renewable energy generation and storage capacity and improving the security, stability and resilience of the NEM;
- facilitate the shift away from coal-fired power generation, supporting Australia's transition towards clean and renewable sources of energy (with a capacity of up to 1 GW and potential to power approximately 380,000 NSW households per year);
- avoid, minimise and mitigate adverse impacts on the environment and community during construction and operation;
- establish a strong network of positive and long-term relationships within the local community and contribute to economic and social growth within the Murrumbidgee LGA and surrounds; and
- provide energy storage for sustainable renewable energy to enable continuous and reliable electricity output as part of a rapidly expanding industry in NSW.

2.3.2 Site suitability

The project investigation area is ideally located for the development of a solar farm and BESS because:

- the project investigation area is within the South-West REZ, an area nominated for significant investment in renewable energy generation, storage and transmission projects;
- the project investigation area is adjacent to Project EnergyConnect and the proposed Dinawan Substation and can export the electricity generated by the project directly into the grid via Project EnergyConnect;
- the project investigation area connects directly to Kidman Way, an approved B-Double route, with access to the Sturt and Newell highways;
- the land surrounding the project investigation area is sparsely populated with only four non-associated residences within 5 km (Figure 2.1);
- the project investigation area is relatively flat and has a very good solar resource that complements the available wind resource proposed to be utilised as part of the Dinawan Wind Farm;
- the existing agricultural land use within and surrounding the project investigation area is compatible with large-scale solar energy generation and storage; and
- the construction and operation of a solar farm and BESS is not anticipated to result in significant adverse biophysical, cultural, social or economic impacts.

3 Project description

3.1 Overview

The project comprises a large-scale solar PV generation facility and BESS, supported by associated infrastructure (Figure 3.1). The project will have a generation capacity of up to approximately 1,000 MW(AC). The BESS will have a capacity of up to approximately 300 MW (AC or DC coupled) and will have provision for up to four hours of storage (1,200 MWh). Details on the investigation area, physical layout and design, activities and uses and timing considered are provided in the following sections.

3.2 Physical layout and design

The project investigation area is approximately 4,500 ha and encompasses 62 land parcels (provided in Appendix A). Within the project investigation area, the development footprint is expected to be around 2,500 ha. The land within the project investigation area is privately owned, and is divided into two distinct sections, one to the west of Kidman Way and one to the east. It is proposed that the eastern and western areas are connected via an overhead or underground line (subject to detail design considerations).

The preferred point of connection to Transgrid's network is via the proposed Dinawan Substation, which forms part of Project EnergyConnect, and will be constructed on land adjacent to the project investigation area (Figure 3.1). An overhead transmission line will connect the project's on-site substation to the Dinawan Substation.

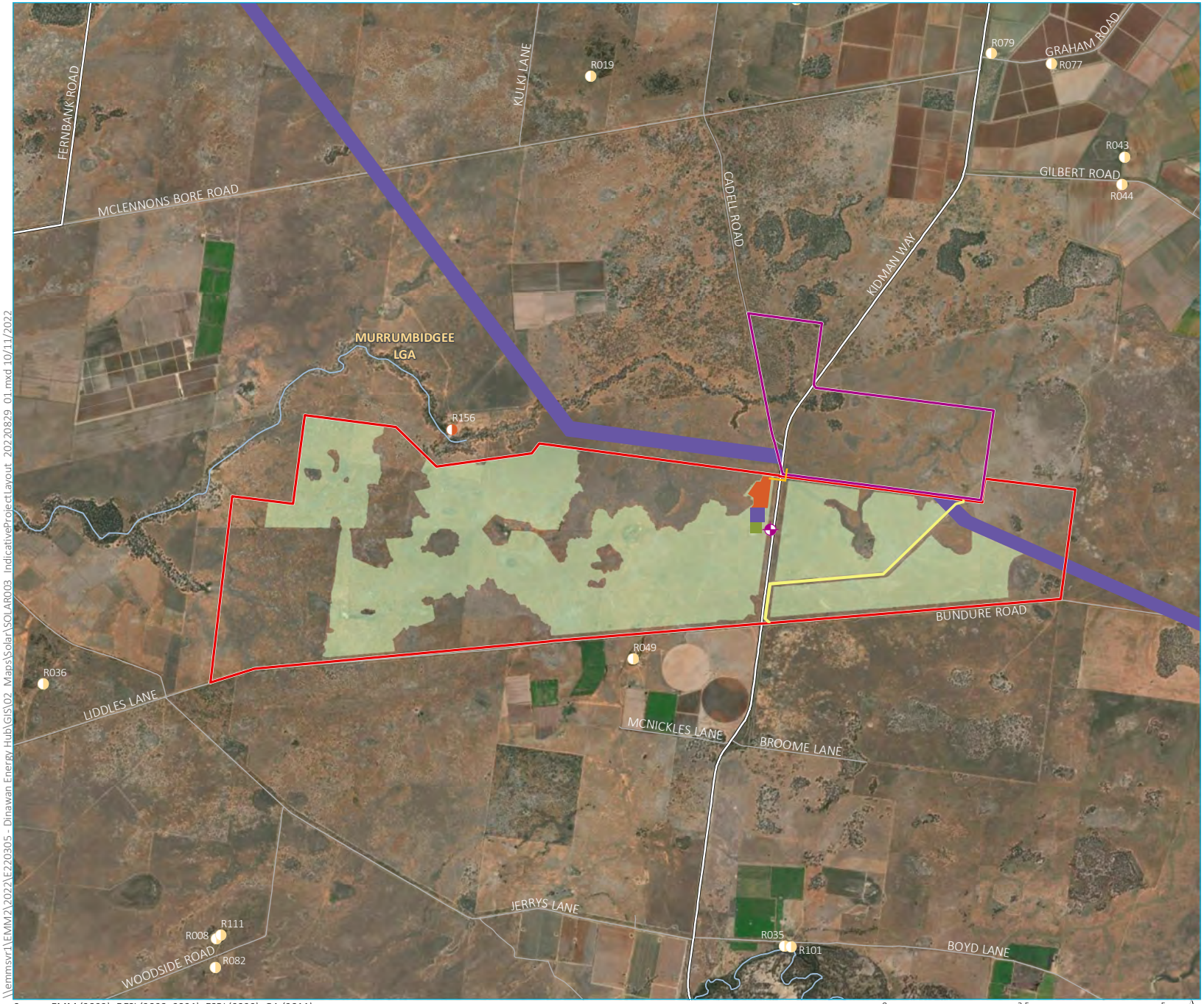
The final layout and capacity of the project will be selected on the basis of environmental constraints identification, outcomes of stakeholder engagement, engineering assessments and design of infrastructure.

It is anticipated that the physical layout and design of the project will comprise the following key infrastructure elements:

- Solar farm – approximately 1.5 million PV modules will be mounted on single-axis tracking systems within the development footprint. The solar farm will also include power conversion units (PCUs), a cable network and internal access tracks.
- Battery energy storage system (BESS) – to store and discharge electricity as required with a storage capacity of up to approximately 300 MW (AC or DC coupled)/4 hr (1,200 MWh).
- Electrical collection system, substation and control room – an on-site substation connected to the solar farm and BESS.
- Operations and maintenance (O&M) facility – including site offices, O&M buildings, amenities, equipment sheds, storage and parking areas.
- Electricity transmission line infrastructure – connecting the project substation to the proposed Dinawan Substation.
- Site access – including access to the eastern and western sections of the solar farm from Kidman Way.
- Temporary construction infrastructure – to facilitate construction and likely to include laydown and storage areas and site offices.

Subdivision for the purpose of construction, operation and maintenance of a substation may be required.

An indicative layout of the project is provided in Figure 3.1. The layout and design will be refined further through the preparation of the EIS for the project. The following sections describe the project design and layout considerations for the key infrastructure elements.



KEY

- Project investigation area

Solar farm infrastructure

- O&M facilities
- On-site substation
- Development footprint
- Battery energy storage system
- Grid connection
- Site access point

Project EnergyConnect (Transgrid)

- Dinawan Substation
- Transmission line

Residence

- Associated residence
- Non-associated residence

Existing environment

- Watercourse (third order and higher)
- Major road
- Minor road
- Coleambally irrigation channel
- Local government area

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Source: EMM (2022); DFSI (2020, 2021); ESRI (2022); GA (2011)

0 2.5 5 km

GDA2020 MGA Zone 55

N

Indicative project layout

Dinawan Solar Farm
Scoping Report
Figure 3.1

EMM
creating opportunities

3.2.1 Solar farm

A solar farm is proposed with a generation capacity of up to approximately 1,000 MW(AC). The project will include the installation of PV modules mounted on single-axis tracking systems that will be configured in rows positioned to maximise the use of the available solar resource. PV modules will be fixed to and supported by ground-mounted framing.

The PV modules will be up to 2.5 m from the ground when in the horizontal position, while the lower edge of each PV module will be no less than 0.3 m from the ground or above the flood depth level at the maximum tilt angle. The maximum height of the modules to the higher edge from ground level at the maximum tilt angle is expected to be 4.7 m, which is assuming a '2 in portrait' (2P) configuration (ie worst case assumption for visual impact assessment). Examples of '1 in portrait' (1P) and 2P configurations are shown in Plate 3.1 and Plate 3.2.

As shown in Figure 3.1, it is anticipated that PV modules will be installed in two sections, east and west of Kidman Way. The PV modules will be installed in parallel rows within each section, with an indicative spacing of 5–10 m between each row. The rows of PV modules will be aligned in a north-south direction, allowing the modules to rotate from east to west during the day, tracking the sun's movement.

Source: NexTracker (2018)

Plate 3.1 Example of a PV module layout (2 in portrait or 2P configuration)

Source: NexTracker (2018)

Plate 3.2 Example of a PV module layout (1 in portrait or 1P configuration)

Initial investigations indicate approximately 1.5 million PV modules can be installed for the project; however, the final design will depend on a range of factors including module technology, available grid capacity, economies of scale, grid connection and environmental constraints.

DC cables will be strung underneath the PV modules, housed in cable trays, or be passed through the tracker tubes before being connected to the PCUs.

The PCUs comprise three main components (inverters, medium voltage transformers and switchgear) and are designed to convert the DC electricity generated by the PV modules into AC form, which is compatible with the electricity grid. The exact dimensions and configuration of the PCUs will be determined during detailed design. PCUs are typically either containerised (20 ft or 40 ft shipping containers) or a skid-mounted design, which is with the cabinets and transformers mounted on either a steel platform or a thin concrete pad. The quantity of PCUs required will be determined during detailed design.

3.2.2 Electrical collection system and substation

Groups of PV modules will be connected to PCUs and the PCUs linked together to collect the total energy being produced. Underground or above ground cables will run from each PCU to the on-site substation.

Power, earthing, and communications cables will also be installed across the development footprint between electrical devices. Cabling may be underground or aboveground depending on geotechnical conditions.

The eastern and western sections of PV module arrays will also be connected via an underground or overhead line that will cross Kidman Way.

A substation will be constructed within the development footprint to convert the on-site AC reticulated 33 kV electricity to 330 kV or 500 kV for export to the grid. The electrical infrastructure components within the development footprint are generally expected to be between 5–10 m tall, with the exception of the 330 kV or 500 kV line to connect the project to the Dinawan Substation and lightning protection at the on-site substation. An indicative footprint for the on-site substation is provided on Figure 3.1 and represents an area of 6 ha.

Electricity generated by the project will be exported to the grid via an overhead line network connection (Section 3.2.4).

3.2.3 Battery energy storage system

Renewable energy generation is intermittent in nature and subject to fluctuations in solar and wind availability. Batteries mitigate these natural fluctuations through their ability to store and discharge electricity when required. The BESS will have a capacity of up to approximately 300 MW (AC or DC coupled) and will have provision for up to four hours of storage (1,200 MWh). The BESS will provide both storage as well as firming capacity to the NEM and assist in grid stability by providing frequency control ancillary services. The BESS will allow for the storage and export of renewable energy within the network so that it can be used during times of peak demand.

The major components of the BESS will comprise:

- batteries – most likely a lithium-ion technology;
- inverters – bi-directional inverters to convert DC current to AC current (when exporting electricity) and vice versa (when importing electricity); and
- transformers – skid-mounted transformers will be installed adjacent to each inverter to step up the voltage to the internal reticulation voltage of the plant.

An indicative footprint for the BESS is provided on Figure 3.1 and represents an area of 16 ha.

Battery modules are the key building block in a utility-scale BESS and are capable of both storing and discharging energy at a rapid rate. Battery modules are installed in racks, then the racks are wired together in strings, and strings of batteries are connected to the inverter stations.

The batteries will either be containerised in self-contained steel enclosures resembling shipping containers or alternatively within a building resembling a large industrial shed. Due to rapidly evolving technology, the final technology choice and battery storage capacity for the project is yet to be confirmed and is subject to final selection and detailed design.

Although adjacent to each other, the solar farm and BESS will be registered as separate generating units in the NEM and will be developed and operated independently. The solar energy generated from the solar farm would be exported to the grid or used to charge the BESS. When discharging, the BESS would export its electricity to the grid. As such, they are independent and distinct, but related, uses of the development footprint.

3.2.4 Network connection

Infrastructure to connect the solar farm and BESS to EnergyConnect's Dinawan Substation will comprise:

- a substation connected to the solar farm and BESS inverter stations (on-site substation); and
- an overhead transmission line that will connect the project to EnergyConnect's Dinawan Substation.

The precise location of the overhead transmission line to connect the project to EnergyConnect's Dinawan Substation has not been determined as this will be confirmed as part of further design works during the preparation of the EIS and following detailed design of EnergyConnect's Dinawan Substation. An indicative grid connection corridor is provided on Figure 3.1.

EnergyConnect's Dinawan Substation will occupy an area of approximately 8.4 ha and will include line bays, capacitor banks, synchronous condensers, transforms and a range of supporting electrical components.

3.2.5 Supporting infrastructure

Supporting infrastructure will be required during construction and operations and will include:

- temporary construction facilities, including:
  - construction compound(s);
  - site office buildings;
  - laydown areas; and
  - construction materials storage;
- a site office and O&M buildings (including offices, amenities and equipment storage sheds) with parking during operations; and
- other associated permanent infrastructure, including:
  - hardstands;
  - new access tracks;
  - upgrades to existing access tracks; and
  - access points from the public road network.

Indicative locations for temporary construction compounds and the O&M facility are shown on Figure 3.1.

Security fencing will also be installed around the perimeter of the solar farm and high voltage electrical equipment such as the BESS and on-site substation. Signage will be clearly displayed identifying hazards present within the development footprint.

Lighting, security cameras and weather stations will be installed where necessary for safety, maintenance, and security purposes. Lightning protection is also likely to be provided in key locations.

Landscaping may also be implemented within the development footprint to reduce the visibility of project infrastructure.

3.2.6 Site access

Site access will be via Kidman Way. The transport route to the development footprint will be confirmed through the EIS but is expected to comprise vehicle movements originating from:

- north of the development footprint and travelling south along Kidman Way;
- east of the development footprint and travelling west along the Sturt Highway before turning onto Kidman Way; and
- south of the development footprint and travelling north along the Newell Highway before turning onto Kidman Way.

Subject to detailed design, internal access tracks will also be established including:

- a perimeter track up to 6 m-wide; and
- internal access tracks for manoeuvring between the module sections between 2 and 5 m-wide.

All internal access tracks will be unsealed. The internal tracks will serve both as access for servicing and maintaining project infrastructure as well as fire trails and buffers.

3.3 Activities and uses

3.3.1 Construction

i Overview

Construction of the project is expected to be completed over approximately 18–24 months (refer Section 3.4). Construction activities will be undertaken during standard day time construction hours (ie 7.00 am to 6.00 pm Monday to Friday and 8.00 am to 1.00 pm Saturday).

Temporary infrastructure required during construction will include temporary construction compounds, laydown areas and internal access tracks. Minor earthworks may be required for the preparation of the development footprint, including site levelling, access track formation and drainage works. The majority of infrastructure will be prefabricated off-site, delivered and assembled on-site.

Where required, additional or improved drainage channels, sediment control ponds and dust control measures will be implemented.

Laydown areas, waste handling, fuel and chemical storage areas will be strategically placed to minimise potential environmental impacts during construction.

ii Workforce

A workforce of approximately 300 personnel will be required on-site during peak construction.

Murrumbidgee Council, Edward River Council and local business owners will be consulted throughout the development and assessment of the project regarding managing potential impacts and opportunities for accommodation of the project's construction workforce.

The construction workforce will be sourced from the local area as far as practicable. Accommodation for non-local construction staff is expected to be through the use of available rental, motel and other accommodation in surrounding townships and regional centres (including Coleambally, Griffith, Deniliquin, Narrandera, Jerilderie and Darlington Point). Potential cumulative impacts on accommodation, infrastructure, and services will be considered in the EIS as part of the social impact assessment.

3.3.2 Operations

The operational lifespan of the project is expected to be in excess of 25–35 years, depending on the nature of solar PV technology and energy market demands.

Key activities during operations will be energy generation and energy storage. Once operational, the project will require up to 10 full-time employees. Project operations will be supported by contractor roles for vegetation, weed and pest management, annual module cleaning and equipment calibration, internal road maintenance and facility cleaning.

Regular maintenance will be required throughout operations. Site maintenance activities will include management of internal roads, drainage, fencing and vegetation. Additional maintenance of key infrastructure will also be required and will include service, repair or replacement of PV modules, inverters, transformers or components of the BESS, substation, or switchyard. Sheep grazing will also occur on-site throughout operations.

Light vehicle access will be required throughout operations and occasional heavy vehicles may also be required.

3.3.3 Decommissioning

Once the project reaches the end of its operational life, a decision will be made to either decommission or re-power the facility, subject to approval requirements.

If the project is decommissioned, all aboveground structures built as part of the project will be removed and the site rehabilitated generally to its pre-existing land use, as far as practicable. The disposal and recycling of project infrastructure will be done in accordance with waste management legislation at the time of decommissioning. Whenever possible, efforts will be made to reduce the amount going to landfill in line with best-practice sustainability principles.

If re-powering is proposed, an appropriate stakeholder consultation process will be undertaken, and all necessary approvals will be sought.

3.4 Timing

Project construction is expected to commence in 2025, subject to relevant approvals, and will take approximately 18–24 months to complete depending on scheduling of the construction works. It is anticipated that the project will be constructed in stages. The exact timing of each stage and the duration of the overlap between stages will be determined during detailed design following project approval. The timeframes assumed as part of the EIS and supporting technical assessments will be indicative only and will reflect a conservative upper limit of potential impacts from the project.

The sequencing of the project will be determined through detailed design, and subject to market demands, and is likely to involve overlap between activities but indicatively will involve the following steps:

- construction of supporting infrastructure and grid connection works;
- construction of solar farm and associated infrastructure;
- construction of BESS and associated infrastructure;
- operation of facility; and
- decommissioning.

The project is expected to be commissioned during 2026 and will have an operational life in excess of 25–35 years.

3.5 Alternatives considered

Alternatives to the project have been considered, including alternative locations, alternative project layouts and not proceeding with the project.

3.5.1 Alternative locations

The project investigation area is highly suitable for a solar farm and battery project as identified in Section 2.3.2. Alternative locations for a project of this scale are limited due to the requirements of surface area, topography, proximity to existing and/or proposed energy infrastructure and available network capacity, as well as the need to avoid major townships or areas of high agricultural and biodiversity value.

Alternatives to the project investigation area were considered by Spark Renewables as part of the site identification process, including other potential sites in NSW. The primary constraint in considering locations elsewhere in NSW, including outside of the REZs, is the increasing distance from the transmission network – both existing and planned. Alternatives which are further away from Project EnergyConnect need long transmission lines and easements to connect into the network, which come with additional environmental and social impacts. As such, the selected project investigation area is considered optimal for development of the project.

The project is also ideally located to complement the available wind resource proposed to be utilised as part of the Dinawan Wind Farm.

3.5.2 Alternative project layouts

Environmental and social constraints have, and will continue to be, a key consideration during the refinement of the project layout within the project investigation area. The development footprint and indicative project layout on Figure 3.1 have been the subject of an iterative design process that has been informed by outcomes of preliminary biodiversity and Aboriginal cultural heritage fieldwork, stakeholder engagement and constraints identification. The development footprint on Figure 3.1 avoids:

- areas of high archaeological sensitivity identified during preliminary archaeological investigations;
- areas of higher biodiversity value (including higher condition state Plant Community Type (PCT) 26 and 45);
- mapped important habitat for Plains Wanderer;
- riparian areas;
- areas directly adjacent to Kidman Way; and
- agricultural land mapped as land and soil capability (LSC) class 3.

The final development footprint (including grid connection and site access) will be refined as part of the preparation of the EIS and will be informed by the outcomes of technical assessments (including biodiversity, Aboriginal cultural heritage, visual amenity and noise and vibration) and outcomes of engagement with community and regulatory stakeholders. As part of further design refinements, the following principles will be adopted:

- minimise vegetation clearing (areas of higher conservation value and/or native vegetation will be avoided, where possible);
- maximise use of previously disturbed land (ie land previously modified by agricultural operations, including cleared areas, established access tracks and local roads);
- minimise disturbance (footprints for project infrastructure will be limited to the minimum area required);
- protect significant Aboriginal cultural and historic heritage values (through the identification and evaluation of heritage sites as part of the preparation of the Aboriginal cultural and historic heritage assessments);

- minimise direct and indirect impacts on neighbouring landholders (locating infrastructure away from nearby residences and adjoining properties, where possible); and
- a flexible approach to design (responding to identified environmental impacts and constraints).

3.5.3 Do nothing

The 'do nothing' scenario would allow for the continued use of the project investigation area for agricultural production; however, it would also forego the project benefits listed in Section 2.3.1, which include contributions to the development of the South-West REZ and supporting Australia's transition towards clean and renewable sources of energy. In addition, the local area and broader region would not realise the economic benefits to local and regional communities provided by direct employment opportunities and flow-on effects.

4 Statutory context

The key relevant statutory requirements for the project having regard to the EP&A Act, other NSW and Commonwealth legislation, and environmental planning instruments are summarised in Table 4.1. This table has been set out in accordance with the Scoping Report Guidelines and *State Significant Development - Preparing an Environmental Impact Statement* (DPIE 2021c) (EIS Guidelines), to cover the following:

- power to grant approval (ie approval pathway);
- permissibility;
- consistent approvals;
- Commonwealth approvals;
- approvals not required (pursuant to Section 4.41 of the EP&A Act); and
- mandatory matters for consideration.

Detailed consideration of relevant statutory requirements will be provided in the EIS.

Table 4.1 Statutory context

Approval	Requirement
Power to grant approval	
EP&A Act and Planning Systems SEPP	Part 4 of the EP&A Act relates to development assessment and consent; Part 4, Division 4.7 relates to the assessment of development deemed to be significant to the State (or SSD). Section 4.36(2) of the EP&A Act states that a: *...State environmental planning policy may declare any development, or any class or description of development, to be State significant development.* The Planning Systems SEPP identifies development that is SSD. Section 2.6(1) of the Planning Systems SEPP states: *(1) Development is declared to be State significant development for the purposes of the Act if:* *(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and* *(b) the development is specified in Schedule 1 and 2.* The project meets both these requirements; it requires development consent, and is a development specified in Schedule 1 of the Planning Systems SEPP. Schedule 1 of the Planning Systems SEPP defines the following as SSD: *Electricity generating works and heat or co-generation* *Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, waste, hydro, wave, solar or wind power) that:* *(a) has a capital investment value of more than $30 million.* The project is development for the purpose of electricity generation and will have a capital investment value of more than $30 million. The capital investment value for the project is estimated to be in the order of $1.5 billion. Consequently, the project is SSD.

Table 4.1 Statutory context

Approval	Requirement
Permissibility	
State Environmental Planning Policy (Transport and Infrastructure) 2021	Under Section 2.36 (1) of *State Environmental Planning Policy (Transport and Infrastructure) 2021*, development for the purpose of electricity generating works, such as the project, may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone. The project is within a rural land use zone, RU1 Primary Production. Development for the purpose of electricity generating works is therefore permissible with consent.
Consistent approvals	
Overview	Section 4.42 of the EP&A Act outlines that the approvals listed below cannot be refused if necessary for carrying out an approved SSD and are to be consistent with the terms of the development consent for the SSD.
An environment protection licence under Part 3 of the NSW *Protection of the Environment Operations Act 1997* (POEO Act)	The POEO Act regulates pollution to the environment and requires licences for environment protection including waste, air, water and noise pollution control. Section 48 of the POEO Act requires an environment protection licence (EPL) to undertake scheduled activities at any premises. Scheduled activities are defined in Schedule 1 of the POEO Act. Solar farms are not a scheduled activity and therefore an EPL is not required.
An approval under Section 138 of the NSW *Roads Act 1993*	Under Section 138 or Part 9, Division 3 of the *Roads Act 1993*, a person must not undertake any works that impact on a road, including connecting a road (whether public or private) to a classified road, without approval of the relevant authority, being either Transport for NSW or local council, depending upon the classification of the road. The interaction of the project with the local and regional road network will be addressed in the EIS. Should road upgrades or works within a designated road corridor be required, approval will be sought from the relevant authority.
Commonwealth approvals	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act aims to protect matters of national environmental significance (MNES). If an action will, or is likely to, have a significant impact on any MNES, it is deemed to be a 'controlled action' and requires approval from the Commonwealth Environment Minister or the Minister's delegate. A search of the Commonwealth Protected Matters Search Tool indicates that there are no World Heritage Properties or National heritage places within the vicinity of the project investigation area. There is potential for Commonwealth listed threatened ecological communities, threatened species and migratory species to occur within the project investigation area. Field surveys will be undertaken to determine whether the plant community types (PCTs) identified within the project investigation area are representative of threatened ecological communities listed under the EPBC Act and whether threatened species habitat is present. The outcomes of these survey will be used to determine whether a referral to the Commonwealth Department of Climate Change, Energy, the Environment and Water is required.
Native Title Act 1993	The Commonwealth *Native Title Act 1993* recognises and protects native title rights in Australia. It allows a native title determination application (native title claim) to be made for land or waters where native title has not been validly extinguished, for example, extinguished by the grant of freehold title to land. Claimants whose native title claims have been registered have the right to negotiate about some future acts, such as mining or granting of a lease over the land covered by their native title claim. Where a native title claim is not registered, a development can proceed through mediation and determination processes, though claimants will not be able to participate in future act negotiations. There are no current native title claims relevant to the project investigation area.
Approvals not required	
Overview	Section 4.41 of the EP&A outlines the following approvals, permits etc are not required for an approved SSD.

Table 4.1 Statutory context

Approval	Requirement
Fisheries Management Act 1994	A permit under the *Fisheries Management Act 1994* to block fish passage or dredge or carry out reclamation work on water land will not be required pursuant to Section 4.41 of the EP&A Act. The project may require work in water land to facilitate the upgrade of road crossings or establish new crossings of mapped watercourses within the project investigation area. These works will be undertaken in accordance with NSW DPI *Policies and Guidelines on Fish-Friendly Waterway Crossings* (undated), *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI 2013), and NSW *Guidelines for Controlled Activities*.
Heritage Act 1977	An approval under Part 4, or an excavation permit under Section 139, of *the Heritage Act 1977* will not be required pursuant to Section 4.41 of the EP&A Act. Notwithstanding, there are no listed heritage items within the project investigation area.
National Parks and Wildlife Act 1979	An Aboriginal heritage impact permit under Section 90 of the *National Parks and Wildlife Act 1974* will not be required pursuant to Section 4.41 of the EP&A Act. There is potential for Aboriginal sites to occur within the project investigation area. Any Aboriginal heritage sites identified within the project investigation area will be avoided as far as practicable during the design process.
Rural Fires Act 1997	A bushfire safety authority under Section 100B of the *Rural Fires Act 1997* will not be required pursuant to Section 4.41 of the EP&A Act. A bushfire assessment in accordance with NSW Rural Fire Service (2019) *Planning for Bushfire Protection* will be carried out to inform the EIS.
Water Management Act 2000	A water use approval under Section 89, a water management work approval under Section 90 or an activity approval (other than an aquifer interference approval) under Section 91 of the *Water Management Act 2000* will not be required pursuant to Section 4.41 of the EP&A Act. Construction work near or within watercourses within the project investigation area may be required. These works will be carried out in accordance with relevant guidelines for controlled activities.
Mandatory considerations – Considerations under EP&A Act and EP&A Regulation	
Section 1.3 of the EP&A Act	Relevant objectives of the EP&A Act are: *(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,* *(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,* *(c) to promote the orderly and economic use and development of land,* *(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,* *(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),* *(g) to promote good design and amenity of the built environment,* *(j) to provide increased opportunity for community participation in environmental planning and assessment.* The above will be considered in the EIS.

Table 4.1 Statutory context

Approval	Requirement
Section 4.15 of the EP&A Act	Pursuant to Section 4.15 of the EP&A Act, the consent authority must consider the following relevant matters for consideration: • relevant environmental planning instruments for the project including: – *State Environmental Planning Policy (Biodiversity and Conservation) 2021*; – *State Environmental Planning Policy (Resilience and Hazards) 2021*; – *State Environmental Planning Policy (Transport and Infrastructure) 2021*; and – other local environmental planning instruments; • relevant development control plans; • the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; • the suitability of the site for the development; and • the public interest. The above will be considered in the EIS.
Section 190 of the EP&A Regulation	Section 190 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) provides requirements for the form of EIS: 1. An environmental impact statement must contain the following information— a) the name, address and professional qualifications of the person who prepared the statement, b) the name and address of the responsible person (the applicant), c) the address of the land: – to which the development application relates, or – on which the activity or infrastructure to which the statement relates will be carried out, d) a description of the development, activity or infrastructure, e) an assessment by the person who prepared the statement of the environmental impact of the development, activity or infrastructure, dealing with the matters referred to in this Division. 2. The person preparing the statement must have regard to— a) for State significant development—the State Significant Development Guidelines, or b) for State significant infrastructure—the State Significant Infrastructure Guidelines. 3. An environmental impact statement must also contain a declaration by the person who prepared the statement of the following— a) the statement has been prepared in accordance with this Division, and b) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure, and c) the information contained in the statement is not false or misleading.

