SPARK RENEWABLES

Mallee Wind Farm Project

SCOPING REPORT

NOVEMBER 2022

umwelt
Environmental & Social Consultants

MALLEE WIND FARM

Scoping Report

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Spark Renewables

Project Director:	Nathan Baker
Project Manager:	Bridie McWhirter
Report No.	22494/R01
Date:	November 2022

Environmental & Social Consultants

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

Document Status

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	Name	Date	Name	Date
FINAL V1	Bridie McWhirter	24 November 2022	Nathan Baker	24 November 2022
V2	Bridie McWhirter	30 November 2022	Nathan Baker	30 November 2022

Abbreviations

Abbreviation	Definition
ABS	Australian Bureau of Statistics
ACHA	Aboriginal Cultural Heritage Assessment
AEMO	Australian Energy Market Operator
AIA	Aviation Impact Assessment
Associated dwelling	A dwelling owned by an associated landholder
Associated landholder	A landholder who has reached an agreement with Spark in relation to the Project but will not host WTGs on their land
BAM	Biodiversity Assessment Method
Spark	Spark Renewables Pty Limited
BBUS	Bird and Bat Utilisation Survey
BC Act	Biodiversity Conservation Act 2016
BCD	Biodiversity and Conservation Division
BDAR	Biodiversity Development Assessment Report
BOM	Bureau of Meteorology
BSAL	Biophysical Strategic Agricultural Land
CASA	Civil Aviation Safety Authority
CCC	Community Consultative Committee
CEEC	Critically Endangered Ecological Community
CLM Act	Contaminated Land Management Act 1997
Crown Land Act	Crown Land Management Act 2016
CSEP	Communications and Stakeholder Engagement Plan
dB(A)	A-weighted noise or sound power level in decibels
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DPE	NSW Department of Planning and Environment [current]
DPIE	NSW Department of Planning, Industry and Environment [former]
EEAP	NSW Energy Efficiency Action Plan
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EL	Exploration Licence
EMF	Electromagnetic Field
EMI	Electromagnetic Interference
EnergyCo NSW	Energy Corporation of NSW
EP&A Act	NSW Environmental Planning and Assessment Act 1979

Abbreviation	Definition
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPL	Environment Protection Licence
GHG	Greenhouse Gas
GIS	Geographic Information System
GW	Gigawatts
Ha	Hectares
Host dwelling	A dwelling owned by a host landholder
Host landholder	A landholder who will (subject to finalisation of an agreement with Spark) host WTGs on their land, also referred to as 'involved' landholders
HHA	Historical Heritage Assessment
IAIA	International Association for Impact Assessment
KV	Kilovolt
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
LVIA	Landscape and Visual Impact Assessment
MNES	Matter of National Environmental Significance
MP	Member of Parliament
MW	Megawatt
MWh	Megawatt Hour
MWTT	Multiple Wind Turbine Tool
NDC	Nationally Determined Contributions
NEM	National Electricity Market
Non-associated dwelling	A dwelling owned by a non-associated landholder
Non-associated landholder	A landholder who has not reached an agreement with Spark in relation to the Project, also referred to as 'non-involved' landholders
NPfI	Noise Policy for Industry 2017
NSW	New South Wales
NSW EPA	NSW Environment Protection Authority
NSW REAP	NSW Renewable Energy Action Plan
OSOM	Over-size, over-mass vehicle
PA	Planning Agreement
PCT	Plant Community Type
POEO Act	Protection of the Environment Operations Act 1997
RAAF	Royal Australian Air Force
REZ	Renewable Energy Zone

Abbreviation	Definition
RFS	NSW Rural Fire Service
FWRP	Far West Regional Plan 2036
Roads Act	Roads Act 1993
SAT	Spot Assessment Technique
SEARs	Secretary's Environmental Assessment Requirements
SIA	Social Impact Assessment
SISR	Social Impact Scoping Report
South-West REZ	South-West Renewable Energy Zone
SSD	State Significant Development
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
TfNSW	Transport for NSW
TTIA	Traffic and Transport Impact Assessment
Umwelt	Umwelt (Australia) Pty Ltd
WM Act	Water Management Act 2000
WRIA	Water Resources Impact Assessment
WSP	Water Sharing Plan
WTG	Wind Turbine Generator

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1.0 Introduction

1.1 The Proponent

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.

Key details of the Proponent are provided in **Table 1.1.**

For brevity, Spark Renewables Pty Limited will be referred to as 'Spark' throughout this report.

Table 1.1 Proponent Details

Requirement	Details
Full Name/s	Spark Renewables Pty Limited
Postal Address	Level 4, 1A Rialto Lane, Manly, NSW 2095
Street Address (Project Site)	Arumpo Road, Mallee NSW 2738
ACN	632 860 023
Nominated Contact	Julian Kasby

Spark is committed to supporting the communities in which they operate, and focus on providing employment opportunities for local residents as much as possible. Spark gives back to the local community by establishing community funds that seek to provide a long term benefit to the community.

Spark is also a member of the Clean Energy Council (CEC) and a signatory to the CEC Best Practice Charter for Renewable Developments (CEC, 2021), and as such is committed to:

- engaging respectfully with the communities in which it plans and operates projects
- being sensitive to the environment and cultural values in developing projects
- making positive contributions to the local and broader communities and regions in which Spark operates.

1.2 Project Overview

Spark is currently in the process of evaluating the Mallee Wind Farm (the Project), which would be located approximately 16 km north-east of Buronga in New South Wales (NSW). The Project is located within the Wentworth Shire Local Government Area (LGA) and strategically positioned in the western extents of the NSW South-West Renewable Energy Zone (REZ). The Project is a renewable energy development featuring up to ~150 wind turbines with a generation capacity of up to 1,000 MW and a containerised Battery Energy Storage System (BESS). The Project is currently in the early stages of project development, stakeholder engagement and overall design.

The Project is State Significant Development (SSD) as defined under State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP) and will require development consent under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

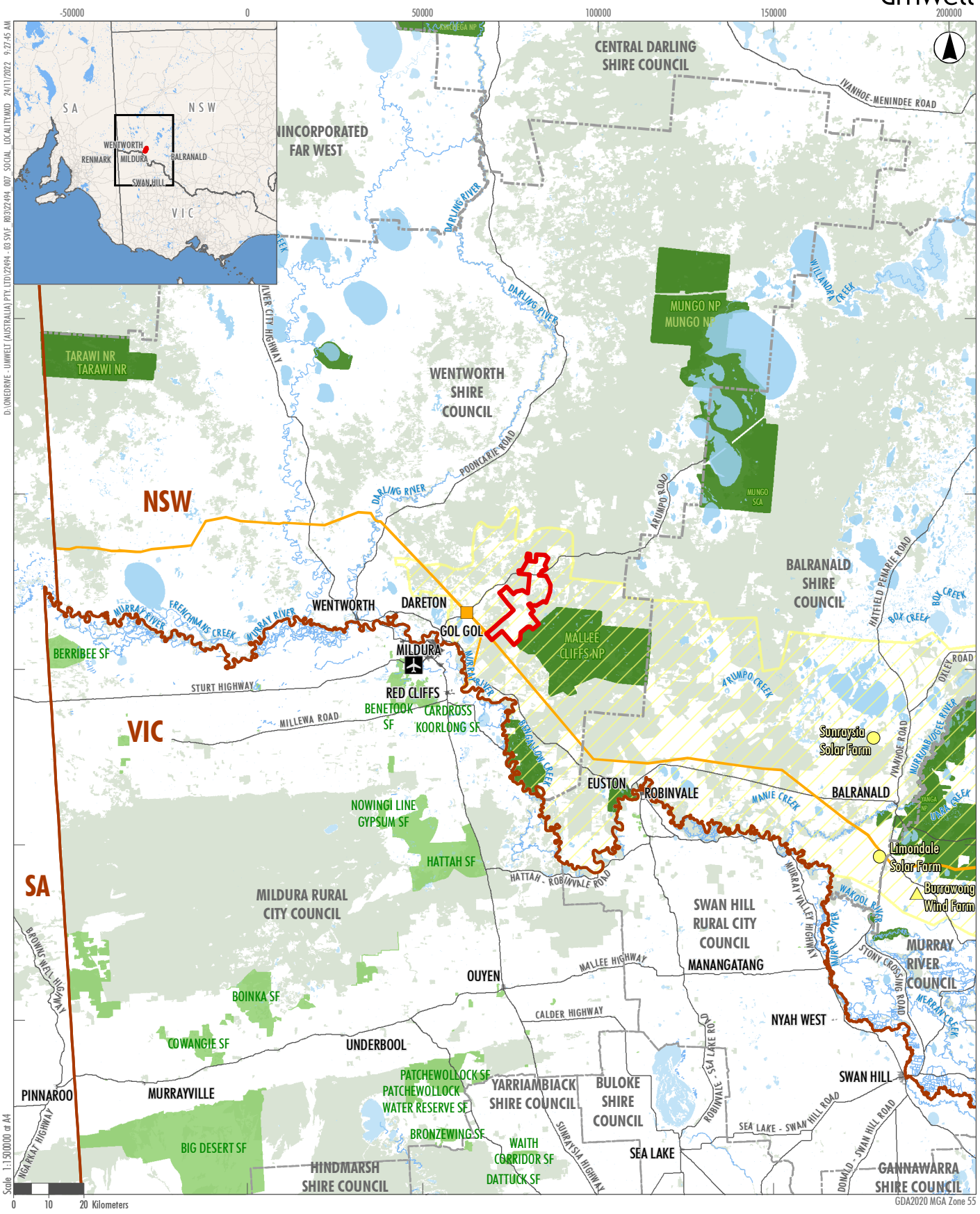
The Project design has been developed with early consideration of environmental and social matters and has been refined during the preliminary stages of the Scoping Report. Spark has established a community and stakeholder engagement plan (CSEP) for the Project and has undertaken the planned engagement with the local community and other valued stakeholders. This community and stakeholder engagement will continue throughout the Project planning and approvals process. Community and stakeholder feedback will continue to be considered, and Project designs will be revised accordingly, towards maximising positive social, economic and environmental outcomes and minimising adverse impacts.

Umwelt (Australia) Pty Limited (Umwelt) was engaged by Spark to prepare a Scoping Report for planning and environmental aspects of the Project. It has been delivered to identify the key environmental, social and economic matters that require further assessment in the Environmental Impact Statement (EIS) phase for the Project, and to inform the preparation of the Secretary's Environmental Assessment Requirements (SEARs).

1.2.1 Location of the Project

The Project is located approximately 16 km north-east of Buronga, close to the NSW-Victorian state border and covers approximately 18,500 hectares (ha). The Project Area is located on relatively flat land at an elevation of approximately 100 metres (m) above sea level with a good available wind resource. There is one residential dwelling located approximately 8 km from the proposed wind turbine generators (WTGs). Refer to **Figure 1.1** for the regional context for the Project.

The Project Area is located primarily on land zoned RU1 Primary Production under the Wentworth Local Environmental Plan 2011 (Wentworth LEP 2011). The Project Area is currently used for cropping and grazing, with patches of remnant native vegetation present. The Project EnergyConnect transmission line corridor is located to the south-west of the Project Area. The Project's local context is presented in **Figure 1.2** below.



Legend

- Project Boundary
- Local Government Areas (NSW/Vic)
- State Border
- State Forest
- NPWS Estate
- Built Up Areas
- Native Vegetation Areas
- Hydro Areas
- Major Roads
- Watercourses
- Mildura Airport
- Project EnergyConnect Corridor
- Southwest REZ boundary (indicative only)
- Buronga Substation

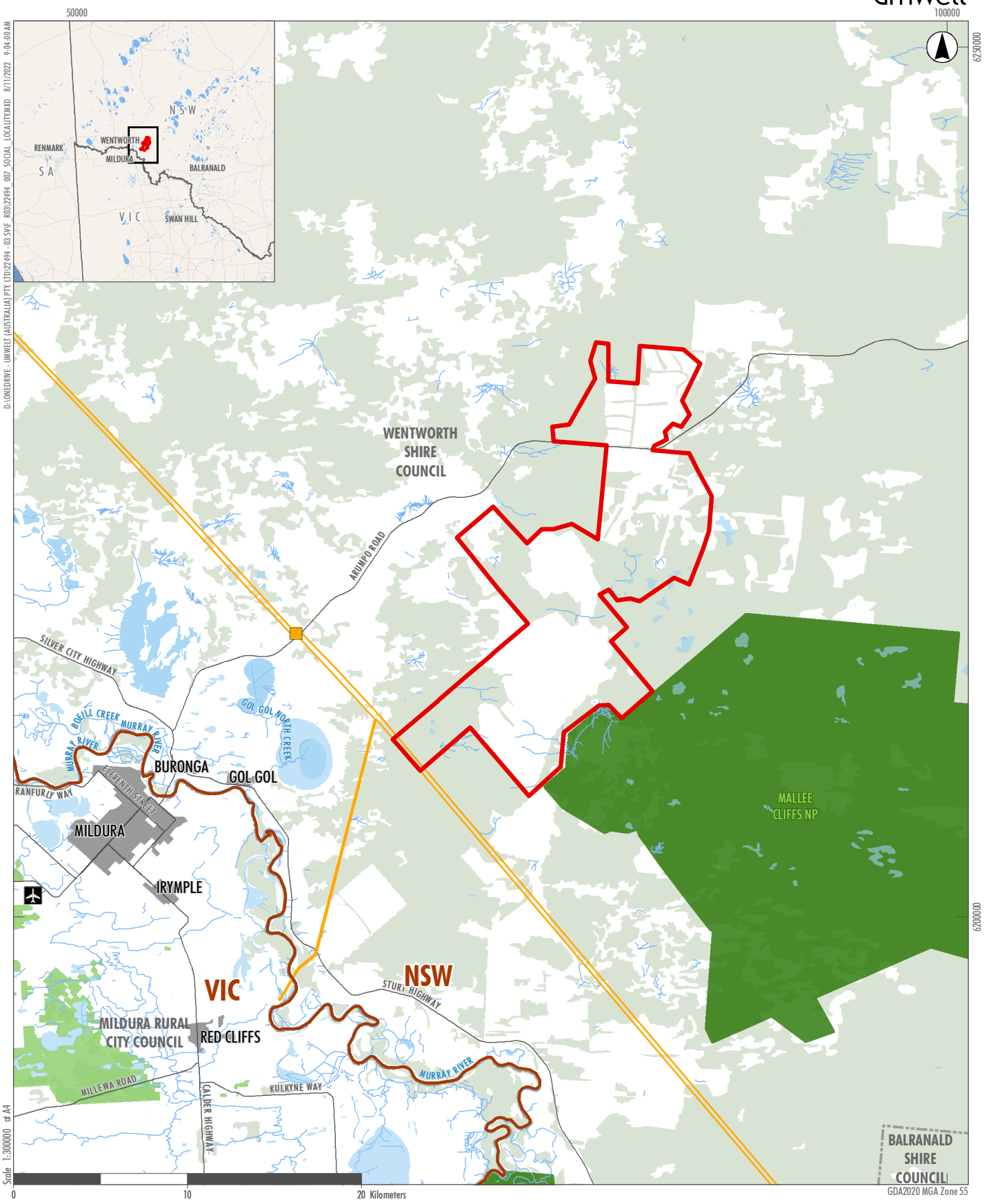
South West REZ Renewable Projects

- Solar
- Wind

FIGURE 1.1

Regional Context

Image Source: ESRI Basemap (2022) Data source: NSW LPI (2021), NSW DFSI (2021), NPWS Estate (2019), VIC DVC (2021), Forestry Corporation of VIC (2019)



Legend

- Project Boundary
- Local Government Areas (NSW/Vic)
- State Border
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- NPWS Estate
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- Native Vegetation Areas
- Waterbodies
- Major Roads
- Watercourses
- Mildura Airport
- Project EnergyConnect Corridor
- Buronga Substation

FIGURE 1.2

Project Locality

Image Source: ESRI Basemap (2022) Data source: NSW LPI (2021), NSW DFSI (2021), NPWS Estate (2019), VIC DVC (2021), Forestry Corporation of VIC (2019)

1.2.1.1 South-West Renewable Energy Zone

The NSW Electricity Strategy and Electricity Infrastructure Roadmap set 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. This builds on the NSW Transmission Infrastructure Strategy and supports the implementation of the Australian Energy Market Operator's (AEMO) Integrated System Plan.

The Project Area is located within the South-West REZ, which was chosen due to an abundance of high-quality solar and wind resources, its proximity to Project EnergyConnect (refer to **Section 1.2.1.2**), relative land use compatibility and a strong pipeline of proposed renewables projects.

The indicative location of the South-West REZ was first published in 2018, however since then, based on continued consultation with NSW Government agencies, stakeholder groups and the community, a refined geographic extent has been published, as shown in **Figure 1.3** below. Changes included an extension of the western boundary towards Buronga, to encompass strong wind resource potential in close proximity to Project EnergyConnect. The eastern and northern boundaries were also retracted to balance interactions with existing agricultural land uses, including irrigated cropping, and ensure reasonable connection distances to planned transmission infrastructure. The Project is located entirely within the declared South-West REZ boundary.

South West REZ Declaration

The South West REZ was formally declared by the Minister for Energy under section 19(1) of the Electricity Infrastructure Investment Act 2020 (the Act) and published in the NSW Gazette on Friday 4 November 2022. The REZ declaration is the first step in formalising the REZ under the Act. It sets out the intended network capacity (size), geographical area (location) and infrastructure that will make up the REZ. This enables and sets the scope of key legislative functions under the Act, including access schemes and REZ network solutions.

As Infrastructure Planner, EnergyCo will make decisions such as assessing and recommending REZ network infrastructure projects and, if needed to maintain community support for the REZ, preventing generation or storage projects from connecting in a specified area within the REZ (if those projects have not received development consent).

The declaration follows an assessment of feedback received during the draft declaration exhibition held between 25 March and 22 April 2022. All consultation feedback was addressed and resulted in some minor changes being made to the specified network infrastructure in the (final) declaration order.

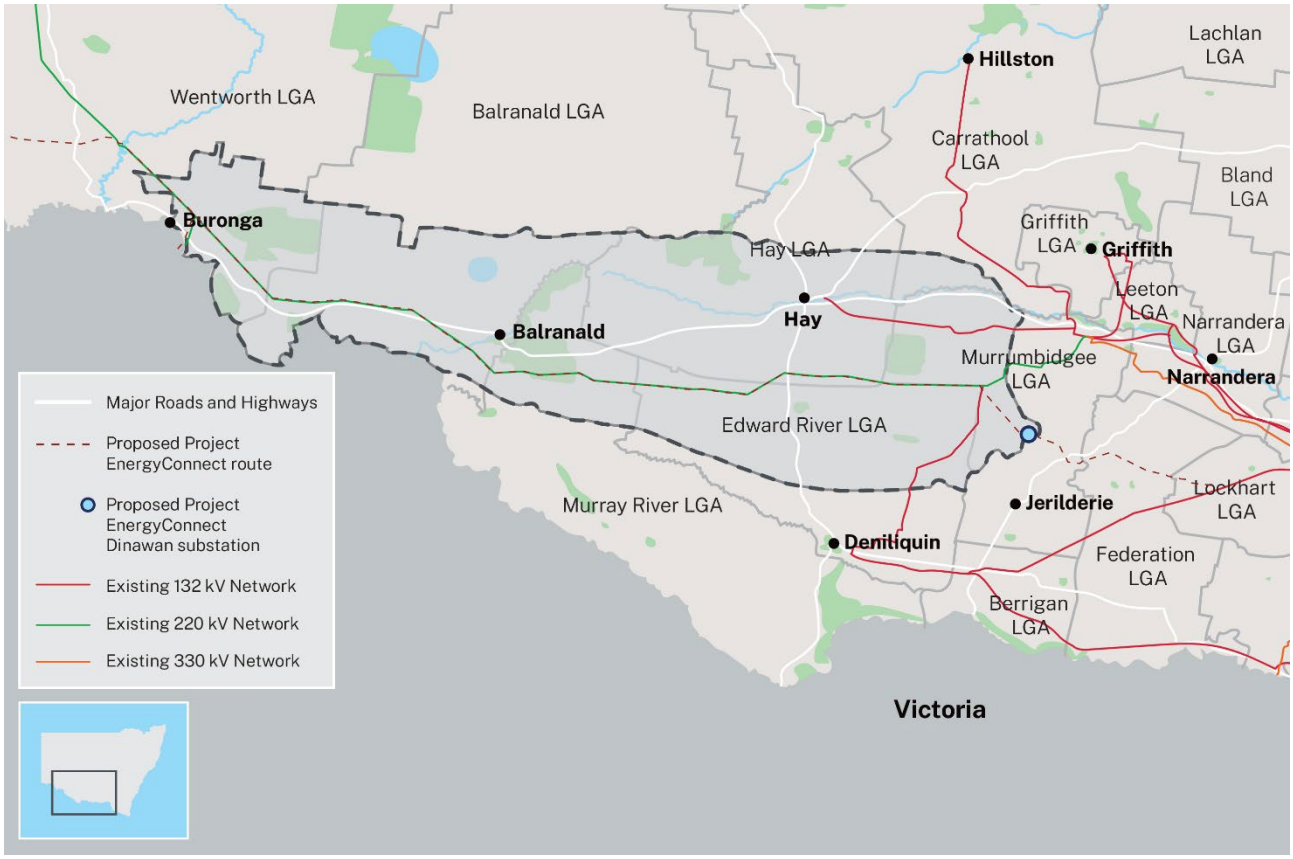


Figure 1.3 South-West Renewable Energy Zone (REZ)

Source: EnergyCo, 2022.

As noted by, EnergyCo this stylised map of the specified geographical area of the REZ is included for reference and accessibility purposes only. **Figure 1.3** does not form part of the abovementioned declaration. It includes the existing 132 kV, 220 kV and 330 kV transmission infrastructure near and in the REZ as a geographical reference. In the future, the Minister may amend the declaration to expand the specified geographical area of the REZ, increase the intended network capacity, specify additional generation, storage and network infrastructure, provide further details and specifications or correct a minor error.

Potential cumulative impacts, associated with multiple projects being developed within the South-West REZ, has been identified as a key consideration for the EIS. Further information is provided within **Section 2.4**, **Section 6.2.10** and of the **Appendix 1** (scoping summary table) of this report.

1.2.1.2 Project EnergyConnect

The South-West REZ is traversed by Project EnergyConnect, an interconnector being built by Transgrid and ElectraNet between Wagga Wagga in NSW and Robertstown in South Australia, with a connection to Red Cliffs in Victoria. The interconnector will involve the construction of a new 330 kilovolt (kV) above ground transmission line, with approximately 800 MW transfer capacity, allowing power to flow between regions in the National Energy Market and providing access to a larger number of electricity generators. The voltage and capacity of the transmission line varies with Project EnergyConnect (West) from the NSW / SA border to Buronga being 330kV, Project EnergyConnect (East) from Buronga substation to the proposed new Dinawan substation being 300kV, and the portion from the Dinawan substation to Wagga Wagga being built to enable transmission at 500kV, although it is understood it will initially be operated at 330 kV.

The NSW component is being undertaken in two stages. The Western Section, which will connect the NSW and SA transmission networks, received State and Commonwealth planning approval in late 2021. Construction of the NSW component began in early 2022 at the Buronga Substation, heading west towards the South Australia border. The second stage, which connects the Buronga and Wagga Wagga substations, was approved in early September 2022.

Project EnergyConnect is of strategic significance to the design of the Project. The 330 kV transmission line alignment runs through the southern extent of the Project Area (refer to **Figure 1.1**) and connects to the Buronga Substation. Spark are currently investigating suitable transmission line options for the Project.

The completion of Project EnergyConnect would support the South-West REZ and more broadly support the Project by unlocking up to an additional 1.2 GW of transmission capacity, transporting electricity from the South-West REZ to homes and businesses across NSW.

1.2.2 Project Background

A high-level investigation area was initially identified for the Project in 2020 to inform the preliminary design, which was approximately 17,300 ha in size. Several studies were undertaken within this investigation area to assess the feasibility of the Project location and identify key environmental constraints, including underground infrastructure, land agreements and licences, contaminated land, biodiversity and heritage. Preliminary biodiversity assessments commenced in December 2021 for the Project, which identified key biodiversity constraints within the investigation area (GHD, 2022). The investigation area was refined in September 2022 to become the current Project Area (as identified in this Scoping Report), which aims to avoid several areas of native vegetation, including areas zoned as 'C2 Environmental Conservation' under the Wentworth LEP 2011.

Spark publicly announced the plans to develop the Project in early August 2022. Community consultation commenced following the public announcement, with the first drop-in session occurring on 23 August 2022. The outcomes of the community consultation undertaken to date is detailed in **Appendix 2** and summarised in **Section 5.0**.

1.2.3 Project Objectives

The objectives of the Project are to:

- 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
- supporting Australia's transition towards clean and renewable sources of energy (with a capacity of up to 1 GW and potential to power approximately 450,000 NSW households per year)
- facilitate the shift away from coal-fired power generation, avoiding up to 2 million tonnes of CO2 emissions annually
- support existing productive agricultural land use and contribute to on farm income for host landholders
- 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 Wentworth Shire Council LGA and surrounds.

1.3 Related Development

Related development, as outlined in the NSW Government State Significant Development Guidelines (DPIE, 2021), refers to any existing or approved development that would be incorporated into, or operated in conjunction with the Project. Related development can also include development by a Proponent that is required for a Project; but is subject to a separate development approval process.

At this stage, there are no existing or approved developments that would need to be incorporated into the assessment of the Project.

1.4 Purpose of this Scoping Report

This Scoping Report has been prepared as part of the scoping process associated with the standard SSD approvals pathway. It aims to:

- describe the Project in simple terms
- include an analysis of feasible alternatives considered having regard to the objectives of the development, and identify the alternatives that will be investigated further in the EIS
- give an early indication of community views on the Project and provide an overview of the community engagement that will be carried out during the preparation of the EIS
- identify the key matters requiring further assessment in the EIS and the proposed approach to assessing each of these matters, having regard to any relevant Government legislation, plans, policies or guidelines.

This Scoping Report also aims to provide a description of the Project to key regulatory agencies and to identify the key environmental, social and economic matters of relevance to the Project to inform the preparation of the SEARs. Under the provisions of Section 4.12 (8) of the EP&A Act, an EIS is required (and will be prepared) to accompany the SSD application for the Project, to be lodged with the NSW Department of Planning and Environment (DPE) on behalf of the Planning Secretary. The SEARs will identify specific assessment considerations relevant to the Project that must be addressed in the EIS.

1.4.1 Wind Energy and SSD Guidelines

This Scoping Report has been prepared in consideration of the NSW Government – DPE – Wind Energy Guideline (the Wind Energy Guideline), dated December 2016 (DPE, 2016a), including:

- NSW Government – DPE – Wind Energy: Visual Assessment Bulletin (the Visual Bulletin), dated December 2016 (DPE, 2016b).
- NSW Government – DPE – Wind Energy: Noise Assessment Bulletin (the Noise Bulletin), dated December 2016 (DPE, 2016c).

It has also been prepared with due regard to the NSW Government – Department of Planning, Industry and Environment (formerly DPIE, now DPE) – State Significant Development Guidelines (SSD Guideline), dated November 2021 (DPIE, 2021), including where relevant:

- NSW Government – DPIE – State Significant Development Guidelines – Preparing a Scoping Report – Appendix A (SSD Guideline: Appendix A), dated November 2021 (DPIE, 2021a), referred to hereafter as the SSD Scoping Report Guideline.
- NSW Government – DPIE – State Significant Development Guidelines – Preparing an Environmental Impact Statement – Appendix B (SSD Guideline: Appendix B), dated December 2021 (DPIE, 2021b).
- NSW Government – DPIE – State Significant Development Guidelines – Preparing a Submissions Report – Appendix C (SSD Guideline: Appendix C), dated November 2021 (DPIE, 2021c).
- NSW Government – DPIE – State Significant Development Guidelines – Preparing an Amendment Report – Appendix D (SSD Guideline: Appendix D), dated November 2021 (DPIE, 2021d).
- NSW Government – DPIE – Social Impact Assessment Guideline for State Significant Projects (the SIA Guideline), dated November 2021 (DPIE, 2021e).
- NSW Government – DPIE – Undertaking Engagement Guidelines for State Significant Projects (the Engagement guidelines), dated November 2021 (DPIE, 2021f).
- NSW Government – DPIE – Cumulative Impact Assessment Guidelines for State Significant Projects (the CIA Guidelines), dated November 2021 (DPIE, 2021g).
- Additionally, Spark will have regard to any relevant Electricity Infrastructure Roadmap guidelines published by EnergyCo NSW during the development of the Project, including but not limited to the NSW Government – Office of Energy and Climate Change – First Nations Guidelines (dated August 2022) and any subsequent region-specific guideline for the South-West REZ.

1.5 Structure of this Report

As per the SSD Scoping Report Guideline, this report has the following sections:

- **Section 1.0 (Introduction)**: introduces the Proponent, the Project and provides an outline of the structure of the document.
- **Section 2.0 (Strategic Context)**: outlines the strategic context for the Project, including the justification for the Project, a summary of the locality in which the Project is undertaken and an overview of the environmental, social and economic context.
- **Section 3.0 (Project)**: contains a description of the Project, including an overview of alternatives considered and strategies to avoid and minimise environmental impacts.
- **Section 4.0 (Statutory Context)**: summarises the relevant State and Commonwealth statutory context applicable to the approval process for the Project.
- **Section 5.0 (Engagement)**: describes the stakeholder engagement program for the Project and identifies the environmental, social and economic matters identified during the scoping phase for further consideration in the EIS.
- **Section 6.0 (Proposed Assessment of Impacts)**: contains analysis of the environmental, social and economic matters relevant to the Project and the assessments proposed to be completed for the EIS.
- **Section 7.0** References.
- **Appendix 1** Scoping Summary Table.
- **Appendix 2** Social Impact Scoping Report
- **Appendix 3** Preliminary Visual Assessment.
- **Appendix 4** Preliminary Noise Impact Assessment.
- **Appendix 5** Biodiversity Constraints Assessment.
- **Appendix 6** Preliminary Heritage Constraints Assessment.

2.0 Strategic Context

2.1 Project Justification

The development of renewable energy projects aligns with both Commonwealth and NSW commitments to increase renewable energy generation and reduce carbon emissions across the NSW and Australian economies. In particular, the NSW Government is taking action to lead investment in new renewable generation to ensure an orderly transition away from coal (EnergyCo NSW, 2022), with the State's five existing coal-fired power stations scheduled for progressive closure from 2022–2023.

The proposed location of this Project is within the South-West REZ, being an area identified by the NSW Government to be targeted for renewable energy development. The five REZs across NSW form a critical component of the NSW Government's Electricity Infrastructure Roadmap (NSW Government, 2020a). The purpose of each REZ is to group new wind and solar power generation projects in areas where it can be efficiently stored and transmitted across NSW. The REZs will help to ensure reliable electricity supply and deliver lower wholesale electricity costs.

The NSW Government has also indicated that the five REZs are expected to unlock a significant pipeline of large-scale renewable energy and storage projects, while supporting private sector investment and jobs throughout regions of NSW. The NSW Government expects the South-West REZ to bring up to $2.8 billion in private investment by 2030 and, at its peak, the REZ is expected to support more than 2,000 construction jobs (EnergyCo, 2022).

As demonstrated in **Section 2.1.1** below, the Project will contribute to meeting these Commonwealth and NSW Government objectives and will provide significant renewable energy generation capacity within an area planned for renewable energy development by the NSW Government.

Furthermore, the Project will contribute capital investment, generate jobs during the construction and operational phases, provide indirect benefits to local services throughout the life of the Project, deliver additional income to Host landholders, and provide benefits to the local community through the implementation of a proposed community benefit fund.

Further details regarding Project benefits are provided in **Section 2.5**.

2.1.1 Strategic and Regional Context

2.1.1.1 Commonwealth Policy

Australia is one of the 192 countries from around the world signed to the international climate change agreement (The Paris Agreement). The Paris Agreement aims to:

- hold the increase in the global average temperature to below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels
- increase the ability (of nations) to adapt to the adverse impacts of climate change and foster climate resilience and low GHG emissions development, in a manner that does not threaten food production
- make finance flows consistent with a pathway towards low GHG emissions and climate resilient development.

The Paris Agreement seeks to meet its objectives by developing programs and mechanisms that:

- Require participating Parties to prepare and communicate GHG mitigation contributions. Parties were expected to set mitigation targets for 2020, and then develop new targets every five years. Each successive target is expected to represent a larger mitigation effort than the previous target.
- Promote climate change resilience and adaptation.
- Provide mitigation and adaptation funding to developing countries.
- Foster mitigation and adaptation technology transfer between Parties.
- Require participating Parties to report progress towards their mitigation contributions on an annual basis.

Australia signed The Paris Agreement on 22 April 2016. The obligations under The Paris Agreement are driving national GHG policy between 2020 and 2030. Australia's commitment to The Paris Agreement includes reducing GHG emissions by 26% to 28% on 2005 levels by 2030 (Commonwealth of Australia, 2021). Australia's Nationally Determined Contribution (NDC) prescribes an unconditional economy-wide target to reduce GHG emissions, and states that future policies will target emissions generated from energy use, industrial processes, agriculture, land-use, land-use change and forestry and waste.

The Project, as a large-scale renewable energy project, will contribute to achieving Australia's GHG emission reduction targets through reducing emissions from energy production in NSW.

2.1.1.2 NSW Policy

NSW Climate Change Policy Framework

The NSW Government has developed its NSW Climate Change Policy Framework, which aims to deliver net zero emissions by 2050, and a State that is more resilient and responsive to climate change (NSW Government, 2016).

Under the NSW Climate Change Policy Framework, NSW has committed to both follow the Paris Agreement and to work to complement national action.

The policy framework is being delivered through:

- the Climate Change Fund
- developing an economic appraisal methodology to value GHG emissions mitigation
- embedding climate change mitigation and adaptation across government operations
- building on NSW's expansion of renewable energy
- developing action plans and strategies.

In 2013, the NSW Government released the Renewable Energy Action Plan (REAP) and the NSW Energy Efficiency Action Plan (EEAP). The REAP aimed to increase the generation, storage and use of renewable energy in NSW, at least cost to customers and with maximum benefits to NSW. The three core goals of the REAP were to attract renewable energy investment, build community support for renewable energy and attract and grow expertise in renewable energy. Based on the implementation of the REAP, renewable energy is now well-placed to play a leading role in meeting NSW's energy needs into the future.

The location of the Project is mapped as an area with high wind renewable energy source potential under the NSW REAP. The Renewable Energy Resource Mapping (DPIE, 2019) is reproduced in **Figure 2.1**, which indicates the existing wind resources applicable to the Project Area. As shown in **Figure 2.1**, publicly available data indicates that the site has a good wind resource with consistently high wind speed across the entire site. On-site monitoring has been conducted on site with measurements up to the proposed hub height, which confirmed the presence of a very good wind resource. This high wind resource makes the location suitable for a productive wind farm.

NSW Electricity Strategy and Electricity Infrastructure Roadmap

Current and future electricity development in NSW is supported though the NSW Government's Electricity Strategy and the NSW Electricity Infrastructure Roadmap (NSW Government, 2020a) which builds on the framework set out in the Electricity Strategy taking an integrated approach to all demand and supply options, including action by households and small businesses, demand management and investment in large-scale, affordable and reliable generation.

EnergyCo NSW has been appointed as the Infrastructure Planner for the South-West REZ and will lead development of this REZ.