Table 4.1 Statutory context

Approval	Requirement
Section 192 of the EP&A Regulation	Section 192 of the EP&A Regulation provides requirements for the content of EIS: (1) An environmental impact statement must contain the following— a) a summary of the EIS, b) a statement of the objectives of the development, activity or infrastructure, c) an analysis of feasible alternatives to the carrying out the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure, d) an analysis of the development, activity or infrastructure, including: i) a full description of the development, activity or infrastructure, and ii) a general description of the environment likely to be affected by the development, activity or infrastructure and a detailed description of the aspects of the environment that are likely to be significantly affected, and iii) the likely impact on the environment of the development, activity or infrastructure, and iv) a full description of the measures to mitigate adverse effects of the development, activity or infrastructure on the environment, and v) a list of the approvals that must be obtained under another Act or law before the development, activity or infrastructure may lawfully be carried out, e) a compilation, in a single section of the EIS, of the measures referred to in paragraph (d)(iv), f) the reasons justifying the carrying out of the development, activity or infrastructure, considering biophysical, economic and social factors, including the principles of ecologically sustainable development set out in section 193.
Mandatory considerations – Considerations under other legislation	
Biodiversity Conservation Act 2016 (BC Act)	The likely impact of the project on biodiversity values will be assessed in a biodiversity development assessment report (BDAR). The Minister for Planning may (but is not required to) further consider under the NSW *Biodiversity Conservation Act 2016* the likely impact of the project on biodiversity values.
Mandatory considerations – Environmental planning instruments	
State Environmental Planning Policy (Resilience and Hazards) 2021 – Section 3.7	The EIS will consider the following relevant departmental guidelines: • *Applying State Environmental Planning Policy No. 33 Hazardous and Offensive Development*; • Hazardous Industry Planning Advisory Paper (HIPAP) No. 3 – Risk Assessment; and • HIPAP No. 12 – Hazards.
State Environmental Planning Policy (Resilience and Hazards) 2021 – Section 4.6	The EIS will consider the potential for the project to impact on contaminated land.
Jerilderie LEP	The EIS will consider the relevant objectives and land uses for RU1 zone.
Mandatory considerations Development control plans	
In accordance with Section 2.10 of the Planning Systems SEPP, development control plans do not apply to SSD and are not a relevant consideration for the project.	

5 Engagement

5.1 Community and stakeholder engagement objectives

As a developer and long-term owner of the proposed project, Spark Renewables has a key objective of giving back to the community in the most effective and strategically beneficial ways possible, through ongoing local investment, support for services, and benefit sharing.

Spark Renewables' key objectives for engagement with stakeholders and the community are to:

- Deliver an honest, innovative, flexible and transparent community engagement process.
- Engage with, and inform, local residents, the broader community and other stakeholders about the project, its benefits and potential impacts by providing timely and ongoing access to project information.
- Develop relationships with the community and other stakeholders to facilitate positive outcomes through the project for the community.

Spark Renewables' approach to the engagement undertaken to date, and the engagement principles to be followed during the preparation of the EIS will be undertaken in accordance with the following guidelines:

- *Undertaking Engagement Guidelines for State Significant Project* (DPIE 2021d);
- *Social Impact Assessment Guideline for State Significant Projects* (DPIE 2021e) (SIA Guideline); and
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a).

5.2 Engagement commitment

Spark Renewables is a signatory to the Clean Energy Council's Community Engagement Best Practice Charter for Renewable Energy Developments. This is a voluntary set of commitments that will be upheld when developing, constructing and operating projects.

Spark Renewables is committed to engaging respectfully with the communities in which it plans and operates projects, to be sensitive to environmental and cultural values and to make a positive contribution to the regions in which it operates.

Spark Renewables upholds the following commitments of the Best Practice Charter for Community Engagement:

1. To engage respectfully with the local community, including Traditional Owners of the land, to seek their views and input before submitting a development application and finalising the design of the project.
2. To provide timely information and be accessible and responsive in addressing the local community's feedback and concerns throughout the life of the project.
3. To be sensitive to areas of high biodiversity, cultural and landscape value in the design and operation of projects.
4. To minimise impacts on highly productive agricultural land and explore opportunities to integrate agricultural production.
5. To consult the community on the potential visual, noise, traffic and other impacts of the project, and on the mitigation options.
6. To support the local economy by providing local employment and procurement opportunities.

7. To offer communities the opportunity to share in the benefits of the project, and consult with them on the options available, including the relevant governance arrangements.

8. A commitment to using the project to support educational and tourism opportunities where appropriate.

9. To demonstrate responsible land stewardship over the life of the project and welcome opportunities to enhance the ecological, cultural and/or agricultural value of the land.

10. During the life of the project, to recycle waste materials where feasible and commit to responsible decommissioning or refurbishment/repowering of the site at the end of the project's life.

5.3 Scoping phase consultation

Spark Renewables has a high-level framework for the delivery of communication and engagement throughout the planning and assessment process for each stage of the project, which is dynamic and evolves based on stakeholder and community feedback. Engagement for Dinawan Energy Hub commenced in 2021 and continues in 2022, and has included:

- briefing letters;
- letterbox drops, phone calls and emails;
- community newsletter distribution;
- community information sessions;
- face-to-face meetings and briefings;
- a community values survey;
- media releases;
- Spark Renewables website launch; and
- advertisements in local news media and social media channels.

Further detail is provided on engagement with community and regulatory stakeholders in the following sections.

5.3.1 Local community stakeholder consultation

Engagement with the local community, including landowners, neighbours, Traditional Owners and local businesses, is summarised in Table 5.1. Initial engagement focussed on residences and landowners within 5 km of the project investigation area, through phone calls, letter box drops and emails, coupled with broader engagement in the form of media releases, advertising and distribution of newsletters, leading up to two community information sessions held in December 2021. Further engagement in 2022 during the scoping phase has included briefing meetings with Traditional Owners, business groups and neighbouring landowners.

Table 5.1 Engagement with local community stakeholders

Method	Timing	Purpose	Stakeholders
Media release	15 July 2021	To announce the intent of Dinawan Energy Hub and purpose to the industry, investors and marketplace and stakeholders broadly Public link: https://sparkrenewables.com/wp-content/uploads/2021/10/Spark-Renewables_media-release-proposed-Dinawan-Energy-Hub-Project-Final.pdf	All Investors Industry Media (limited)
Launch Spark Renewables website	30 September 2021	To provide a comprehensive online portal for Spark Renewables and its projects. Project website: www.dinawanenergyhub.com.au	All
Phone calls, emails and letterbox drop	w/c 18 October 2021	To deliver project overview, discuss the Dinawan Energy Hub and promote drop-in sessions. Informational newsletters delivered to 25 residences within a 5 km radius of the project investigation area. Calls made to those residences whose phone numbers were publicly available. Emails to nearby residences, and the relevant stakeholders and organisations whose email addresses were publicly available.	Project neighbours Resident distribution area
Media release and Community Newsletter 1	21 October 2021	To announce the Dinawan Energy Hub consultation sessions to the community, provide links to website, contact information and high-level timelines for the stages. Media release: https://sparkrenewables.com/wp-content/uploads/2021/10/Dinawan-Energy-Hub-Media-Release.pdf Community newsletter 1: https://sparkrenewables.com/wp-content/uploads/2021/10/DEH-Newsletter-Number-1.pdf	Media Community Businesses
Briefing letters & distribute media release	29 October 2021	To provide an update on Dinawan Energy Hub consultation program and overview (links to website, contact information and high-level timeline).	Industry (ICN) Business leaders
Advertisements published in newspapers and radio	22 November – 6 December 2021	To promote drop-in sessions to community. These included: • One week campaign across 4 radio stations (Triple M, HIIT, Edge FM, 2QN). Announcements ran 3 times a day and there was a phone interview with the project manager. • A one-off ad placement (1/6 pager) in The South Riverina. • A digital banner ad in The South Riverina (4 weeks). • A one-off classified in The Griffith Area News.	Media Community

Table 5.1 Engagement with local community stakeholders

Method	Timing	Purpose	Stakeholders
Website Social media Newsletters	November, December 2021	To provide updates on Dinawan Energy Hub and share notes and feedback received from community received during scoping. Continuous update to the project website and Spark Renewables' Instagram account with posts and stories.	Community
Community information drop-in sessions 1 and 2	7–8 December 2021	To provide the community with an overview of the Dinawan Energy Hub and seek initial input. Valuable conversations were had with many members of the community, neighbours to the project, farming businesses and local organisations such as Coleambally Irrigation Co-operative, as well as with members of the Murrumbidgee Council. There were six information posters on display, detailed maps and community perceptions survey (published on project website at https://sparkrenewables.com/dinawan-news/dinawan-energy-hub-initial-community-consultation-sessions/). Community perception surveys: https://www.surveymonkey.com/r/WNJ6RRH	Community Businesses
Briefing meetings	May – June 2022	Project briefing and introduction/update: • 19 May 2022 presentation to Lions Club; • 20 May 2022 meeting with Wiradjuri Elders; and • 8 June 2022 meeting with EnergyCo.	Business groups Traditional Owners Industry
Phone calls and face to face meetings	September 2022	Project briefing and update ahead of submission of Scoping Report.	Neighbouring landholders

i Feedback from the community

The community information sessions held at Coleambally on 7 December 2021 and Jerilderie on 8 December 2021 were key opportunities for the Spark Renewables project team to engage face to face with the local community to introduce the project and provide opportunities for the community to ask questions, as well as provide valuable feedback to the project team on important values of the local area and concerns or areas of interest about the project. There were six information posters on display, detailed project maps, community perception surveys, information documents and four Spark Renewables staff members on hand to talk to community members.

The sessions were attended by 13 individuals at Coleambally and 15 individuals at Jerilderie. Valuable conversations were had with many members of the community, neighbours to the project, farming businesses and local organisations such as Coleambally Irrigation Co-operative, as well as with members of Murrumbidgee Council. Generally, feedback from community members was positive. Many of the questions from the community surrounded the timing of the project, technology and mitigation of impacts. Community members asked about project-specific information, such as the technology to be implemented or exact location of project infrastructure and were pleased to hear that, given the early stages of project development, these details are still in development and will be decided with continual community input.

Key issues of concern raised by community members included:

- biodiversity impacts (due to loss of native flora and fauna);
- fire risk (particularly in the context of recent fires at a nearby operating solar farm and concerns about fires relating to the BESS);
- increased workforce and concerns regarding accommodation and housing of workers;
- traffic and road safety during construction; and
- long-term decommissioning and land rehabilitation plans.

Discussions with a number of community members revolved around community issues currently experienced in the local area, how addressing these would be readily supported and strategically beneficial, and ideas for how such improvements could be achieved. Answers were consistent from individuals across both sessions. These included:

- Improved telecommunications, as there are many wide ranging 'black spots' with no mobile or radio signal. This has been a long-standing issue in the community posing risk to safety, such as communicating emergencies on roads or on farming operations.
- Access to an electricity benefit sharing scheme, offering lower prices for electricity to community members.
- A benefit sharing fund that will invest strategically into the community over the long-term.
- Many community members also said they would be happy to see increased employment opportunities in the area, and some offered their services both in construction and throughout the project development.

At these sessions, Spark Renewables aimed to provide clarity on misconceptions about perceived project impacts and provide as much detail as possible at this stage to ensure transparent communication. This is important to Spark Renewables to ensure the foundation for a meaningful relationship with community members is established. Many of the concerns raised were also discussed in the FAQ brochures provided to community members to increase transparency.

ii Community values survey

An optional survey was offered to attendees at the community information sessions. Of the 28 attendees, 14 responded to the survey assessing potential project benefits, concerns, and community values. Most respondents lived locally in rural localities and the townships of Coleambally and Jerilderie.

The highest proportion of benefits, concerns and values selected from a list of possible options by respondents is presented in Table 5.2.

Table 5.2 Community values survey outcomes - benefits, concerns and local values

Aspect	Proportion of respondents
Benefits of the project	• Investment in local community – 71% • Road upgrades and better access to the Rural Fire Service – 62% • Clean energy generation – 54% • Employment opportunities – 46%
Concerns about the project	• Risk of fire – 57% • Potential impacts to native flora and fauna – 46% • Traffic and road safety – 23% • Visual impacts – 23% • Land use – 23%
Values of the local and regional area	• Farming land – 38% • Landscape – 23% • Native flora and fauna – 23%

Information gathered both directly from community members and through the surveys assessing community values and perceived benefits and impacts, has been invaluable to the development process in shaping an understanding of what can be achieved and what Spark Renewables can do to support the community's experience with the project.

iii Feedback from neighbouring landholders

Spark Renewables have met with neighbouring landholders to introduce the project and provide opportunities for them to ask questions, as well as provide valuable feedback to the project team on important values of the local area and concerns or areas of interest about the project. To date, concerns have been raised with regards to:

- bush fire risk; and
- heat island effect and potential impacts on agricultural practices in the area.

A bushfire hazard assessment will be prepared to identify potential hazards and risks associated with bushfires and to demonstrate compliance with *Planning for Bush Fire Protection* (RFS 2019).

As recommended in the *Large-Scale Solar Energy Guideline* (DPE 2022a), to mitigate any heat island effect, project infrastructure will be setback from the property boundary by at least 30 m where it is adjacent to cropping activity.

5.3.2 Government and regulatory stakeholders

A summary of engagement during the scoping phase with government and regulatory stakeholders is provided in Table 5.3.

Table 5.3 Engagement with government and regulatory stakeholders

Method	Timing	Purpose	Stakeholders
Briefing letters	14 July 2021	To provide an overview of Dinawan Energy Hub, process and timeline.	Murrumbidgee Council State MP Federal MP NSW Energy Minister AEMO CEO
Media release	15 July 2021	To announce the intent of Dinawan Energy Hub and purpose to the industry, investors and marketplace and stakeholders broadly. Public link: https://sparkrenewables.com/wp-content/uploads/2021/10/Spark-Renewables_media-release-proposed-Dinawan-Energy-Hub-Project-Final.pdf	All
Launch Spark Renewables website	30 September 2021	To provide a comprehensive online portal for Spark Renewables and its projects. Project website: www.dinawanenergyhub.com.au	All
Briefing meetings	October 2021–May 2022	To seek input into Scoping Report, specifically the identification of perceived and real impacts.	Murrumbidgee Council (presentation 25 October 2021) Edward River Council (phone call – 27 October 2021) Transgrid (presentation 23 November 2021) State MP Federal MP
Briefing letters and distribute media release	29 October 2021	To provide an update on Dinawan Energy Hub consultation program and overview (links to website, contact information and high-level timeline).	Murrumbidgee and Edward River council staff State MP Federal MP Industry (ICN) Business leaders
Meeting	21 December 2021	Meeting to discuss Spark Renewables upcoming projects (including Dinawan Energy Hub).	DPE
Meeting	7 September 2022	Scoping meeting with DPE.	DPE
Meeting	20–21 September 2022	Project briefing and update.	Edward River Council Murrumbidgee Council

5.4 EIS phase consultation

During the preparation of the EIS, Spark Renewables will consult with relevant local, State and Commonwealth Government authorities, infrastructure and service providers, community groups, Traditional Owners, neighbours and affected landowners. Spark Renewables is committed to genuine and consistent engagement with the local community and stakeholders to support the building of strong relationships with stakeholders, foster existing connections, and establish a socially sustainable project.

Aboriginal stakeholders will be identified and consulted with during the preparation of the EIS in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a), and the recently released *First Nations Guidelines* (Office of Energy and Climate Change 2022).

Electricity infrastructure owners, including Transgrid, will be consulted with in relation to activities impacting the transmission network and connection requirements to the Dinawan Substation.

Consultation during the development of the EIS will aim to:

- proactively inform, consult and involve stakeholders using clear and consistent key messages;
- continue to collaborate with key stakeholders to identify potential issues, impacts, opportunities and benefits;
- communicate the progress of the project and key findings or outcomes of assessments;
- enable stakeholders to have input into the preparation of the EIS, project planning, investigate opportunities for visual treatment and identify opportunities for benefit sharing; and
- implement response and feedback strategies to address stakeholder concerns and use these to inform the evolution of the project.

A range of tools and methods will be used to communicate and engage with the community and other stakeholders during preparation of the EIS, with examples provided in Table 5.4. Issues raised during engagement will be documented by the project team to inform the project design, environmental assessment and the preparation of the EIS.

Table 5.4 Engagement tools and methods during preparation of the EIS

Engagement methods	Detail
Advertising	Advertising in local media to advise of upcoming consultation opportunities and provide project updates.
Briefings	Formal letters or meetings with key stakeholders including landowners, MPs, Councillors and council staff to provide updates on the project.
Community contact cards	Business-size card provided to specialists and contractors to give to community stakeholders if approached.
Door-knocking	Project representatives go door to door to speak with impacted landowners and neighbours and/or provide them with project briefings and information
Drop-in sessions	Multi-hour time periods when stakeholders can drop in to speak to the project team, view documents and plans and ask questions.
Email inbox	A dedicated project inbox info@dinawanenergyhub.com for managing community and stakeholder correspondence.
Letterbox drops or unaddressed mail	General information about the project delivered by the project team or Australia Post.
Letters	Addressed mail containing information, clarification, responses or requests to a particular household, business or individual.
Media releases/statements	Proactive or responsive media statements or announcements provided to the media and other key stakeholders to provide updates, address concerns and clarify information.
Meetings	One-on-one or small group meetings to discuss project issues and concerns in more detail.

Table 5.4 Engagement tools and methods during preparation of the EIS

Engagement methods	Detail
Newsletters	Regular project information distributed by email or in hard copy to registered stakeholders.
Phone line	A dedicated number for stakeholders to contact Spark Renewables. The number is 1300 271 419.
Photography	Photos, composites, concept and artist imagery can help illustrate processes and make technical information more accessible.
Pop-up stalls	An engagement booth/stall set up at community events, shopping centres and key locations to intercept and engage stakeholders.
Presentations	Presentations about the project delivered to a group of interested persons, club or committee on request or by invitation.
Site tours	An escorted tour of the project investigation area to understand how the project is located geospatially and fits in to the surrounding environment.
Surveys	Online or offline surveys to obtain input and feedback on project decision-making.
Social media	Online social connection platforms used to share project information and interact with stakeholders.
Website	Updates to the existing website including descriptions of the project, company information, frequently asked questions, plans, maps, media releases and contact information.
Workshops	A structured method working with groups of stakeholders to identify and suggest solutions for project issues and concerns.

6 Proposed assessment of impacts

A preliminary environmental assessment has been carried out to identify matters requiring further assessment in the EIS and the level of assessment that should be carried out. In accordance with the Scoping Report Guidelines (DPIE 2021a), the following factors have been considered in the identification of matters needing further assessment for the project:

- the scale and nature of the likely impact of the project and the sensitivity of the receiving environment;
- whether the project is likely to generate cumulative impacts with other relevant future projects in the area; and
- the ability to avoid, minimise and/or offset the impacts of the project, to the extent known at the scoping phase.

The following sections of this chapter present the identified matters requiring further assessment and the proposed approach to the respective assessments. In addition to the preliminary environmental assessment presented herein, preliminary technical studies have been carried out for the key issues of visual amenity and social, as well as the results of preliminary biodiversity and heritage surveys and investigations. These preliminary technical studies have commenced to ensure that the values of the project investigation area and surrounds are taken into consideration early in the planning and design of the project. Measures implemented through the scoping phase to avoid and minimise impacts are also described in the following sections.

Matters have been categorised as per the categories identified in the Scoping Report Guidelines (DPIE 2021a). A scoping summary table in accordance with the Scoping Report Guideline is included in Appendix B. Also, in accordance with the Scoping Report Guideline, the level of assessment identified for each matter is presented in Table 6.1.

Table 6.1 Level of assessment required in EIS

Level of assessment	Aspect
Detailed	Visual
	Biodiversity
	Aboriginal heritage
	Traffic
	Social
Standard	Historic heritage
	Land
	Water
	Noise and vibration
	Air quality
	Hazards and risks

6.1 Visual

A preliminary visual impact assessment (PVIA) has been prepared by Moir Landscape Architecture Pty Ltd (Appendix C) in accordance with the *Large-Scale Solar Energy Guideline* (DPE 2022a) and supporting *Technical Supplement – Landscape and Visual Impact Assessment* (DPE 2022b) (referred to as the Technical Supplement). For the purposes of the PVIA, the study area encompasses the project investigation area, plus a 5 km buffer from the project investigation area.

6.1.1 Existing environment

i Landscape features

The landscape surrounding the project investigation area is dominated by flat agricultural land. Other prominent features within the landscape include overhead electricity transmission lines, remnant vegetation, watercourses, farm dams, agricultural infrastructure and rural residences.

For the purposes of the PVIA, the study area has been broken up into three landscape character zones (LCZs):

- seasonal water corridors – defined by flat to gently undulating vegetation corridors that carry seasonal water;
- swamps and floodplains – defined by flat, shallow depressions that accommodate excess flows from seasonal water corridors; and
- grassy plains – defined by vast, flat land and open plains with isolated stands of vegetation.

The preliminary LCZs are shown on Figure 3 of Appendix C.

The area surrounding the project investigation area is sparsely populated with only two non-associated residences within 4 km of the project investigation area, including 1 within 500 m of the project investigation area (R049 on Figure 2.1).

ii Outcomes of engagement

As discussed in Chapter 5, community feedback and community values surveys have been distributed. The community values survey includes questions on the scenic value of different landscape features and asks respondents to identify what they consider to be the best landscape features within the project investigation area and surrounds. Landscape features with the highest reported scenic value to date are rivers/creeks, followed by grazing land, townships, historic features, bushland and hills/ridgelines. Specific landscape features within the project area and surrounds that have been identified by the local community as of the highest value have included agricultural land, creeklines (including Yanco Creek), native vegetation and native grass and shrublands. Where possible, these features have been mapped in the PVIA.

6.1.2 Potential impacts

i Overview

The project has potential to result in visual amenity impacts to scattered rural residences surrounding the project investigation area. Project infrastructure may also be visible to motorists travelling along Kidman Way and other local roads, including Jerrys Lane, Liddles Lane and Bundure Road. Concurrent views of project infrastructure and other renewable energy generation and transmission developments may also be possible.

ii Preliminary visual impact assessment

a Viewpoint selection and preliminary assessment tool

In accordance with the Technical Supplement (DPE 2022b), all viewpoints from public roads and rail lines within 2.5 km of the project investigation area must be identified and assessed. Seven public viewpoints have been selected representing views from Kidman Way, Liddles Lane, Jerrys Lane and Bundure Road.

In accordance with the Technical Supplement (DPE 2022b), public and private viewpoints within 4 km of the project investigation area must be identified and assessed. Two non-associated residences (R049 and R036 on Figure 2.1) have been identified within 4 km of the project investigation area and have been considered as part of the PVIA.

As part of the preliminary assessment tool, the horizontal and vertical field of view for seven viewpoints from the public road network and two viewpoints from non-associated residences have been determined in accordance with the Technical Supplement (DPE 2022b). A summary of the results of the preliminary assessment tool is provided in Table 6.2 and viewpoint locations are shown on Figure 4 of Appendix C.

Table 6.2 Results of visual impact preliminary assessment tool

Viewpoint	Distance to project investigation area	Elevation at viewpoint	Relative height difference[1]	Vertical field of view[2]	Horizontal field of view[3]	Assessment required[4]
Viewpoint 1 – Kidman Way (north)	1.2 km	114.5 m	0.7 m	0°	163°	No
Viewpoint 2 – Jerrys Lane (west)	1 km	110.1 m	0.7 m	1°	78°	No
Viewpoint 3 – Liddles Lane	20 m	112.1 m	0 m	3°	182°	Yes
Viewpoint 4 – Bundure Road (west)	30 m	116.2 m	0.1 m	3°	181°	Yes
Viewpoint 5 – Bundure Road (east)	250 m	116.8 m	0.8 m	2°	96°	Yes
Viewpoint 6 – Jerrys Lane (south)	2.5 km	109.8 m	0.4 m	0°	110°	No
Viewpoint 7 – Kidman Way (south)	2.5 km	112.1 m	1 m	0°	145°	No
Viewpoint 8 – R049	435 m	115 m	1 m	1°	180°	Yes
Viewpoint 9 – R036	2.9 km	110 m	0 m	0°	46°	No

Notes: 1. Relative height difference is calculated based on elevation at the viewpoint and elevation at the project investigation area.
2. Calculated using Figure 2 of the Technical Supplement (DPE 2022b).
3. Measured using a worst-case assumption that infrastructure is constructed within the entire project investigation area.
4. Determined using Table 1 of the Technical Supplement (DPE 2022b).

The preliminary assessment tool has identified that detailed assessments are required for four of the preliminary viewpoints (representative of views from Liddles Lane, Bundure Road and one non-associated residence (R049)).

b Viewshed mapping

A preliminary viewshed map has been prepared and conservatively assumes that infrastructure is constructed within the entire project investigation area (Figure 8 of Appendix C). The preliminary viewshed mapping is based on topography alone and does not consider intervening elements such as vegetation and structures that may screen views of project infrastructure. Due to the flat terrain within and around the project investigation area, the preliminary viewshed map indicates that the majority of project infrastructure will be visible from all locations within 4 km of the project investigation area (including R036 and R049).

A reverse viewshed map has also been prepared, which considers potential visibility of project infrastructure from 19 non-associated residences within 8 km of the project investigation area (Figure 9 of Appendix C). The reverse viewshed map conservatively assumes that infrastructure is constructed within the entire project investigation area and is also based on topography alone (ie does not consider intervening elements that may screen views of project infrastructure). Due to the flat terrain within and around the project investigation area, the reverse viewshed map indicates that the majority of project infrastructure in the eastern and southern parts of the project investigation area will be visible from dwellings within 8 km; however, predicted visibility of project infrastructure reduces in the northern, central and western parts of the project investigation area.

6.1.3 Assessment approach

A detailed landscape and visual impact assessment (LVIA) will be prepared to support the EIS and will include an assessment of the likely visual impacts of the project (including any glare, reflectivity and night lighting) on surrounding residences and scenic or significant vistas.

The assessment will be undertaken with reference to the *Large-Scale Solar Energy Guideline* (DPE 2022a) and the Technical Supplement (DPE 2022b) and include a detailed viewpoint assessment for viewpoints identified in the PVIA (including strategies to mitigate these impacts). The detailed assessment will be prepared in accordance with the process described in Figure 5 of the Technical Supplement (DPE 2022b) and will include:

- refining and classifying viewpoints identified in the PVIA;
- determining the magnitude of impact and visual sensitivity from selected viewpoints (including preparation of photomontages);
- determining the visual impact; and
- identifying performance objectives and mitigation measures.

Where relevant, the LVIA will recommend mitigation measures to reduce the project's visual amenity impacts (eg perimeter vegetation screening). Possible mitigation measures will be discussed with relevant stakeholders during the preparation of the LVIA.

Targeted community engagement is proposed with surrounding landholders in relation to visual amenity impacts and neighbour agreements will be considered where mitigation options will not be effective in mitigating impacts.

A glint and glare assessment will also be undertaken in accordance with the requirements of Appendix C of the *Large-Scale Solar Energy Guideline* (DPE 2022a).

6.2 Biodiversity

Preliminary biodiversity assessments have been undertaken for the project by Biosis Pty Ltd (Biosis) to inform the scoping and design of the project. A desktop assessment was undertaken in 2021 (Biosis 2021) followed by preliminary site investigations including rapid assessments of native vegetation and fauna habitat types across the project investigation area (Biosis 2022). Vegetation mapping and targeted surveys have also been undertaken within the project investigation area.

6.2.1 Existing environment

The project investigation area is within the Riverina Interim Biogeographic Regionalisation for Australia (IBRA) region and the Murrumbidgee IBRA subregion between Jerilderie and Coleambally. The project investigation area is a flat, lowland plain with heavy-textured grey, brown and red clays. It is made up of multiple rural land parcels most of which are subject to light to moderate grazing with sheep and cattle. The project investigation area is largely covered with native vegetation.

Biodiversity assessment methods to establish the existing environment have included:

- collection of floristic data in nine 20 m x 20 m floristic plots to validate grassland/woodland PCT mapping and test PCT against threatened ecological community (TEC) diagnostic characteristics and condition thresholds;
- broad-scale mapping of PCT extent and condition and consideration of the presence of derived and natural grassland communities;
- collection of preliminary species lists;
- broad-scale mapping of other features such as wetlands; and
- preliminary review of historical aerial imagery (1958) and literature to determine the likely extent of derived and natural grasslands.

i Plant community type mapping and threatened ecological communities

The preliminary field assessment confirmed the project investigation area supports extensive native vegetation cover generally consistent with mapping by EES (2017). There are no areas in the project investigation area or development footprint that have been developed for cultivation, cropping or irrigation, or where significant pasture improvement has occurred, except for the presence of an irrigation channel that runs through the land to the east of the Kidman Way.

Vegetation cover includes native grasslands (natural and derived), Weeping Myall Woodland, Black Box woodland and wetlands (Lignum or sedge-dominated wetlands). There are also multiple minor natural drainage systems, depressional wetlands and farm dams in the project investigation area that support seasonal and semi-permanent wetland habitats.

Six PCTs occur in the project investigation area ranging from low to high condition, considering the long-term livestock grazing use of the land. These PCTs, including those that represent EPBC Act or BC Act listed TECs, are summarised below in Table 6.3 and shown in Figure 6.1.