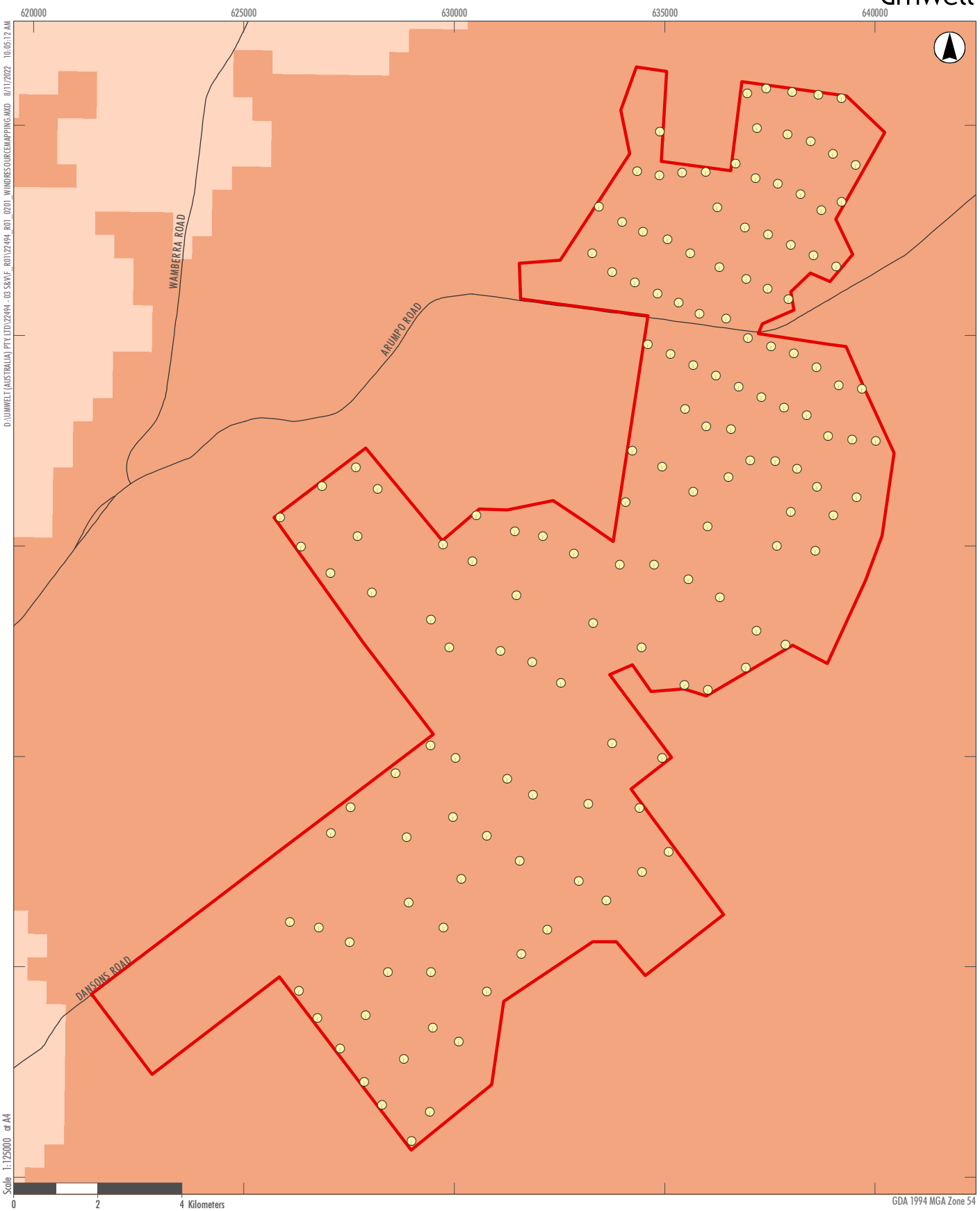
South-West REZ

The indicative location of the South-West REZ was first published in 2018 following a detailed state-wide geospatial mapping exercise overlaying 25 data layers, including renewable energy resource potential, proximity to the existing electricity network and existing land uses such as agricultural lands and biodiversity conservation. The geographical extent of the South-West REZ was subsequently refined through an ongoing process of consultation with NSW Government agencies and stakeholder groups.

As discussed in **Section 1.2.1.2**:

- The South West REZ was then formally declared by the Minister for Energy under section 19(1) of the Electricity Infrastructure Investment Act 2020 and published in the NSW Gazette on Friday 4 November 2022. The REZ declaration is the first step in formalising the REZ under the Electricity Infrastructure Investment Act 2020. It sets out the intended network capacity (size), geographical area (location) and infrastructure that will make up the REZ. This enables and sets the scope of key legislative functions under the Act, including access schemes and REZ network solutions.
- The region is traversed by Project EnergyConnect, an interconnector being built by Transgrid and ElectraNet. The South-West REZ has potential to be further boosted by the construction of the HumeLink and Victoria-NSW Interconnector West projects, which are new 500kV transmission lines proposed by TransGrid which would provide additional transmission between the South-West REZ and Sydney and Melbourne respectively.

Based on the current mapping, the Project is wholly located within the current South-West REZ (refer to **Figure 2.2** below). The Project is consistent with the objectives of the Electricity Strategy and Infrastructure Road Map, in aiming to provide large-scale renewable electricity generation that is affordable and reliable.



Legend

- Project Boundary
- Potential Wind Turbine Generator Locations
- Road

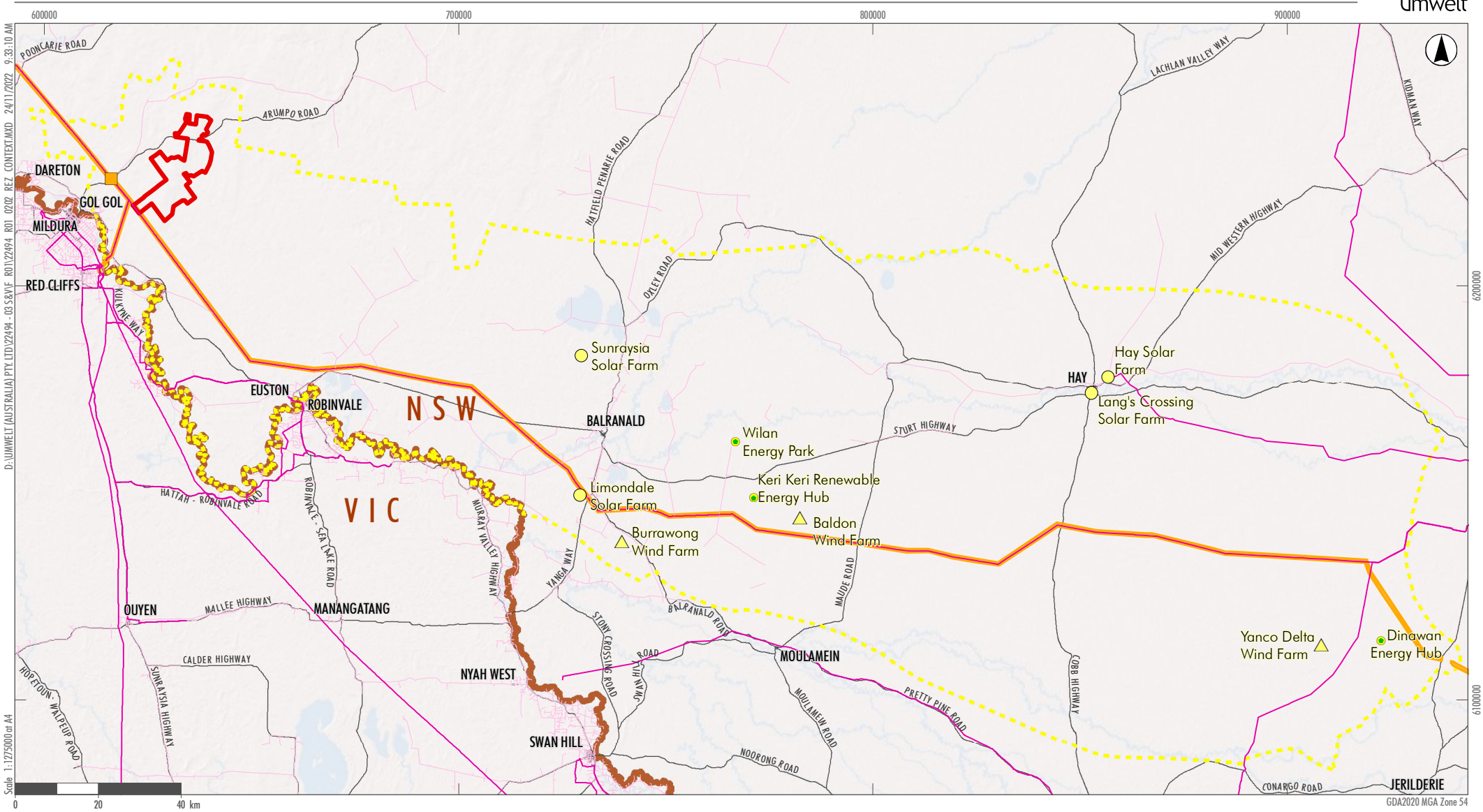
Wind speed (metres per second)

- 6.5 - 7.0
- 7.0 - 7.5

FIGURE 2.1

Wind Resource Mapping

Data source: DFSI (2021); DNV GL



Legend

- Project Boundary
- State Border
- Project EnergyConnect Corridor
- Buronga Substation
- South-West REZ Boundary (Indicative only)

Existing Powerlines

- Voltage 66 kV and above
- Voltage below 66 kV

South-West REZ Renewable Projects

- Renewable Energy Hub
- Solar
- Wind

FIGURE 2.2

Project Context in South-West REZ

Image Source: ESRI Basemap (2022) Data source: NSW DFSI (2021), VIC DELWP (2022)

2.1.2 Regional and Local Plans

2.1.2.1 Far West Regional Plan 2036

The Far West Regional Plan 2036 (FWRP) is the NSW Government's strategy for guiding land use planning decisions for the Far West Region over the next 14 years. The vision of the FWRP is to create a 'diverse economy, supported by the right infrastructure, an exceptional natural environment and resilient communities' (DPE, 2017). The supporting goals of the FWRP are to create:

- a diverse economy with efficient transport and infrastructure networks
- exceptional semi-arid rangelands traversed by the Barwon-Darling River
- strong and connected communities.

The FWRP promotes further development of renewable energy across the Far West region of NSW through Direction 4, being '*Diversify energy supply through renewable energy generation*'. The region is identified as having significant potential for renewable energy industries, including wind power generation, large-scale solar energy and bioenergy generation.

The Project is considered to be consistent with the vision of the FWRP, particularly in light of the proposed development of renewable energy generation.

2.1.2.2 Wentworth Shire Council Draft Local Strategic Planning Statement

The Wentworth Shire Council Draft Local Strategic Planning Statement (Wentworth Shire LSPS) (Wentworth Shire Council, 2020) establishes a 20-year vision for land use planning in the Wentworth Shire. The Wentworth Shire LSPS gives effect to the Far West Regional Plan 2036, implementing the directions and actions at a local level with a suite of planning priorities. Specifically, in relation to the Project, Planning Priority 3 of the Wentworth Shire LSPS is to 'Manage resources and renewable energy', where Wentworth Shire proposes to capitalise on its solar and wind endowments, as well as its strategic location on the transmission network. Additionally, the Wentworth Shire LSPS proposes to provide additional accommodation supply for construction workforces associated with the development of renewable projects in Wentworth and adjoining council areas.

The Project is considered consistent with the objectives and strategic visions of the Wentworth Shire LSPS, as it will promote renewable energy infrastructure development.

2.2 Site Context

The Project Area falls entirely within the Wentworth Shire LGA. The closest larger population centres are Mildura (22 km south west of the Project Area, population 32,738) and Wentworth (40 km west of the Project Area, population 2,369) (ABS, 2021). Smaller townships of Mallee, Red Cliffs, Trentham Cliffs and Buronga are nearer to the Project.

The Project Area is located mostly east of the Arumpo Road, however this road intersects the northern extent of the Project Area in an east to west direction. The Project Area is located approximately 12 km north-east of Sturt Highway and directly borders the western extent of the Mallee Cliffs National Park. Calder Highway is located approximately 15 km south-west of the Project Area, while the Silver City

Highway is located approximately 38 km west of the Project Area. The Cobb Highway is situated ~200 km east of the Project Area.

As discussed in **Section 1.2.1**, the Project Area is zoned as RU1 Primary Production within the Wentworth LEP 2011. There are pockets of land surrounding the Project Area zoned as C2 Environmental Conservation, all of which are outside of the proposed WTG locations. The Project Area is bordered by Mallee Cliffs National Park to the south-east, which is zoned as C1 National Parks and Nature Reserves.

Additional contextual features of the Project Area are summarised below and addressed further in subsequent sections of this Scoping Report (where necessary):

- **Crown Lands:** The Project Area currently includes a mix of Crown Land and Freehold Land. Landowners are currently in the process of converting the Crown Land to Freehold Land. If this process is not successful or possible within the required timeframe, works that may intercept areas of Crown Land may require changes to the landowner leases. This will be investigated further during preparation of the EIS, in consultation with the host landowners and Crown Lands (part of the Department of Planning and Environment). Refer to **Section 2.3** for more detail.

- **Community**: Several SSD projects at various stages of development are present within the region and the South-West REZ more broadly (as outlined in **Section 2.4** below), which are of relevance to local communities. Cumulative impacts are addressed within **Section 6.2.10** and then **Appendix 1** of this report. Further discussion regarding local community and other stakeholders is provided in **Section 5.0** and the Social Impacts Scoping Report (SISR) provided as **Appendix 2**.

- **Land Use**: Agricultural land uses are prevalent within and surrounding the Project Area. There are no areas of mapped Biophysical Strategic Agricultural Land (BSAL). There is one existing Minerals Exploration Licence (EL9459) and one Minerals Assessment Lease (AL24) within the Project Area, and two Minerals Assessment Leases (AL26 and AL27) to the immediate east of the Project Area. There are also several Minerals Exploration Licences to the west and south of the Project Area. Spark has commenced consultation with the holders of these licences and leases and will progress this matter further during the preparation of the EIS.

- **Biodiversity**: The Project Area comprises of agricultural land, including cropping land and grazed land, as well as uncleared remnant vegetation. The remnant woodland has been retained as small patches scattered across the Project Area. Further discussion around biodiversity values within the Project Area is provided in **Section 6.2.3**.

- **Traffic and Access**: The Sturt Highway is located to the south of the Project Area and acts as the primary connection between Wagga Wagga and the Far West region. Other key routes in the locality include the Silver City Highway, Cobb Highway and Calder Highway (refer to **Figure 3.2**). Further discussion around traffic, transport and access is provided in **Section 6.2.5**.

- **Topography:** The topography of the Project Area is relatively flat and homogeneous ranging from between 50– 130 m Australian Height Datum (AHD). The closest national park, state park or nature reserve is the Mallee Cliffs National Park which is adjacent to part of the eastern boundary of the Project Area (refer to **Figure 1.2**).

- **Hydrology:** There are several small unnamed watercourses within the Project Area (refer to **Section 6.2.8**). No flood prone land or flood management areas are identified within the Project Area,

however the Murray River has been identified as flood prone land under the Wentworth LEP 2011, which is located 8.5 km south-west of the Project Area. Further discussion around water and soil resources relevant to the Project is provided in **Section 6.2.8**.

- **Hazards:** With areas of remnant or plantation vegetation, bushfire presents a potential hazard for the Project Area. The EIS will include an assessment of potential hazards associated with the Project. Further discussion around hazards and safety is provided in **Section 6.2.7**.

2.2.1 C1 and C2 Zoned Lands

The closest areas of C2 'Environmental Conservation' land are situated a) south of the Project Boundary near wind turbines T3, T5, T10, T15, T19 and T25, b) east of the Project Boundary (between the Project and Mallee Cliffs National Park) near wind turbines T94, T107 and T126, c) west of the Project Boundary (and near the nominated site entrances) near wind turbines T64, T65 and T72, and d) north of the Project Boundary near wind turbines T75, T76, T83, T91, T110, T112 and T104. Each of these C2 zoned lands contain mature stands of native vegetation and designate areas with higher ecological value. The Mallee Cliffs National Park (situated approximately 200 m east of the Project Area) was created in April 1977.

It covers an area of 57,969 ha. It protects extensive areas of flat to undulating sandy red plains and linear sand dunes formed during arid periods from 350,000 to 500,000 years ago. The park contains a number of isolated, relict, plant communities that demonstrate shifts in the pattern of vegetation arising from long-term environmental change. Mallee Cliffs National Park is managed to protect the sand plain and sand dune land systems and ecological communities. Emphasis is placed on the value of Mallee Cliffs National Park as a wildlife conservation area. A policy of restricted public access for education purposes is maintained to assist in meeting conservation objectives. The park is used for educational activities by schools and colleges. Research activities which are relevant to the management of the Park and compatible with conservation objectives are encouraged. (NPWS, 2022).

The EIS will include a biodiversity assessment of potential impacts within the Development Corridor and surrounds including the values of the adjacent Mallee Cliffs National Park and land zoned 'C2 Conservation'. This will include consideration of potential impacts to biodiversity conservation activities such as species reintroductions and rewilding in the Mallee Cliffs National Park. The BDAR will assess the Project's potential direct and indirect impacts to species and communities, including consideration of any edge effects or habitat connectivity features. The 'Mallee Cliffs National Park Plan of Management' (NPWS, 2018) and 'Mallee Cliffs National Park Fire Management Strategy' (NPWS, 2013) are also in place and will be considered further during the EIS phase of the Project. Consultation with NPWS (commenced during the Scoping Report stage of the Project) will also be progressed during the EIS.

2.3 Crown Land Leases

As noted above, the Project Area contains a mix of Crown Land and Freehold Land, which is outlined in **Table 2.1** and then illustrated in **Figure 2.3** below.

Land Parcels within the Project Boundary that are mapped as Crown Land (i.e. Lot 1726/DP763664, 1727/DP763667 and 3805/DP763156) are those associated with Crown Lands leases, established by the Host landholders as part of the broader Crown Lands 'Western Division'.

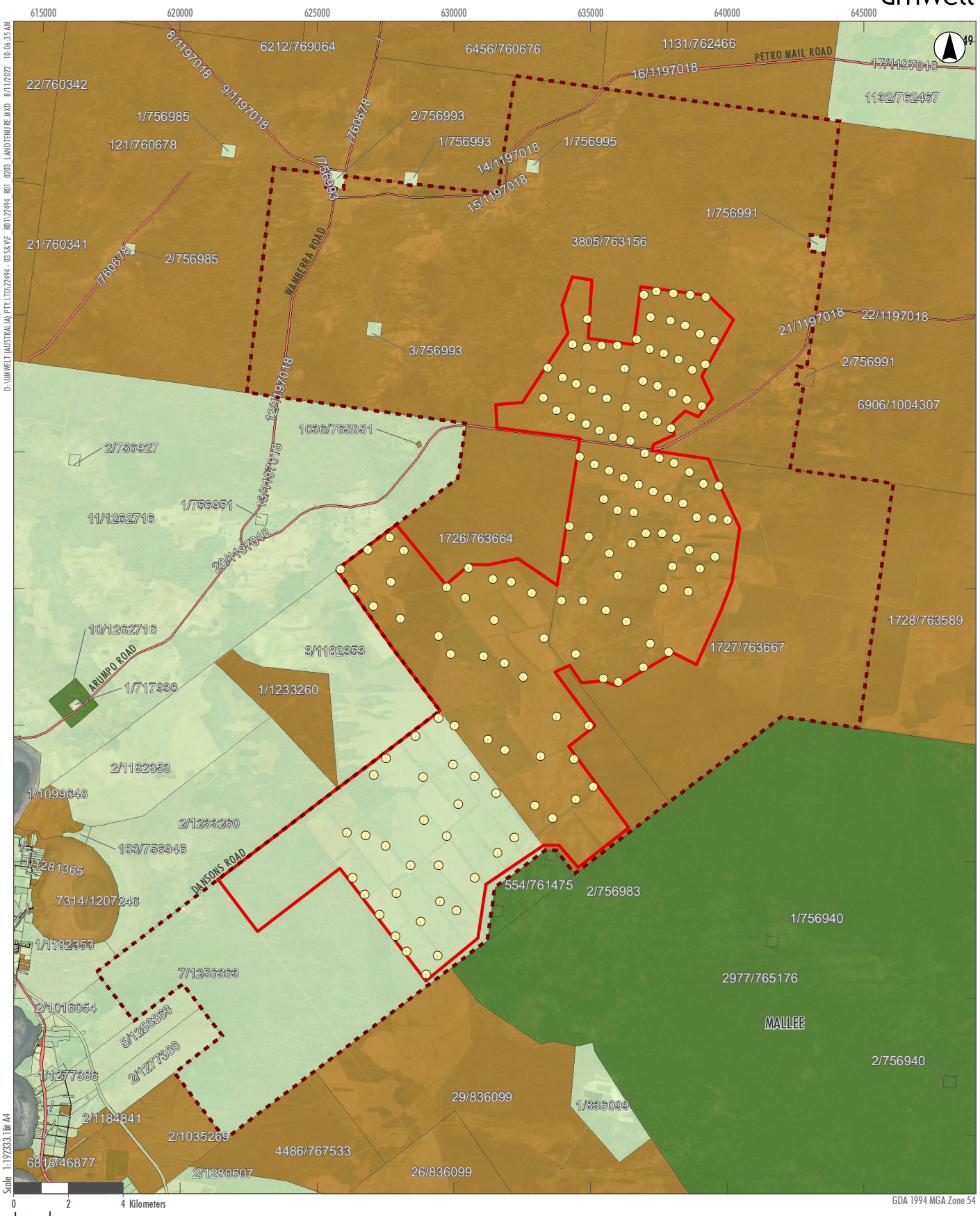
Host landholders aim to purchase the Crown Land lease to obtain freehold title, prior to determination of the Project. This will occur under provisions of the *Crown Land Management Act 2016*, inclusive of special provisions applicable to land in the Western Division, and any other related legislation.

If the host landowners are not able to obtain freehold title within the required timeframe, works that may intercept areas of Crown Land may require changes to the landowner leases. This will be investigated further during preparation of the EIS, in consultation with the host landowners and Crown Lands.

Although progressed by Host landholders, Spark has also commenced consultation with the 'Department of Planning and Environment – Crown Lands' on this matter, which will be further investigated during the preparation of the EIS.

Table 2.1 Crown Lands within the Project Area

Lot/DP	Land Tenure	Ownership
7/DP1256363	Freehold	Landowner 1
1726/DP763664	Crown	Landowner 2
1727/DP763667	Crown	
3805/DP763156	Crown	Landowner 3



Legend

- Project Boundary
- Host Landholder Boundary
- Potential Wind Turbine Generator Locations

Land Tenure

- Crown
- Freehold
- NSW Government
- Local Government Authority Roads

FIGURE 2.3

Land Tenure

Data source: DFSI (2022)

2.4 Cumulative Impact Considerations

A key component of environmental impact assessment is the consideration of cumulative impacts. The Project will be assessed in accordance with the requirements of the Cumulative Impact Assessment Guidelines for State Significant Project (CIA Guidelines) (DPIE, 2021g), which sets clear expectations and requirements for assessing project-level cumulative impacts related to SSD projects. The EIS will consider other relevant construction, industrial and employment-generating projects within the locality.

There are a number of renewable energy projects within and in the vicinity of the South-West REZ, at different stages of the approval process (refer to **Figure 2.1** and **Table 2.2**) however, and as identified in the below table, many are situated at substantial distance (> 60 km) from the Project. It is however anticipated that there will be additional renewable energy projects proposed in the vicinity of the Project that are not publicly known at the time of preparing this report. At the time this Scoping Report was prepared, the closest renewable energy development to the Project is the Sunraysia Farm, a utility-scale solar photovoltaic (PV) farm located approximately 100 km east of the Project.

Given the strategic importance of the South-West REZ for the NSW Electricity Infrastructure Roadmap and the number of approved and proposed renewable energy projects in the region, the potential for cumulative environmental, social and economic impacts will require detailed consideration during the EIS phase of the Project, in line with the CIA Guidelines.

Further information regarding potential cumulative impacts is provided within **Section 6.2.10** and of the **Appendix 1** (scoping summary table) of this report.

Table 2.2 Renewable Energy Projects Surrounding the Project

Project	Status	Generation Capacity (MW)	Potential Construction Start Date	Distance from Mallee Wind Farm	Potential for Cumulative Impacts
Sunraysia Solar Farm	Approved	200	Operating	>60 km	No
Darlington Point Solar Farm	Approved	275	Operating	>60 km	No
Yanco Delta Wind Farm	Proposed	730	2024	>60 km	No
Hay Solar Farm	Approved	110	Operating	>60 km	No
Coleambally Solar Farm	Approved	150	Operating	>60 km	No
Coleambally Battery Energy Storage System	Proposed	200	Unknown	>60 km	No
Woodland Battery Energy Storage System	Proposed	200/800 MWh	Unknown	>60 km	No
Riverina/Darlington Point Energy Storage Systems	Proposed	150/300 MWh	Unknown	>60 km	No
Currawarra Solar Farm	Approved	195	Operating	>60 km	No
Southdown Solar Farm	Proposed	70	Unknown	>60 km	No
Tarleigh Park Solar Farm	Approved	90	Operating	>60 km	No
Finley Solar Farm	Approved	170	Operating	>60 km	No
Baldon Wind Farm	Proposed	1000	Unknown	>60 km	No

Project	Status	Generation Capacity (MW)	Potential Construction Start Date	Distance from Mallee Wind Farm	Potential for Cumulative Impacts
Keri Keri Solar Farm	Proposed	1000	2024	>60 km	No
Keri Keri Wind Farm	Proposed	N/A	2024	>60 km	No
Burrawong Wind Farm	Proposed	750	2023	>60 km	No
Limondale Solar Farm	Approved	250	Operating (modification for BESS approved)	>60 km	No
Dinawan Energy Hub	Proposed	2500	Unknown	>60 km	No
Wilan Energy Park	Proposed	800	Unknown	>60 km	No
The Plains Renewable Energy Park	Proposed	400	Unknown	>60 km	No
Lang's Crossing Solar Farm	Approved	5	Unknown	>60 km	No

2.5 Planning and Other Agreements

Should the Project be approved, Spark will enter into a planning agreement (PA) in accordance with the requirements of the EP&A Act. The PA will be negotiated with the relevant Council(s) for the provision of infrastructure or other items to support local communities.

2.6 Project Benefits

The Project will provide long-term, strategic benefits to the state of NSW, including:

- 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 450,000 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 and Edward River LGAs and surrounds
- provide energy storage for sustainable renewable energy to enable continuous and reliable electricity output as part of a rapidly expanding industry in NSW
- The Project will also provide direct and indirect financial benefits to the regional and local community, including:

- employment generation creating approximately 250 jobs during the construction phase and approximately 50 jobs during the operational phase
- flow on economic benefits to local services through the construction and operation phases
- additional income to Host landholders with flow on economic benefits to the local community, and
- the development of a Community Benefit Fund.

3.0 Project

3.1 Project Summary

The proposed development is seeking approval for up to 150 wind turbines, with a maximum blade-tip height of 280 m AGL and a generating capacity of up to 1,000 MW (1 GW). A single grid-scale BESS is also proposed and will allow for the capture and storage of dispatchable energy for up to four hours, to be distributed to the electricity grid as required and utilised to provide additional grid services. The power generated by the Project (from wind turbines or released from battery storage) will feed into the electricity grid (National Energy Market, NEM) via direct connection to the existing 220kV transmission line or the new 330kV Project EnergyConnect line. The key components of the Project include:

- up to 150 (3 blade) WTGs, with a maximum blade-tip height of 280 m AGL
- power infrastructure providing connection to the NEM i.e. on-site substations/switchyards and an external transmission line to connect the proposed wind turbines to either the 'Project EnergyConnect' or the existing 220kV south of the Project Area
- internal electrical reticulation network i.e. electrical connections between the proposed wind turbines and substations consisting of a combination of underground cables and overhead powerlines
- other associated permanent infrastructure including hardstands, new access tracks, upgrades to existing access tracks, access point/s from public roads, operation and maintenance buildings
- a single grid-scale BESS (~300 MW, four-hour battery)
- permanent and temporary meteorological monitoring masts
- temporary construction facilities including:
    - construction compound/s and site office buildings and storage areas, including fencing and screen as required
    - on-site concrete batching plants for use during the construction phase
    - laydown areas used for wind turbine installation and storage of wind turbine components
    - potential construction material areas such as borrow pits, quarry and rock crushing facilities
- targeted road network upgrades to facilitate delivery of wind turbine components to the Project site as required.

The indicative Project layout is shown on **Figure 3.1**. The indicative Project components are provided in **Table 3.1** noting that these will be subject to further refinement as part of ongoing design development and the planning and approvals process.

Table 3.1 Indicative Project Components and Approximate Dimensions

Project Component(s) / Infrastructure	Approximate Dimensions	Quantity
WTGs		
WTG height	Up to 280 m	Up to 150
Rotor diameter	Up to 210 m	
Uppermost blade tip	280 m	
Lowermost blade tip	~50 m	
Tower (hub) height	Up to 170 m	
WTG foundations	30 m diameter	
Ancillary Infrastructure		
Main (on-site) substations/switchyards, for grid connection	250 m x 250 m	3
Overhead transmission lines (high to low voltage)	Up to around 23 km of internal overhead cables i.e. high voltage transmission lines from the wind farm to the grid connection point.	n/a
Underground transmission cables (medium to low voltage)	<150 km	n/a
Crane hardstands	75 m x 75 m	Multiple
Internal access tracks	Up to 150 km	n/a
Primary site access point	Subject to intersection design	2
Operations and maintenance facility	300 m x 250 m	1
Permanent meteorological masts	125 m to 200 m high	5
Battery Energy Storage System		
Facility/compound	300 m x 300 m	1
Temporary Construction Facilities		
Main Construction Compound	200 x 200 m	1
Construction site compounds, including: • construction laydown areas for equipment and supplies • concrete batching plants • construction compounds, site office, etc.	150 x 150 m	Up to 2
On-site concrete batching plants	50 m x 100 m	Within Construction Site Compounds
Rock crushing facilities	50 m x 100 m	
Site compound and office	150 m x 150 m	
Stockpiles and materials storage compounds	Subject to construction requirements	
Laydown Areas	Subject to construction requirements	
Temporary meteorological masts	125 m to 200 m high	5

The proposed Project infrastructure (as summarised in **Table 3.1** above) would be contained within the Project Area, including WTG blades. The proposed layout allows for micro-siting and will be subject to further detailed design as the environmental, social and economic impact assessments progress.
The conceptual design for the EIS will include a Development Corridor within which infrastructure and WTGs will be placed, providing the necessary flexibility for the detailed design of the Project whilst also allowing a detailed environmental assessment process to be completed.

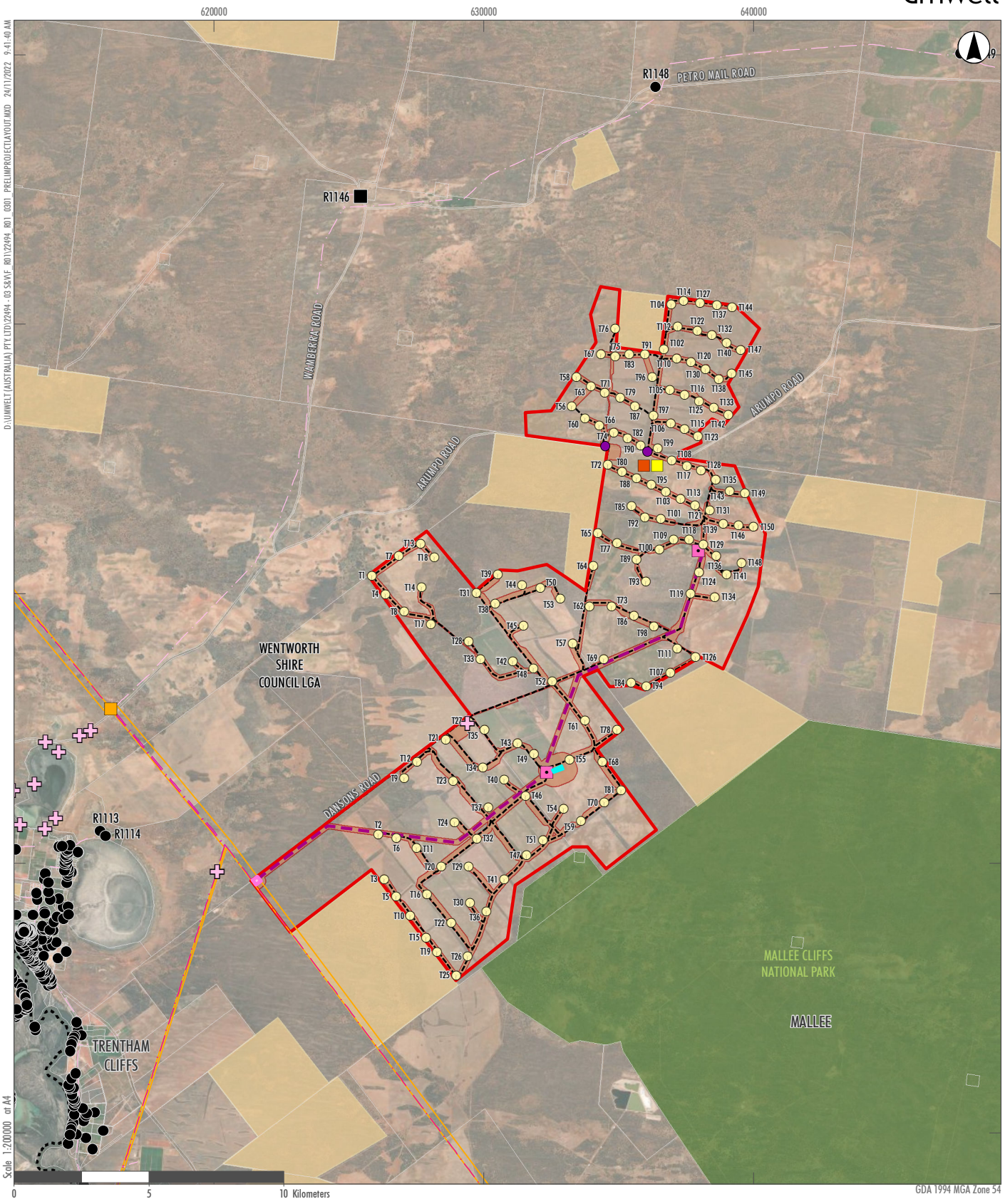
3.1.1 Anticipated Timeframes

Construction works will commence as soon as practical following Project approval (which is estimated to be mid to late 2024). The timing of construction will be driven by additional permits and authorisations, contractor selection, detailed design and procurement processes, and a final investment decision.
The construction phase of the Project is anticipated to be 2.5 to 3 years. The Project has an estimated operational life of 30 years after which it may be decommissioned or re-powered.

In summary the anticipated timeframes for the Project are:

- **Planning and approvals**: in progress and aiming to be completed in mid to late 2024.
- **Construction and Commissioning**: planned to commence in 2025, for approximately 2.5 to 3 years.
- **Operation**: planned to commence in 2027 with full scale operations planned for 2028, with an estimated operational life of 30 years.

As is typical for projects of this scale and nature, construction and operation could be undertaken in stages. Spark aim to construct the Project as a single stage of development but is seeking flexibility to construct the Project in stages, if required and depending on factors such as grid connection capacity and the outcomes of competitive Long-Term Energy Service Agreements and REZ Access Rights tenders.



Legend

- Project Boundary
- Lot Boundary
- Local Government Area Boundary
- National Parks (NPWS Estate)
- C2 Environmental Conservation - Land Zoning
- Project EnergyConnect Corridor
- Buronga Substation

Existing Powerlines

- Voltage 66 kV and above
- Voltage below 66 kV

- Aboriginal Sites

Dwellings

- Host Landholder Dwellings
- Non-associated Landholder Dwellings

Project Infrastructure

- Potential Transmission Line
- Potential Access Tracks
- Potential Wind Turbine Generator Locations
- Potential Internal Substation Locations
- Operations & Maintenance Facility
- Construction Site Compound
- Site Entrances

- Development Corridor
- Potential BESS Location
- Potential Switchyard Substation

FIGURE 3.1

Preliminary Project Layout

Image Source: ESRI (2022) Data source: DSFI (2020)

3.2 Wind Turbine Generators

The Project is designed to accommodate approximately 150 WTGs of up to 280 m in height. This enables a conservative assessment allowing for WTG advances between the time of assessment for the Project and the commencement of construction. A candidate turbine model has not been selected and multiple WTG options will be investigated further during the EIS, with potential worst-case parameters being assessed across various models/options. The WTGs will be three-bladed with the rotor and nacelle mounted on a tower with an internal ladder or lift. The WTGs would be installed at final locations to be confirmed within a 100 m micro-siting buffer of the proposed locations identified in the EIS, with the current conceptual locations shown on **Figure 3.1**.