Table 6.3 PCTs mapped in the project investigation area and associated threatened ecological communities

Plant community type	BC Act listed (status)	EPBC Act listed (status)
PCT 13 – Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone	No	No
PCT 16 – Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW	No	No
PCT 17 – Lignum shrubland wetland of the semi-arid (warm) plains	No	No
PCT 26 – Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (endangered)	Weeping Myall Woodlands (endangered)
PCT 44 – Forb-rich Speargrass – Windmill Grass – White Top grassland of the Riverina Bioregion	No	No. This community is derived from PCT 26 and not considered natural in this region.
PCT 45 – Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes	No	Natural Grasslands of the Murray Valley Plains (critically endangered)

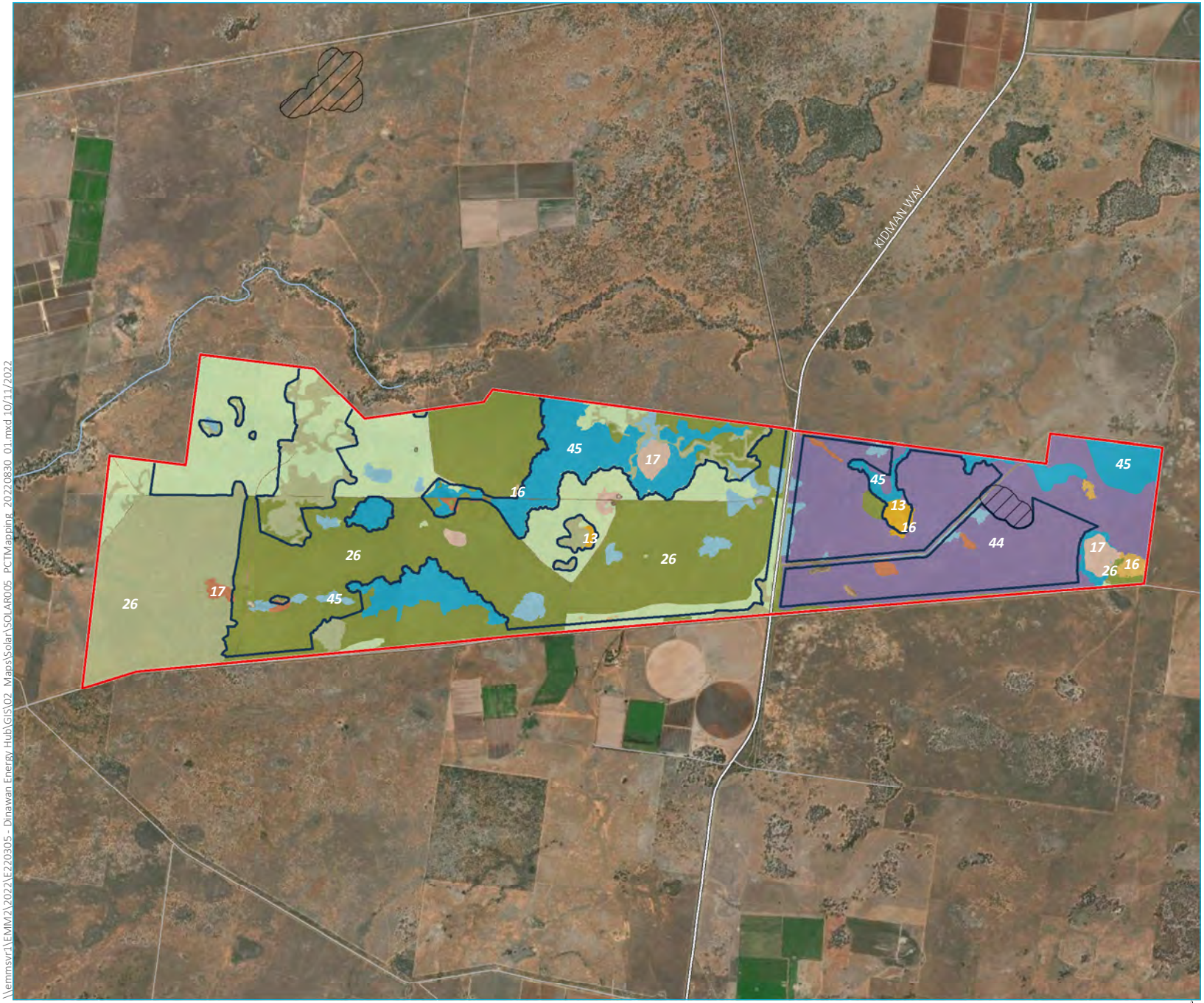
The majority of the project investigation area is dominated by native grassland vegetation that aligns with either:

- modified weeping myall woodland and grasslands derived from PCT 26;
- PCT 44 derived grassland – where woody Weeping Myall vegetation has been completely removed; or
- PCT 45 – natural grassland.

Grasslands are likely to be a combination of naturally occurring grasslands (PCT 45) and grasslands derived from Weeping Myall Woodland (PCT 26 and PCT 44), which occurs extensively to the north of the project investigation area and on local roadsides. The natural tree cover may have been historically cleared or died out and generally, only the native ground layer vegetation remains (eg grasses, sedges, forbs and small shrubs). This grassland vegetation now supports livestock grazing (ie native pasture). Weeping Myall Woodlands is listed as 'endangered' under the EPBC Act and BC Act. The community occurs in small pockets throughout the inland alluvial plains west of the Great Dividing Range in NSW and Queensland and is dominated by Weeping Myall (*Acacia pendula*).

Occurrence of intact Weeping Myall woodlands (represented by PCT 26) is intermittent across the project investigation area, and more so to the west. This woodland vegetation is composed of what appears to be semi-mature and younger regrowth stands of Weeping Myall. PCT 26 typically occurs on fertile clay soils with moderate to extensive gilgai that are subject to seasonal waterlogging. Weeping Myall patches can also include areas of adjacent derived grassland within 10 m of the dripline of a patch (TSSC 2009).

It was determined that treed patches of Weeping Myall woodland and immediately adjacent derived grasslands (within 10 m of the treed dripline) would meet the EPBC Act definition. The BC Act does not contain key diagnostics or condition thresholds for this community but instead relies on a general description of the community and a list of characteristic plant species. The Weeping Myall treed patches also meet the general description of the BC Act definition.



KEY

- Project investigation area
- Development footprint
- Plains Wanderer - Mapped Important Habitat (includes 100 m buffer)

Plant Community Type (PCT) mapping

PCT 13 | Black Box Lignum woodland wetland
- Moderate

PCT 16 | Black Box grassy open woodland
- Low
- Good

PCT 44 | Forb - rich Speargrass grassland
- Good

PCT 17 | Lignum shrubland wetland
- Low
- Moderate

PCT 45 | Plains Grass grassland on alluvial clays
- Good
- Moderate

PCT 26 | Weeping Myall
- DNG
- Intact
- Modified

Existing environment
- Watercourse (third order and higher)
- Rail line
- Major road
- Minor road

Plant community types

Dinawan Solar Farm
Scoping Report
Figure 6.1

EMM creating opportunities

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Source: EMM (2022); ABS (2021); DFSI (2020, 2021); ESRI (2022); GA (2011)

0 2.5 5 km

GDA2020 MGA Zone 55

N

Native grassland is unlikely to meet the EPBC Act definition for Weeping Myall Woodlands where it occurs adjacent to treed patches of Weeping Myall but is beyond 10 m of the treed dripline. These areas are derived from the original Weeping Myall woodland vegetation. This is particularly obvious west of Kidman Way.

PCT 45 occurs in low-lying grey clay areas. Where PCT 45 is present, these grasslands may fit the description of the EPBC Act listed Natural Grasslands of the Murray Valley Plains critically endangered ecological community (CEEC) (TSSC 2012) and have been mapped by NSW Government as plant communities that align with this TEC (ie PCT 45 only). These native grasslands are in moderate condition due to long-term grazing. The grasslands are dominated by native Spear-grasses (*Austrostipa* spp.) including Plains Grass, Wallaby-grasses (*Rytidosperma* spp.), Windmill Grass (*Chloris truncata*), Panic-grass (*Walwhalleya proluta*) and Curly Windmill Grass (*Enteropogon acicularis*). A range of grazing-tolerant native herbs are present and some less grazing-tolerant native plant species occur at low densities. There is no NSW BC Act equivalent of the EPBC Act grassland TEC.

The BDAR will determine more accurate boundaries and definition of native grassland vegetation to a derived or natural condition state and will be an important part of further ecological investigations.

Small discreet patches of Black Box woodland also occur within the project investigation area as well as along drainage lines adjacent to the project investigation area. These areas are in moderate condition generally, and often used as congregating areas for cattle or have been subject to the thinning of woody vegetation, effecting groundcover diversity. These patches contain multiple hollow bearing trees.

Natural wetlands occur in drainage basins and along shallow gradient drainage lines throughout the project investigation area. These wetlands are attributable to PCT 17. Artificial wetlands such as dams and channels also occur within the project investigation area. PCT 17 is not associated with any TECs.

Background research indicates the possible occurrence of a further eight PCTs, none of which were recorded within the project investigation area during preliminary investigations. Although Buloke trees are scattered occasionally in the project investigation area, they do not form woodland stands that would qualify as either the Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions endangered ecological community (EEC) under the EPBC Act or the Allocasuarina luehmannii Woodland in the Riverina and Murray-Darling Depression Bioregions EEC under the BC Act.

ii Threatened flora and fauna

Background searches identified 16 threatened flora species and 51 threatened fauna species recorded (EES 2021) or predicted to occur within 50 km of the project investigation area.

Due to the moderate quality of the native grasslands, the presence of threatened flora is reduced but isolated individuals or clusters may still persist. Species that are known or predicted to occur with a medium or greater likelihood of occurrence include:

- Claypan Daisy (*Brachyscome muelleroides*);
- Lanky Buttons (*Leptorhynchos orientalis*);
- Chariot Wheels (*Maireana cheelii*);
- Sand-hill Spider Orchid (*Caladenia arenaria*);
- Winged Peppercress (*Lepidium monoplocoides*);
- Turnip Copperburr (*Sclerolaena napiformis*);
- Slender Darling Pea (*Swainsona murrayana*);
- Red Darling Pea (*Swainsona plagiotropis*);

- Silky Swainson-pea (*Swainsona sericea*);
- Spear Grass (*Austrostipa wakoolica*); and
- Austral Pillwort (*Pilularia novae-hollandiae*).

Threatened fauna recorded during the preliminary field assessments or considered likely to occur in the project investigation area include:

- Superb Parrot (*Polytelis swainsonii*) (EPBC Act vulnerable, BC Act vulnerable);
- White-fronted Chat (*Epthianura albifrons*) (BC Act vulnerable);
- Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*) (BC Act vulnerable);
- Spotted Harrier (*Circus assimilis*) (BC Act vulnerable);
- Black Falcon (*Falco subniger*) (BC Act vulnerable); and
- Plains Wanderer (*Pedionomus torquatus*) (EPBC Act critically endangered, BC Act endangered).

The presence of woodland and scattered trees is likely to provide habitat for woodland birds such as Superb Parrot and Grey-crowned Babbler but may reduce the extent of possible habitat for Plains Wanderer, which tends to avoid wooded areas. Open areas of native grassland (natural and derived) may support Plains Wanderer where optimal percentage cover occurs, as well as providing foraging habitat for raptors such as the Spotted Harrier and Black Falcon.

Other threatened fauna includes Sloane's Froglet, which has been recorded from near Coleambally to the north, and near Berrigan to the south. Investigation of the habitat within the project investigation area has determined habitat is generally sub optimal within the project investigation area, with seasonally flooded grassy/sedge drainage lines, farm dams and artificial drains and channels generally lacking vegetation required for refuge.

Further targeted surveys will be undertaken in accordance with the *Biodiversity Assessment Method* (BAM) during the preparation of the BDAR and EIS to determine the presence of these threatened species as well as impact avoidance, mitigation and offset obligations, if required.

6.2.2 Potential impacts

Impacts on native vegetation, native fauna and terrestrial ecosystems are likely to occur as a result of the project. The construction of solar and battery infrastructure, access roads and associated facilities for the operation of the project will result in the direct loss of vegetation and some reshaping of the topography and landscape. These activities may result in a direct and long-term impact on the occurrence, extent and coverage of native vegetation, including threatened species and ecological communities. Indirect impacts such as shading, may also result in the modification of feeding, refuge and breeding habitat for native fauna, including habitat fragmentation and the loss of habitat connectivity.

Direct and indirect impacts during construction may include clearing, sedimentation, dust deposition, erosion, weed introduction and/or spread, vehicle/machinery strike, light and noise pollution and shading and vibration from the movement of equipment and vehicles. Cumulative impacts may also occur in the context of development in the broader South-West REZ area, including the Dinawan Wind Farm and other surrounding renewable energy developments.

Biodiversity values have been investigated early in the development process and have been considered in the development of the project investigation area and development footprint. Biodiversity values will be a key constraint considered throughout the design development to avoid and minimise impacts as far as practical. Design development will aim to avoid remnant vegetation, TECs and threatened species habitat where practicable. Avoidance strategies to minimise impacts to biodiversity may include:

- constraint buffers of mapped Plains Wanderer Important Habitat Areas;
- constraint buffers around treed watercourses; and
- avoidance of EPBC and BC Act listed TECs as far as practicable.

As shown on Figure 6.1, the development footprint has already been refined to avoid mapped Important Habitat Areas for Plains Wanderer, as well as areas of higher biodiversity value (including higher condition state PCT 26 and 45).

Impacts to terrestrial biodiversity during operation are likely to be minimal and limited to the development footprint. Traffic and maintenance activities may present a small risk to some fauna species.

6.2.3 Assessment approach

The project is SSD, triggering entry into the Biodiversity Offset Scheme (BOS). Field surveys and a BDAR will be required to address the requirements of the BC Act, including the BAM, and EPBC Act. The BDAR will be prepared in accordance with the BAM detailing the project and the associated biodiversity values, how the project has avoided and minimised impacts to biodiversity, and an impact assessment for those residual impacts that could not be avoided. This will include an impact assessment in accordance with the EPBC Act and NSW *Fisheries Management Act 1994* (FM Act), where relevant.

The approach for the BDAR will be based on avoiding and minimising impacts, with unavoidable residual impacts offset through the BOS. A referral in relation to MNES under the EPBC Act may be required do address potential impacts to TECs and nationally threatened species. MNES will be assessed within the BDAR as a streamlined assessment under the Commonwealth/NSW Bilateral Agreement.

A desktop report and preliminary field assessments have been completed; however, further detailed field assessment, data analysis and reporting as part of the scope of the BDAR will include:

- A review and update if required of background searches including:
  - NSW BioNet Atlas of NSW Wildlife for BC Act listed threatened entities;
  - review of the Protected Matters Search Tool for EPBC Act MNES; and
  - relevant LEPs and SEPPs.
- Broad condition states assigned to develop vegetation zones in accordance with the BAM.
- Formalise a detailed land category assessment (LCA) with a review of land categorisation under the NSW *Local Land Services Act 2013* (LLS Act). This will clarify the native vegetation management and land use regime and where applicable to do so, the potential for land to be mapped as Category 1 exempt land. Land mapped or determined as Category 1 exempt can be excluded from the BAM and is not required to be assessed, with exception to prescribed impacts. The LCA does not remove the requirement to address matters under the EPBC Act.
- Establishment of a BAM calculator project for the assessment to determine the requirements for threatened species survey.

- Field investigation in accordance with the BAM, including floristic plot surveys and targeted searches for threatened flora and fauna species.
- Identification of any impact avoidance, mitigation and offset measures necessary for the project.
- Undertake analysis of field data to determine impacts to threatened species and native vegetation and calculate any offset requirement in accordance with the BAM.
- If required, engage species experts, as required, where field surveys could not sufficiently determine the presence/absence of candidate species credit species, due to constraints such as seasonal survey restrictions or requirements for replicate surveys follow weather events etc.

6.3 Aboriginal heritage

6.3.1 Existing environment

The project investigation area is within the Riverina Bioregion (Eardley 1999) which consists of mainly fluvial clays, silts and sands. The Murrumbidgee and Murray rivers are the major hydrological systems in the bioregion and the project investigation area is between the Murrumbidgee River and Yanco Creek, a major creek system in the local area. The region is generally flat owing to its origin as a shallow embayment of the Southern Ocean (Austral Archaeology 2021).

Austral Archaeology (2021) reported that surface features of the plains are a result of the evolution of river systems through the Pleistocene and Holocene (Martin & Pardoe 2011). The Murrumbidgee region is characterised by extensive fluvial deposits with low source bordering dunes and sand dunes created by ancient rivers. Austral Archaeology (2021) indicates that the main Murrumbidgee channel and floodplain was significantly larger during the late Pleistocene; this has implications for the distribution of Aboriginal heritage sites which were occupied prior to the Holocene. Paleo-channels (or prior streams) are a landscape feature which should also be considered when predicting the location of Aboriginal heritage sites. The Coleambally paleo-system is the oldest in the region with thermoluminescence dating the system to between 105,000 and 80,000 years before present (BP) (Martin & Pardoe 2011). This system pre-dates the known human occupation of Australia; however the system had streams and tributaries in flow during the period of human occupation. The Yanco paleo-system, also associated with the project investigation area, flowed between 20,000 and 13,000 years BP, and the incised nature of the channel indicates this was a major and powerful river during this period (Austral Archaeology 2021).

Lakes and lunettes are also a major surface feature of the region and a likely location for Aboriginal heritage sites. Lakes and lunettes in the region vary significantly in size, however all have a distinctive round or ‘kidney’ shape. Lakes were formed when water accumulated on the plain and wave action then created deeper basins. Most water in the region was ephemeral and a combination of wave and wind action created lunettes (source bordering dunes) on the edges of the lakes (Austral Archaeology 2021).

The project investigation area is within the boundary of the Cummeragunja Local Aboriginal Land Council. A search of the NSW Native Title Vision website indicates that there are no determined or registered Native Title claim or Indigenous Land Use Agreements that exist over the project investigation area.

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 11 August 2021 (Client service ID: 612882). The search identified 82 Aboriginal archaeological sites within a 50 km search area approximately centred on the project investigation area (Table 6.4). There are no AHIMS listed sites within the project investigation area. The closest AHIMS listed site (AHIMS# 55-1-0052) is approximately 4.5 km north of the project investigation area.

Table 6.4 Summary of AHIMS site types within 50 km of the project investigation area

Site type	Number of sites	Percentage of total
Hearth	38	46%
Modified tree (carved or scarred)	21	26%
Artefact	9	11%
Aboriginal resource and gathering	8	10%
Earth mound	4	5%
Burial	1	1%
Potential archaeological deposits (PADs)	1	1%
Total	**82**	**100%**

6.3.2 Potential impacts

Construction of the project has the potential to impact known and currently unidentified Aboriginal heritage sites. The potential for other archaeological site types and intangible cultural sites to occur within the project investigation area will be established through further archaeological investigation and consultation with Registered Aboriginal Parties (RAPs), which will also provide valuable information on the cultural heritage values of the project investigation area and broader region.

Spark Renewables will seek to avoid impacts to Aboriginal heritage sites wherever possible. Due to the nature of solar farm infrastructure, impacts to Aboriginal heritage sites can often be avoided with careful consideration of project design.

Initial predictive modelling indicates Aboriginal heritage sites are most likely to occur in proximity to current or past waterways; avoidance of these features, if possible, could reduce impacts to Aboriginal heritage sites. Any impacts and mitigation and management measures will be defined in the EIS in consultation with the RAPs.

6.3.3 Assessment approach

A detailed Aboriginal cultural heritage assessment (ACHA) will be prepared for the project in accordance with relevant regulations and guidelines, including:

- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011);
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a); and
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b).

The ACHA will include consultation with the local Aboriginal community, review of existing information, development of a predictive model, on-site investigations, description of cultural materials and their significance, potential impacts and recommendations for the project usually in the form of mitigation measures.

The ACHA will include the following key components:

- Identification of Aboriginal cultural heritage values relevant to the project investigation area through background research, predictive modelling, consultation with Aboriginal stakeholders and archaeological field investigations. Archaeological survey will be undertaken by archaeologists and representatives of the local Aboriginal community. Potential project constraints identified during the survey will inform potential refinement of the development footprint to minimise impacts to Aboriginal heritage values. Measures will be developed to avoid and mitigate potential impacts to Aboriginal cultural heritage, as required. The findings of the background research and surveys will inform the need for further archaeological assessment (such as test excavation).
- Assessment of the significance of Aboriginal objects, sites and locations identified in the course of the archaeological investigations and through Aboriginal community consultation.
- Assessment of the impact of the project on identified Aboriginal cultural heritage values.
- Provision of appropriate management measures for potentially impacted Aboriginal cultural heritage values in response to their assessed significance.

6.4 Traffic

6.4.1 Existing environment

Access to the project will be via Kidman Way. Kidman Way (route B87) is a fully sealed state highway running generally north-south from Bourke at its northern terminus and Jerilderie at its southern terminus. Kidman Way connects the project to other highways, notably the Sturt Highway (national route A20) to the north which connects NSW and South Australia, and the Newell Highway (national route A39) to the south, which provides an important connection between Queensland and Victoria through central NSW.

The transport route to the project will be confirmed during the preparation of the EIS but is expected to comprise vehicle movements originating from:

- north of the project and travelling south along Kidman Way;
- east of the project travelling west along the Sturt Highway before turning onto Kidman Way; and
- south of the project travelling north along the Newell Highway before turning onto Kidman Way.

Over-size, over-mass (OSOM) vehicles will require access to the project and the preferred route will be subject to more detailed route analysis.

Subject to detailed design, internal access tracks will also be established to connect the project to the public road network. All internal access tracks will be unsealed. The internal tracks will serve both as access for servicing and maintaining project infrastructure as well as fire trails.

6.4.2 Potential impacts

The project will generate traffic during construction related to the movement of construction workers and the delivery of materials, plant and equipment. OSOM vehicles will be required for the transport of oversized infrastructure and project components to the project. Construction traffic generation has the potential to impact on intersection performance and traffic volume capacity on the surrounding network and along key transport routes for the movement of infrastructure from ports to the project.

Operational traffic generation will be minimal with some daily light vehicle movements and heavy vehicle deliveries only as required.

6.4.3 Assessment approach

Engagement with Transport for NSW (TfNSW) and relevant local council/s and the Victorian Department of Transport (where relevant for transport from Victoria) will be required to identify any existing road safety concerns and ensure any potential deficiencies are clearly understood and assessed. Proposed new access points from the public road network will be required for project construction access. Ongoing road maintenance requirements and any potential need for localised upgrades to mitigate traffic impacts during construction will also need to be considered. Should upgrades be required, these will form part of the development application and will be detailed in the EIS (including assessment of impacts to biodiversity and Aboriginal cultural heritage). Road upgrade requirements will be determined in consultation with the relevant road authority.

A traffic impact assessment will be carried out to investigate potential impacts associated with the project. The traffic impact assessment will include:

- projections of traffic volumes (both light and heavy vehicles) and transport routes during construction and operation;
- assessment of the potential traffic impacts of the project on road network function, including intersection performance, site access arrangements, and road safety, including school bus routes and cyclist safety;
- assessment of the capacity and condition of the existing road network to accommodate the type and volume of traffic generated by the project (including OSOM vehicles and escorted deliveries) during construction and operation, with any potential cumulative impacts from other projects in the area being taken into account; and
- provide details of measures to manage potential impacts, including a schedule of required road upgrades, road maintenance contributions, and other traffic control measures, developed in consultation with the relevant road authority.

The assessment of traffic and access impacts will be prepared using the following guidelines, policies and design requirements:

- *Guide to Traffic Generating Developments* (RTA 2002);
- *Austroads Guides to Road Design* (various publications);
- *Austroads Guides to Traffic Management* (various publications);
- Australian Standard AS 2890 Parts 1 and 2; and
- *Australian Code for Dangerous Goods Transport*.

6.5 Social

A social impact assessment (SIA) scoping report has been prepared to support this scoping report (Appendix D).

6.5.1 Existing environment

The project is within a sparsely populated area which encompasses the localities of Coleambally, Gala Vale and Bundure, and lies within the Murrumbidgee LGA.

The local study area for the SIA includes all land within the project investigation area along with a 5 km buffer area around the periphery, recognising that direct project-related impacts may also be experienced by those living in close proximity to the project investigation area. Social baseline characterisation utilised data generated by the Australian Bureau of Statistics (ABS) at the Statistical Area 1 (SA1) geographical classification. Two SA1 areas have been included in the local study area.

Surrounding townships are likely to be primary sources of labour, goods and services which will support the project and subsequently experience social impacts and benefits. Nearby regional communities considered relevant to the SIA include:

- Griffith;
- Deniliquin;
- Wagga Wagga;
- Coleambally; and
- Jerilderie.

The regional study area encompasses:

- Murrumbidgee LGA; and
- Edward River LGA (due to the project's proximity to the eastern boundary of this LGA).

Both LGAs will experience some direct and indirect impacts, mostly related to workforce accommodation, local procurement opportunities and employment.

The local study area has a combined total population of 399, while the regional study area has a population of 11,809 (ABS 2021). Agriculture is the primary industry of employment within the local study area and is an important source of employment within the broader region.

Wagga Wagga is the largest centre in the surrounding area with a population of 56,974. This is followed by Griffith, with a population of 20,569. Other nearby regional communities of Deniliquin (7,038), Coleambally (1,152) and Jerilderie (922) have considerably smaller populations.

6.5.2 Potential impacts

Potential social impacts and benefits identified as part of the SIA scoping report include:

- impacts to livelihood (such as the potential for lowered agricultural productivity caused by disruption to farming and potential biosecurity and weed risk due to increased vehicle activity);
- health and wellbeing impacts (such as increased noise and public safety issues due to trucks and increased vehicle movements);
- impacts to access and surroundings (such as changes to the landscape due to the construction and operation of the project);
- impacts on culture and community (such as from potential loss of heritage and changes in the community due to a new workforce entering the area);
- increased opportunities for employment and occupational training;
- economic in-flows to the local community; and
- opportunities for diversification of landholder income.

The project will look to initiate measures that maximise positive impacts and benefits (such as utilising local workforce and supplies), in addition to other mitigation measures to manage potential negative impacts.

6.5.3 Assessment approach

Potential social impacts and benefits will be assessed in accordance with the requirements of the *Social Impact Assessment Guideline for State Significant Projects* (DPIE 2021e) and will utilise the risk assessment matrix presented in the *Technical Supplement Social Impact Assessment Guideline for State Significant Projects* (DPIE 2021f). The SIA will be led by a suitably qualified Social Scientist.

The identification of social impacts will be informed by community and stakeholder engagement activities, as well as SIA field study activities, and will be conducted in an integrated manner to ensure consistency, reduce duplication, and allow for management of consultation fatigue. In addition, findings from the technical assessments will be considered to understand the consequences to the community and existing research and previous SIAs will inform the identification of the social impacts.

6.6 Historic heritage

6.6.1 Existing environment

Statutory registers were reviewed including the National Heritage List (NHL), the Commonwealth Heritage List (CHL), the State Heritage Register (SHR), the Section170 Register (s170) and Schedule 5 of the Murrumbidgee LEP. Non-statutory registers reviewed as a part of this assessment include the National Trust of Australia, NSW (NT) and the Register of the National Estate (RNE).

No items of National, State or local heritage significance have been identified. There are no items of heritage significance in relative proximity to the project investigation area (under 10 km).

While no statutory-listed sites have been identified, the project investigation area is in the Murrumbidgee Historic Region. The *Regional Histories of NSW* document prepared by the Heritage Office in 1996 notes that the region has a long pastoral and farming history dating from the first European settlement in 1829 in the Murrumbidgee Valley (Heritage Office 1996, p133). Therefore, there is potential throughout the project investigation area for existing built heritage as well as archaeological remnants that have previously been unidentified including:

- homesteads;
- cottages;
- stockyards;
- camps and huts; and
- infrastructure associated with the pastoral landscape including dams, fencing, pastoral tracks and roadways.

In conjunction, the project investigation area includes various cultural landscapes that are indicative of the character of the Murrumbidgee Historic Region including:

- areas of historic plantings;
- large water bodies;
- pastoral fields; and
- areas with a high concentration of built heritage situated within a specific landscape type.

The project investigation area forms part of numerous blocks of land which were allocated to pastoral stations established following European settlement in the area from the 1850s onwards (Austral Archaeology 2021). In particular, the project investigation area is closely associated with Yanko Station and later the Goolgumbla property. Individuals with a link to the project investigation area include the Wilson family, predominantly renowned pastoralist and politician Sir Samuel Wilson, and his relative Samuel McCaughey, a man who was famous for the quality of his livestock and who was instrumental in introducing new irrigation techniques to the Riverina. McCaughey was also responsible for the invention of a type of earth scoop known as the 'Tumbling Tommy', which became a common sight on farms across Australia even into the 20th century. It is possible that archaeological evidence relating to McCaughey's irrigation schemes or his engineering activity may be present within the project investigation area.

Preliminary research by Austral Archaeology (2021) noted that various structures are likely to have once existed within the project investigation area (such as pastoral and farming infrastructure), although the location of these structures are currently unknown.

6.6.2 Potential impacts

Due to the size of the project investigation area, it is likely that historic heritage sites as described above would be identified through both a more detailed desktop analysis and physical inspection. Construction of the project has the potential to impact currently unidentified historic heritage sites; however, the level of direct and cumulative impacts cannot be established at this stage in the project.

Spark Renewables will seek to avoid impacts to historic heritage sites wherever possible. Any impacts and mitigation and management measures will be identified in the EIS.

6.6.3 Assessment approach

To inform the development of the EIS, a historical heritage assessment of built, archaeological and landscape values and a statement of heritage impact (technical report) will be prepared. The assessment will include further and more detailed desktop research and consultation, which will also provide valuable information on the historical heritage values of the project investigation area and broader region. An inspection of the project investigation area may also be required, should the desktop analysis yield information that clearly suggests the presence of historical sites.

The assessment will also consider the wider region to determine the potential for historical finds to be present in the project investigation area and if so, assess the potential significance of the finds and provide recommendations for the appropriate management of any finds.

6.7 Land

6.7.1 Existing environment

Regional land and soil mapping data has been reviewed with a focus on the indicative development footprint (Table 6.5).