3.3 Battery Storage

Battery storage forms part of the Project to allow for the storage and discharge of energy. Storage of energy can add significant benefits to renewable generation because it allows for the dispatch of energy in accordance with market demand and overcomes potential issues associated with intermittency of output from the WTGs. The indicative electrical capacity of the battery storage is 300 MW / up to 1,200 MWh, (alternatively known as a 300 MW, up to four-hour battery).

The battery storage will be connected to the WTGs and substations via underground and/or overhead cables. Potential locations are shown on **Figure 3.1** however, these locations are subject to further design work and the storage facilities may be co-located with other compounds within the Project Area. The final design of the battery storage will depend on the technology selected during detailed design.

3.4 Ancillary Infrastructure

Ancillary infrastructure required to support the construction and operation of the Project is presented in **Table 3.1** above and includes, but is not limited to:

- main substation and switchyards
- underground and overhead transmission lines
- temporary and permanent offices and site compounds
- a permanent operations and maintenance facility
- permanent meteorological masts
- hardstands
- internal access tracks and site access points.

Temporary facilities will include site offices and compounds, rock crushing facilities, concrete batching plants, stockpiles and materials storage compounds, temporary laydown areas, minor construction access roads, temporary meteorological masts. All temporary facility sites will be rehabilitated once they are no longer required.

3.4.1 Grid Connection

As noted in **Section 3.1** above, the Project will include power infrastructure providing connection to the NEM. This will occur via on-site substations and an external switchyard and transmission line to connect the proposed wind turbines to either the 'Project EnergyConnect' transmission line or the existing 220kV transmission line south of the Project Area. These two grid connections are preferred because of secured landowner agreement and minimising the overall distance of the proposed ancillary infrastructure.

An alternate option, which would have provided grid connection via the Buronga Substation was considered and explored during the scoping phase of the Project. However, this option is not viable due to land access restrictions and will not be progressed. This alternate option was removed from the Project design during the late stages of finalising this Scoping Report , despite any reference to it that may remain within specialist studies and reports appended herein.

Further information regarding the grid connection / transmission line alternatives is provided in **Section 3.8** of this report.

3.5 Temporary Accommodation Camp

Spark will consult closely with key stakeholders during the preparation of the EIS to assess whether existing accommodation facilities in the local area have sufficient capacity for the Project's construction workforce (in combination with other large-scale renewable energy projects within the South-West REZ).

Opportunities will be investigated for the re-use of the EnergyConnect accommodation camp.

3.6 Access

3.6.1 Project Site Access

Access to the Project Area is proposed via the existing road network. Primary access will likely be via Arumpo Road off the Sturt Highway, which provides connection to Adelaide and Wagga Wagga. The proposed site access points are shown on **Figure 3.2**. Arumpo Road traverses the Project Area in an east to west direction.

The site access point, local access road connections and approach routes to the Project will require further investigations during preparation of the EIS; and will be developed in combination with site planning and wind turbine location selection. Given the large geographical area of the Project, multiple site access points may also be considered by the Proponent to facilitate the ready access and delivery of wind turbine components. **Figure 3.2** depicts the indicative locations of the Project site access points which would be gated and secured, and appropriate warning signs erected.

The Project will seek to allow heavy and light vehicles to use other public roads not discussed above, but only to:

- undertake pre-construction minor works
- construct intersection upgrades, if necessary
- undertake dust suppression
- procure resources from licenced operators which are located along these roads.

Over-sized, over-mass (OSOM) vehicle transport will be required to transport WTG components to the Project Area from several ports across Australia. A preferred port and transport route has not yet been established, but several options are available as indicated in **Figure 3.2**.

The preferred transport route of WTG components and other Project related materials will be confirmed through a port and transport route assessment, which will be prepared as part of the EIS. Outcomes of the port and transport route assessment will be incorporated into the EIS traffic and transport impact assessment. This assessment will include identification of a proposed transport route from the preferred port to the Project Area, as well as any road upgrades.

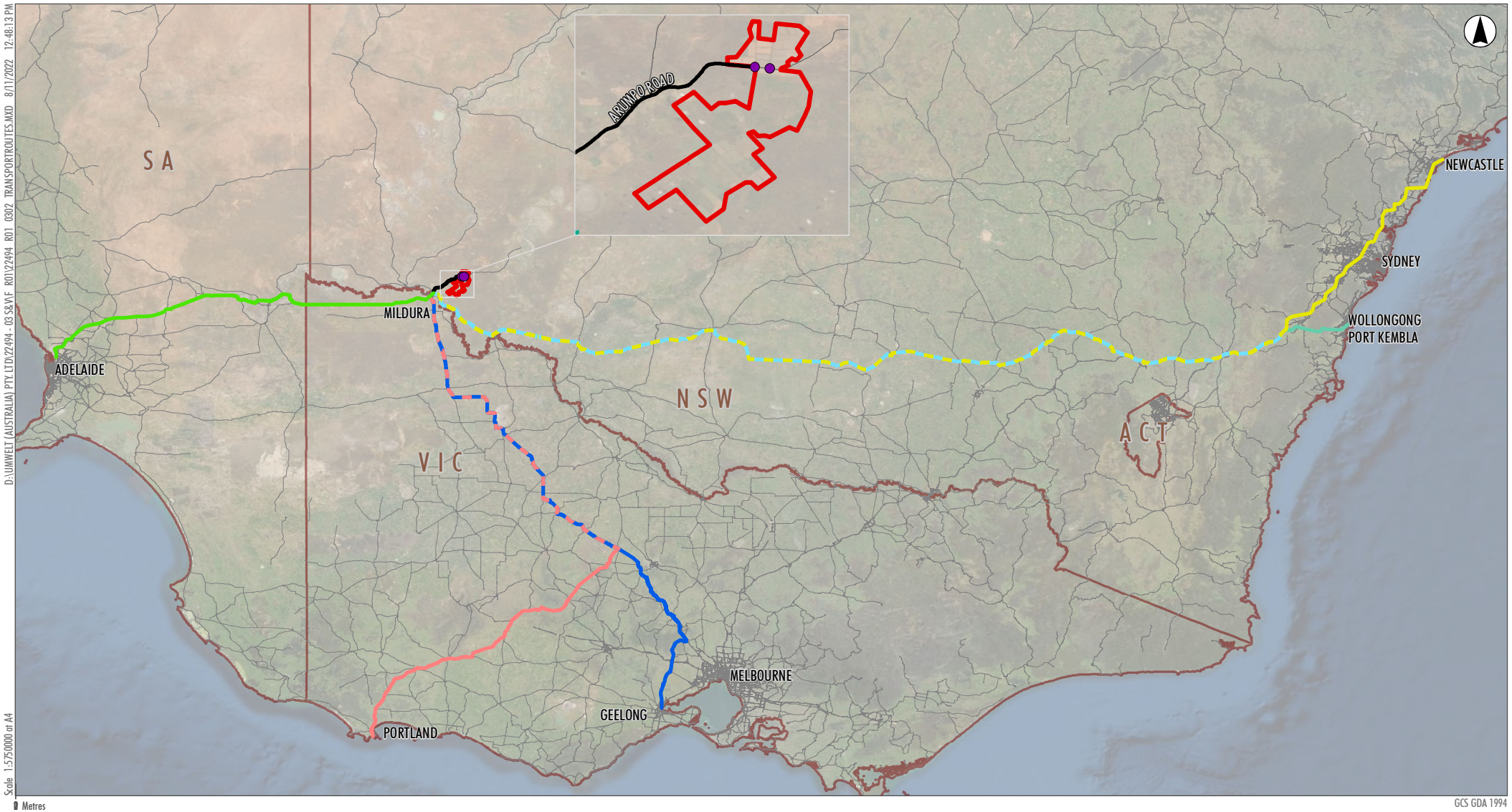


FIGURE 3.2

Indicative Transport Routes

Image Source: ESRI Basemap (2022) Data source: NSW DFSI (2021), VIC DELWP (2022)

3.7 Development Corridor

The Project Boundary is the maximum spatial extent of the Project defined by all current land access available to Spark. It includes all Lot and DP for involved landholders and encompasses all aspects of the Project except for the off-site transport route. The Project Area encompasses all land within and including the Project Boundary and covers approximately 18,500 ha.

The indicative Development Corridor for the Project is shown in **Figure 3.1.** The Development Corridor is defined as the area within which all WTG and associated infrastructure will be placed, providing the necessary flexibility for the detailed design of the Project whilst also allowing a detailed environmental assessment process to be completed. The Development Corridor is of variable width (to avoid key site constraints) however it generally comprises:

- A variable (typically 200 m) radius buffer around proposed WTGs.
- A variable (typically 100 m) buffer around access tracks.
- A variable (typically 500 m) buffer measured from the edge of all other infrastructure, including the proposed BESS location.

The proposed Development Corridor associated with the Project is approximately 3,575 ha based on the current indicative Project layout, which will be subject to further design refinement and revision as the Project progresses. This represents 19% of the total Project Area.

The proposed disturbance area for the Project will be within the Development Corridor and is subject to further detailed design as the environmental assessment process progresses. The proposed Development Corridor is a conservative area for early assessment purposes and the proposed disturbance area will likely be significantly smaller, subject to further detailed assessments and design.

3.8 Project Alternatives

The Project location was selected due to:

- a reliable wind resource and access to this wind resource consistently across the Project Area
- its position within the South-West REZ and proximity to transmission infrastructure including the approved Project EnergyConnect 330 kV
- very low density of housing near the Project with the closest towns of Gol Gol and Buronga, approximately 12 km and 16 km respectively, from the nearest turbine location
- generally flat topography within the Project Area resulting in simplified construction when compared to wind farms in other geographies i.e. Projects with more substantial topography
- much of the Project Area being historically cleared for agricultural use, resulting in generally large areas of cropped land within and surrounding the Project Area
- the Project being compatible with existing agricultural land uses, with minimal impact to current farming activities being anticipated during both construction and operation of the Project, refer to **Section 6.2.8.4** of this report for further information

- proximity to the existing public road network
- small number of watercourses, and lower stream order, within the Project Area
- consideration of other important social and environmental values.

The indicative Project layout documented in this Scoping Report (refer **Figure 3.1**), informed by discussions with Host landholders, has been subject to a number of design iterations to incorporate feedback received during this stage of the Project.

A number of alternative Project options have been considered to date by Spark:

- A 'do nothing' approach. This option does not meet Spark commercial objectives to develop renewable energy projects in NSW; and does not assist to support the strategic context outlined in **Section 2.0** or achieve the Project Objectives outlined in **Section 1.2**. Accordingly, it has not been considered any further.
- Options to develop a wind farm of up to 170 WTGs
    - within other areas of the Project Boundary, and
    - within the Development Corridor identified in **Figure 3.1** were considered and would result in achieving the Project Benefits described in **Section 1.2**.
- Several options for grid connection and the transmission line route, refer **Section 3.8.1** below.

The option to develop a wind farm of up to ~150 WTG within the Development Corridor (summarised in **Section 3.7** and identified in **Figure 3.1**) is currently preferred as it:

- allows for the positioning of all WTGs to be located on cropped land, avoiding native vegetation
- incorporates feedback from Host landholders
- maximises distance offsets to non-associated dwellings, with the closest non-associated dwelling located approximately 8 km from the nearest WTG
- optimises the layout with respect to other key environmental matters (e.g. visual, noise, biodiversity and heritage constraints), whilst maintaining a feasible wind farm project that can contribute to both Commonwealth and NSW commitments to increase renewable energy generation and reduce carbon emissions across the NSW and Australian economies.

This option (as represented in this Scoping Report) is proposed to be progressed to the EIS stage following receipt of the SEARs, noting that the Project layout will be subject to further refinement during the EIS and ongoing design development to minimise impacts on the environment and community. This will be informed by the further technical and environmental studies and continued community and stakeholder engagement. At time of lodgement of the EIS, the specific technology provider for the WTGs and the BESS may not have been selected and may change during future stages of development. As such, reasonable worst-case assumptions will be used to facilitate impact assessment in the EIS.

3.8.1 Grid Connection / Transmission Line

Several options were considered for the grid connection and transmission line route, including possible connections to the:

- Buronga substation (no longer viable due to land access)
- existing 220 kV transmission line, and
- planned 330 kV Project EnergyConnect.

The proposed transmission line option (being either connection via the existing 220kV transmission line or via the planned 330kV Project EnergyConnect) presented in this Scoping Report was selected on the basis of successfully securing landowner agreement and minimising the overall distance of the proposed ancillary infrastructure. This preferred option is entirely within the Project Boundary indicated in this Scoping Report (as shown on **Figure 3.1**), and offered the shortest transmission line route distance to the proposed grid connection point, a distance of approximately 12 km between the nearest proposed internal substation location and the proposed switchyard (grid connection point). The south-western extent of this proposed transmission line alignment has the potential to interact with and impact existing native vegetation and habitat that is present. This route has however followed the existing road corridor of Dansons Road, which will reduce the requirement for clearing of vegetation, and provide vehicle ready access to the transmission line. Should unacceptable impacts be identified during the EIS with this alignment, Spark will continue to explore alternative routes/options to minimise the overall impact of the transmission infrastructure.

The grid connection option at Buronga Substation (and associated transmission line route) had potential to partially avoid native vegetation clearing and minimise impacts to habitat. This option represented a longer overall distance of that ancillary infrastructure (an increase of approximately 11 km), when compared to the proposed route presented in this Scoping Report. Despite this option having potential to avoid some sections of more densely populated native vegetation southwest of the Project, existing native vegetation is still however present north west of the Project and within the potential disturbance area of this alternate route. This option was investigated during the scoping phase but found to not be viable after consultation with nearby landholders determined that land access (for the purpose of that transmission alignment) would not be possible.

Options for the Project's grid connection and associated transmission line alignment (and design) will be investigated further during the EIS. Amongst other things, environmental and social aspects of this investigation will focus on the potential to avoid and/or minimise impacts to existing native vegetation present and habitat in the south-western extent of that proposed transmission line alignment. Further information regarding biodiversity aspects of the Project are summarised in **Section 6.2.3** and detailed within the 'Biodiversity Constraints Assessment' report (refer to **Appendix 5**). Other transmission line alignment options identified during the EIS would be contingent of securing appropriate landowner agreement.

3.9 Strategies to Avoid or Minimise Impacts

The key impact avoidance and minimisation strategies implemented by Spark during the early stages of design development included establishing an area (defined by Spark) beyond which Project WTG and ancillary infrastructure would not occur. It was established based on:

- a 100 m buffer to all waterbodies
- a 300 m buffer to the Mallee Cliffs National Park
- a 100 m buffer to road reserves (with the exception of access tracks which may intersect road reserves)
- an 100 m buffer from the Project Boundary to any WTG
- WTG locations being placed in locations that are compatible with Host landholders' existing land uses.

•The key strategies implemented by Spark during the Scoping stage to avoid and minimise impacts includes revising the indicative Project layout to:

- Relocate WTG and associated ancillary infrastructure to existing areas of cleared land to avoid native vegetation clearing, where possible.
- Relocate WTG and associated ancillary infrastructure to avoid sensitive archaeological areas and ensure an appropriate buffer is applied. This was based on the outcomes of the desk-based Heritage Constraints Assessment (refer to **Appendix 6**) and informed by subsequent constraints/design workshops led by Umwelt to assist Spark to situate Project infrastructure sensitive areas.
- Alignment with existing roads and reduction of Development Corridor to avoid areas of remnant vegetation, resulting in a reduced potential interaction with native vegetation of approximately 400 ha.

3.9.1 Summary of Avoidance/Minimisation and Next Steps

During the Scoping stage, the indicative Project layout (and development corridor) was revised to accommodate the abovementioned avoidance and minimisation strategies, with each revision incorporating multiple constraints-based changes.

The Project layout will be subject to further refinement during the EIS and further design development to minimise impacts on the environment and community. It will be revised as more social and environmental information is received, constraints are identified, further technical studies and environmental assessments occur and further feedback from stakeholder and community engagement is received.

At time of lodgement of the EIS, the specific technology provider for the WTGs and the BESS may not have been selected and may change during future stages of development. As such, reasonable worst-case assumptions will be used to facilitate impact assessment in the EIS.

4.0 Statutory Context

The relevant statutory requirements for the Project are summarised in the following sections.

4.1 NSW Approval Pathway

The EP&A Act is the primary instrument which regulates the environmental impact assessment and approval process for development in NSW.

The Project will require development consent under Part 4 of the EP&A Act. Being development for the purpose of electricity generation with a capital investment value of more than $30 million, the Project is declared to be SSD under the provisions of the Planning System SEPP. The development application will be lodged with DPE. Currently the Project has a CIV estimated to be around $2 billion dollars.

Section 4.15 of the EP&A Act describes the matters for consideration in assessing SSD, which includes the provisions of relevant environmental planning instruments (EPIs), proposed instruments that have been the subject of public consultation, development control plans, planning agreements and statutory regulations. The assessment of SSD must also consider the likely impacts of the development, suitability of the site, any submissions received and the public interest.

4.1.1 Consent Authority

Under Section 4.5(a) of the EP&A Act, the consent authority for SSD is the Minister for Planning unless the development is of a kind for which the Independent Planning Commission (IPC) is declared the consent authority by an environmental planning instrument.

In accordance with Section 2.7(1) of the Planning System SEPP, if any of the criteria identified below are exceeded, the IPC is the consent authority:

- Wentworth Shire Council object to the application.
- 50 submissions (other than from the Council noted above) are made objecting to the Project.
- Spark discloses a reportable political donation.

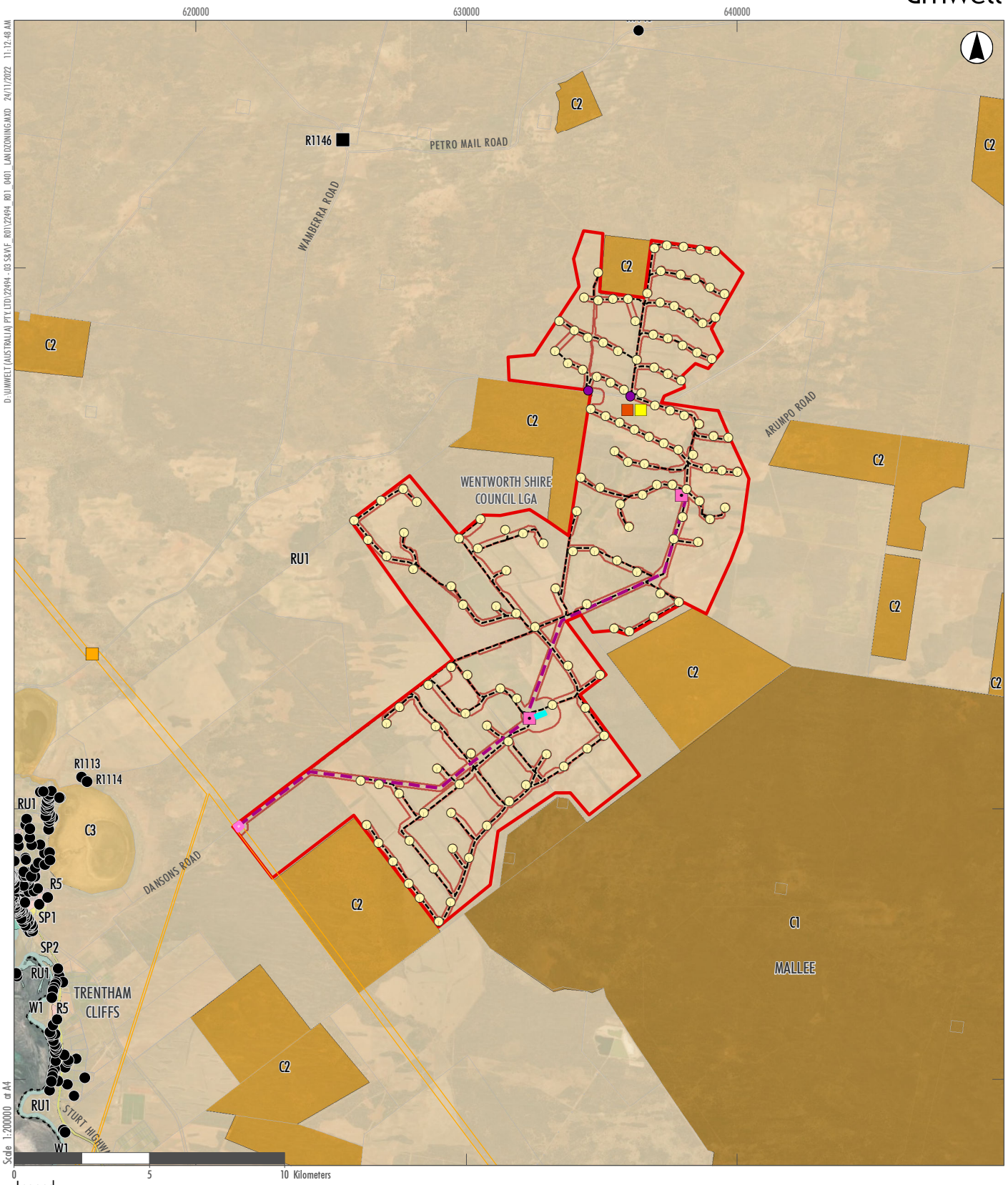
If none of the above criteria are triggered, DPE will determine the development application on behalf of the Minister.

4.1.2 Permissibility

As outlined in **Section 2.2**, the Project Area is situated entirely within the Wentworth Shire LGA. The Project Area is zoned as RU1 Primary Production within the Wentworth LEP 2011 (refer to **Figure 4.1** below). Electricity generating works are not permitted within the RU1 zoning in this LEP.

Section 2.36(1)(b) of *State Environmental Planning Policy (Transport and Infrastructure) 2021* (TI SEPP) states that development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone. Under Section 2.7(1) of the TI SEPP, the provisions prevail where there are inconsistencies with any other EPIs, including LEPs. The Project Area is situated within RU1 zoned land under the Wentworth LEP 2011, which is a prescribed rural zone under the TI SEPP. Development for the purpose of electricity generating works (including the Project) within prescribed rural zones is permitted with consent under the TI SEPP.

Due to the operation of Section 2.36(1)(b) of the TI SEPP, the Project is permissible with development consent.



Legend

- Project Boundary
- Lot Boundary
- Project EnergyConnect Corridor
- Buronga Substation

Dwellings

- Host Landholder Dwelliings
- Non-associated Landholder Dwellings

Land Use Zoning

- C3 Environmental Management
- C2 Environmental Conservation
- C1 National Parks and Nature Reserves
- R5 Large Lot Residential
- RU1 Primary Production
- RU5 Village
- SP1 Special Activities
- SP2 Infrastructure
- W1 Natural Waterways
- W2 Recreational Waterways

Project Infrastructure

- Potential Transmission Line
- Potential Access Tracks
- Potential Wind Turbine Generator Locations
- Potential Internal Substation Locations
- Operations & Maintenance Facility
- Construction Site Compound
- Site Entrances
- Development Corridor
- Potential BESS Location
- Potential Switchyard Substation

GDA 1994 MGA Zone 54

FIGURE 4.1

Land Use Zoning

Image Source: ESRI (2022) Data source: DSFI (2020)

4.1.3 Other Approvals

In addition to development consent under the EP&A Act, several other NSW Acts or planning policies are applicable or potentially applicable to the Project. **Table 4.1** identifies the other NSW legislation and policies and their applicability to the Project.

Table 4.1 NSW Legislation

State Legislation	Description
Biodiversity Conservation Act 2016 **(BC Act)**	Under the BC Act, biodiversity assessment in accordance with the Biodiversity Assessment Method (BAM) is required for any SSD project. The Project (as SSD) triggers the need to prepare a Biodiversity Development Assessment Report (BDAR) in accordance with the BAM. The EIS will include a BDAR.
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. Wind farms are a scheduled activity under the POEO Act and require an Environment Protection Licence (EPL). An EPL would be sought in relation to the construction and operation of the Project.
Water Management Act 2000 **(WM Act)**	Any water extractions from water sources (i.e. surface and groundwater) regulated by a Water Sharing Plan (WSP) required for construction or operational purposes will require licensing under the WM Act. The potential water requirements during construction and operation will be assessed as part of the Water and Soil Impact Assessment prepared as part of the EIS. Any necessary licences would be obtained for the Project.
Roads Act 1993 **(Roads Act)**	A consent is required under section 138 to work on or above a road or to connect a road to a classified road. Consents under section 138 will be required for proposed road works.
Crown Land Management Act 2016 **(Crown Land Act)**	The Crown Land Act provides for the administration and management of Crown Land in NSW. Crown land may not be occupied, used, sold, leased, licensed, dedicated, reserved or otherwise dealt with unless authorised by the Crown Land Act. The Project Area includes a mix of Crown Land and Freehold Land. Works that may intercept areas of Crown Land may require approval or changes to lease agreement issued under the *Crown Land Management Act 2016*. This will be investigated further during preparation of the EIS. Refer to **Section 2.3** for more detail. Should any works be proposed in these areas (Crown Land leases or otherwise), suitable approvals would be obtained.
Contaminated Land Management Act 1997 **(CLM Act)**	The CLM Act establishes the process for investigating and if required, remediating land that the NSW EPA considers to be contaminated significantly enough to require regulation. The Project Area does not contain land listed on the Contaminated Lands Register. Relevant mitigation and management measures would be incorporated as part of the Project to address potential contamination issues.

4.2 Commonwealth Legislation

4.2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a framework for protection of the Australian environment, including its biodiversity and its natural and culturally significant places.

Any action which will or is likely to have a significant impact on a matter of national environmental significance (MNES) must be referred to the Minister for the Environment, MNES includes:

- world heritage properties
- national heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development.

The Project Area is not within a world heritage property or place, does not have wetlands of international importance, is not within either a Commonwealth marine area or the Great Barrier Reef Marine Park, and does not relate to a nuclear action, coal seam gas or coal mining development.

There is potential for the Project to impact on listed threatened species, threatened ecological communities (TECs) and migratory species. Further discussion around impact to biodiversity is provided in **Section 6.2.3**.

A EPBC Act Referral will be lodged to determine whether the Project requires formal assessment and approval under the EPBC Act as a Controlled Action. If deemed a Controlled Action, it is proposed that the Project would be assessed under the bilateral agreement between the NSW and Commonwealth Governments.

4.2.1.2 Civil Aviation Regulations 1988

Reporting of tall structures to the Royal Australian Air Force (RAAF) is required under the *Civil Aviation Regulations 1988*. A detailed assessment in accordance with the regulations and consultation with the relevant agencies will be undertaken as part of the preparation of the EIS.

4.2.1.3 Heavy Vehicle National Law

Approvals would be required for the transport of wind turbines and associated infrastructure by OSOM vehicles. The requirements for such OSOM transport will be assessed via a route analysis study as part of the EIS.

4.3 Statutory Requirements Summary

This section provides an overview of the key statutory requirements for the Project. The statutory requirements addressed in **Table 4.2** are categorised as per the SSD Scoping Report Guideline.

Table 4.2 Statutory Requirements Summary

Matter	Detail	Comment
Power to grant consent	The legal pathway under which consent is to be sought, why the pathway applies, and who the consent authority is likely to be.	As outlined in **Section 4.1.1**, the Project requires approval under Part 4 of the EP&A Act being SSD. The consent authority will be the IPC or DPE based on the number and type of any objections to the Project or any political donations made by Spark or related entities.
Permissibility	The relevant provisions affecting the permissibility of the Project, including any land use zones. Any provisions or actions being taken that would allow the Project to be considered on its merits, where the Project would otherwise be partly or wholly prohibited.	As outlined in **Section 4.1.2**, the Project Area is zoned RU1 Primary Production within the Wentworth LEP 2011. Electricity generating works are not permitted within the RU1 zoning in this LEP. Section 2.36(1)(b) of the TI SEPP states that development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone. The Project Area is situated within RU1 zoned land under the Wentworth LEP 2011, which is a prescribed rural zone. Under Section 2.7(1) of the TI SEPP, the provisions prevail where there are inconsistencies with any other EPIs, including LEPs. Therefore the Project is permissible with development consent.
Other approvals	Other approvals that are required to carry out the Project and why they are required.	**Section 4.1.3** provides a list of other NSW approvals required or that may be required for the Project. **Section 4.2** discusses potential Commonwealth approvals that may be required for the Project.
Pre-conditions to exercising the power to grant consent	Pre-conditions to exercising the power to grant consent for the Project that may be relevant to setting the SEARs.	An EIS will be prepared in accordance with relevant legislative requirements and guidelines. No pre-conditions to exercising the power to grant consent for the Project are currently envisaged.

Matter	Detail	Comment
Mandatory matters for consideration	Matters that the consent authority is required to consider in deciding whether to grant consent to any development application for the Project that may be relevant to setting the SEARs.	As outlined in **Section 4.1**, Section 4.15 of the EP&A Act describes the matters for consideration in assessing SSD, which includes the provisions of relevant environmental planning instruments, proposed instruments that have been the subject of public consultation, development control plans, planning agreements and statutory regulations. The assessment of SSD must also consider the likely impacts of the development, suitability of the Project site, any submissions received and the public interest. All relevant mattes will be addressed in the EIS based on the outcomes of environmental assessments to be undertaken (refer to **Section 6.0**).

5.0 Engagement

Spark recognise that respectful, inclusive, and meaningful engagement is fundamental to the development of wind farm projects, and that effective engagement is a key component of the SSD process, in line with the NSW Government's Engagement Guidelines (DPIE, 2021f).

Spark acknowledges that effective engagement requires everyone involved to do their part, at the appropriate stage in the process. Spark aims to provide engagement that is meaningful, proportionate and tailored to the needs of the community, councils and government agencies as well as outlining the statutory context that ensures the community can participate in planning and assessment.

Accordingly, Umwelt (on behalf of Spark) has prepared a CSEP for the Project to outline the objectives and approach to community engagement throughout the life of the Project from development through construction and operation. This CSEP is provided as Appendix A of **Appendix 2**.

The following section provides a summary of the CSEP, the consultation undertaken to date and key issues raised.

5.1 Community and Stakeholder Engagement Plan

The CSEP identifies the stakeholder engagement approach and objectives for the Project and the surrounding communities, namely it aims to:

- identify effective methods to inform the community of Project information and updates, which foster trust and build positive long-term relationships with community stakeholders
- ensure delivery of an honest, innovative, flexible and transparent community engagement process
- identify ways to facilitate engagement and collaborate with relevant community organisations, including for input into the social and environmental assessment of the Project and ongoing project design and planning including the development of community benefit sharing programs
- ensure the broader community and stakeholders are kept informed about benefits, potential impacts, and activities of the Project
- identify effective avenues for community members to communicate any concerns and provide valuable feedback with Project personnel
- ensure means of community involvement are known and distributed consistently
- ensure the commitments made to the community during the Project development stage are being met.

The CSEP provides an overview of Spark's approach to stakeholder engagement throughout all stages of the Project, outlines the Project and the relevant stakeholders, outlines the key messages of the Project, and outlines the approach to monitoring and evaluating the effectiveness of the engagement program.

5.2 Stakeholder Engagement

Engagement with local community commenced in August 2022 and has predominantly been undertaken by the Mallee Wind Farm Project team of two Spark staff, supported by Umwelt. The Project team have engaged in a range of activities, including hosting a community drop-in session and meeting with neighbouring landholders and local stakeholders in-person and online to build and maintain genuine, trusting relationships. The overall approach to consultation with local community is to be flexible, inclusive, open and responsive.

Stakeholder and community engagement has been undertaken early in the scoping phase to:

- proactively inform Project design and development
- identify perceived issues/impacts to be addressed in the assessment process
- establish stakeholder relationships with Host landholders, near neighbours and key stakeholders for the Project.

The key stakeholders identified for the Project within each stakeholder group are outlined in **Table 5.1**.

Table 5.1 Identified Stakeholders

Stakeholder Group	Stakeholder
Host landholders	Landholders within the Project site (including those hosting turbines or that are intersected by the transmission line).
Neighbouring landholders	Neighbours to the Project site.
Residents in neighbouring communities	Wider community of Project and residents across nearby LGAs: • Wentworth Shire LGA • Mildura Rural City LGA.
Community and special interest groups	Other organisations representing the local community, health, sports, environmental, culture and interest groups, local businesses: • Country Women's Association local branches • Men's Shed local branches • Lion's Club branches • Rotary branches • Regional Disability Advocacy Services • Wentworth Historical Society • Mallee Community Voices • Hands Up Mallee • Western Landcare NSW • Gol Gol Community Reference Group • Mildura Climate Action Group • Mallee Climate Action Group.

Stakeholder Group	Stakeholder
Traditional Owners	• Dareton Local Aboriginal Land Council • Barkandji Native Title Group Aboriginal Corporation • Barkindji Maraura Elders Environment Team (BMEET) • Barkindji Maroura Elders Council (BMEC) • Kureinji Aboriginal Corporation • First People of the Millewa-Mallee Aboriginal Corporation.
Industry and business	• Mildura Chamber of Commerce • Mildura Regional Development Association • Local businesses and service providers • Mining License holders • Industry Capability Network Clean Energy Council (CEC) • Australian Energy Market Operator (AEMO) • Australian Energy Market Commission (AEMC) • NSW Farmers Association • National Farmers Federation.
Federal Government	• Clean Energy Regulator (CER) • Australian Energy Regulator (AER) • Minister for Industry, Energy and Emissions Reduction (Department of Industry, Science, Energy and Resources) • Member for Farrer.
NSW State Government	• Member for Murray • Minister for Planning and Homes • Minister for the Environment and Heritage • Treasurer and Minister for Energy • NSW Environmental Protection Agency (EPA) • NSW Department of Planning and Environment (the Department) • Crown Lands • Heritage NSW • NSW Department of Industry • Department of Regional NSW • Western Local Land Service • Transport for NSW • SafeWork NSW • Independent Planning Commission.
Local Government	• Wentworth Shire Council • Mildura Regional Council.

Stakeholder Group	Stakeholder
Utilities	• Transgrid • Essential Energy • Telstra • National Broadband Network (NBN) • WaterNSW.
Emergency services	• NSW Rural Fire Service • Fire and Rescue NSW • NSW Police • NSW Ambulance • State Emergency Service.
Education	• TAFE – Mildura • MADEC Community College • La Trobe University • Buronga Public School • Gol Gol Public School • Mildura Senior College • Chaffey Secondary College.
Media	Local and regional radio and TV stations: • ABC Mildura-Swan Hill • Radio Hot-FM • Radio 3MA.
	Regional newspapers and magazines: • Mildura Weekly • Mildura Independent • Sunraysia Daily.
	Metropolitan newspapers: • The Guardian Australia.
	Industry online news: • Renew Economy.
	National and financial publications: • Australian Financial Review.

5.2.1 Community Engagement

Spark and Umwelt have commenced stakeholder engagement as part of the scoping phase. The community consultation undertaken to date is summarised in **Table 5.2**.

Table 5.2 Community Engagement

Mechanism	Targeted stakeholder	Engagement Objective	Description	First Round of Consultation
Website	Traditional Owners Host landholders Community groups Broader community Local businesses and service providers Local media	Inform	A website dedicated to the Project including a description and overview of the Project, development application process, company information, responses to key concerns, risk management plans, maps, media releases and contact information.	A website and email established in August 2022.
Media release	Local Government Traditional Owners Host landholders Neighbouring/proximal landholders Community groups Broader community Local businesses and service providers Local media	Inform	To introduce the project to the broader community through local and regional media channels.	Advertising in local newspapers and radio stations in August 2022 to advise of upcoming consultation opportunities and provide Project updates.
Community Newsletters	Broader community	Inform	Project information sheets to distribute information about the Project to the broader community and targeted stakeholders.	No. 1 – Project overview and invitation to drop-in session was distributed in August 2022.
Drop-in session	Broader community Community groups Local businesses and service providers	Consult	Multi-hour time periods when stakeholders can drop in to speak to the Project team and experts, view documents and plans and ask questions of the Project team.	One session held at Buronga Midway Centre on Tuesday 22 August between 3 pm and 6 pm.
Online Survey	Broader community	Consult	Online or offline surveys to obtain input and feedback on Project decision-making, as well as specific information about the needs, desires and impacts on stakeholders related to the Project.	Surveys distributed online and in person at the drop-in session and running from August to September 2022

Mechanism	Targeted stakeholder	Engagement Objective	Description	First Round of Consultation
Personal Meetings or Interviews	Local Government Community groups Traditional Owners	Involve	Introductions to the Project, semi-structured interview discussions to listen to individual concerns, interests, and issues to gather preliminary feedback, including sensitivities, understanding of information needs and future engagement preferences.	One on one meetings held throughout the month of August and September 2022.
Project briefings	State Government Local Government Traditional Owners Community groups	Involve	Formal briefings to key stakeholders and government agencies, with Project Information Sheets and/or slide decks to formally introduce the Projects.	Initial Project briefings undertaken in August and September 2022.