Table 6.5 Land and soil characteristics

Soil landscapes[1]	Great soil group	Australian soil classification (ASC)	Inherent soil fertility	Land soil capability (LSC) class	Area (ha)[1]
Coleambally variant b	Siliceous Sands (SS)	Rudosols	Low	6	10
Jerilderie	Grey, Brown and Red Clays (GC, BC and RC)	Vertosols	Moderate	4	2,530

1. Soil and land resource mapping is unavailable for the entire development footprint, therefore the area (ha) of soil landscapes has been extrapolated based on the extent of the associated ASC, LSC and other inputs across the development footprint.

The development footprint is dominated by the presence of cracking clay Vertosols associated with the stagnant alluvial Jerilderie soil and land resource (SLR) area whilst small areas of poorly developed Rudosols are present, associated with the aeolian Coleambally variant b SLR.

LSC is consistent across the SLR and ASC associations. The Jerilderie Vertosols are classed as LSC Class 4, moderate capability land with moderate to high limitations for high impact land uses, restricting land use to cropping with restricted cultivation, pasture cropping, grazing and some horticulture. The Coleambally SLR Rudosols are LSC Class 6, low capability land with very high limitations for high impact land uses, restricting land use to low-impact land uses such as grazing, forestry and nature conservation (OEH 2012). LSC mapping within the development footprint and broader project investigation area is shown on Figure 6.2.

Modelled inherent soil fertility is similarly consistent, with the Vertosols of the Jerilderie SLR being moderate soil fertility, soils with low to moderate fertilities that usually require fertiliser and/or have some physical restrictions for arable use. The Rudosols of Coleambally variant b have low soil fertility, soils which, due to their poor physical and/or chemical status, only support limited plant growth. The maximum agricultural use of these soils is sparse grazing (Charman 1978).

The development footprint and broader project investigation area is not mapped as Biophysical Strategic Agricultural Land (BSAL).

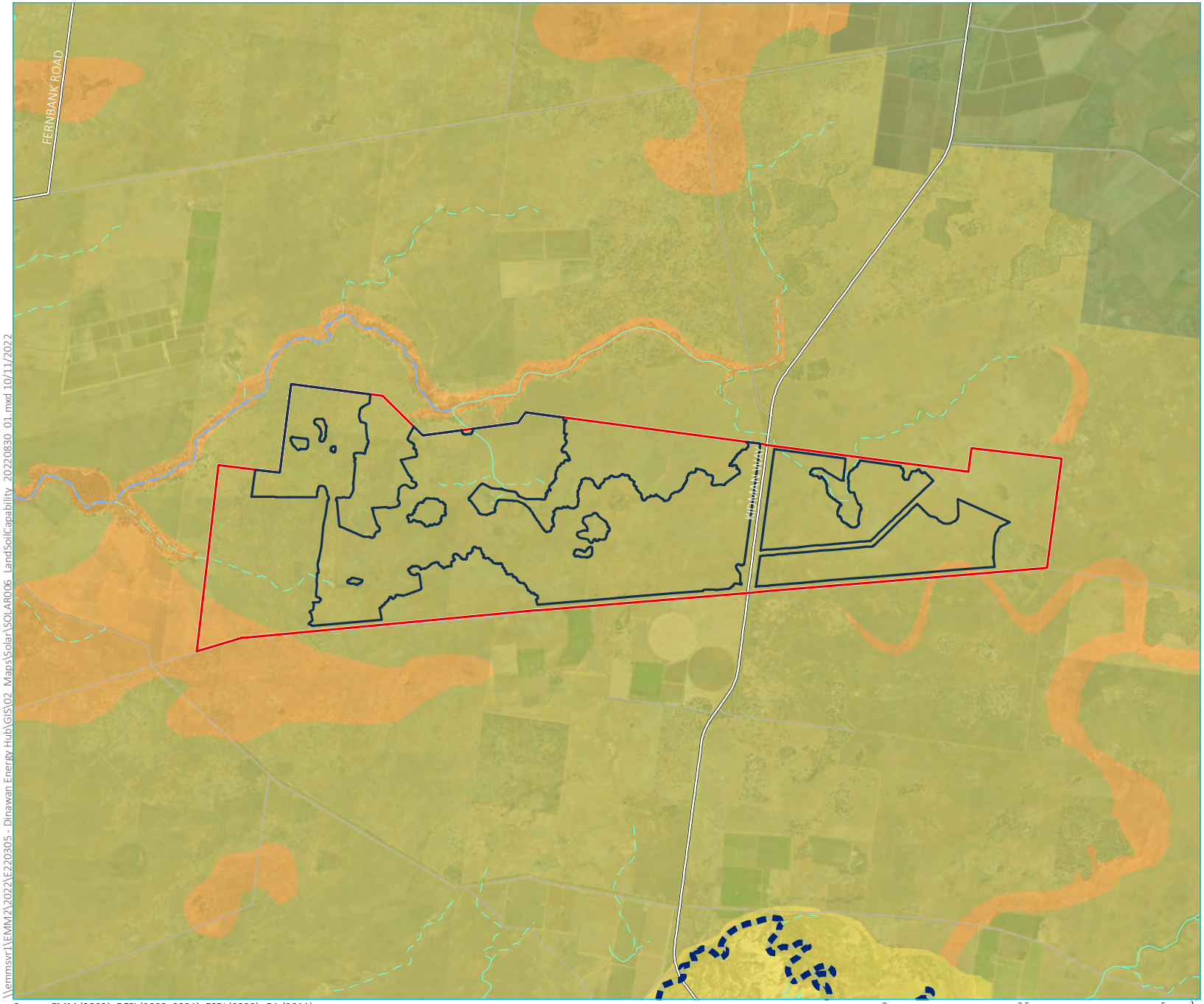
There are no acid sulfate soils (ASS) or potential acid sulphate soils mapped within the development footprint. Acid sulfate soils can occur in conducive alluvial environments and may be present in the development footprint.

6.7.2 Potential impacts

i Construction

Soil disturbance during construction may result in:

- topsoil and subsoil impacts (eg degradation and loss of topsoil, compaction of soil through vehicle movement and poor reinstatement and soil inversion or mixing resulting in changes in constraints such as salinity and sodicity within the soil profile);
- disturbance and form changes affecting natural surface drainage;
- erosion and sedimentation, particularly during clearance and soil exposure activities resulting in:
  - on-site impacts (such as erosion of constructed landforms); or
  - off-site impacts (such as eutrophication of downstream waters);
- increased dust generation.



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Source: EMM (2022); DFSI (2020, 2021); ESRI (2022); GA (2011)

Land and soil capability

Dinawan Solar Farm
Scoping Report
Figure 6.2

EMM
creating opportunities

These impacts could result in reduction of soil quality that could be deleterious to agricultural productivity and land use after rehabilitation if not suitably managed or mitigated.

Decreasing soil quality or volumes during construction could result in limitations to rehabilitation from loss or degradation of soil materials that are needed to reinstate the soils in a suitable condition.

Any negative impact to soil characteristics presents a risk of harm to the land and soil capability and productivity of the development footprint post-rehabilitation.

ii Operations

Once constructed, the land within the development footprint will not be able to be used for the same intensity of agricultural production; however, there are opportunities to co-locate agricultural land uses, such as sheep grazing, to maintain a level of agricultural productivity. Inappropriate management of soils could result in negative impacts to soil characteristics, which may impact the land and soil capability and agricultural productivity of the development footprint post-rehabilitation.

These impacts could result in reduction of soil quality that could be deleterious to agricultural productivity and land use after rehabilitation if not suitably managed or mitigated.

Decreasing soil quality or volumes during construction could result in limitations to rehabilitation from loss or degradation of soil materials that are needed to reinstate the soils in a suitable condition.

Any negative impact to soil characteristics presents a risk of harm to the land and soil capability and productivity of the development footprint post-rehabilitation.

iii Operations

Once constructed, the land within the development footprint will not be able to be used for the same intensity of agricultural production; however, there are opportunities to co-locate agricultural land uses, such as sheep grazing, to maintain a level of agricultural productivity. Inappropriate management of soils could result in negative impacts to soil characteristics, which may impact the land and soil capability and agricultural productivity of the development footprint post-rehabilitation.

6.7.3 Assessment approach

A land, soil and erosion assessment will be prepared as part of the EIS and will include:

- a description of the biophysical environment (including soil landscapes and LSC class);
- a detailed erosion hazard analysis (including site inspection and opportunistic soil sampling to identify site-specific issues and soil characteristics relevant to erosion and sediment control);
- an impact assessment of the project on soil types, LSC class and agricultural productivity;
- completion of a Land Use Conflict Risk Assessment in accordance with the Department of Industry's *Land Use Conflict Risk Assessment Guide*; and
- recommendations for site decommissioning and rehabilitation to restore disturbed land back to agriculture.

Land within the development footprint is mapped as LSC Class 4. Therefore, in accordance with the requirements of the *Large-Scale Solar Energy Guideline* (DPE 2022a), a soil survey is required to verify the LSC class. If verified as LSC Class 4, a Level 2 (reduced) agricultural impact assessment will be completed as part of the EIS. If LSC Class 1–3 land is identified within the development footprint, a Level 3 (detailed) agricultural impact assessment will be completed as part of the EIS. The outcomes of the soil survey will also be used to inform the erosion hazard analysis and recommendations for site decommissioning and rehabilitation.

6.8 Water

6.8.1 Existing environment

The project is within the lower Murrumbidgee River Catchment in southern NSW which drains a total area of around 84,000 km^2. The Murrumbidgee River Catchment flows in a south-westerly direction from its headwaters in Kosciuszko National Park to the floodplains at the western end of the valley where the project would be situated. More locally, the project investigation area is situated between two waterways, Yanco Creek to the south and Cooinbil Creek to the north. Yanco Creek is a major perennial waterway which flows south-west toward the Murray River. Delta Creek is a minor, ephemeral waterway which also drains in a south-westerly direction during significant rainfall, although does not connect to any downstream major channel unless the area is flooded.

The project investigation area is largely flat with some minor drainage depressions that hold water during rainfall and flooding, and flow in a south-westerly direction. Several minor topographic depressions on the floodplain hold water for longer, creating scattered swamp environments within the project investigation area. There are four first order watercourses and one second order watercourse mapped within the project investigation area; however, all are ephemeral (Figure 6.2).

Parts of the project investigation area are identified as ‘groundwater vulnerable’ and ‘wetland’ on the Jerilderie LEP groundwater vulnerability map. Clauses 6.5 and 6.7 of the Jerilderie LEP require the consent authority to consider potential impacts on groundwater dependent ecosystems and wetlands prior to determining a development application.

6.8.2 Potential impacts

The construction of the project has the potential to result in the following impacts to water resources in the absence of suitable controls:

- ground disturbance during bulk earthworks and other site activities could lead to exposure of soils and potential erosion and mobilisation of sediment into receiving watercourses;
- contamination of surface waters or groundwater as a result of accidental spillage of materials such as fuel, lubricants, herbicides and other chemicals used to support construction activities;
- disturbance of watercourses (eg through construction of creek crossings) and associated riparian zones to support construction activities (including clearing, bulk earthworks and civil works, installation of infrastructure and site establishment);
- partial blockage or redirection of floodwaters and downstream impacts as a result of poorly considered construction activities; and
- demand for water during construction.

Operation has the potential to result in the following impacts to water resources in the absence of suitable controls:

- demand for water for land management purposes;
- potential ongoing erosion of soils and mobilisation of sediment into receiving watercourses;
- contamination of surface water or groundwater as a result of accidental spillage of materials such as fuel, lubricants, herbicides and other chemicals used to support site activities, or through poor site and vegetation management practices; and
- partial blockage or redirection of floodwaters and downstream impacts as a result of poorly considered permanent facilities.

Specific design considerations and mitigation measures may be recommended to minimise potential impacts within and along drainage lines. Roads and services that require watercourse crossings will be designed and constructed in accordance with relevant regulations and best practice design and construction methods.

The project is not likely to impact groundwater during construction, operation, or decommissioning due to the limited amount of subsurface disturbance activities required during the installation and decommissioning of project infrastructure.

6.8.3 Assessment approach

A water resources assessment will be prepared and will include a review of the existing water environment, an assessment of potential impacts on water resources and a description of any proposed mitigation and management measures. The water resources assessment will include:

- complete site characterisation including mapping to effectively characterise surface water features, groundwater features and relevant water users;
- the likely impacts of the project (including flooding) on surface water and groundwater resources, drainage channels, wetlands, riparian land, farm dams, groundwater dependent ecosystems and acid sulfate soils, related infrastructure, adjacent licensed water users and basic landholder rights, and measures proposed to monitor, reduce and mitigate these impacts;
- a qualitative review and assessment of the likely risks and impacts of the project on flooding and floodplain areas using available flood data and mapping;
- a review of the relevant regulatory requirements (eg Water Sharing Plans) of relevance to the catchment and groundwater sources in which the project is located;
- consideration of water requirements and supply arrangements for construction and operation; and
- erosion and sediment control measures that will be implemented to mitigate any impacts in accordance with *Managing Urban Stormwater: Soils & Construction* (Landcom 2004).

6.9 Noise and vibration

6.9.1 Existing environment

Land use within the project investigation area and surrounds is predominantly agricultural. Given the project's rural setting, background noise at nearby sensitive receptors is likely to be low and characterised by agricultural equipment and machinery associated with agricultural production activities, vehicle movements along local roads and natural sounds (eg livestock, birds, insects, etc).

The area surrounding the project investigation area is sparsely populated with only 4 non-associated residences within 5 km of the project investigation area, including 1 within 500 m of the project investigation area (R049 on Figure 2.1).

6.9.2 Potential impacts

Noise impacts from the project will mostly be associated with construction activities and include noise generated by preparatory earthworks, delivery and assembly of the solar panel infrastructure (including pile driving), construction of the BESS, on-site substation and grid connection works and operation of light and heavy vehicles.

Operational noise impacts will include the operation of the solar tracking system, on-site substation and BESS. The location of noise-generating infrastructure within the development footprint will be determined with consideration to noise impacts on surrounding residences.

6.9.3 Assessment approach

A noise and vibration impact assessment will be prepared and will consider relevant noise impacts to local receptors within the vicinity of the project and cumulative impacts with surrounding developments. The assessment will include:

- identification of noise sources and relevant noise outputs of construction equipment and infrastructure proposed by the project; and
- noise modelling and assessment, taking into consideration the following:
  - predictive modelling;
  - noise mitigation strategies; and
  - potential construction activity, road traffic noise and operational noise impacts;

The assessment will be prepared in accordance with the:

- *Interim Construction Noise Guideline* (DECC 2009);
- *Noise Policy for Industry* (EPA 2017);
- *Road Noise Policy* (DECCW 2011); and
- *Assessing Vibration: A Technical Guideline* (DEC 2006).

Specific community engagement is proposed with surrounding landholders in relation to noise and vibration. A road traffic noise assessment will also be included to assess noise impacts associated with project-related vehicle movements along the local road network during the construction phase of the project.

The potential for cumulative noise impacts with the Dinawan Wind Farm, Project EnergyConnect's Dinawan Substation and Yanco Delta Wind Farm will be considered as the project design evolves and will be assessed in the EIS.

6.10 Air quality

6.10.1 Existing environment

Land use within the project investigation area and surrounds is primarily agricultural, which is likely to influence local and regional air quality. Existing sources of air pollution within a local setting are limited and typically comprise dust and vehicle and machinery exhaust emissions associated with agricultural production and local roads. Wood smoke from bushfires and rural residences can also be a source of particulates.

6.10.2 Potential impacts

The project is not anticipated to generate significant air quality impacts during construction. Dust may be generated during construction due to an increase in exposed areas following site preparation works and from construction traffic movements on unsealed roads. This dust generation is expected to be localised, unlikely to have significant impacts at nearby receivers, and able to be easily mitigated through implementation of standard management measures.

No significant dust generation is expected during operations given exposed areas will have been sealed or rehabilitated.

Minor levels of dust may be generated during decommissioning as a result of structures being removed, areas being temporarily exposed and rehabilitation works. This will only occur for a short duration before rehabilitation of exposed areas has been established.

6.10.3 Assessment approach

A quantitative air quality assessment with dispersion modelling is not considered warranted given risk of air quality impacts is low and will not extend beyond the construction phase of the project.

Impacts to neighbouring sensitive receptors (human and ecological) from construction dust emissions (including the potential for cumulative emissions due to the possible concurrent construction of the project with the Dinawan Wind Farm, Project EnergyConnect and Yanco Delta Wind Farm) will be assessed using a qualitative impact assessment approach.

6.11 Hazards and risk

Potential hazardous scenarios and risks associated with the project include bushfires, dangerous goods and hazardous substances, and exposure to electromagnetic fields. Accordingly, the EIS will include an assessment of potential hazards and risks including:

- Bushfire risks, which will be assessed against *Planning for Bush Fire Protection 2019* (NSW Rural Fire Service 2019). This will include an assessment of risks that may contribute to ignition and/or propagation of a bushfire within the project investigation area. An assessment that demonstrates that the area designated for the BESS is sufficient such that the separation distances between the BESS and on-site or off-site receptors and between BESS sub-units (containers, modules, etc) prevent fire propagation will be prepared.

- A Preliminary Hazard Analysis will be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis* (DoP 2011a) and *Multi-Level Risk Assessment* (DoP 2011b).

- Electromagnetic fields from proposed electrical infrastructure, which will be assessed against the International Commission on Non-Ionizing Radiation Protection *Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields* (1998).

There is no established evidence that exposure to electromagnetic fields generated by powerlines, substations, and other electrical sources cause adverse health effects (ARPANSA 2018). Generally, at distances of greater than 50 m from a high voltage powerline, electromagnetic field levels are at levels considered typical. Electromagnetic field levels at distances of 5–10 m away from substations are considered to be consistent with background levels in a typical home (ARPANSA 2022).

Electromagnetic fields that are anticipated to be generated by the project are not expected to exceed guidelines for public exposure and will not cause adverse impacts for human health. The electromagnetic field levels of the project including solar farm, BESS, on-site substation and grid connection will be assessed as part of the EIS but are not anticipated to increase electromagnetic field levels above existing background environmental levels.

6.12 Cumulative impacts

The project will contribute to the overall development of the South-West REZ. Other proposed, approved, under construction and operational renewable energy developments within and in the vicinity of the South-West REZ and the project are summarised in Table 2.1.

As shown in Figure 1.1, there are multiple renewable energy generation and transmission projects proposed in the vicinity of the project investigation area with the proposed Yanco Delta Wind Farm, Project EnergyConnect and the Dinawan Wind Farm adjoining or within close proximity to the project investigation area. Further, it is anticipated that there will be additional renewable energy generation, storage and transmission projects proposed in the vicinity of the project that are not publicly known at the time of preparing this report.

The project may generate cumulative impacts in conjunction with surrounding projects during both construction and operation. These impacts may include cumulative traffic, construction noise, visual, social (including workforce and accommodation capacity), and biodiversity impacts. However, there may also be a cumulative benefit to local communities from the project and other developments in the region through the generation of jobs during construction and ongoing operation, particularly under the South-West REZ, and contribution to local economies associated with the purchase of local goods and services.

The EIS will carry out a cumulative assessment in accordance with the *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPIE 2021b). The following matters will require consideration:

- visual amenity;
- biodiversity;
- Aboriginal and historic heritage;
- traffic;
- social;
- land; and
- noise and vibration.

Further consideration of potential cumulative impacts for projects within 100 km of the project investigation area and the proposed assessment approach is provided in Table 6.6.

Table 6.6 Cumulative impact assessment scoping summary table

Project	Distance to project	Project status	Indicative timing/overlap	Potential cumulative impacts
Dinawan Wind Farm – includes construction and operation of 1.5 GW wind farm and BESS on approximately 22,000 ha.	0 km	Proposed – EIS in preparation.	18–24 month construction and operations overlap (assumes concurrent construction).	• Visual amenity – Detailed assessment – further assessment required to determine cumulative visual amenity impacts. • Biodiversity – Detailed assessment – further assessment required to determine cumulative biodiversity impacts. • Aboriginal and historic heritage – Standard assessment of impacts on Aboriginal and historic cultural landscapes. • Traffic – Detailed assessment – cumulative impacts on local and regional road network will require assessment. • Social – Detailed assessment – cumulative impacts on local population, accommodation and goods and services will require assessment. • Land – Standard assessment – cumulative impacts on regional agricultural productivity will be assessed. • Noise and vibration – Detailed assessment – cumulative construction, operational and road traffic noise will require assessment.
Project EnergyConnect – includes construction and operation of 330 kV and 500 kV transmission line and Dinawan Substation.	0 km	Approved – not constructed	24-month construction unlikely to overlap. Operations overlap.	• Visual amenity – Detailed assessment – further assessment required to determine cumulative visual amenity impacts. • Biodiversity – Standard assessment of impacts on biodiversity. • Aboriginal and historic heritage– Standard assessment of impacts on Aboriginal and historic cultural landscapes. • Traffic – Detailed assessment – cumulative impacts on local and regional road network will require assessment if concurrent construction assumed to occur. • Social – Detailed assessment – cumulative impacts on local population, accommodation and goods and services will require assessment if concurrent construction assumed to occur. • Land – Standard assessment – cumulative impacts on regional agricultural productivity will be assessed. • Noise and vibration – Standard assessment – closest residence to Dinawan Substation is approximately 4 km away, therefore cumulative construction and operational noise impacts are considered unlikely.
Yanco Delta Wind Farm – includes construciton and operation of 1.5 GW wind farm, including approximately 225 WTGs across 24,000 ha.	1 km (south-west)	Proposed – EIS in preparation	36-month construction and operations overlap.	• Visual amenity – Detailed assessment – further assessment required to determine cumulative visual amenity impacts. • Biodiversity – Standard assessment of impacts on biodiversity. • Aboriginal and historic heritage– Standard assessment of impacts on Aboriginal and historic cultural landscapes. • Traffic – Detailed assessment – cumulative impacts on local and regional road network will require assessment. • Social – Detailed assessment – cumulative impacts on local population, accommodation and goods and services will require assessment. • Land – Standard assessment – cumulative impacts on regional agricultural productivity will be assessed. • Noise and vibration – Detailed assessment – cumulative construction, operational and road traffic noise will require assessment.

Table 6.6 Cumulative impact assessment scoping summary table

Project	Distance to project	Project status	Indicative timing/overlap	Potential cumulative impacts
Coleambally BESS – includes construction and operation of 100 MW capacity BESS across 4 ha.	30 km (north)	Proposed – EIS in preparation	12 month construction unlikely to overlap. Operations overlap.	• Visual amenity – No potential overlap in impacts. • Biodiversity – No potential overlap in impacts. • Aboriginal and historic heritage– No potential overlap in impacts. • Traffic – Detailed assessment – cumulative impacts on regional road network will require assessment if concurrent construction assumed to occur. • Social – Detailed assessment – cumulative impacts on local population, accommodation and goods and services will require assessment if concurrent construction assumed to occur. • Land – Standard assessment – cumulative impacts on regional agricultural productivity will be assessed. • Noise and vibration – No potential overlap in impacts.
Coleambally Solar Farm – 150 MW solar farm constructed on 570 ha formerly used to support irrigation cropping.	30 km (north)	Operating	No construction overlap. Operations overlap.	• Visual amenity – No potential overlap in impacts. • Biodiversity – No potential overlap in impacts. • Aboriginal and historic heritage – No potential overlap in impacts. • Traffic – vehicle movements during operations are minimal; therefore negligible potential overlap in traffic impacts. • Social – employment during operations is considered minimal; therefore negligible potential overlap in social impacts. • Land – Standard assessment – cumulative impacts on regional agricultural productivity will be assessed. • Noise and vibration – No potential overlap in impacts.
Bullawah Wind Farm – includes construction and operation of 1 GW wind farm, including approximately 170 WTGs across 33,000 ha.	38 km (north-west)	Proposed – pre-scoping stakeholder engagement	Length of construction unknown; however, assume both construction and operations overlap.	• Visual amenity – No potential overlap in impacts. • Biodiversity – Standard assessment of impacts on biodiversity. • Aboriginal and historic heritage – Standard assessment of impacts on Aboriginal and historic cultural landscapes. • Traffic – Detailed assessment – cumulative impacts on local and regional road network will require assessment. • Social – Detailed assessment – cumulative impacts on local population, accommodation and goods and services will require assessment. • Land – Standard assessment – cumulative impacts on regional agricultural productivity will be assessed. • Noise and vibration – No potential overlap in construction and operational noise impacts. Road traffic noise may require assessment.

Table 6.6 Cumulative impact assessment scoping summary table

Project	Distance to project	Project status	Indicative timing/overlap	Potential cumulative impacts
Darlington Point Solar Farm – 275 MW solar farm (constructed) and 200 MW BESS (under construction) on 1,042 ha formerly used for grazing.	45 km (north)	Operating	No construction overlap with solar farm and overlap with BESS construction unlikely. Operations overlap.	• Visual amenity – No potential overlap in impacts. • Biodiversity – No potential overlap in impacts. • Aboriginal and historic heritage – No potential overlap in impacts. • Traffic – vehicle movements during operations are minimal; therefore negligible potential overlap in traffic impacts. It is assumed construction of the BESS will be completed prior to the commencement of project construction. • Social – employment during operations is considered minimal; therefore negligible potential overlap in social impacts. It is assumed construction of the BESS will be completed prior to the commencement of project construction. • Land – Standard assessment – cumulative impacts on regional agricultural productivity will be assessed. • Noise and vibration – No potential overlap in impacts.
Woodland BESS – includes construction and operation of 200 MW BESS across 16 ha.	45 km (north)	Proposed – EIS in preparation	12-month construction unlikely to overlap. Operations overlap.	• Visual amenity – No potential overlap in impacts. • Biodiversity – No potential overlap in impacts. • Aboriginal and historic heritage– No potential overlap in impacts. • Traffic – Standard assessment – cumulative impacts on regional road network will require assessment if concurrent construction assumed to occur. • Social – Standard assessment – cumulative impacts on local population, accommodation and goods and services will require assessment if concurrent construction assumed to occur. • Land – Standard assessment – cumulative impacts on regional agricultural productivity will be assessed. • Noise and vibration – No potential overlap in impacts.
Yarrabee Solar Farm – includes construction and operation of 900 MW solar farm and BESS on approximately 2,600 ha	45 km (north-east)	Approved – not constructed	Proposed to be constructed in 18 month stages, which may overlap with the project. Operations overlap.	• Visual amenity – No potential overlap in impacts. • Biodiversity – No potential overlap in impacts. • Aboriginal and historic heritage– No potential overlap in impacts. • Traffic – Standard assessment – cumulative impacts on regional road network will require assessment if concurrent construction assumed to occur. • Social – Standard assessment – cumulative impacts on local population, accommodation and goods and services will require assessment if concurrent construction assumed to occur. • Land – Standard assessment – cumulative impacts on regional agricultural productivity will be assessed. • Noise and vibration – No potential overlap in impacts.

Table 6.6 Cumulative impact assessment scoping summary table

Project	Distance to project	Project status	Indicative timing/overlap	Potential cumulative impacts
Currawarra Solar Farm – includes construction and operation of 195 MW solar farm and BESS on approximately 472 ha.	60 km (south)	Approved – not constructed	18-month construction unlikely to overlap. Operations overlap.	• Visual amenity – No potential overlap in impacts. • Biodiversity – No potential overlap in impacts. • Aboriginal and historic heritage – No potential overlap in impacts. • Traffic – Standard assessment – low risk of cumulative traffic impacts due to distance from the project (limited to cumulative use of regional road network if concurrent construction occurs). • Social – Standard assessment – cumulative impacts on local population, accommodation and goods and services will require assessment if concurrent construction assumed to occur. • Land – Standard assessment – cumulative impacts on regional agricultural productivity will be assessed. • Noise and vibration – No potential overlap in impacts.
Tarleigh Park Solar Farm – includes construction and operation of 90 MW solar farm and BESS on approximarely 250 ha.	75 km (south)	Approved – not constructed	12-month construction unlikely to overlap. Operations overlap.	• Visual amenity – No potential overlap in impacts. • Biodiversity – No potential overlap in impacts. • Aboriginal and historic heritage – No potential overlap in impacts. • Traffic – Standard assessment – low risk of cumulative traffic impacts due to distance from the project (limited to cumulative use of regional road network if concurrent construction occurs). • Social – Standard assessment – low risk of cumulative social impacts due to distance from the project – if not constructed at time of assessment, standard assessment may be required. • Land – Standard assessment – cumulative impacts on regional agricultural productivity will be assessed. • Noise and vibration – no potential overlap in impacts.
Baldon Wind Farm – includes construction and operation of 1 GW wind farm, including approximately 162 WTGs across approximately 42,000 ha.	100 km (west)	Proposed – EIS in preparation	36-month construction and operations overlap.	• Visual amenity – No potential overlap in impacts. • Biodiversity – No potential overlap in impacts. • Aboriginal and historic heritage – No potential overlap in impacts. • Traffic – Standard assessment – low risk of cumulative traffic impacts due to distance from the project (limited to cumulative use of regional road network if concurrent construction occurs). • Social – Standard assessment – low risk of cumulative social impacts due to distance from the project (limited to cumulative use of available workforce and accommodation in regional centres). • Land – Standard assessment – cumulative impacts on regional agricultural productivity will be assessed. • Noise and vibration – No potential overlap in impacts.