It is noted that the formal notification process for the Aboriginal Cultural Heritage Assessment will commence following submission of the Scoping Report to DPE. Once commenced, detailed consultation will be undertaken with the Registered Aboriginal Parties (RAPs) for the Project. Consultation will be undertaken in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010a). Further detail on the proposed EIS stage heritage assessment is provided in **Section 6.2.4**.

5.2.1.1 Community Views

As discussed in the SISR (refer to **Appendix 2**), the following key community views were identified in engagement conducted for the social scoping phase. When stakeholders and community members were asked directly about potential negative impacts of the Project, the top issues raised included:

- impacts on flora and fauna or conservation areas
- noise generated during operation
- water access and use
- fire risks
- increased traffic and road safety
- land-use changes
- Aboriginal cultural values
- noise generated during construction.

When community members were asked directly to identify potential positive impacts of the Project, the most frequently cited responses relate to:

- access to cheaper electricity
- employment and business opportunities
- investment in the local community
- low carbon-emission energy
- road and infrastructure improvements
- community sponsorships
- increased tourism.

5.2.1.2 Community Consultation for Visual Impacts

In accordance with the Visual Assessment Bulletin, community consultation was undertaken by Spark (supported by Umwelt and Moir) to establish key landscape features, define areas of scenic quality and identify key public viewpoints valued by the community.

As of October 2022, a total of nine (9) community engagement surveys have been completed for visual impacts, which were incorporated into the Preliminary Visual Impact Assessment (PVIA) (attached as **Appendix 3**). Further discussion on preliminary visual consultation is discussed in **Section 5.5.1**.

The community engagement identified the Murray River and Mungo National Park as the key public viewpoints in the local area.

5.2.1.3 Continued Engagement

Spark will continue to implement the CSEP throughout the Project assessment phase. Key consultation mechanisms and activities will include:

- one-on-one meetings and phone calls
- email/letter updates and Project newsletters
- the maintenance of a Project website
- community information sessions
- community surveys.
- Further detail on the planned consultation mechanisms is provided in the CSEP (Appendix A of **Appendix 2**).

5.3 Agency and Elected Official Stakeholder Engagement

Agency and elected official consultation undertaken to-date in relation to the Project is provided in **Table 5.3** below.

Table 5.3 Agency Consultation

Agency	Date	Mechanism	Details
Crown Lands	July 2021	Email	Preliminary discussions about conversion of Crown Land to Freehold land or changing the permitted use of a Western Lands perpetual lease.
Department of Planning and Environment	December 2021	Meeting	Introduction of the Project.
Department of Climate Change, Energy, the Environment and Water (DCCEEW)	10 August 2022	Letter	Letter issued to the Minister (Chris Bowen) introducing the Project.
Jenny McCallister	10 August 2022	Letter	Letter issued introducing the Project.
Member for Farrer (Sussan Ley)	10 August 2022	Letter	Letter issued introducing the Project.
Victorian State Government (Ali Cupper)	10 August 2022	Letter	Letter issued introducing the Project.
Minister for Energy and Environment (Matt Kean)	10 August 2022	Letter	Letter issued introducing the Project.
Member for Murray (Helen Dalton)	10 August 2022	Letter	Letter issued introducing the Project.
Senator Jenny McAllister	10 August 2022	Letter	Letter issued introducing the Project.
Department for the Environment and Water (Tanya Plibersek)	10 August 2022	Letter	Letter issued introducing the Project.
Department of Planning and Environment (James Hay)	11 August 2022	Letter	Letter issued introducing the Project.
Jihad DIP, MP – NSW Parliament	11 August 2022	Letter	Letter issued introducing the Project.
Dr Anne Webster MP – Parliament of Australia	11 August 2022 23 August 2022	Letter Meeting	Letter issued introducing the Project. Meeting to introduce the Project.

Agency	Date	Mechanism	Details
Wentworth Shire Council	23 August 2022	Meeting	Meeting to introduce the Project.
Mildura Rural City Council	23 August 2022	Meeting	Meeting to introduce the Project.
Department of Planning and Environment	21 October 2022	Meeting	Scoping Meeting prior to requesting SEARs.
National Parks and Wildlife Services (NPWS)	22 November 2022	Email	Email issued introducing the Project.

Consultation with agencies and elected officials to date has been primarily to commence engagement, introduce the Project and key Project team members.

As outlined in **Section 2.2**, the Project Area is situated entirely within the Wentworth Shire Council LGA, however it is also in close proximity to the Mildura Rural City Council LGA. Consultation with these Councils has occurred with briefings provided by Spark and council personnel also attending the community drop in session.

Consultation with further agencies will be undertaken throughout the assessment process, in accordance with the SEARs for the Project.

5.4 Consultation with Mining License holders

Spark Renewables has engaged in consultation with the holder of a mining license that intersects with the Project Area. The mining license is in regard to a mineral sands deposit that is present within the Project Area and adjacent properties. Both projects are in the early stages of design and planning approvals and conversations to date have been productive and collaborative. Ongoing consultation and regular communication is proposed to be undertaken to ensure that both projects can proceed without limiting the viability of the other.

5.5 Feedback from Proximal Neighbours

Spark Renewables has engaged 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 regard to:

- visual impact on Arumpo Road
- impacts to potential tourism developments
- impacts on the National Park (including birds flying through the area)
- feedback from some neighbouring landholders included possible initiatives for the community benefit fund associated with the Project.

As part of the site selection process, Spark Renewables has selected a Project Area that minimises the number of close residential receivers. While there are a low number of close residential receivers for a project of this scale, it is acknowledged that the Project has the potential for high visual impacts on travellers using Arumpo Road. Refer to **Section 6.2.1** for further detail on the Visual Assessment.

The biodiversity assessment approach is described in **Section 6.2.3.** Impacts on biodiversity (including the bird and bat impact assessment) will be avoided wherever possible, with unavoidable residual impacts offset.

5.5.1 Preliminary Visual Consultation

A key component of the Scoping phase consultation conducted for the Project was gaining an understanding of community opinions and views regarding visual and landscape values. Consultation with proximal neighbours included targeted questions relating to visual aspects of the development. To avoid known issues with consultation fatigue these questions were incorporated into the broader community and stakeholder engagement that occurred for the Project.

In summary, the format of this visual consultation included written notification/newsletter, online surveys, phone interviews and face-to-face meetings, in addition to the community drop-in session held in August 2022. Where possible, participants were asked targeted questions relating to visual and landscape features, including:

Are there any landscapes or views close to the proposed Project site that are of significant value to yourself, your business, or your community? What are the best lookouts or public vantage points in the area? For example, if you have a visitor, where do you take them to showcase your local area?

Are there things Spark Renewables could do to reduce the visual impact of the wind farm or make it more visually appealing?

By comparison to online surveys and questionnaires, phone interview and face-to-face meeting based consultation was able to be extended (via open communicative dialogue) to seek deeper insights and feedback from participants on these specific matters.

This information was reviewed by the Umwelt social team and specialist visual consultant to evaluate community views relating to the visual significance of landscape features as outlined in the Visual Bulletin.

Attendees at the community information session raised concerns around visual impacts associated with the Project. As mentioned previously, there is one residential property (R1148) located within 8 km of the Project site, however given the relatively flat terrain, residents of nearby communities held concerns relating to changes the Project may have to the broader visual landscape in the area.

Other stakeholders commented that as the Project will be located some distance from Buronga and Gol Gol, they were relatively unconcerned about visual impacts.

> *Wouldn't worry me out there, but don't like seeing it on beautiful mountain ranges.* – Community Group

> *Not a lot of people go out that way, but it will make it look terrible* – Community Member

When asked to consider approaches that Spark Renewables could take to reduce the visual impact of the Project, one stakeholder suggested increasing the distance of the Project to Arumpo Road to reduce the visual impact of those travelling to Mungo National Park, wanting to maintain "the remote feel of the place". An additional stakeholder suggested the planting of trees as a visual screen. Others felt that no strategies could be put in place to reduce visual impacts of the project.

There were nine (9) online surveys completed at the time of preparation of this report. Additional methods for broader community engagement as described in **Section 5.2.1**, include the Project newsletter, which was delivered by Australia Posts Unaddressed mail system to approximately 1,100 households which covered in Buronga, Gol Gol, Mallee, Arumpo, Monak, Trentham Cliffs, and Mourquong. This mail out also included a QR code to access the online survey. The verbatim responses to the general visual questions are outlined in **Table 5.4** below.

Ongoing consultation on these matters will occur during the EIS and incorporated into the detailed Landscape Visual Impact Assessment (LVIA) that is to be prepared in accordance with the requirements of the Visual Bulletin. This ongoing consultation represents the first step in the detailed LVIA process which relates to the preparation of visual baseline study inputs, including consulting the community on aspects of the baseline study. The detailed LVIA is a key component of the EIS, as described further in **Section 6.2.1** below.

Table 5.4 Verbatim Responses to General Visual Questions

Question	Verbatim Response
Are there any landscapes or views close to the proposed Project site that are of significant value to yourself, your business, or your community?	• *From where I live I believe I will see the turbines on the horizon, I do not want that* • *Not too look too stark* • *Mungo.*
What are the best lookouts or public vantage points in the area? For example, if you have a visitor, where do you take them to showcase your local area?	• *The river in Gol Gol is magnificent.* • *The river* • *the river, and Mungo NP* • *mungo.*
Are there things Spark Renewables could do to reduce the visual impact of the wind farm or make it more visually appealing?	• *How on earth, on our flat land, could Spark Renewables possibly reduce the visual impact of the ugly wind turbines? There is only one way and that is to not build them.* • *Not put them up* • *Distance from the river and road leading to Mungo. Keep the remote feel of the place.* • *Mass plantings* • *need more details of the exact location.*

6.0 Proposed Assessment of Impacts

6.1 Key Environmental, Social and Economic Matters

A review of the environmental, social, and economic matters relevant to the Project have been conducted to determine which issues need to be assessed as part of the EIS and the level of assessment that is required. This review has been undertaken with reference to the categories of assessment matters identified in the SSD Scoping Report Guideline (DPIE, 2021a), with the key issues and the proposed level and scope of assessments discussed in the following sections.

The environmental and social matters relevant to the Project are identified and have been characterised (in accordance with the SSD Scoping Report Guideline) as follows:

- matters requiring further assessment in the EIS (refer to **Section 6.2**)
- matters requiring no further assessment in the EIS (refer to **Section 6.3**).

For the matters requiring further assessment in the EIS, **Section 6.2** identifies whether detailed or standard assessment is required (as defined by Appendix D of SSD Scoping Report Guideline). Appendix 1 presents a Scoping Summary Table showing the outcome of the scoping stage review of matters as required under the SSD Scoping Report Guidelines.

6.2 Matters Requiring Further Assessment in the EIS

The environmental, social and economic matters discussed in this section have been identified as key issues requiring further assessment as part of the EIS to fully understand the potential impacts and identify project-specific mitigation measures and/or alternatives. The relevant assessments will be undertaken in consideration of the Wind Energy Guideline (DPE, 2016a).

6.2.1 Amenity – Visual

A PVIA has been undertaken by Moir Landscape Architecture Pty Ltd (Moir) in accordance with the requirements of the *Wind Energy: Visual Assessment Bulletin December 2016*. This section provides a summary of the outcomes of the PVIA with the full report provided in **Appendix 3**.

The Project Area is located on relatively flat land at an elevation of approximately 100 m above sea level. The Project Area is currently used for cropping and grazing, with patches of remnant native vegetation present. There is one (1) non-associated dwelling approximately 8 km from the proposed wind turbines.

In preparation of the PVIA, Spark (supported by Umwelt and Moir) undertook community consultation to establish key landscape features, defined areas of science quality and identify key public viewpoints valued by that community. Attendees at the community information session raised concerns around visual impacts associated with the Project due to the relatively flat terrain and its impact on the broader visual landscape. Other stakeholders commented that they were relatively unconcerned about visual impacts due to the distance from Buronga and Gol Gol. Additional consultation and further detailed assessment of these viewpoints will be undertaken during the EIS phase.

6.2.1.1 Landscape Character

The PVIA identified key landscape character units (LCUs) and their scenic quality based on the presence or absence of key features and the community's perception of their scenic and aesthetic value. The assessment of existing land use and landscape features found that the Project Area and its surrounds exhibit a strong agricultural history of grazing and cropping along with ecological associations with the adjacent Mallee Cliffs National Park and Associated Nature Reserves. A total of five LCUs were identified and scenic quality ratings were developed using a standard frame of reference. A summary of the LCUs present and their scenic quality ratings is presented in **Table 6.1**.

Table 6.1 Landscape Character Units

LCU	Name	General Character	Preliminary Scenic Quality Rating
LCU01	Grazing and Native vegetation paddocks	Clear, flat expanses of land used for grazing or cropping. Most prominent character of the region with minor to no elevation changes.	**Low**
LCU02	Hydrological systems	Characteristic riverine vegetation along river channels, creeks and lakes. Features include Gol Gol Creek, Lake Gol Gol, associated floodplains and swamps.	**Moderate**
LCU03	Cropping pastures	Expansive lots with modified land to support pastoral farming and irrigated agriculture. Vegetation character is predominantly Mallee shrubland scattered throughout the landscape.	**Low**
LCU04	Townships	Dense urban development is characteristic of this LCU and includes the towns of Buronga and Gol Gol.	**Low**
LCU05	National Parks and Conservation Areas	Comprises of dense woodlands of dense mallee, rosewood, bluebush and belah woodlands that are spread across the extents of Riverina plains within the extents of the Mallee Cliffs National Parks and associated Nature Reserves and other vegetated areas in close proximity.	**High**

6.2.1.2 Visual Magnitude Assessment (VMA)

Visual magnitude is a key visual parameter in the preliminary assessment tool within the Visual Bulletin. The Visual Magnitude Threshold is based on a ratio of turbine height and distance, determining the visual extent of WTGs relative to dwellings and key public viewpoints. Application of the VMA to the Project identified one (1) dwelling which requires further assessment in accordance with the Bulletin. The rest of the results are as follows:

- No non-associated dwellings were identified within 3.75 km or 5.5 km of the proposed WTG locations.
- One (1) non-associated dwelling (R1148) has been identified within 5.5 – 8 km of the proposed WTG locations (**Figure 6.1**).

- Preliminary site assessment identified that existing vegetation would reduce visibility from all dwellings within the visual magnitude.
- Further detailed assessment and site inspections of sensitive receptors to ground-truth this analysis will be undertaken during the EIS phase.
- **Figure 6.2** illustrates the Preliminary Zone of Visual Influence (ZVI), which indicates the theoretical visibility of the proposed turbines. The ZVI represents the area over which a development can theoretically be seen and is based on a Digital Terrain Model. The following provides a summary of the ZVI:
    - Due to the relatively flat topography, the majority of the WTGs associated with the Project will be visible from the surrounding areas.
    - Certain areas to the south-west and west of the Project are characterised by shallow topographical changes by embankments along lake and swamps. The ZVI identifies these areas to have limited views due to the minor topographical differences between them and the Project.
    - Views to the majority of WTGs associated with the Project are likely to be available for the non-associated dwelling within 8 km of the WTGs. This assessment is based on a consideration of topography alone and does not consider intervening elements such as vegetation and existing structures.
    - The closest townships to the Project Area are Gol Gol and Buronga, which are located approximately 12 km and 16 km from the Project Area, respectively. As these townships are over 8 km from the Project Area in a developed landscape, the views towards the Project from these locations will likely be filtered by built structures and vegetation associated with developments. As such, the potential impacts to scenic quality for these townships is considered low with regards to the Project.

Mallee Cliffs National Park

As discussed in **Section 2.2.1** the Mallee Cliffs National Park is situated approximately 200 m east of the Project Area and covers an area of 57,969 ha (NPWS, 2022). It is managed to protect the sand plain and sand dune land systems and ecological communities with emphasis placed on the value of Mallee Cliffs National Park as a wildlife conservation area. A policy of restricted public access for education purposes is maintained to assist in meeting conservation objectives (NPWS, 2022).

Whilst the Mallee Cliffs National Park is adjacent to the Project the restricted public access results in no public/recreational viewpoints within the Park itself. Consultation will continue with NPWS and the community during preparation of the EIS to identify any additional scenic values or viewpoints associated with the Mallee Cliffs National Park (and community values regarding potentially disrupted views to the Park itself) that should be considered in the detailed Landscape Visual Impact Assessment (LVIA).

Mungo National Park

Mungo National Park (a World Heritage listed National Park) was a location of concern identified during community consultation. It is the home of the 'Mungo Lady' and 'Mungo Man', and represents a place rich in Aboriginal history (NPWS, 2022). The 'Willandra Lakes' are also a World Heritage Area.

Known for its dry lakes and breathtaking dunes, the extraordinary Mungo National Park is visually spectacular. But of course, there's much more to this ancient place. Contained within the Willandra Lakes Region World Heritage Area, its Aboriginal culture stretches back some 40,000 years. Traditional Owner involvement in the park's management was formalised in 2001, when consultation with local Aboriginal communities identified 3 tribal groups with traditional associations with the region: The Barkindji, Mutthi Mutthi and Ngyiampaa tribes. The 3 groups agreed that management decisions were the business of all three tribal groups and established the Traditional Tribal Groups Elders Council as a body to coordinate Aboriginal involvement with the park. The Elders agreed to enter into a Memorandum of Understanding (MOU) with NPWS to establish joint management of the park (NPWS, 2022).