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Abbreviations

ABS	Australian Bureau of Statistics
ACHA	Aboriginal Cultural Heritage Assessment
AEMO	Australia Energy Market Operator
AHIMS	Aboriginal Heritage Information Management System
ASC	Australian soil classification
BAM	*Biodiversity Assessment Method*
BC Act	NSW *Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
BESS	battery energy storage system
BP	before present
BSAL	Biophysical Strategic Agricultural Land
CEEC	critically endangered ecological community
CIV	capital investment value
DPE	Department of Planning and Environment
EEC	endangered ecological community
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Limited
EPA	NSW Environment Protection Authority
EPL	environment protection licence
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
GHG	greenhouse gas
GW	gigawatt
ha	hectares
HV	High voltage
HIPAP	Hazardous Industry Planning Advisory Paper
IBRA	Interim Biogeographic Regionalisation for Australia
ICNG	NSW *Interim Construction Noise Guideline*
km	kilometre
km^2	square kilometre
kV	kilovolt
LCA	land category assessment

LCZ	landscape character zone
LEP	Local Environmental Plan
LGA	Local Government Area
LSC	land and soil capability
LVIA	landscape and visual impact assessment
MNES	Matters of national environmental significance
MW	Megawatt
NEM	National Electricity Market
NSW	New South Wales
OSOM	over-size, over-mass
O&M	operations and maintenance
PCT	plant community type
PCU	power conversion unit
PMST	Commonwealth Protected Matters Search Tool
POEO Act	NSW *Protection of the Environment Operations Act 1997*
PV	photovoltaic
PVIA	Preliminary visual impact assessment
RAPs	Registered Aboriginal Party
REZ	Renewable Energy Zone
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State environmental planning policy
SIA	Social impact assessment
SLR	soil and land resource
SSD	State Significant Development
TEC	threatened ecological community
TfNSW	Transport for NSW

Appendix A

Cadastral lots within project investigation area

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Table A.1 Cadastral lots within project investigation area

Lot	DP
8	532988
49	756444
48	756444
47	756444
46	756444
29	756444
28	756444
27	756444
103	756444
104	756444
105	756444
106	756444
107	756444
108	756444
26	756444
24	756444
32	756444
31	756444
30	756444
45	756444
44	756444
44	756396
10	113903
41	756396
39	756396
7	113903
110	756444
125	756444
22A	756444
111	756444
112	756444

Table A.1 Cadastral lots within project investigation area

Lot	DP
109	756444
23	756444
5	594041
133	756396
113	756444
114	756444
134	756396
40	756396
1	532988
2	532988
8	113903
3	532988
4	532988
5	532988
6	532988
6	113903
7	532988
9	113903
6	594041
43	756396
1	113903
7	594041
42	756396
45	756396
46	756396
47	756396
48	756396
50	756396
51	756396
2	1244278
3	1244278

Appendix B
Scoping summary table

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B.1 Scoping summary table

Level of assessment	Matter	Cumulative impact assessment	Engagement	Relevant policies and guidelines	Scoping report reference
Detailed	Visual	Yes	Specific	• *Large-Scale Solar Energy Guideline* (DPE 2022). • *Technical Supplement – Landscape and Visual Impact Assessment* (DPE 2022). • *Guidelines for Landscape and Visual Impact Assessment* (United Kingdom Landscape Institute of Environmental Management and Assessment 2013). • *Wind Energy: Visual Assessment Bulletin AB 01 For State Significant Wind Energy Development* (DPE 2016). • *Guidance Note for Landscape and Visual Assessment* (Australian Institute of Landscape Architects 2018).	Section 6.1
	Biodiversity	Yes	General	• *Biodiversity Assessment Method* (DPIE 2020c). • *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC 2004). • *Surveying Threatened Plants and their Habitats: NSW Survey Guide for the Biodiversity Assessment Method* (DPIE 2020d). • *Species Credit Threatened Bats and their Habitats* (OEH 2018). • *NSW Survey Guide for Threatened Frogs* (DPIE 2020e). • *Commonwealth EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance* (Commonwealth of Australia 2013). • *Commonwealth Department of the Environment – Survey Guidelines for Nationally Threatened Species* (various).	Section 6.2
	Aboriginal heritage	Yes	Specific	• *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011). • *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010). • *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010).	Section 6.3

Level of assessment	Matter	Cumulative impact assessment	Engagement	Relevant policies and guidelines	Scoping report reference
	Traffic	Yes	General	• *Guide to Traffic Generating Developments* (RTA 2002). • *Austroads Guides to Road Design* (various publications). • *Austroads Guides to Traffic Management* (various publications). • Australian Standard AS 2890 Parts 1 and 2. • Australian Code for Dangerous Goods Transport.	Section 6.4
	Social	Yes	Specific	• *Social Impact Assessment Guideline for State Significant Projects 2021* (DPIE 2021e).	Section 6.5
Standard	Historic heritage	Yes	General	• The principal articles of The Burra Charter – *The Australia ICOMOS Charter for Places of Cultural Significance* (ICOMOS 2013). • *Statements of Heritage Impact* (Heritage Office 1996). • *Investigating Heritage Significance Draft Guideline* (Heritage Office 2004). • *Assessing Heritage Significance* (Heritage Office 2001). • *Assessing Significance for Historical Archaeological Sites and 'Relics'* (Heritage Branch Department of Planning 2009).	Section 6.6
	Land	Yes	General	• *Land Use Conflict Risk Assessment Guideline* (DPI 2011). • *Best Practice Erosion and Sediment Control* (IECA 2008). • *Large-Scale Solar Energy Guideline* (DPE 2022). • *Land and Soil Capability Assessment Scheme* (OEH 2012).	Section 6.7
	Water	No	General	• *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom 2004). • *Managing Urban Stormwater: Soils and Construction Volume 2* (DECC 2008). • *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC/ARMCANZ 2000). • *Guidelines for Instream Works on Waterfront Land* (NOW 2012). • *Guidelines for Riparian Corridors on Waterfront Land* (NOW 2012). • *Guidelines for Watercourse Crossings on Waterfront Land* (NOW 2012).	Section 6.8
	Noise and vibration	Yes	General	• *Interim Construction Noise Guideline* (DECC 2009). • *Noise Policy for Industry* (EPA 2017). • *Road Noise Policy* (DECCW 2011). • *Assessing Vibration: A Technical Guideline* (DECC 2006).	Section 6.9
	Air quality	No	General	• N/A	Section 6.10

Level of assessment	Matter	Cumulative impact assessment	Engagement	Relevant policies and guidelines	Scoping report reference
	Hazards and risk	No	General	• Hazardous Industry Planning Advisory Paper No. 6 – *Guideline for Hazard Analysis* (DoP 2011a). • *Multi-Level Risk Assessment* (DoP 2011b). • *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (DoP 2011c).	Section 6.11

Appendix C
Preliminary visual impact assessment

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Dinawan Energy Hub Solar Farm

Preliminary Visual Impact Assessment

Dinawan Energy Hub Solar Farm

Preliminary Visual Impact Assessment

Prepared for
EMM Consulting Pty Ltd

Issue
03

Date
19.10.2022

Project Number
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Revision	Date	Author	Checked	Comment
01	30.09.22	SB	SW	Draft for review
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Contents

1.0 Introduction

1.1 Introduction

Spark Renewables Pty Limited (Spark Renewables) proposes to develop the Dinawan Energy Hub, comprised of a hybrid wind and solar farm and battery energy storage system (BESS). Moir Landscape Architecture (Moir LA) has been commissioned by EMM Consulting Pty Ltd on behalf of Spark Renewables to prepare a Preliminary Visual Impact Assessment (PVIA) for the Dinawan Energy Hub. The purpose of this PVIA is to provide a preliminary assessment of the potential visual impacts associated with the Dinawan Energy Hub Solar Farm which is referred to hereafter as 'the Project'.

The PVIA for the Project has been prepared in accordance with the following documents:

- *Large-Scale Solar Energy Guideline August 2022* (referred to hereafter as 'the Guideline')
- *Technical Supplement - Landscape and Visual Impact Assessment, Large-Scale Solar Energy Guideline August 2022* (referred to hereafter as 'the Technical Supplement').
- *State Significant Development Guidelines - Preparing a Scoping Report (Appendix A)* (referred to hereafter as 'the SSD Guidelines')

This PVIA will form part of the Scoping Report seeking the Secretary's Environmental Assessment Requirements (SEARs) in order to prepare an Environmental Impact Statement (EIS).

1.2 Relevant Experience

The Technical Supplement states: "*The applicant is expected to engage relevant professionals (for example, landscape architects, architects, environmental planners, geographers, or other visual assessment specialists) with demonstrated experience and capabilities. Experts should follow the guidance in this document to perform an effective and consistent assessment for large-scale solar energy development."* (DPE, 2022b).

Moir LA is a professional design practice and consultancy specialising in the areas of Landscape Architecture, Urban Design and Landscape and Visual Impact Assessment. Our team has extensive experience in undertaking Landscape and Visual Impact Assessments for large-scale infrastructure and renewable energy projects. In the context of our experience and with guidance from the Guideline and the Technical Supplement we have developed methodologies to ensure a comprehensive and qualitative assessment of the Project.

Recent experience includes the preparation of Landscape and Visual Impact Assessments for the following Solar Energy Projects:

- *Blind Creek Solar Farm LVIA (Bungendore, NSW)*
- *Glenellen Solar Farm LVIA (Glenellen, NSW)*
- *Oxley Solar Farm LVIA (Castledoyle, NSW)*
- *Stubbo Solar Farm LVIA (Stubbo, NSW)*
- *Tilbuster Solar Farm LVIA (Tamworth, NSW)*
- *Dunedoo Solar Farm LVIA (Dunedoo, NSW)*

1.3 Overview of Preliminary Visual Impact Assessment for Solar Farms

The Technical Supplement states: "*A preliminary visual assessment must be included in an applicant's scoping report as part of their request for the Secretary's environmental assessment requirements (SEARs).*" (DPE, 2022b). It also states that the visual assessment process is broken into two key stages:

- **Stage 1** - Preliminary assessment
- **Stage 2** - Detailed assessment

This PVIA forms part of ***Stage 1*** - *Preliminary Assessment* and will be submitted to DPE together with the Scoping Report for the request for SEARs. This stage is used to identify viewpoints or receptor locations that would require detailed assessment in Stage 2 as a part of the EIS phase.

Stage 1 - Preliminary Assessment is comprised of the application of the Preliminary Assessment Tools. The Preliminary Assessment Tools assist in the identification of viewpoint locations where a solar farm may have impacts that warrant further consideration. This also provides the opportunity to identify potential impacts to inform and refine the proposed development footprint layout. The tools assist in identifying locations and viewpoints that are likely to experience little to no impacts which is useful in early consultation and to ensure field work and assessments are targeted only on areas with potential visual impacts.

The Guideline states that effective and early stakeholder engagement is critical for large-scale solar energy projects (DPE, 2022a). Along with the application of Preliminary Assessment Tools in *Stage 1 - Preliminary Assessment*, the Guideline recommends proponents engage with the local community in the project's preliminary stages. Findings from preliminary stakeholder engagement helps identify existing community values related to specific viewpoints or key landscape features, and assists in identifying opportunities and constraints related to the design, management, visual impact and mitigation measures.

2.0 Study Method

2.1 Study Method

The Guideline and Technical Supplement state that assessments for large-scale solar farms should include a landscape character assessment and visual impact assessment. It defines these two components as the following:

- Landscape Character Assessment: *"This is the process for determining the overall impact of a project on an area's character and sense of place including what people think and feel about it and how society values it*." (DPE, 2022b).

- Visual Impact Assessment: *"This is the process for determining the day-to-day visual effects of a project on people's views (what people see at a place, when they are there) from the private and public domain."* (DPE, 2022b).

The following has been undertaken to develop the PVIA in accordance with the Guideline and the Technical Supplement:

Preliminary Landscape Character Assessment:

This PVIA includes a preliminary landscape character assessment in order to assist with the determination of preliminary landscape character zones and the level of detail that may be required to develop a baseline analysis in the EIS phase. The findings of this assessment will help in understanding sensitivities associated with the current landscape.

Preliminary Visual Impact Assessment:

Preliminary assessment tools have been applied to identify locations or viewpoints with potential views to the solar array. The results of preliminary visual impact assessment identify viewpoint locations that require further detailed assessment. The findings of the preliminary assessment have been included in this PVIA and will form the basis for discussion with the community in the EIS phase of the Project.

Community Consultation:

Community consultation has been undertaken through the scoping phase of the Project. Results of community consultation have been utilised to gain perspective on the landscape values held by the community to inform the PVIA. Community consultation will be continued through the EIS phase of the Project

2.2 Report Structure

The following table provides an overview of the requirements of the Guideline and the Technical Supplement, and where these have been addressed in the PVIA:

Preliminary Visual Impact Assessment Report Structure:	
PVIA Report:	**Guideline and Technical Supplement Requirements:**
Refer to Section 3.0: Project Overview	*The assessment must include a full description of the proposed solar energy project design and use maps to show the location of the project in relation to viewpoints and surrounding landscapes identified for analysis.*
Refer to Section 4.0: Preliminary Landscape Character Assessment	*The applicant is encouraged to consult with the department in scoping its project to determine the level of detail that may be required in the landscape character assessment.*
Section 5.0 : Preliminary Visual Impact Assessment	*A preliminary visual assessment must be included in an applicant's scoping report as part of their request for the Secretary's environmental assessment requirements (SEARs).*
Section 6.0: Viewshed Mapping	*The applicant can use viewshed mapping to further eliminate the need to assess viewpoints that fall below the lines in the Preliminary Assessment Tool if the analysis shows there is intervening terrain that would block line of sight to a particular viewpoint. The applicant should also consider undertaking a reverse viewshed analysis.*
Section 7.0: Community Consultation	*The community should be engaged as early as possible to identify potential opportunities and constraints associated with the proposed development. The applicant should identify the elements of the project and the environmental assessment that can be influenced or shaped by the community.*
Section 8.0: Cumulative Visual Impacts	*The baseline analysis should identify and describe (...) the location of any existing operational or approved large-scale energy developments within a regional and local context, including projects which may have the potential to create direct or indirect cumulative impacts with the project.*
Section 10.0: Summary and Next Steps	

Table 1 Overview of Report Structure

2.3 Steps Undertaken for PVIA

The following process has been undertaken to develop this PVIA:

3.0 Project Overview

3.1 The Project

3.1.1 Project Description

The Project comprises a large-scale solar photovoltaic (PV) generation facility with a generation capacity of approximately 1000 MW (AC). The Project also comprises of a BESS and supported by associated infrastructure. The BESS will have a capacity of up to approximately 300 MW (AC or DC coupled) and will have provision for up to four hours of storage (1,200 MWh).

The Project Investigation Area is approximately 4,500 hectares (ha). Within the Project Investigation Area, the development footprint is expected to cover approximately 2,500 ha. The development footprint will comprise of two areas which will be located on the western and eastern sides of Kidman Way. **Figure 1** shows the existing site context and **Figure 2** provides an indicative layout of the Project. The final layout and capacity of the Project will be investigated during the preparation of the EIS and will be selected on the basis of environmental constraints identification, outcomes of stakeholder engagement, engineering assessments and design of project infrastructure.

The preferred point of connection to Transgrid's network is via the Dinawan Substation, which forms part of Project EnergyConnect and will be constructed on land adjacent to the Project Investigation Area. An overhead transmission line will connect the Project's on-site substation to the Dinawan Substation.

The PV modules will be up to 2.5 metres (m) above the ground level when in horizontal position and the lower edge of each PV module will not be less than 0.3 m above ground level at the maximum tilt angle. As a worst case assumption for visual impact assessment, the maximum height of the PV modules at maximum tilt angle is expected to be 4.7 m above ground level. The Project would include underground or overhead electrical reticulation to connect the solar arrays and associated electrical infrastructure to Project EnergyConnect's proposed Dinawan Substation.

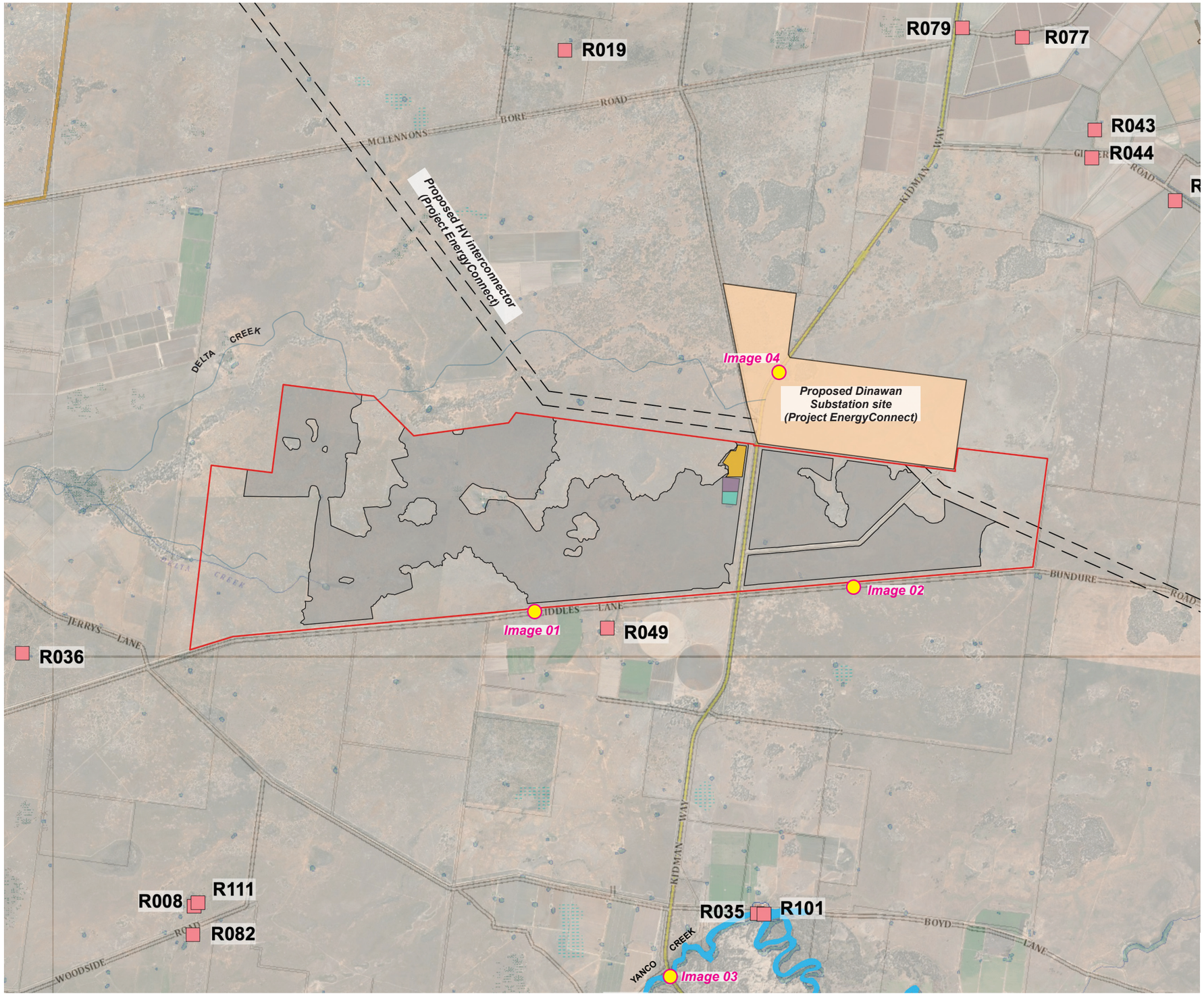
Figure 1 Site Context (Map Source: ArcGIS Map, October 2022)

3.1.2 Key Project Components

It is anticipated that the physical layout and design of the Project will comprise the following key infrastructure elements:

- Solar farm – Approximately 1.5 million PV modules will be mounted on single-axis tracking systems within the development footprint. The solar farm will also include power conversion units (PCUs), a cable network and internal access tracks.
- Battery energy storage system (BESS) – to store and discharge electricity as required with a storage capacity of up to approximately 300 MW (AC or DC coupled)/4 hr (1,200 MWh).
- Electrical collection system, substation and control room – an on-site substation connected to the solar farm and BESS.
- Operations and maintenance (O&M) facility – including site offices, O&M buildings, amenities, equipment sheds, storage and parking areas.
- Electricity transmission line infrastructure – connecting the project substation to the proposed Dinawan Substation.
- Site access – including access to the eastern and western sections of the solar farm from Kidman Way.
- Temporary construction facilities - including construction compound(s), site office buildings, laydown areas and construction materials storage.

Once the Project reaches the end of its operational life, a decision will be made to either decommission or re-power the facility, subject to approval requirements. If the project is decommissioned, all aboveground structures built as part of the project will be removed and the site rehabilitated generally to its pre-existing land use, as far as practicable. **Images 1 - 4** show the existing character of the Project Investigation Area and the surrounding landscape character.



Preliminary Project Layout

Dinawan Energy Hub Solar Farm

LEGEND

- Project Investigation Area
- Development footprint
- R008 Non-associated residences
- Main Road
- Local Road
- Creek corridors (generally dry)
- Creeks (perennial)
- Proposed BESS
- Proposed On-site substation
- Proposed O & M Facilities
- Dinawan Substation site (Project EnergyConnect)
- Proposed HV interconnector (Project EnergyConnect)
- Image locations (refer to pages 11 and 12)

N

0 1 2 3 4 5km

Figure 2 Preliminary Project Layout (Map Sources: ESRI Aerial Imagery October 2022, Six Maps 2015)

Image 1.

Panoramic view from the southern boundary facing north towards the Project Investigation Area. Photograph was taken along the southern boundary on Liddles Lane and west of Kidman Way from a location with clearing in roadside vegetation.

Character is defined by flat terrain and scattered vegetation which is generally found along roadsides. Paddocks are generally treeless.

Image 2.

Panoramic view from the southern boundary east of Kidman Way. Photograph faces north (taken on Bundure Road).

Character is defined by flat terrain and scattered vegetation which is generally found along roadsides. Paddocks are generally treeless.

Image 3.

Aerial view of Yanco Creek and its environs. The creek's character is defined by dense vegetation and a gently undulating creek bed that perennially carries water. The creek is an important water source in the region.

Image 4.

Vegetation associated with Delta Creek as viewed from Kidman Way. Creek bed is generally defined by densely vegetated rows of vegetation and little or no water. The vegetation acts as a landmark within the landscape.

4.0 Preliminary Landscape Character Assessment

4.1 Existing Visual and Landscape Character

The Project is proposed on either side of Kidman Way approximately 30 kilometres (km) south of Coleambally within the Murrumbidgee Local Government Area (LGA). The Project Investigation Area is characterised by flat land parcels with native vegetation used for livestock grazing. Surrounding land parcels are also used for agricultural activities such as grazing and irrigated or dryland cropping. Topography within this area is generally flat with minor undulations along creek corridors.

Patches of trees are spread across the paddocks and along roadsides within and around the Project Investigation Area (see **Image 01** and **Image 02**). Dense canopy cover is generally associated with creek corridors or floodplains that are located on the northern and southern sides of the Project. Intermittent patches of dense roadside vegetation borders Kidman Way, Bundure Road and Liddles Lane.

Delta Creek is located approximately 200 m north of the Project Investigation Area and Yanco Creek is located approximately 6 km south of the Project Investigation Area (see **Image 03** and **Image 04**). Vegetation associated with these creek corridors acts as landmarks in the landscape. Two (2) dwellings were identified within 4 km of the Project on the southern side. Other rural dwellings are generally scattered and located more than 6 km away from the Project.

Figure 3 represents a ‘Study Area’ of 4 km from the Project Investigation Area and has been defined in accordance with the Technical Supplement.

4.2 Existing Landscape Character Zones

The Technical Supplement states: “*If the landscape includes distinct areas that have different qualities, the study area should be broken down into different character zones. Landscape character zones (LCZs) should divide the landscape based on common distinguishing visual characteristics. These patterns are formed by combinations of vegetation, water bodies, landforms and land use, from which key landscape features can also be identified.”* Further, the Technical Supplement states: *“The study area for the landscape character assessment should generally be approximately 5 km from the proposed development”* (DPE, 2022b).

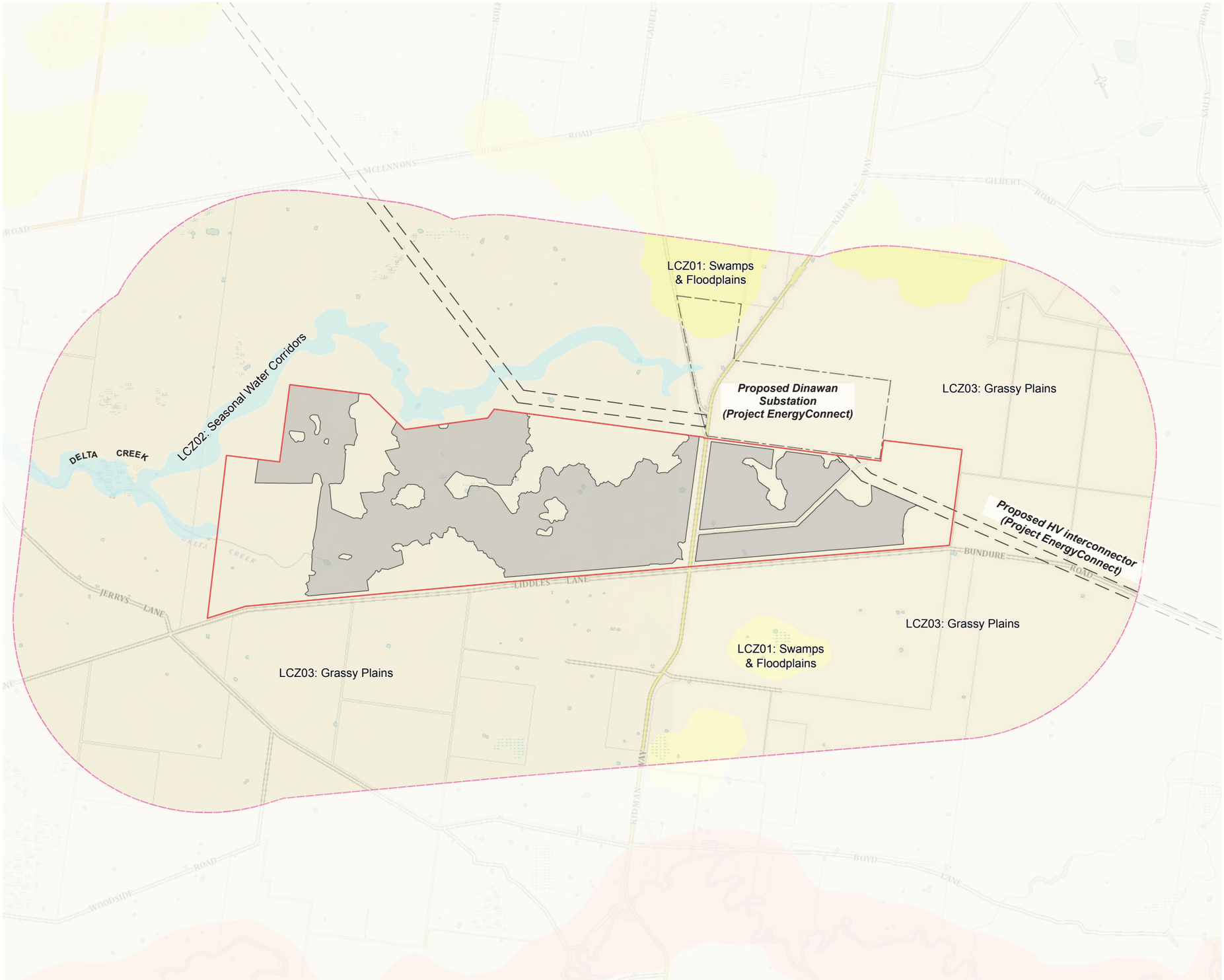
A preliminary desktop assessment indicates typical existing LCZs identified within the Study Area form a precursory baseline for character assessment which will be assessed in detail in the EIS.

Figure 3 indicates the LCZs identified through field work and desktop assessment.

A summary of the preliminary LCZs identified is provided in **Table 1** below.

Landscape Character Zones		
LCZ:	**Name:**	**General Character:**
LCZ01	**Seasonal Water Corridors**	*Moderately vegetated seasonal creeks and drainage channels that run east-west. Embankments are generally shallow to moderately steep. Some areas are characterised by minor depressions and generally dense vegetation.*
LCZ02	**Swamps and Floodplains**	*Flat, sub-circular, shallow depressions characterised by grasses, forbs and patchy to dense tree cover. These also act as wildlife refuges because they hold overflows from the creeks and drainage corridors.*
LCZ03	**Grassy Plains**	*Clear, flat expanses of land used for grazing or cropping. Most prominent character of the region with minor to no elevation changes.*

Table 1. Overview of Landscape Character Zones



Landscape Character Zones

Dinawan Energy Hub Solar Farm

LEGEND

- Project Investigation Area
- Development footprint
- R049 Non-associated residences
- Main Road
- Local Road
- 5 km radius from Project Investigation Area
- LCZ01: Seasonal Water Corridors
- LCZ02: Swamps & Floodplains
- LCZ03: Grassy Plains
- Dinawan Substation (Project EnergyConnect)
- Proposed HV interconnector (Project EnergyConnect)

N

0 1 2 3 4 5km

Figure 3. Landscape Character Zones (Map Source: Six Maps 2015)

LCZ01: Seasonal Water Corridors

The Seasonal Water Corridors LCZ is defined by flat to gently undulating vegetation corridors that carry seasonal water. They are characterised by shallow depressions or minor to moderate elevation changes that are covered with speargrass, forbs and saltbush, and clumps of nitre goosefoot, rosewood, belahs and myall communities. The density of trees varies in different locations. These also act as important wildlife refuges and distribute water across the region to support agricultural activity.

See Images 5 and 6.

Image 5

Delta Creek when views from Kidman Way. The creek corridor comprises of dense tree cover that acts as wildlife refuge.

Image 6

View of Delta Creek channel characterised by clumps of belah trees, myall. rosewood, grasses and forbs in gently sloping to flat tracts of lands.

LCZ02: Swamps and Floodplains

The LCZ is defined by flat, shallow sub-circular depressions that occasionally accommodate excess flows from the seasonal water corridors. Characterised by dry, red-brown earths and grassy understorey vegetation. Canopy species generally comprise of mid and tall canopy cover such as nitre goosefoot, myall, belah and ocassionally white box communities.

See Images 7 and 8.

Image 7

Generally flat parcels with minor undulations. Characterized by red-brown earths and sparse to dense clumps of tree cover and grassy understorey.

Image 8

Stands of trees associated with Gum Swamp and Jung Jung Swamp spread across a generally flat topography and grassy understorey.

LCZ03: Grassy Plains

The Grassy Plains LCZ is defined by vast, open land parcels that are utilised for native as well as modified grazing pastures and cropping areas (irrigated and dry). The LCZ constitutes as one of the predominant characters of the region. It comprises of open plains with isolated stands of trees and vast extents of saltbush varieties, speargrass and forbs. The vast and expansiveness is defined by the flat, planar topographic character.

See Images 9 and 10.

Image 9

Large, open expanses of scrubby plant communities with isolated stands of trees over flat land parcels define the LCZ's typical character.

Image 10

Open, expansive and flat land parcels typically covered with saltbush and speargrass communities.

5.0 Preliminary Visual Impact Assessment

5.1 Preliminary Visual Impact Assessment

The Technical Supplement states: "*A preliminary visual assessment must be included in an applicant's scoping report as part of their request for the Secretary's environmental assessment requirements (SEARs)"* (DPE, 2022b). Further, it states: *"To use the preliminary assessment tools; identify all viewpoints from public roads and rail lines within 2.5 km of the proposed development; identify other public and private viewpoints within 4 km of the proposed development."* (DPE, 2022b).

The preliminary assessment tools must be used to identify viewpoints that require detailed assessment in the EIS. The tools can be used to eliminate the need to assess viewpoints that are likely to experience very low impacts. This is based on the vertical and horizontal field of view that a development is likely to occupy when viewed from each viewpoint and is influenced by distance, height elevation changes, and width of a project (DPE, 2022). **Table 2** provides an overview of the requirements of the Preliminary Assessment (in accordance with the Technical Supplement) and where these have been addressed in this report.

5.2 Viewpoint Selection and Preliminary Assessment Tool

The following provides an overview of the viewpoint selection process. Viewpoints have been illustrated on **Figure 4**. Further refinement of the viewpoints will be undertaken in the preparation of the LVIA.

Public Roads and Rail Lines:

In accordance with the Technical Supplement, all viewpoints from public roads and rail lines within 2.5 km of the Project must be assessed. A total of seven (7) public viewpoints have been selected to represent roads within 2.5 km of the Project.

Other public and private viewpoints:

In accordance with the Technical Supplement, other public and private viewpoints within 4 km of the Project Investigation Area must be identified and assessed. Moir LA have identified two (2) private receptors within 4 km of the Project Investigation Area.

Additional viewpoints:

The Technical Supplement states: "*Additional viewpoints should be considered if ancillary infrastructure, such as substations, have the potential to cause impacts beyond the distances prescribed in the tool.*" (DPE, 2022b). If required, these will be considered in the LVIA.

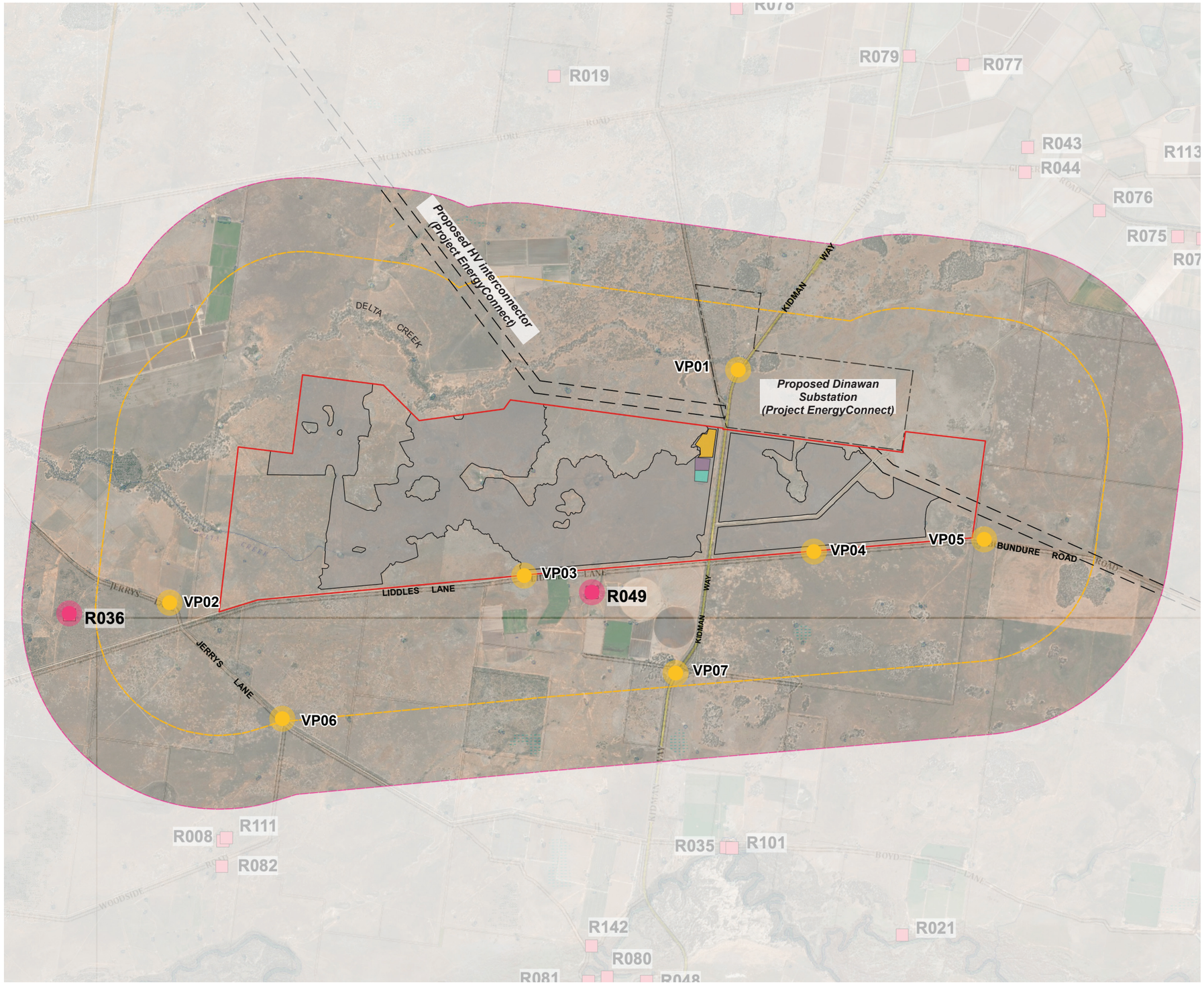
Assessment Parameters:

The Technical Supplement states:"*The calculations can be based on either the project area, or the development footprint depending on the level of information available at the time. A more refined approach that uses the development footprint, may result in less viewpoints requiring assessment."* (DPE, 2022b).

To present a worst case scenario, Moir LA have measured the 2.5 km and 4 km radius from the Project Investigation Area. Assessment will be refined in the LVIA and will account for any further revisions to the development footprint.

Requirements of the Preliminary Assessment in accordance with the Technical Supplement	Addressed in this PVIA:
The applicant can use viewshed mapping to further eliminate the need to assess viewpoints that fall below the lines in the Preliminary Assessment Tool if the analysis shows there is intervening terrain that would block line of sight to a particular viewpoint.	**Refer to Section 6.0 - Viewshed Mapping**
Identify all viewpoints from public roads and rail lines within 2.5 km of the proposed development.	**Refer to Figure 4**
Identify other public and private viewpoints within 4 km of the proposed development.	**Refer to Figure 4**
Calculate the distance of each of these viewpoints from the nearest point of the proposed development.	**Refer to Table 4**
Determine the 'relative height difference' between the proposed development and each viewpoint.	**Refer to Table 4. Note: Analysis is based on elevation within the Project Investigation Area which is;** **Lowest Point = 108 m** **Highest Point = 117 m**
Plot each viewpoint on the Preliminary Assessment Tool – Vertical Field of View (Figure 4) to determine the indicative vertical field of view (as either 1, 2, 3 or 4+ degrees)	**Refer to Figure 5**
Measure the worst-case horizontal field of view of the project from each viewpoint (not considering topography or vegetation)	**This is based on the Project Investigation Area (to represent a worst case scenario), assessment will be refined in the EIS Phase.**
Compare the vertical and horizontal fields of view using the matrix in Table 1 to determine whether detailed visual assessment of each viewpoint is required.	**Refer to Table 3**

Table 2 Overview of Preliminary Assessment Tools
(Source: Technical Supplement, DPE, August 2022)



Viewpoint Locations

Dinawan Energy Hub Solar Farm

LEGEND

- Project Investigation Area
- Development footprint
- R049 Non-associated residences
- Main Road
- Local Road
- 2.5 km radius from Project Investigation Area
- 4 km radius from Project Investigation Area
- Proposed BESS
- Proposed On-site substation
- Proposed O & M Facilities
- Road / Rail viewpoint locations within 2.5 km
- Private viewpoint locations within 4 km
- Creek corridors (generally dry)
- Dinawan Substation (Project EnergyConnect)
- Proposed HV interconnector (Project EnergyConnect)

N

0 1 2 3 4 5km

Figure 4 Viewpoint Locations (Map Sources: ESRI Aerial Imagery October 2022, Six Maps 2015)

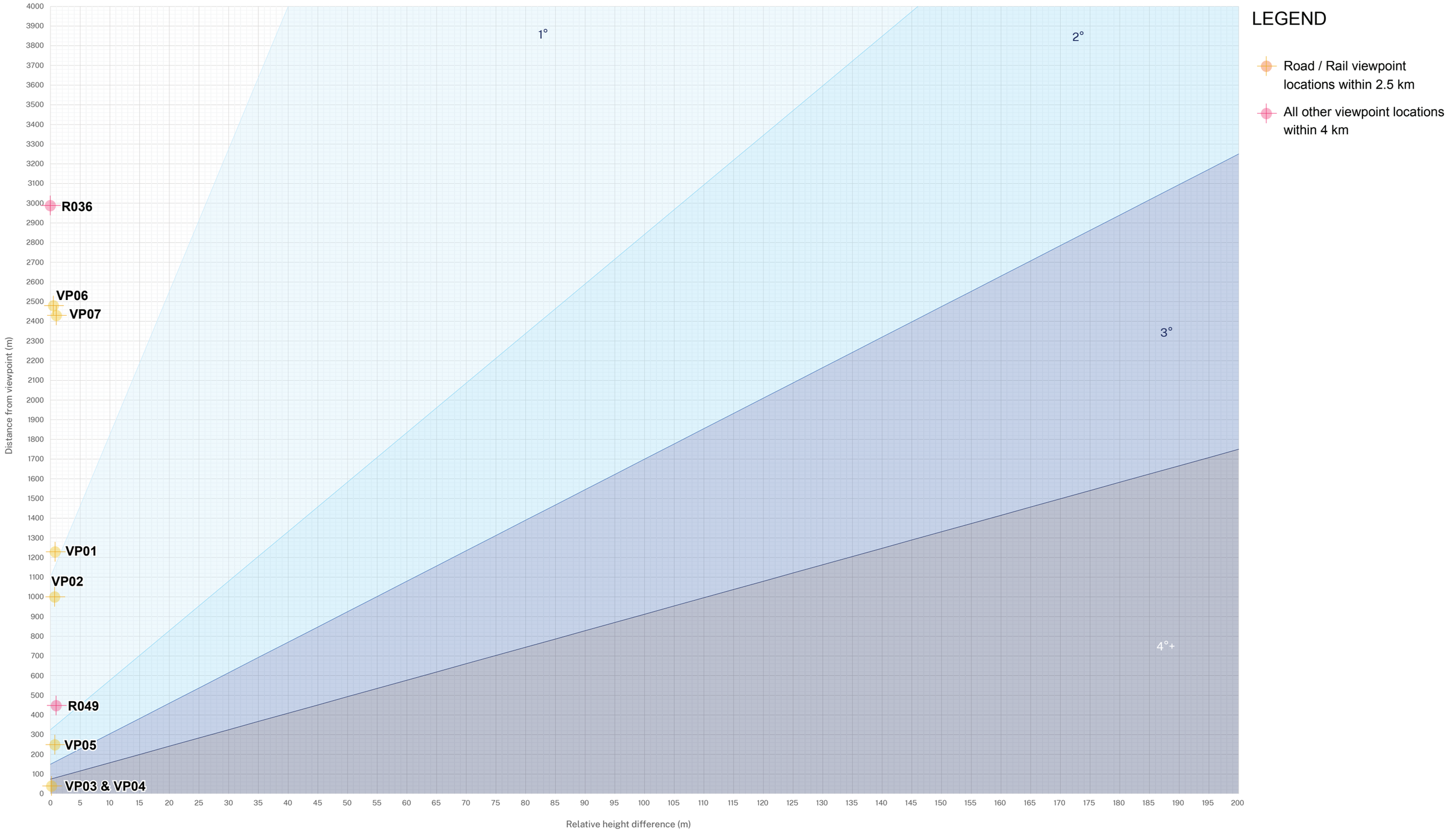


Figure 5 Preliminary Assessment Tool – vertical field of view (Source: DPE, 2022)

5.3 Vertical Field of View Calculation

Figure 6 below illustrates how the vertical field of view is calculated for each viewpoint location. Plotting viewpoints on **Figure 5**, however, provides the actual value of the vertical field of view.

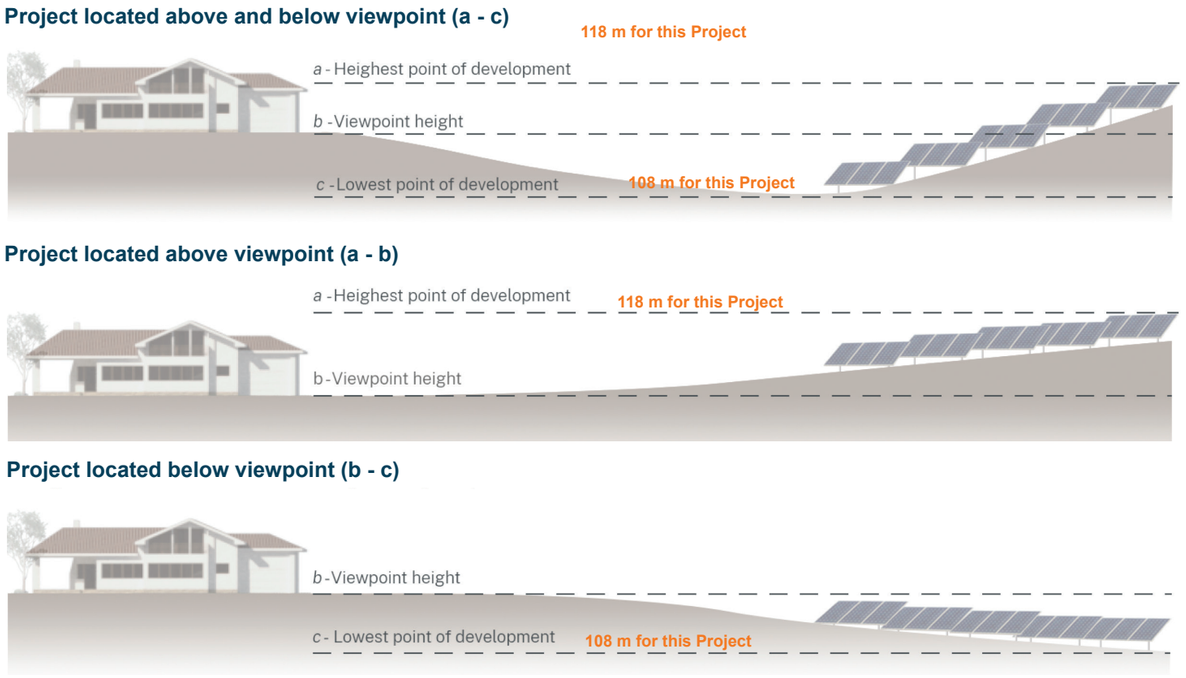


Figure 6 Vertical field of view calculation (Source: DPE, 2022)

5.4 Horizontal Field of View Calculation

Figure 7 below illustrates how the horizontal field of view is calculated for each viewpoint location. For the purpose of this report, the horizontal field of view has been calculated based on the Project Investigation Area to provide a worst case scenario assessment. This will be refined in the EIS phase.

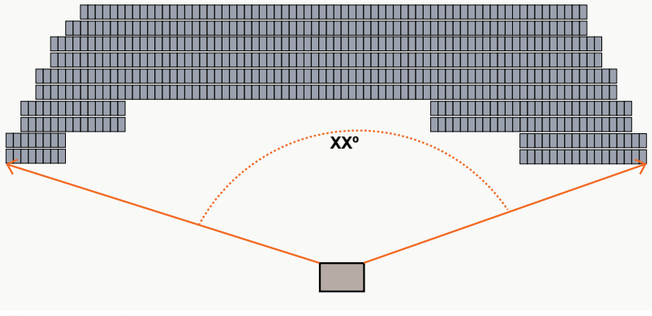


Figure 7 Horizontal Field of View

5.5 Assessment Requirements

Horizontal field of view of project	1° vertical field of view	2° vertical field of view	3° vertical field of view	4° + vertical field of view
1 - 10°	No assessment required	No assessment required	No assessment required	No assessment required
11 - 20°	No assessment required	No assessment required	No assessment required	Assessment required
21 - 30°	No assessment required	No assessment required	Assessment required for all viewpoints except road / rail	Assessment required
31 - 40°	No assessment required	Assessment required for all viewpoints except road / rail	Assessment required for all viewpoints except road / rail	Assessment required
41 - 50°	No assessment required	Assessment required for all viewpoints except road / rail	Assessment required	Assessment required
51 - 60°	No assessment required	Assessment required for all viewpoints except road / rail	Assessment required	Assessment required
61 - 70°	No assessment required	Assessment required	Assessment required	Assessment required
71 - 130°	Assessment required for all viewpoints except road / rail	Assessment required	Assessment required	Assessment required
130°+	Assessment required	Assessment required	Assessment required	Assessment required

Table 3 Preliminary Visual Assessment Tool - Assessment Requirements

(Source: Technical Supplement, DPE, August 2022)

5.6 Results of Preliminary Assessment Tool

The preliminary assessment tool identifies viewpoints (public and private) within 4 km of the Project Investigation Area. Application of the preliminary assessment tool identified that a total of four (4) viewpoints, of which one (1) is private and the remaining three (3) are public, would require further detailed assessment in the LVIA. **Table 4** provides a summary of these results.

Residential Viewpoints:							
Receptor ID:	**Distance to Project Investigation Area:**	**Elevation of receptor:**	**Relative Height Difference:**	**Vertical field of view:**	**Horizontal extent of view:**	**Horizontal field of view:**	**Assessment Required?:**
R049	435 m	115 m	1 m	1º	90º - 270º	180º	Yes
R036	2992 m	110 m	0 m	0º	45º - 91º	46º	No
Public Viewpoints (Road and Rail):							
Receptor ID:	**Distance to Project Investigation Area:**	**Elevation of receptor:**	**Relative Height Difference:**	**Vertical field of view:**	**Horizontal extent of view:**	**Horizontal field of view:**	**Assessment Required?:**
VP01	1,240 m	114.5 m	0.7 m	0º	106º- 269º	163º	No
VP02	1,000 m	110.1 m	0.7 m	1º	23º - 101º	78º	No
VP03	20 m	112.1 m	0 m	3º	263º- 85º	182º	Yes
VP04	30 m	116.2 m	0.1 m	3º	264º - 85º	181º	Yes
VP05	250 m	116.8 m	0.8 m	2º	265º - 1º	96º	Yes
VP06	2,510 m	109.8 m	0.4 m	0º	326º - 76º	110º	No
VP07	2,480 m	112.1 m	1 m	0º	280º - 65º	145º	No

Table 4 Results of preliminary assessment tool

6.0 Viewshed Mapping

6.1 Viewshed Mapping

A viewshed map identifies all areas from which a project may be viewed. Viewshed mapping can be achieved by using geographic information systems (GIS) that account for topography and line of sight between viewpoints and the project.

The purpose of the viewshed map is to further eliminate the need to assess viewpoints that fall below the lines in the Preliminary Assessment Tool if the analysis shows there is intervening terrain that would block line of sight to a particular viewpoint.

Viewshed mapping was undertaken for the Project to eliminate viewpoint locations that will not have a line of sight to the Project (refer to **Figure 8**). It is important to note that the viewshed map provides an assessment based on topography alone and does not take into account intervening elements such as vegetation and structures. The viewshed map, therefore, represents a theoretical worst case scenario.

Viewshed mapping has been undertaken based on a panel height of 4.7m.

Summary of Viewshed Map:

The following provides a summary of the viewshed map prepared for the Project Investigation Area:

- Due to the flat terrain within and around the Project Investigation Area, the viewshed map indicates that majority of the Project will be visible from all public viewing locations within 4 km of the Project Investigation Area.

- It was identified that two (2) dwellings (R036 and R049) have the potential to view the Project in its entirety. This assessment is based on topography alone and does not consider intervening elements such as vegetation and structures.

- Areas associated with the floodplains of Delta Creek and Yanco Creek will have limited visibility of the Project due to topographical changes. Areas to the northeast, southeast and southwest are also experience limited visibility of the Project Investigation Area.

It is important to reiterate that this is a preliminary assessment based on theoretical worst case scenario that does not consider the impact of vegetation or structures. Ground-truthing during field work will ascertain potential visibility by taking into account structures and vegetation.

6.2 Reverse Viewshed Map

The Technical Supplement states: "*The applicant should also consider undertaking a reverse viewshed analysis. This can be a useful tool to refine the project design process to reduce any significant impacts. It can also be used to communicate the visibility of certain parts of the project and aid consultation with the community. This analysis should be used to highlight parts of the project that can be seen from the greatest number of viewpoints"* (DPE, 2022b).

Figure 9 represents a reverse viewshed map that takes into account a total of **19 neighbouring dwellings** within up to **8 km** of the Project Investigation Area due to the flat topographic character. The map shows parts of the Project Investigation Area that are likely to be visible from these 19 private viewing locations. This assessment also represents a bare ground scenario, i.e., a landscape without intervening elements such as vegetation and structures.

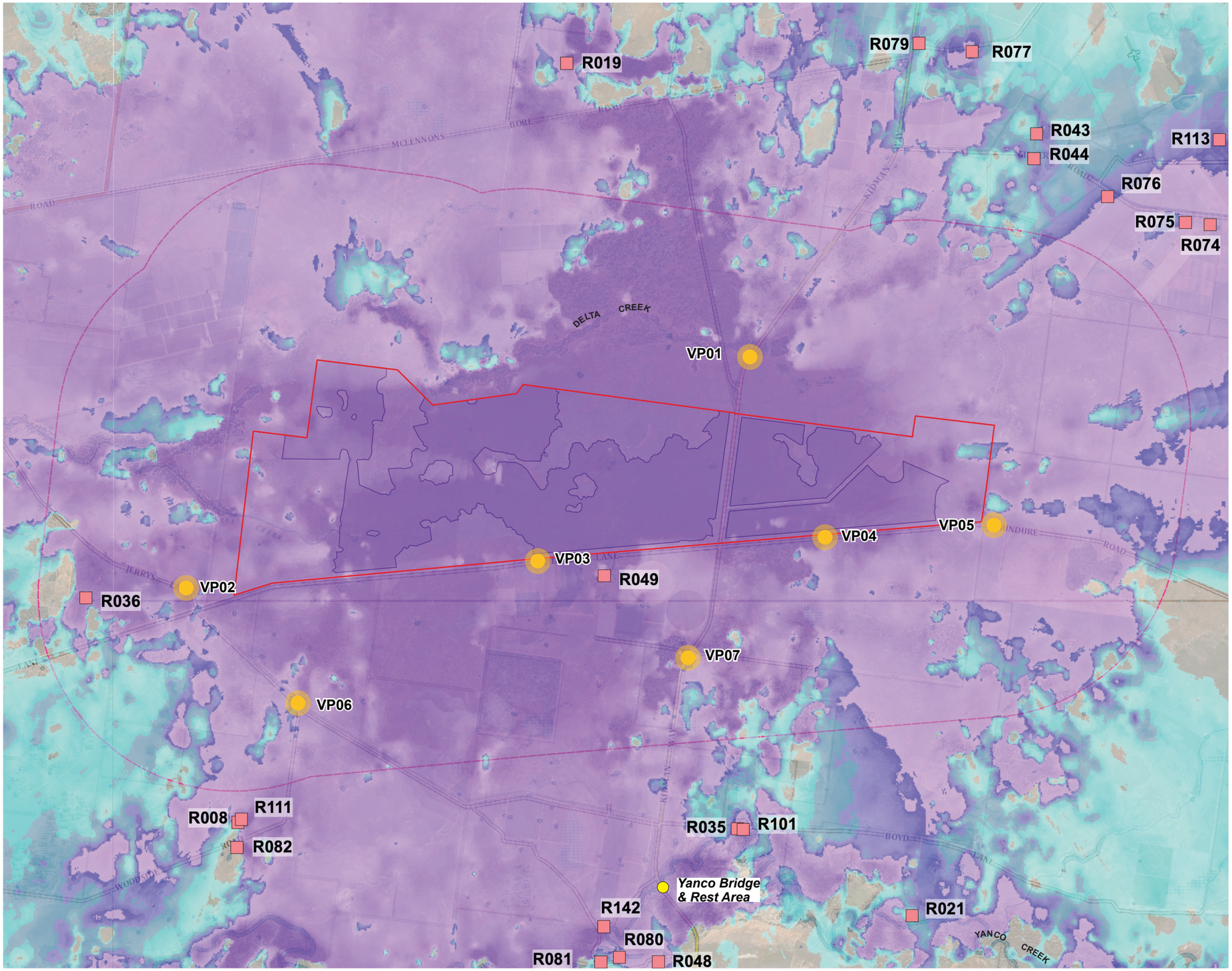
Summary of Reverse Viewshed Map:

The following provides a summary of the reverse viewshed map prepared for the Project Investigation Area:

- Eastern and southern parts of the Project Investigation Area are likely to be visible to majority of the dwellings and most visible areas are located on the eastern side of Kidman Way. This is primarily due to the flat topographic character within and around the Project Investigation Area.

- The northern, central and western parts of the Project Investigation Area are likely to visible from a limited number of neighbouring dwellings. Dwellings R036 and R049 will have most views due to their proximity to the Project Investigation Area.

- The identification of the most visible parts of the Project indicates that detailed viewpoint assessment will be required for dwellings within 4 km of the Project Investigation Area.



Viewshed Map

Dinawan Energy Hub Solar Farm

LEGEND

- Project Investigation Area
- Development footprint
- R049 Non-associated residences
- Main Road
- Local Road
- 4 km radius from Project Investigation Area
- Yanco Bridge and Rest Area
- Road / Rail viewpoint locations within 2.5 km

ZVI (Based on 4.7 m Panel Height)

- No Visibility
- 1 - 25% Visibility
- 25 - 50% Visibility
- 50 - 75% Visibility
- 75 - 100% Visibility

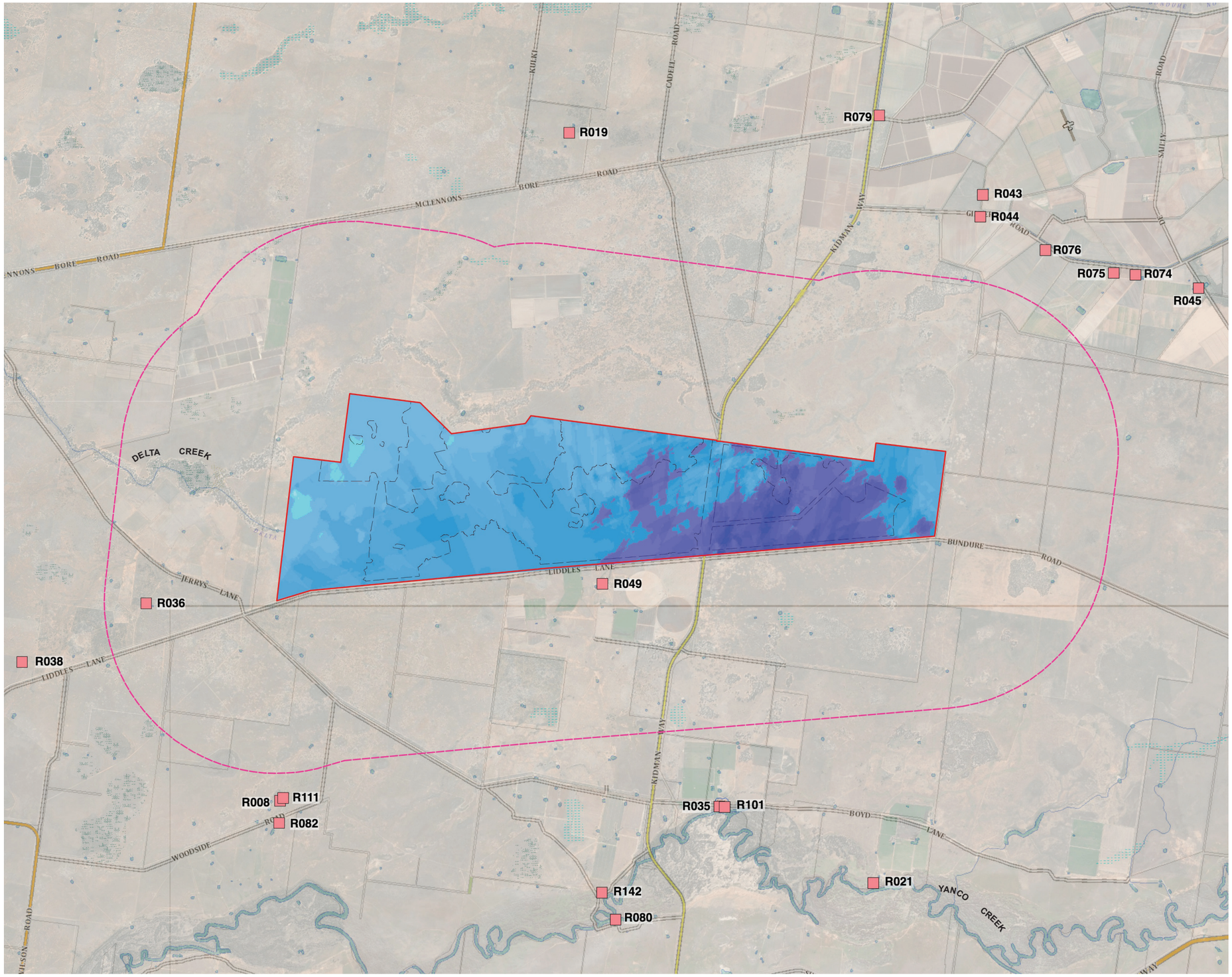
Note:

Viewshed Map is a preliminary assessment tool that represents a bare ground scenario - ie. a landscape without screening, structures or vegetation. As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the map is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst case scenario.

N

0 1 2 3 4 5km

Figure 8. Viewshed Map (Map Sources: ESRI Aerial Imagery August 2022, Six Maps 2015)



Reverse Viewshed Map

Dinawan Energy Hub Solar Farm

LEGEND

- Project Investigation Area
- Development footprint
- R049 Non-associated residences
- Main Road
- Local Road
- 4 km radius from Project Investigation Area
- Creek corridors

Reverse ZVI (Based on 4.7 m Panel Height)

- No Visibility from surrounding dwellings
- 0 - < 6 dwellings
- 6 - <12 dwellings
- 12 - </= 19 dwellings

Note:

This reverse viewshed map is a preliminary assessment tool that represents a bare ground scenario - ie. a landscape without screening, structures or vegetation. As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the viewshed map is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst case scenario.

N

0 1 2 3 4 5km

Figure 9. Preliminary Reverse Viewshed Map (Map Sources: ESRI Aerial Imagery August 2022, Six Maps 2015)

6.3 Results of Preliminary Visual Assessment and Viewshed Mapping

Application of the preliminary assessment tool and results from the viewshed mapping identified that a total of four (4) viewpoints, of which one (1) is private and the remaining three (3) are public, would require further detailed assessment in the EIS phase. **Table 5** provides a summary of these results.

Residential Viewpoints:								
Receptor ID:	**Distance to Project Investigation Area:**	**Elevation of receptor:**	**Relative Height Difference:**	**Vertical field of view:**	**Horizontal extent of view:**	**Horizontal field of view:**	**Visible based on viewshed mapping:**	**Assessment Required?:**
R049	435 m	115 m	1 m	1º	90º - 270º	180º	Yes	Yes
R036	2992 m	110 m	0 m	0º	45º - 91º	46º	Yes	No
Public Viewpoints (Road and Rail):								
Receptor ID:	**Distance to Project Investigation Area:**	**Elevation of receptor:**	**Relative Height Difference:**	**Vertical field of view:**	**Horizontal extent of view:**	**Horizontal field of view:**	**Visible based on viewshed mapping:**	**Assessment Required?:**
VP01	1,240 m	114.5 m	0.7 m	0º	106º- 269º	163º	Yes	No
VP02	1,000 m	110.1 m	0.7 m	1º	23º - 101º	78º	Yes	No
VP03	20 m	112.1 m	0 m	3º	263º- 85º	182º	Yes	Yes
VP04	30 m	116.2 m	0.1 m	3º	264º - 85º	181º	Yes	Yes
VP05	250 m	116.8 m	0.8 m	2º	265º - 1º	96º	Yes	Yes
VP06	2,510 m	109.8 m	0.4 m	0º	326º - 76º	110º	Yes	No
VP07	2,480 m	112.1 m	1 m	0º	280º - 65º	145º	Yes	No

Table 5 **Results of preliminary visual impact assessment and viewshed mapping**

7.0 Community Consultation

7.1 Preliminary Stakeholder Engagement and Consultation

Community engagement will continue during the EIS phase of the Project and provide the community with opportunities to provide input into the LVIA. The intent is to:

- Undertake early and proactive community engagement with nearby residents and the wider community to identify and address any concerns.
- Ensure the layout of the Project will minimise potential visual impacts and reflect community feedback.
- Ensure mitigation measures proposed for the project are in consultation with the relevant landowners.

7.2 Results of Preliminary Stakeholder Engagement and Consultation

In addition to a review of existing landscape maps, a community consultation questionnaire was distributed and asked respondents to identify key landscape features of importance to them. There were seven (7) responses to the question: "***What would you consider to be the best landscape features in the area?***" Key landscape features identified by the community include:

- Farming activities
- Creeklines and native vegetation
- The Yanco Creek and its environs
- Billabong Creek System
- Country with remnant native species
- Grasses and shrublands of the Western Riverina
- Rangeland native grasses

Of the 14 responses, three (3) responses were given to the question: "***What would you consider to be the best lookout spots in the area?***"

- "Creeklines"
- "There are no high vantage points in my area. Beauty is in the eye of the beholder"
- "The Black Ranges"

Additional consultation and further detailed assessment of these features and viewpoints will be undertaken during the EIS phase.
Community values are highly subjective and can differ depending on location, local context and place attachment. The results of specific questions will assist in identifying key areas of concern and ensuring the LVIA provides a comprehensive assessment taking into account landscape values held by the community.

The question ***'what do you value most about your local area?'*** was asked to gain an understanding of the respondents connection to the local area. The majority of respondents identified 'farming' as a key value, followed by 'landscape' and 'native flora and fauna' (see **Figure 10**).

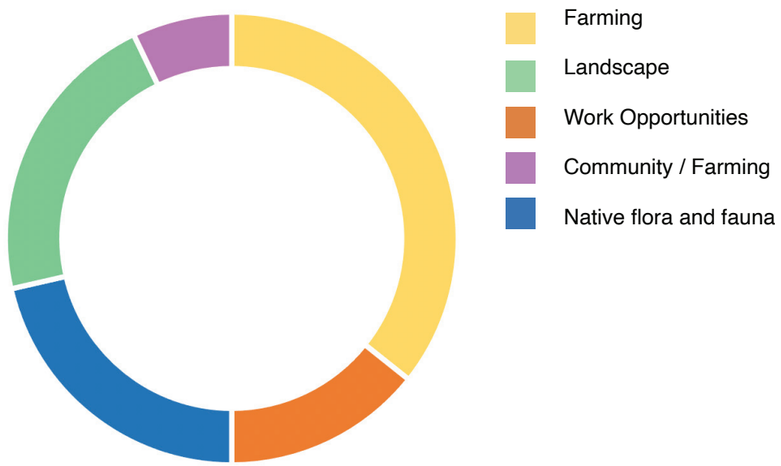


Figure 10. Community Values

8.0 Cumulative Visual Impacts

8.1 Overview of potential cumulative impacts

The Project is located within the extents of the proposed Dinawan Energy Hub project, located in the eastern region of the South West Renewable Energy Zone (REZ). The REZ has been identified by the NSW Governments Electricity Strategy and is expected to play a vital role in delivery of affordable energy to the community across NSW (Energy NSW, 2021).

The existing landscape character allows optimum harvest of wind and solar energy and as such, it is highly likely that over time this will be utilised for the development of renewable energy projects. **Figure 17** shows nearby renewable energy projects that are currently proposed, operating and under construction.

8.2 Nearby Large-Scale Renewable Energy Projects

Currently, six (6) other renewable energy projects have been identified in the area.

Name of Project	*Distance to Project Investigation Area*	*Current Status*
Coleambally Solar Farm	Approx. 37 km	Operational
Darlington Point Solar Farm	Approx. 49 km	Operational
Yarrabee Solar Farm	Approx. 36 km	Under Construction
Yanco Delta Wind Farm	Approx. 800 m	SEARs issued in May 2022
Dinawan Enegry Hub Wind Farm	Adjacent, part of overall Dinawan Energy Hub project	Preliminary Planning Phase
Bullawah Wind Farm	Approx. 38 km	Preliminary Planning Phase

Table 6 Nearby Renewable Energy projects

It is likely that majority of the above mentioned renewable energy projects will not be visible because of their distance from the Project.

Yanco Delta Wind Farm (YDWF) is located closest to the Project. YDWF's preliminary layout comprises of 216 turbines spread across an area of approximately 41,900 ha. SEARs were issued for the Yanco Delta Wind Farm Project in May 2022. It is located on the western side and adjacent to the Project. There is potential to view some parts of YDWF and the Project simultaneously, and this will be assessed in detailed during the EIS Phase.

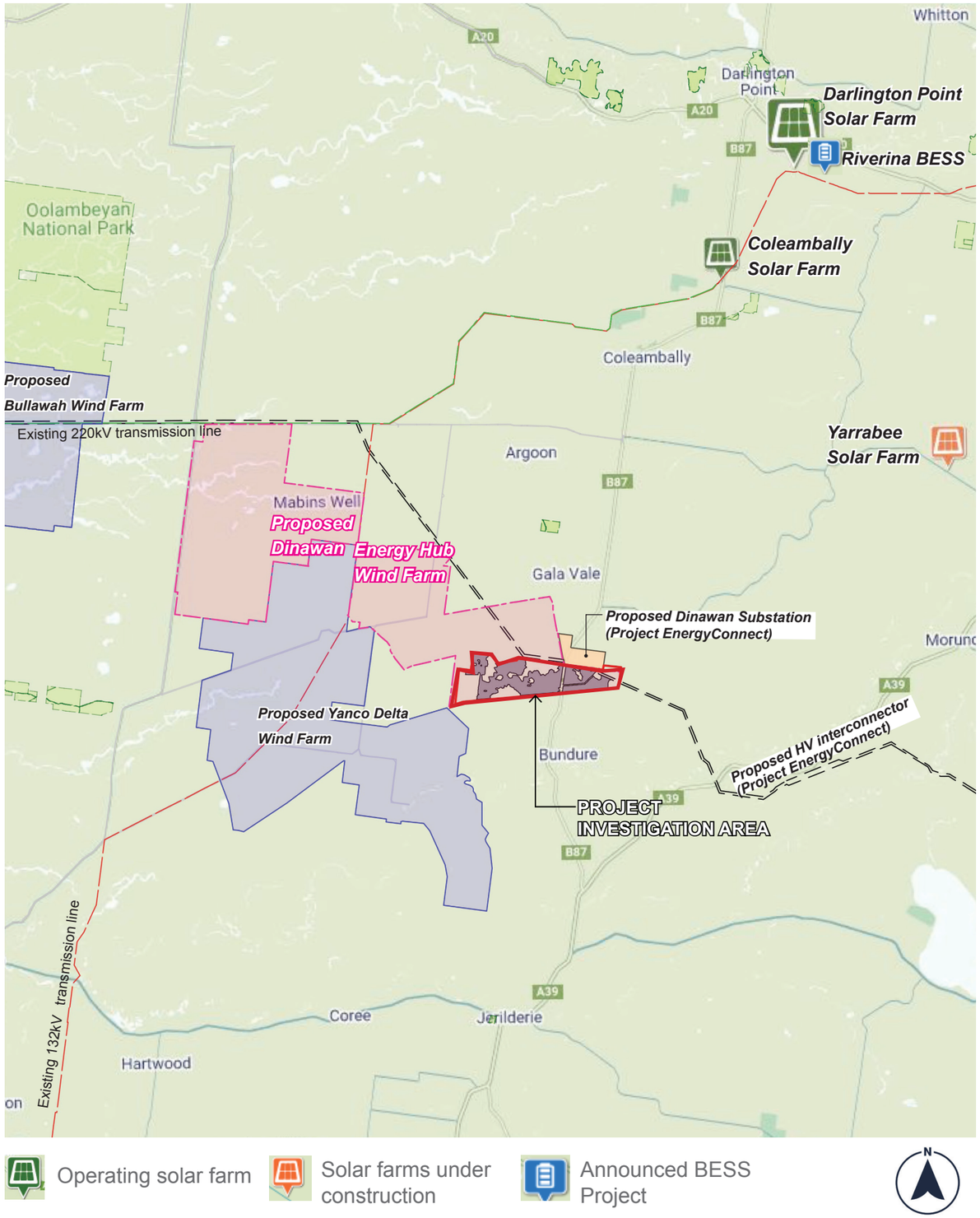


Figure 17 Existing large-scale renewable energy projects (Source: Renew Economy, 2022)

8.3 Cumulative Impact on Broader Landscape Character

The South West REZ presents ample opportunities for the construction and operation of renewable energy projects. The region's character is typically defined by flat terrain and scattered rural dwellings. Due to the lack of obtrusive elements, it is likely that there will be areas from which multiple renewable energy projects will be visible simultaneously.

Re-occurrence of renewable energy projects has the potential to alter the perception of the overall landscape character irrespective of being viewed in a single viewshed. It is important to determine whether the effect of major infrastructure projects within the region would combine to become the dominant visual element, altering the perception of the general landscape character.

With respect to the Project, it is likely that YDWF would be visible from the Project Investigation Area because of its proximity to the Project. Further assessment of the cumulative visual impact will be detailed in the EIS, along with a description of the mitigation and management measures being employed to reduce impacts.

9.0 Summary & Next Steps

9.1 Summary of Findings

Due to the relatively flat topography that is typical of the existing landscape, the majority of the Project Investigation Area is likely to be visible from surrounding areas. Minor undulations associated with landscape features such as Delta Creek and Yanco Creek will potentially help reduce visibility for areas that are further away. However, desktop analysis identifies that intervening vegetation will assist in screening potential views to the Project.

Two (2) dwellings have been identified within 4,000 m of the Project. Application of preliminary assessment tools, however, indicates that only one (1) dwelling would require detailed assessment. In addition, three (3) public viewpoints (VP03, VP04 and VP05) would require detailed assessment in the EIS phase.

9.2 Next Steps

A Landscape and Visual Impact Assessment (LVIA) will be prepared. During the preparation of the LVIA, detailed site investigations will be undertaken from areas identified in the preliminary assessment as having potential visibility towards the Project. This process will be undertaken using the procedures outlined in accordance with relevant guidelines. These include but are not limited to :

- Large-Scale Solar Energy Guideline (August 2022)
- Technical Supplement Landscape and Visual Impact Assessment - Large-Scale Solar Energy Guideline (August, 2022)
- Environmental Planning and Assessment Regulation 2021
- Murrumbidgee Council Local Environmental Plan (LEP) 2013
- State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP).

Specialised modelling tools and visualisations (including photomontages) will be developed to illustrate potential views of the Project from key public viewpoints within 2.5 km of the Project. In addition to the assessment from key public viewpoints, site inspections will be undertaken from dwellings identified as requiring further assessment.

The LVIA will include an assessment of the landscape and visual impact resulting from all associated infrastructure and ancillary structures, and consideration of cumulative impacts with nearby infrastructure. Further assessment will be undertaken to assess potential impacts of glint and glare using industry standard methodology.

Ongoing community consultation will be undertaken to ensure an understanding of the community's landscape values.

Cumulative impacts of surrounding renewable energy projects will also be assessed in the LVIA in order to identify impacts on the broader landscape character of the region. Currently, one (1) proposed wind farm project (Yanco Delta Wind Farm) was identified in proximity to the Project. Detailed assessment of the impacts of these projects will be undertaken in the EIS phase.

On-site and off-site visual landscape mitigation strategies will be developed in response to the assessment and community consultation. The purpose of the mitigation strategies will be to ensure the Project is integrated into the existing landscape.

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Appendix D

Social impact assessment – Scoping report

EMM
creating opportunities

Dinawan Energy Hub - Solar Farm

Social Impact Assessment - Scoping Report

Prepared for Spark Renewables Pty Limited

October 2022

Dinawan Energy Hub - Solar Farm

Social Impact Assessment - Scoping Report

E220305 RP#1

October 2022

Version	Date	Prepared by	Approved by	Comments
1	2 September 2022	Candace Lim	Chris Mahoney	
2	29 September 2022	Candace Lim	Chris Mahoney	
3	14 October 2022	Candace Lim	Chris Mahoney	

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14 October 2022

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1 Introduction

1.1 Purpose

The purpose of this social impact assessment (SIA) scoping report is to accompany the main Scoping Report that requests and informs the content of the Secretary's Environmental Assessment Requirements (SEARs) for the Dinawan Energy Hub Solar Farm (the project). This SIA scoping study is an evaluation procedure, and its primary objective is to define the scope of the SIA for the project in accordance with the *Social Impact Assessment guideline for State Significant Projects* (DPIE 2021). This will be achieved through:

- identifying potentially affected stakeholders;
- identifying and understanding the area of social influence (SIA study area);
- identifying the potential, negative and positive, social impacts for further investigation; and
- determining the level of assessment required for each potential social impact.

1.2 Project description

Spark Renewables Pty Limited (Spark Renewables) proposes to develop the Dinawan Energy Hub, which comprises a hybrid wind and solar farm and battery energy storage system (BESS). Dinawan Energy Hub will be delivered through two separate, but related, State significant development (SSD) applications to the NSW Department of Planning and Environment (DPE). This report relates to the Dinawan Energy Hub Solar Farm.

The project investigation area is between the towns of Coleambally and Jerilderie and lies within the Murrumbidgee local government area (LGA) in NSW. The project will be developed within the South-West Renewable Energy Zone (REZ) and will connect to the Dinawan Substation, proposed to be built by Transgrid as part of Project EnergyConnect.

The project investigation area is immediately adjacent to Kidman Way which will provide direct access to the project. Kidman Way connects the project to the Sturt Highway to the north and the Newell Highway to the south.

The project will comprise a large-scale solar photovoltaic (PV) generation facility and BESS, supported by associated infrastructure. The project will have a generation capacity of up to approximately 1,000 MW (AC). The BESS will have a capacity of up to approximately 300 MW (AC or DC coupled) and will have provision for up to 4 hours of storage (1,200 MWh).

1.3 SIA study area

The SIA study area identifies surrounding stakeholders who could potentially be directly or indirectly affected by the project. This includes landholders, community members, businesses and service providers who may have an interest in the project and who could be impacted. The SIA study area identifies the social and geographical boundaries for the SIA, and takes into account the following:

- the nature and scale of the proposed project, including associated infrastructure;
- the scope of the potential social impacts throughout the project lifecycle;
- the location and characteristics of potentially affected communities; and
- land use patterns, infrastructure and urban/rural centres.

The project is across a sparsely populated area which encompasses the localities of Coleambally, Gala Vale, and Bundure. The local study area for the SIA includes all land within the project investigation area along with a 5 km buffer area around the periphery, recognising that direct project-related impacts may also be experienced by those living in close proximity to the project investigation area. Social baseline characterisation utilised data generated by the Australian Bureau of Statistics (ABS) at the Statistical Area 1 (SA1) geographical classification. Two SA1 areas have been included in the local study area. The local study area is defined on Figure 1.1.

Surrounding townships are likely to be primary sources of labour, goods and services which will support the project and subsequently experience social impacts and benefits. Nearby regional communities considered relevant to the SIA are identified on Figure 1.1 and include:

- Griffith;
- Jerilderie;
- Coleambally;
- Deniliquin; and
- Wagga Wagga.

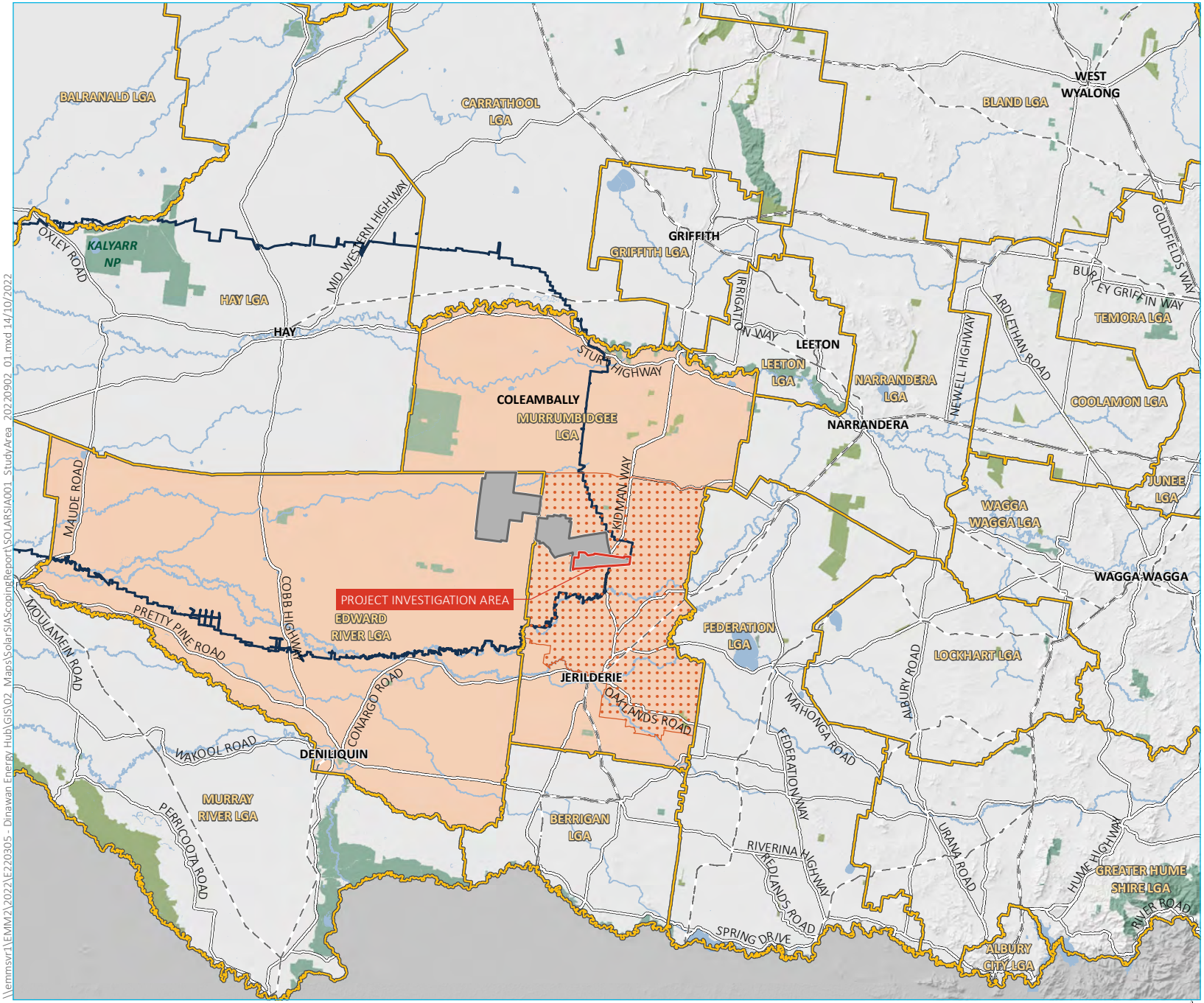
The regional study area is defined on Figure 1.1 and encompasses:

- Murrumbidgee LGA; and
- Edward River LGA (due to the project's proximity to the eastern boundary of this LGA).

Both LGAs will experience some direct and indirect impacts, mostly related to workforce accommodation, local procurement opportunities and employment. The SIA study area is summarised in Table 1.1.

Table 1.1 Locations within the SIA study area mapped to ABS categories

Indicative location	ABS statistical locality	SIA study area
Gala Vale and Argoon	10903118529 SA1	Local area
South of Coleambally	11301125715 SA1	
Jerilderie	Suburbs and localities	Nearby regional communities
Coleambally	11301125713 SA1 and 11301125734 SA1	
Wagga Wagga	SA2	
Griffith	SA2	
Deniliquin	SA2	
Murrumbidgee Region	Murrumbidgee LGA	Regional area
Edward River Region	Edward River LGA	



KEY

- Project investigation area
- Dinawan Energy Hub - Wind Farm
- Local study area
- Regional study area
- Renewable Energy Zone

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest
- Local government area

Source: EMM (2022); ABS (2021); DFSI (2020, 2021); ESRI (2022); GA (2011)

0 25 50 km

GDA2020 MGA Zone 55

N

Study area

Dinawan Energy Hub - Solar Farm
Social Impact Assessment - Scoping report
Figure 1.1

EMM creating opportunities

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2 Community profile

2.1 Overview

This section provides a brief overview of the social conditions of the suburbs and broader region in which the project will operate. Collectively, the study area includes a 5 km buffer around the project, two SA1, five nearby regional communities, Edward River LGA and Murrumbidgee LGA.

Data used to profile nearby regional communities are different for Wagga Wagga, Griffith and Deniliquin than Jerilderie and Coleambally. This is because the metadata for each of these areas are based on population size. Jerilderie has a much smaller population, therefore, to isolate the appropriate study area based on the ABS geography, the data category of 'Suburbs and localities' has been used. For Coleambally, two SA1 areas have been identified (11301125734 and 11301125713), whilst for Wagga Wagga, Griffith and Deniliquin the data category of SA2 has been utilised.

2.2 Demographic profile

In 2021, the two SA1s identified for the local study area had a combined total population of 399 (Table 2.1). SA1 South of Coleambally had the highest population with 234 persons, whilst SA1 Gala Vale and Argoon had the lowest population (165). The percentage of males to females was higher across the local study area compared to the NSW average.

Wagga Wagga is the largest centre in the surrounding area with a population of 56,974. This is followed by Griffith, with a population of 20,569. The other nearby regional communities of Deniliquin (7,038), Jerilderie (922) and Coleambally (566) have considerably smaller populations. Coleambally had the highest percentage of males (52%) to females (48%) whilst Deniliquin, and Griffith were comparable to the NSW average.

Relatively low population density is a key characteristic of the regional study area. With a combined population of 11,809, the Murrumbidgee LGA has a substantially smaller population (3,353) than that of Edward River LGA (8,456). The Murrumbidgee LGA had a higher male (52.2%) to female (47.8%) population. Edward River LGA was opposite to the Murrumbidgee LGA which was comparable to NSW and had more females (49.3%) than males (50.65%).

Table 2.1 Population summary (2021)

Area	Population	Male (%)	Female (%)
Local study area			
Gala Vale and Argoon	165	56.2	43.8
South of Coleambally	234	50.8	49.2
Nearby regional communities			
Wagga Wagga (SA2)	56,974	47.9	52.1
Deniliquin (SA2)	7,038	48.3	51.7
Griffith (SA2)	20,569	49.6	50.4
Jerilderie (suburbs and localities)	922	51.3	48.7
Coleambally	566	52	48

Table 2.1 Population summary (2021)

Area	Population	Male (%)	Female (%)
Regional study area			
Murrumbidgee LGA	3,353	52.2	47.8
Edward River LGA	8,456	49.3	50.7
NSW	**8,072,163**	**49.4%**	**50.6%**

Source: ABS (2021).

The median age for SA1 Gala Vale and Argoon (38) is comparable to NSW (39) while the median age for SA1 South of Coleambally is lower (37). The population across all ages and locations vary across the age range. Ages within SA1 Gala Vale and Argoon significantly vary, with a higher population percentage than the SA1 South of Coleambally and NSW across the ages of 0–4, 25–34, 45–54, and 55–64 with a significant drop in the number of people between 35 and 44. SA1 South of Coleambally also fluctuates but less dramatically from that of NSW. Both SA1s had a lower population than NSW across the ages of 5–14, 15–19, and 75–84 with no population above 85 years. SA1 Gala Vale and Argoon has a larger middle age population when compared to NSW and SA1 South of Coleambally.

The regional study area demonstrates an age distribution which differs from that of NSW. Both LGAs had a lower population between the ages of 19 and 44 and a higher population between the ages of 55 and 74 compared to NSW. Between the age of 0 and 19, both LGAs were comparable to NSW. This indicated both LGAs have an aging population with a much higher median age (Murrumbidgee LGA 54, Edward River LGA 46) compared to NSW (39).

The age group distribution for the local and regional study area is summarised in Table 2.2.

Table 2.2 Age group distribution (2021)

Area	0–4 years	5–14 years	15–19 years	20–24 years	25–34 years	35–44 years	45–54 years	55–64 years	65–74 years	75–84 years	85 years and older	Median age
Local study area												
Gala Vale and Argoon	9.4%	10.7%	3.8%	3.8%	17.5%	6.3%	17.4%	16.3%	11.3%	3.8%	0.0%	38
South of Coleambally	8.8%	8.4%	3.3%	6.7%	11.7%	13.8%	8.4%	15.1%	11.3%	4.2%	0.0%	37
Regional study area												
Murrumbidgee LGA	5.5%	11.4%	5.0%	5.1%	12.2%	10.4%	12.3%	16.5%	12.9%	6.5%	2.3%	45
Edward River LGA	5.2%	12.2%	5.7%	4.7%	10.2%	10%	12.1%	14.9%	13.5%	8%	3.4%	46
NSW	**5.8%**	**12.4%**	**5.7%**	**6.1%**	**14.2%**	**13.7%**	**12.6%**	**11.9%**	**9.8%**	**5.6%**	**2.3%**	**39**

Source: ABS (2021).

2.3 Aboriginal and/or Torres Strait Islander peoples

There is significant variation throughout the study areas in the proportion of persons who identify as Aboriginal and/or Torres Strait Islander. SA1 Gala Vale and Argoon has a significantly higher proportion of people who identify as Aboriginal and/or Torres Strait Islander (9.1%) compared to NSW (3.4%), whilst in SA1 South of Coleambally the proportion was lower (2.6%), as shown in Table 2.3.

The identified SA1 areas have a low female to male ratio in the Aboriginal and/or Torres Strait Islander population compared to NSW which has a higher female ratio of 50.3%.

The proportion of the population who identify as Aboriginal and/or Torres Strait Islander in Murrumbidgee LGA (8.6%) and Edward River LGA (4.8%) was higher than the NSW average (3.4%).

Table 2.3 Aboriginal and/or Torres Strait Islander population

Area	Aboriginal and/or Torres Strait Islander population	Aboriginal and/or Torres Strait Islander population (% of total population)	Male (%)	Female (%)	Median age
Local study area					
Gala Vale and Argoon	15	9.1%	70.0%	30.0%	9
South of Coleambally	6	2.6%	60.0%	40.0%	41
Regional study area					
Murrumbidgee LGA	290	8.6%	50.3%	49.7%	32
Edward River LGA	410	4.8%	46.3%	53.7%	23
NSW	**278,043**	**3.4%**	**49.7%**	**50.3%**	**23**

Source: ABS (2021).

2.4 Employment

Unemployment rates within SA1 Gala Vale and Argoon (4.3%) are comparative to NSW (6.3%.) The unemployment rate within SA1 South of Coleambally was recorded as 0% (Table 2.4).

Unemployment in Edward River LGA was higher (5.0%) than in the Murrumbidgee LGA (4.5%). When compared to NSW, both LGAs had lower than average rates of unemployment.

Table 2.4 Unemployment rate (2016)

Study area	Area	Unemployment rate
Local study area	Gala Vale and Argoon	4.3%
	South of Coleambally	0%
Nearby regional communities	Wagga Wagga	5.8%
	Deniliquin	5.6%
	Griffith	5.3%
	Jerilderie	4.7%
	Coleambally	4.5%

Table 2.4 Unemployment rate (2016)

Study area	Area	Unemployment rate
Regional area	Murrumbidgee LGA	4.5%
	Edward River LGA	5.0%
NSW		**6.3%**

Source: ABS (2016).

Agriculture was the primary industry of employment across the local study area (Table 2.5). The most common industry of employment was 'other grain growing' followed by 'grain-sheep or grain-beef cattle farming'. 'Other grain growing' and 'grain-sheep or grain-beef cattle farming' was also in the top three industries of employment in the Murrumbidgee LGA.

In the nearby regional communities, 'local government administration' employs 8.2% of Jerilderie's population and 'other grain growing' employ 7.7% of the population in Jerilderie and is the highest employer in the Murrumbidgee LGA. Approximately 7.8% of the population in Griffith is employed by 'poultry processing', which was also the second highest industry of employment across the Murrumbidgee LGA. The highest industry of employment in Edward River LGA is in 'other social assistance services' at 3.5%.

In Wagga Wagga, Deniliquin, and Griffith a key industry of employment was 'supermarket and grocery store' along with 'hospitals' in Wagga Wagga and Griffith.

Table 2.5 Primary industries of employment (2016)

Area	First		Second		Third	
Local study area						
South of Coleambally	Other grain growing	53.3%	Grain-sheep or grain-beef cattle farming	11.4%	Other allied health services	4.8%
Gala Vale and Argoon	Grain-sheep or grain-beef cattle farming	15.4%	Other grain growing	15.4%	Sheep farming (specialised)	10.3%
Nearby regional communities						
Wagga Wagga	Hospitals (except psychiatric hospitals)	4.9%	Defence	3.9%	Higher education	3.3%
Deniliquin	Other social assistance services	4.0%	Supermarket grocery store	3.4%	Meat processing	3.2%
Griffith	Poultry processing	7.8%	Wine and other alcoholic beverage manufacturing	5.6%	Hospitals (except psychiatric hospitals)	3.0%
Jerilderie	Local government administration	8.2%	Other grain growing	7.7%	Grain-sheep or grain-beef cattle farming	5.5%
Coleambally	Technicians and trades Workers	4.4%	Managers	4.2%	Labourers	4.2%

Table 2.5 Primary industries of employment (2016)

Area	First		Second		Third	
Regional study area						
Murrumbidgee LGA	Other grain growing	11.1%	Poultry Processing	4.1%	Grain-sheep or grain-beef cattle farming	3.9%%
Edward River LGA	Other social assistance services	3.5%	Supermarket grocery store	3.0%	Primary Education	2.9%
NSW	**Hospitals (except psychiatric hospitals)**	**3.3%**	**Café and Restaurants**	**2.4%**	**Supermarket and grocery Stores**	**2.2%**

Source ABS (2016).

2.5 Local businesses

In 2021, there were a total of 930 businesses registered in the Edward River LGA, of which the most prevalent were 'agriculture, forestry and fishing', which accounted for 36% (334 businesses) and 'construction', which accounted for 13% (117 businesses). The majority of the 'construction' businesses are in Deniliquin while 'agriculture, forestry and fishing' related business are throughout the Edward River LGA (ABS 2016).

In the Murrumbidgee LGA, there were a total of 656 businesses registered in 2021. Of these, 'agriculture, forestry and fishing' accounted for 59% (386 businesses) distributed throughout the LGA, 'rental, hiring and real estate services' accounted for 8% (51 businesses) and 'construction' accounted for 7% (43 businesses) of which the majority were in Coleambally and Jerilderie (ABS 2021).

2.6 Socio-economic advantage and disadvantage

To assess the welfare and determine the social and economic wellbeing of Australian communities, the ABS has developed the Socio-Economic Indexes for Areas (SEIFA). The indexes are based on information from a five-yearly census of population and housing. The index provides a measure of socio-economic status based on low-income earners, relatively lower education attainment, high unemployment, people's access to material and social resources and their ability to participate in society. Indexes are provided as a score and decile. Low index values represent areas of most disadvantage and high values represent areas of least disadvantage.

SA1 Gala Vale and Argoon and SA1 South of Coleambally were comparable in terms of the index of disadvantage. Both areas recorded a decile ranking of nine (9) which indicates relatively low levels of disadvantage.

Of the nearby regional communities, Wagga Wagga (6) and Coleambally (5) recorded the lowest level of relative disadvantage whilst the incidence of relative disadvantage was high in the towns of Jerilderie (3), Griffith (3), and Deniliquin (2).

Across the regional study area, the SEIFA Disadvantage Index indicates moderate levels of disadvantage with Murrumbidgee LGA recording a decile score of five (5) and Edward River LGA a decile score of four (4).

2.7 Health

The Murrumbidgee LGA and Edward River LGA are serviced by the Murrumbidgee Local Health District (LHD), which measures health outcomes against the indicators listed in Table 2.6. The Murrumbidgee LHD recorded a relatively higher proportion of people exhibiting behaviours which pose a health risk (including alcohol consumption, smoking, obesity and mental health) than those across NSW. Asthma prevalence in adults in the Murrumbidgee LGA was 9.6% compared with 11.5% in NSW.

Table 2.6 Health indicator summary (2020)

Health indicator	Murrumbidgee LHD	NSW
Alcohol drinking, long-term risk in adults	38.7%	33.5%
Daily smoking in adults	10.5%	8.2%
Overweight and obesity in adults	68.2%	57.8%
Asthma prevalence in adults	9.6%	11.5%
High or very high psychological distress in adults	23.4%	16.7%

Source: NSW Health (2021).

3 Community and stakeholder engagement

A core element of SIA is engagement with the community and other stakeholders. This is undertaken to validate baseline data, build an appreciation of community values, interests and aspirations and to inform the identification of project-related social impacts and benefits.

Spark Renewables has undertaken a range of engagement activities to date, including:

- Briefing letters and meetings – project overviews to various stakeholders (including Council, NSW Department of Planning and Environment, State MP, Federal MP, NSW Energy Minister, Australian Energy Market Operator (AEMO) and business leaders) and updates on community consultation.
- Development of a project website and social media presence – providing project updates.
- Media releases and community newsletters – announcing the project and providing information to the community and businesses.
- Phone calls, emails, letterbox drops and advertisements – to promote the community drop-in session to affected residents and the local community.
- Community drop-in session –to gather feedback from the local community and businesses.

In addition to the above, community feedback and community values surveys have been promoted through the drop-in session and social media channels and made available via the web portal.

A total of 29 responses to the community feedback survey were received. Of the responses received:

- fourteen (48%) had a general interest in renewable energy projects;
- ten (34%) had an interest in employment and procurement opportunities; and
- eight (28%) had an interest because they either live or own land near the project.

Fourteen respondents answered the community values questionnaire, and their responses are outlined in Table 3.1 (project benefits) and Table 3.2 (project concerns).

Table 3.1 Community values questionnaire – project benefits

Potential project benefit	Response (%)	Total responses
Employment opportunities	46.15%	6
Investment in the local community	71.43%	10
Road upgrades/better access to Rural Fire Services	61.54%	8
Land use diversification	23.08%	3
Community sponsorships	30.77%	4
Access to cheaper electricity	38.46%	5
Partnerships with Local Aboriginal Land Councils	7.69%	1
Increased tourism	7.69%	1
Clean energy	53.85%	7

Table 3.2 Community values questionnaire – project concerns

Project concern	Response (%)	Total responses
Visual	23.08%	3
Traffic and road safety	23.08%	3
Potential impacts on flora and fauna	46.15%	6
Increased workforce in the area	7.69%	1
Land use	23.08%	3
Water	7.69%	1
Noise	15.38%	2
Fire	57.14%	8
No concerns	15.38%	2

The feedback generated through community and stakeholder engagement has been used to inform the preliminary identification of social impacts and benefits.

Detailed community and stakeholder engagement will be undertaken specifically to inform key elements of the SIA including baseline conditions and social trends occurring in different communities, identification and assessment of potential impacts and benefits and how these may most effectively be mitigated and managed. The objectives of SIA engagement are to:

- provide local stakeholders with the opportunity to define local values and the characteristics of potentially affected communities;
- provide stakeholders with the opportunity to identify and assess potential social impacts and applicable mitigation and management strategies;
- ensure the SIA considers the interests and perspectives of stakeholders who may be affected by project-related impacts; and
- integrate with broader environmental impact statement (EIS) and project engagement activities so as to provide a range of opportunities for community members and key stakeholders to provide feedback.

Stakeholder engagement will be iterative throughout the SIA with the stakeholder groups to be engaged including:

- local communities;
- local and state government agencies;
- local and regional employment and training providers;
- public and private housing providers;
- local and regional commerce and community development groups;
- social and public service providers;
- emergency services; and
- public health providers.

4 Proposed assessment scope

4.1 Potential social impacts

A preliminary set of potential impacts and benefits of the project has been identified based on the scoping assessment, including the outcomes of the community survey, community and stakeholder engagement and observations of the local community and project investigation area. The purpose of identifying potential impacts and benefits at this preliminary stage is to ensure the EIS preparation focuses on:

- the potential social impacts identified by, and of greatest concern, to the community; and
- an appropriate range of stakeholders (ie affected groups or individuals are included in the SIA field study activities).

Potential negative impacts requiring further assessment and likelihood of potential positive social impacts are detailed in Table 4.1. Additional details are provided in the SIA Scoping Worksheet (Appendix A).

There are a variety of potential social impacts which may arise from the project, both during construction and throughout operation. Without mitigation, these social impacts could contribute to negative changes to the existing community (such as to their way of life or livelihood through the disruption of farming and agricultural practices).

Changes to accessibility (such as to one's property or to adequate social infrastructure) and/or surroundings (including visual amenity and noise disruption) may also have material impacts on the way of life and health and wellbeing of community members. However, with proper mitigation measures, many of these social impacts can be effectively managed, and closely monitored throughout construction and operations.

The project also has the potential to generate positive social impacts, such as increased opportunities for employment and occupational training, economic in-flows to the local community, and diversification of landholder income. The project will look to initiate measures to maximise these benefits (such as utilising the local workforce and supplies), in addition to other mitigation measures.

Table 4.1 Identified potential social impact mapped to issues (positive and negative)

Project activity	Potential social impacts	Issue – negative related to:	Issue – positive related to:	Level of assessment	Mitigation
Construction and operations	**Livelihoods**	• Disruption to farming activity may lead to lowered agricultural productivity. • Potential farm biosecurity and weed incursions due to vehicle access during construction. • Increased employment opportunity may lead to skills and labour shortages which affects the profitability of local businesses.	• Diversification of landholder incomes. • Increased opportunity for local employment and occupational training. • Diversification of local economy through direct and indirect economic benefits (including local spending). • Potential to develop new industries and employment opportunities in the region to service and maintain the project.	• Detailed	• Consideration of economic impacts as part of the EIS. • Implementation of community and stakeholder engagement program. • Completion of SIA inclusive of tailored mitigation and enhancement measures.
	Health and wellbeing	• Increased noise during construction and operation (largely associated with the BESS). • Public safety due to truck and other vehicle movements along roads (during construction). • Decreased air quality due to dust from newly formed roads and increased traffic (during construction). • Stress and anxiety for landowners caused by lease agreement negotiations or community pressures. • Increased demand on health services due to presence of construction workers.	• Injection of wealth into the local economy improves real wages and enhanced access to health services.	• Detailed	• Completion of a noise and vibration impact assessment as part of the EIS. • Consideration of air quality impacts as part of the EIS. • Completion of SIA inclusive of tailored mitigation and enhancement measures.
	Way of life	• Construction may disrupt farming activity or cause a reduction in the availability of agricultural land. • Broad regional shift towards prioritising land use for renewable energy projects may impact the agricultural way of life and cohesion of the community.	• Stabilisation of local populations due to the economic stimulus provided by the project.	• Detailed	• Consideration of economic impacts as part of the EIS. • Completion of SIA inclusive of tailored mitigation and enhancement measures.

Table 4.1 Identified potential social impact mapped to issues (positive and negative)

Project activity	Potential social impacts	Issue – negative related to:	Issue – positive related to:	Level of assessment	Mitigation
	Access	• Increased traffic may cause perceived road safety risks. • Construction workers may place increased pressure on social infrastructure. • Construction workers moving to the area could constrain access to housing and accommodation.	• Increased traffic may require road upgrades which could benefit the local users. • Upgraded road infrastructure may improve access to other areas and their services.	• Detailed	• Completion of a traffic assessment as part of the EIS. • Completion of SIA inclusive of tailored mitigation and enhancement measures.
	Surroundings	• Changes to the landscape and visual amenity due to the presence of project infrastructure. • Changes to the landscape can impact the visual amenity of the area.	• Vegetation offsets could result in plantings and rehabilitation undertaken on landholder property.	• Detailed	• Completion of a visual impact assessment as part of the EIS. • Completion of SIA inclusive of tailored mitigation and enhancement measures.
	Culture	• Potential impacts related to ability to practice culture from potential loss of heritage sites. • Loss of rural heritage values due to re-purposing of land. • Potential effects on items and areas of cultural significance to Aboriginal people.	• Employment opportunities for Aboriginal stakeholders during the assessment and approval process.	• Detailed	• Completion of an Aboriginal cultural heritage assessment and historic heritage assessment as part of the EIS. • Completion of SIA inclusive of tailored mitigation and enhancement measures.
	Community	• New workers may affect the composition of the local community and the community identity and cohesion. • Potential for polarisation of community sentiment regarding the project (and solar farms in general) could affect community cohesion.	• New workers may integrate and add value to the local community. • Diversification of the economy opportunity may have a positive effect on community capital and resilience.	• Detailed	• Implementation of community and stakeholder engagement program • Completion of SIA inclusive of tailored mitigation and enhancement measures.

4.2 Proposed methodology

The SIA will be led by a suitably qualified Social Scientist who will adopt the methodology outlined in Plate 4.1 and employ social science methods and tools for the collection of qualitative and quantitative data.

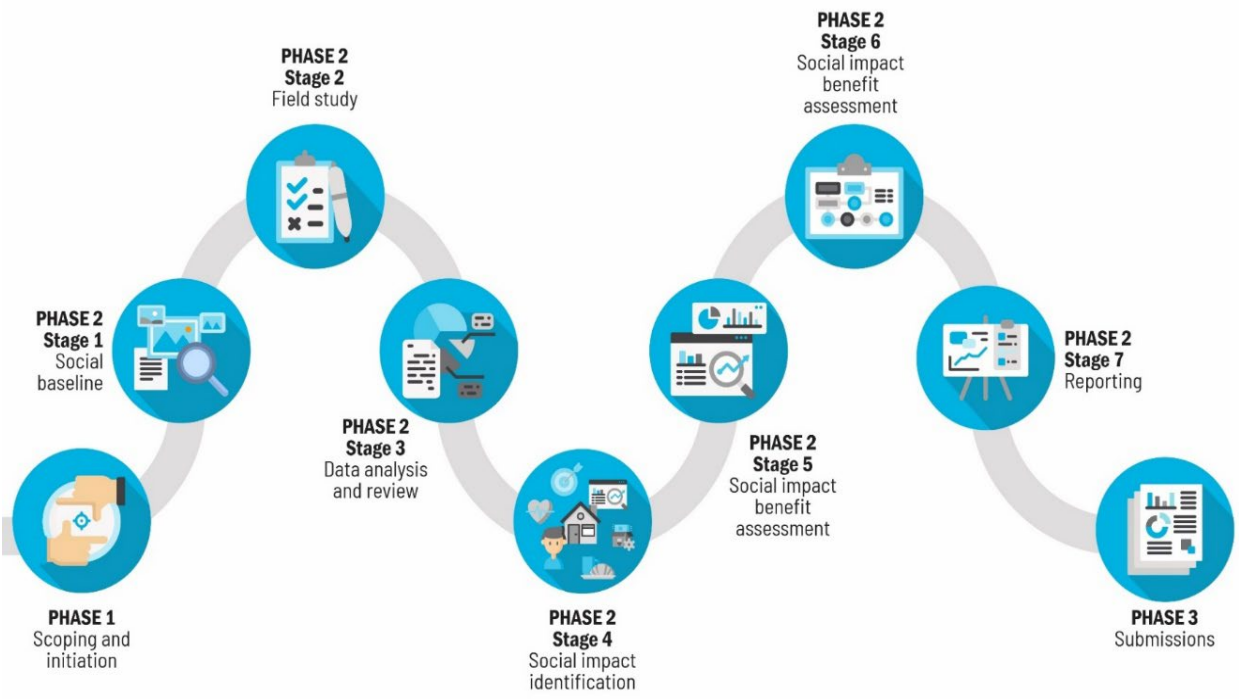

Plate 4.1 Social impact assessment methodology

The identification of social impacts will be informed by community and stakeholder engagement activities, as well as SIA field study activities, and will be conducted in an integrated manner to ensure consistency, reduce duplication, and allow for management of consultation fatigue. In addition, findings from the technical assessments will be considered to understand the consequences to the community and existing research and previous SIAs will inform the identification of the social impacts.

Potential social impacts and benefits will then be assessed in accordance with the requirements of the *Social Impact Assessment Guideline for State Significant Projects* (DPIE 2021a) and will utilise the risk assessment matrix presented in the *Technical Supplement Social Impact Assessment Guideline for State Significant Projects* (DPIE 2021b).

References

ABS 2016, *Census of Population and Housing: Quickstats.*

- 2018, *Socio-Economic Indexes for Australia* (SIEFA).
- 2021a, *Census of Population and Housing: Quickstats*.
- 2021b, *Counts of Australian Businesses*.

DPIE 2021a, *Social Impact Assessment Guideline for State Significant Projects*.

- 2021b, *Technical Supplement: Social Impact Assessment Guideline for State Significant Projects*.

NSW Health 2021, *Healthstats NSW*.

Appendix A
Scoping worksheet

EMM
creating opportunities

Social Impact Assessment (SIA) Worksheet

Project name: Dinawan Energy Hub - Solar Farm

Date: 2-Sep-22

CATEGORIES OF	POTENTIAL IMPACTS ON PEOPLE		PREVIOUS		CUMULATIVE		ELEMENTS OF IMPACTS - Based on preliminary investigation					ASSESSMEN				PROJECT REFINEMENT	MITIGATION / ENHANCEMENT MEASURES
what **social impact categories** could be affected by the project activities	What impacts are likely, and what concerns/aspirations have people expressed about the impact? Summarise how each relevant stakeholder group might experience the impact. NB. Where there are multiple stakeholder groups affected differently by an impact, or more than one impact from the activity, please add an additional row.	Is the impact expected to be **positive or negative**	Has this impact previously been investigated (on this or other project/s)?	If "yes - this project," briefly describe the previous investigation. If "yes - other project," identify the other project and investigation	Will this impact combine with others from this project (think about when and where), and/or with impacts from other projects (cumulative)?	If yes, identify which other impacts and/or projects	Will the project activity (without mitigation or enhancement) cause a material social impact in terms of its: You can also consider the various magnitudes of these characteristics **extent** i.e. number of people potentially affected?	**duration** of expected impacts? (**i.e.** construction vs operational phase)	**intensity** of expected impacts i.e. scale or degree of change?	**sensitivity** or vulnerability of people potentially affected?	**level of concern/interest** of people potentially affected?	Level of assessment for each social impact	What methods and data sources will be used to investigate this impact? Secondary data	Primary Data - Consultation	Primary Data - Research	Has the project been refined in response to preliminary impact evaluation or stakeholder feedback?	What **mitigation / enhancement measures** are being considered?
community	Proposed development projects can be grounds for contestation within local communities, which can negatively impact on community cohesion.	Negative	Yes - other project	Coleambally Solar Farm and Tarleigh Park solar farm	Yes	Wind and other solar farms being developed	Unknown	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Robust community and stakeholder engagement to be determined and delivered as part of the EIS community and stakeholder engagement program and social impact assessment. In consultation with a diverse range of key local stakeholders, a community partnership or benefit sharing initiative may be established.
health and wellbeing	Stress and anxiety caused by lease agreement negotiations or community pressures	Negative	Unknown	Tarleigh Park solar farm	Yes	Wind and other solar farms being developed	Unknown	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	High levels of engagement with landholders along with transparent and respectful lease negotiation process.
decision-making systems	Real or perceived lack of knowledge and inclusion in the planning, assessment and consultation process. Translates into real or perceived inability to make informed decisions, and/or inability to influence project decisions, including elements of project design.	Negative	Unknown	-	Unknown	-	Unknown	No	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	Yes	Robust community and stakeholder engagement to be determined and delivered as part of the EIS community and stakeholder engagement program and social impact assessment.
surroundings	Potential air quality impacts for landholders/neighbours close to the project as well as along proposed access routes due to dust from construction activities and ground disturbance from traffic on unsealed roads within the development footprint.	Negative	Yes - other project	Southdown Solar Farm Coleambally Solar Farm	Yes	Wind and other solar farms being developed	Unknown	No	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be informed by an air quality assessment and investigated through community and stakeholder engagement undertaken as part of the social impact assessment and EIS engagement program.
surroundings	Vegetation offsets could result in plantings and rehabilitation undertaken on landholder property	Positive	Unknown	-	Unknown	-	Unknown	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required		Targeted research	No	High levels of engagement with landholders along with transparent and respectful negotiation processes.
surroundings	Potential for adverse noise impacts for landholders/neighbours close to the project as well as along proposed access routes.	Negative	Yes - other project	Tarleigh Park Solar Farm	Yes	Existing agricultural uses Other projects being developed in the area	Yes	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be informed by the noise assessment and investigated through community and stakeholder engagement undertaken as part of the social impact assessment and EIS engagement program.
way of life	Loss of community character from increased traffic due to trucks and construction vehicles in the local area.	Negative	Yes - other project	Southdown Solar Farm	Yes	Existing agricultural uses Other projects being developed in the area	Unknown	No	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be informed by the traffic assessment and investigated through community and stakeholder engagement undertaken as part of the social impact assessment and EIS engagement program.
culture	Potential for impacts to unknown items or sites of Aboriginal and historic heritage.	Negative	Yes - other project	New England Solar Farm	Yes	Existing agricultural uses Other projects being developed in the area	Unknown	Unknown	Unknown	Yes	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be addressed through an Aboriginal heritage assessment and cultural heritage management agreements
livelihoods	Potential farm biosecurity and weed incursions due to vehicle access during construction.	Negative	Yes - other project	New England Solar Farm	Yes	Existing agricultural uses Other projects being developed in the area	Yes	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required		Targeted research	No	High levels of engagement with landholders along with transparent and respectful negotiation processes.
livelihoods	Employment opportunities for local and regional workforce. Project may provide alternate employment for those in the agricultural sector.	Positive	Yes - other project	Tarleigh Park solar farm	Yes	Other projects being constructed in the area	Unknown	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	A strategy will be put in place to prioritise the skills and capabilities of the workforce in the local area and further investigated through the social impact assessment.
livelihoods	Diversification of local economy through direct and indirect economic benefits (including local spending).	Positive	Yes - other project	Coleambally Solar Farm	Yes	Other projects being constructed in the area	Unknown	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Development of a local procurement strategy and process for the construction phase. To be further investigated through the social impact assessment.
access	Construction workers moving to the area could decrease availability of housing and accommodation as well as lead to an increase in rental housing prices. An influx of construction workers may also constrain the availability of accommodation for tourism.	Negative	Yes - other project	Coleambally Solar Farm	Yes	Other projects being constructed in the area	Unknown	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Development of a Workforce Accommodation Strategy. To be further investigated through the social impact assessment.
health and wellbeing	Increased traffic may also cause perceived road safety risks.	Negative	Yes - other project	Finley Solar Farm Tarleigh Park solar farm	Yes	Other projects being constructed in the area	Unknown	No	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be informed by the traffic assessment and investigated through community and stakeholder engagement undertaken as part of the social impact assessment and EIS engagement program.
access	An influx of construction workers staying in the nearby townships may increase demand for local social and community infrastructure (eg health and community services).	Negative	Yes - other project	Coleambally Solar Farm	Yes	Other projects being constructed in the area	Unknown	No	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	Development of a Workforce Accommodation Strategy. To be further investigated through the social impact assessment.
surroundings	Changed sense of place (character) due to changed visual amenity.	Negative	Yes - other project	Finley Solar Farm Coleambally Solar Farm	Yes	Other projects being constructed in the area	Yes	Yes	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be informed by the visual impact assessment and investigated through community and stakeholder engagement undertaken as part of the social impact assessment and EIS engagement program.
community	Social cohesion and resilience arising from community benefit and investment.	Positive	Yes - other project	Coleambally Solar Farm	Yes	Use of land for agricultural purposes	Unknown	Unknown	Yes	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	Yes	In consultation with a diverse range of key local stakeholders, a community partnership or benefit sharing initiative may be established.

CATEGORIES OF	POTENTIAL IMPACTS ON PEOPLE		PREVIOUS		CUMULATIVE		ELEMENTS OF IMPACTS - Based on preliminary investigation					ASSESSMEN				PROJECT REFINEMENT	MITIGATION / ENHANCEMENT MEASURES
what **social impact categories** could be affected by the project activities	What impacts are likely, and what concerns/aspirations have people expressed about the impact? Summarise how each relevant stakeholder group might experience the impact. **NB. Where there are multiple stakeholder groups affected differently by an impact, or more than one impact from the activity, please add an additional row.**	Is the impact expected to be **positive or negative**	Has this impact previously been investigated (on this or other project/s)?	If "yes - this project," briefly describe the previous investigation. If "yes - other project," identify the other project and investigation	Will this impact combine with others from this project (think about when and where), and/or with impacts from other projects (cumulative)?	If yes, identify which other impacts and/or projects	Will the project activity (without mitigation or enhancement) cause a material social impact in terms of its: You can also consider the various magnitudes of these characteristics — **extent** i.e. number of people potentially affected?	**duration** of expected impacts? (**i.e. construction vs operational phase**)	**intensity** of expected impacts i.e. scale or degree of change?	**sensitivity** or vulnerability of people potentially affected?	**level of concern/interest** of people potentially affected?	Level of assessment for each social impact	What methods and data sources will be used to investigate this impact? — Secondary data	Primary Data - Consultation	Primary Data - Research	Has the project been refined in response to preliminary impact evaluation or stakeholder feedback?	What **mitigation / enhancement measures** are being considered?
livelihoods	Diversification of landholder income through lease arrangements.	Positive	Yes - other project	Coleambally Solar Farm	Yes	Use of land for agricultural purposes	Yes	Yes	Yes	Unknown	Unknown	Detailed assessment of the impact	Required		Targeted research	Yes	High levels of engagement with landholders along with transparent and respectful negotiation processes.
livelihoods	Potential to develop new industries and employment opportunities in the region to service and maintain the project.	Positive	Yes - other project	Coleambally Solar Farm	Yes	Other projects being constructed in the area	Unknown	Unknown	Yes	Unknown	Unknown	Detailed assessment of the impact	Required		Targeted research	Yes	To be further investigated through the economic and social impact assessments
surroundings	Reduced ability to practice fire management due to presence of project infrastructure.	Negative	Unknown	-	Unknown	-	Yes	Yes	Yes	Unknown	Unknown	Detailed assessment of the impact	Required		Targeted research	Yes	Completion of hazard and risk assessment. High levels of engagement with landholders.
livelihoods	Improved productivity of farms due to access improvements created by roads within the development footprint.	Positive	Unknown	-	Unknown	-	Yes	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required		Targeted research	Yes	To be further investigated through the economic and social impact assessments.
access	Multiple developments being constructed in the area could further decrease availability of housing and accommodation as well as lead to an increase in rental housing prices.	Negative	Unknown	-	Unknown	-	Yes	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required		Targeted research	Yes	Completion of a Workforce Accommodation Assessment. To be further investigated through the social impact assessment.
community	New workers moving to the local area due to multiple developments in the area may change the composition of the local population, and cause impacts to community identity/character.	Negative	Yes - other project	Coleambally Solar Farm	Yes	Wind, solar and other projects being developed in the area	Yes	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be further investigated through the social impact assessment.
access	Increased traffic arising from the construction of multiple developments in the area may require upgrades to local roads, which would also benefit local users.	Positive	Yes - other project	Coleambally Solar Farm	Yes	Wind, solar and other projects being developed in the area	Yes	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined from the social assessment and be informed by a traffic impact assessment.
access	Increased workforce in the regional area may increase demand for social and community infrastructure beyond capacity (eg health and community services).	Negative	Yes - other project	Coleambally Solar Farm	Yes	Wind, solar and other projects being developed in the area	Yes	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be further investigated through the social impact assessment.
way of life	Way of life related to land use tensions. A broad regional shift towards prioritising land use for renewable energy projects may impact the agricultural way of life in these areas as well as how communities use land for agricultural activities.	Negative	Yes - other project	Southdown Solar Farm	Yes	Wind, solar and other projects being developed in the area	Yes	Unknown	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be further investigated through the social impact assessment.

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