Accordingly, these locations are considered to have very high environmental and social value, reflecting the concerns raised by community. The Project is approximately 47 km south-west of Mungo National Park and would have very minimal visibility at this distance. The potential for views from Mungo National Park (and any associated visual impacts) will be considered further during the EIS. Consultation with NPWS (commenced during the Scoping Report stage of the Project) will also be progressed during the EIS.

It is important to reiterate that this is a preliminary assessment based on worst case scenario that does not consider the impact of vegetation or structures. Based on the preliminary assessments, it is likely that existing intervening vegetation surrounding the non-associated dwelling is likely to reduce views of WTGs from a number of locations.

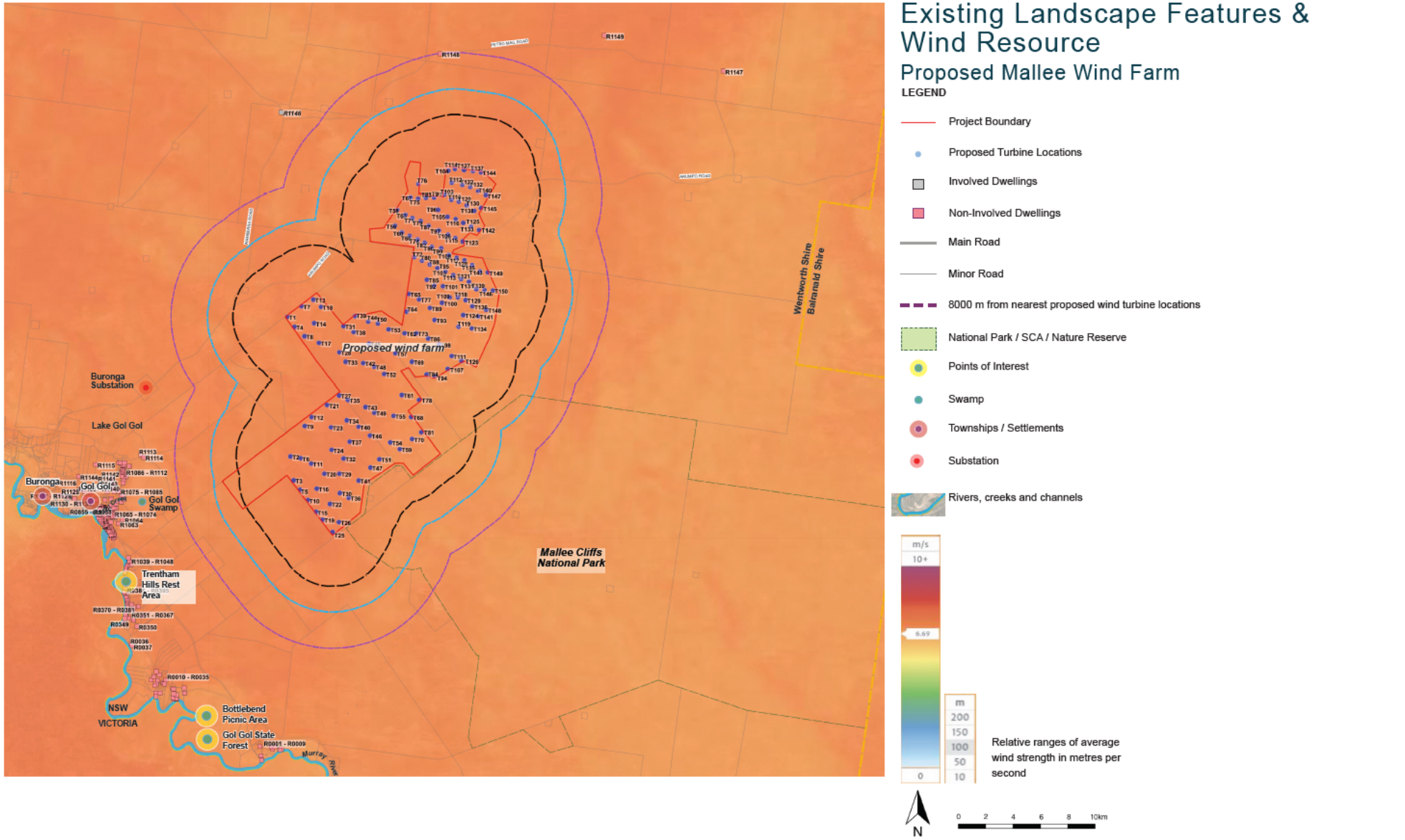


Figure 6.1 Preliminary Assessment Tool 1: Visual Magnitude

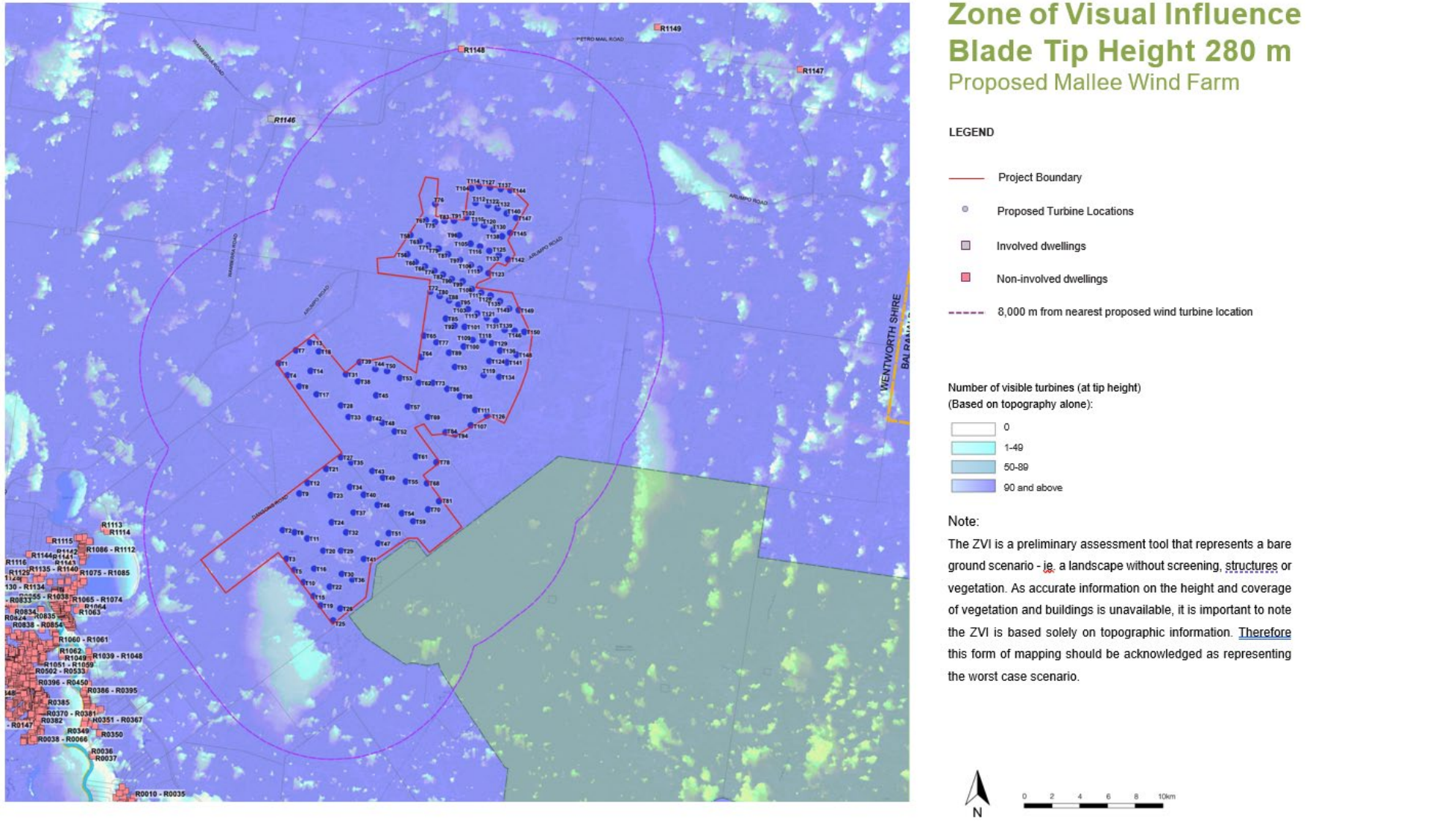


Figure 6.2 Zone of Visual Influence

6.2.1.3 Multiple Wind Turbine Analysis

The Multiple Wind Turbine Tool is part of the preliminary assessment that provides an indication of potential cumulative impacts arising for the Project. To establish whether the degree to which dwellings or key public viewpoints may be impacted by multiple WTGs, the proponent must map into six sectors of 60° any proposed WTGs, and any existing or approved WTGs within 8 km of each dwelling or key public viewpoint.

Figure 6.3 provides an overview of the number of 60° sectors visible from each of the dwellings identified within 8 km of the Project Area. One (1) non-associated dwelling (R1148) will have views in up to one (1) 60-degree sectors. The rest of the results are as follows:

- no dwellings have WTGs in up to three (3) 60-degree sectors
- no dwellings have WTGs in up to four (4) 60-degree sectors
- no dwellings have WTGs in up to six (6) 60-degree sectors.

Public viewpoints were also reviewed against the multiple wind turbine tool. The PVIA selected 25 representative public viewpoints, based on which the multiple wind turbine tool analysis identified:

- 17 public viewpoints with no WTGs within 8 km.
- Three (3) public viewpoints with WTGs within one (1) 60-degree sector.
- One (1) public viewpoint with WTGs within two (2) 60-degree sectors.
- Two (2) public viewpoints with WTGS within three (3) 60-degree sectors.
- No public viewpoints with WTGs within four (4) 60-degree sectors.
- Two (2) public viewpoints with WTGs within five (5) 60-degree sectors.

- The most affected public viewpoints were primarily transient views to traffic along Arumpo Road within the locality of Arumpo itself.

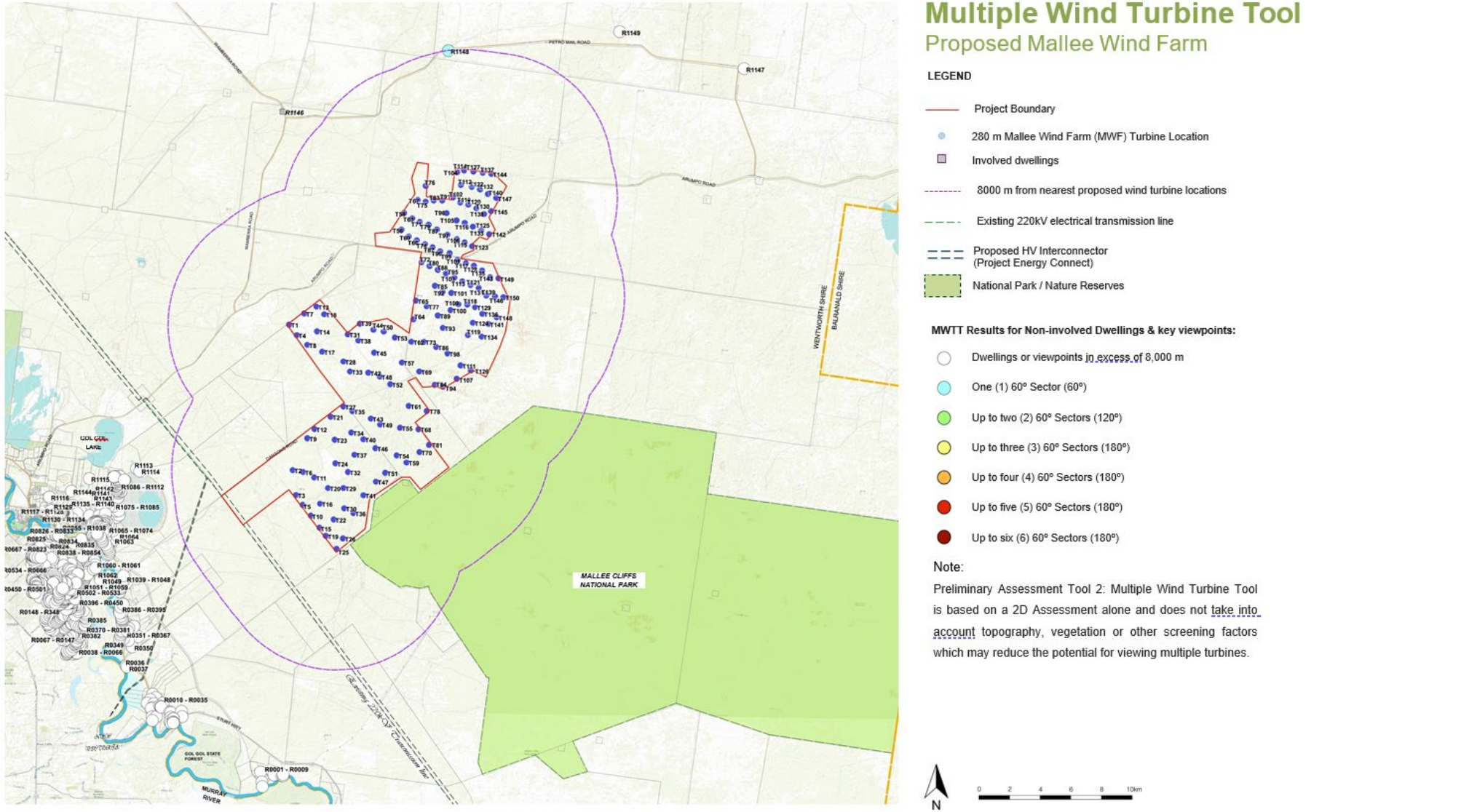


Figure 6.3 Multiple Wind Turbine Tool

6.2.1.4 Landscape Visual Impact Assessment

A detailed Landscape Visual Impact Assessment (LVIA) will be prepared as part of the EIS in accordance with the requirements of the Visual Bulletin and based on the following next steps:

- Community and stakeholder consultation will be ongoing through the Project. Ongoing input from the community will assist the preparation of the LVIA.
- Utilise the landscape character assessment to prepare a detailed Visual Baseline Study.
- Identify any additional key features, key viewpoints valued by the community through ongoing consultation.
- Refine the Landscape Character Units (LCU) and allow the community to provide feedback on the relative scenic quality ratings of LCUs.
- Determine the Visual Influence Zone of key viewpoints and assess against the objectives outlined in the Visual Assessment Bulletin.
- Ground-truthing of all identified non-associated dwellings.
- Undertake site inspection and detailed dwelling assessment at sensitive non-associated dwellings.
- The LVIA will assess each 'sensitive receptor' in detail to consider topography, vegetation, and other screening factors.
- Determine the potential visual impact of each sensitive receptor and provide mitigation methods to reduce potential visual impacts.
- Determine the potential visual impact to sensitive receptors and viewpoints and provide mitigation measures (if needed) including the nearest townships of Gol Gol and Buronga (see below), the Mungo National Park and Mallee Cliffs National Park.
- The LVIA will require further detailed assessment from areas identified as having potential visibility in the Preliminary ZVIs.
- Graphic representations of the Project using GIS technology including wire frame diagrams and photomontages will be provided in the EIS phase.
- Further assessment and justification for placement of WTGs in multiple sectors will need to be detailed in the EIS, along with a description of the mitigation and management measures being employed to reduce impacts. Such further assessment may identify that factors such as topography, relative distance and existing vegetation may minimise the impacts of the Project.

Gol Gol and Buronga Visual Assessment

As noted in this Scoping Report, there is a very low density of housing near the Project, with the closest towns of Gol Gol and Buronga being approximately 12 km and 16 km respectively from the nearest turbine location. Being at this distance from the Project, they are beyond the 8 km study area identified in the PVIA. "*At eight kilometres, turbines and objects recede into the background in terms of visibility…*" (Page 9 of the Visual Bulletin). However, due to a flat topography, it is likely that the nearby towns of Gol Gol and Buronga may require further investigation to determine potential visual impact. Accordingly, the LVIA will include an assessment to determine the potential visual impact to sensitive receptors and viewpoints (and provide mitigation measures, if needed) to these towns. Amongst other assessment tools, visual impact will be investigated through preparation of Photomontages or Wireframe Diagrams, with public viewpoint locations to be selected during the LVIA works. Indicatively this would include approximately four (4) to six (6) viewpoint locations distributed across the Gol Gol and Buronga landscape, focusing on the most affected locations in the vicinity of the Project.

6.2.2 Amenity – Noise and Vibration

A preliminary noise assessment (PNA) has been undertaken by Marshall Day Acoustics Pty Ltd (Marshall Day) in accordance with the NSW Noise Bulletin. The results of the PNA are summarised below, with the full report provided in **Appendix 3**.

The WTG model will be determined from ongoing Project design development. The final selection would be made on account of a range of design requirements including achieving compliance with relevant noise limits at surrounding noise sensitive receivers. A candidate WTG model with specifications consistent with the Project design has been used for purposes of the PNA.

6.2.2.1 Potential Noise and Vibration Impacts

The Noise Bulletin provides a baseline noise criterion of 35 dB(A) or 5 dB(A) above the background noise level at each integer wind speed for non-associated dwellings (whichever is greater). For associated receivers, where a noise agreement is in place, the Noise Bulletin enables the baseline criteria to be higher. Currently, no associated receivers are nominated for the Project.

The preliminary noise assessment assumes a candidate WTG sound power level of 107.5 dB(A), including 1 dB for test uncertainty. The overall level represents the total noise emission of the WTG, including the secondary contribution of ancillary plant associated with the turbine (e.g., cooling fans and internal transformer). The candidate WTG sound power level is considered typical of noise emissions from comparable multi-megawatt WTG models.

Predicted noise levels for all receivers within 12 km of a WTG were conducted (refer to **Figure 6.4**). Modelling was based on candidate wind turbine's noise emissions highest wind speed level (comprising to 9m/s or greater) and the wind being directed from the wind farm to each receiver. All predicted noise levels fell below the NSW Noise Assessment Bulletin base criterion of 35 dB(A). The highest noise levels at any dwelling would occur at R1148 and R1146, where noise levels up to 21.8 dB(A) and 21.2 dB(A) were predicted. Noise predictions were below 20 dB (A) at all other dwellings.

The preliminary noise assessment also indicates that as calculated low frequency noise levels remain below the applicable thresholds for both associated and non-associated receivers, no adjustments for special noise characteristics where applied.

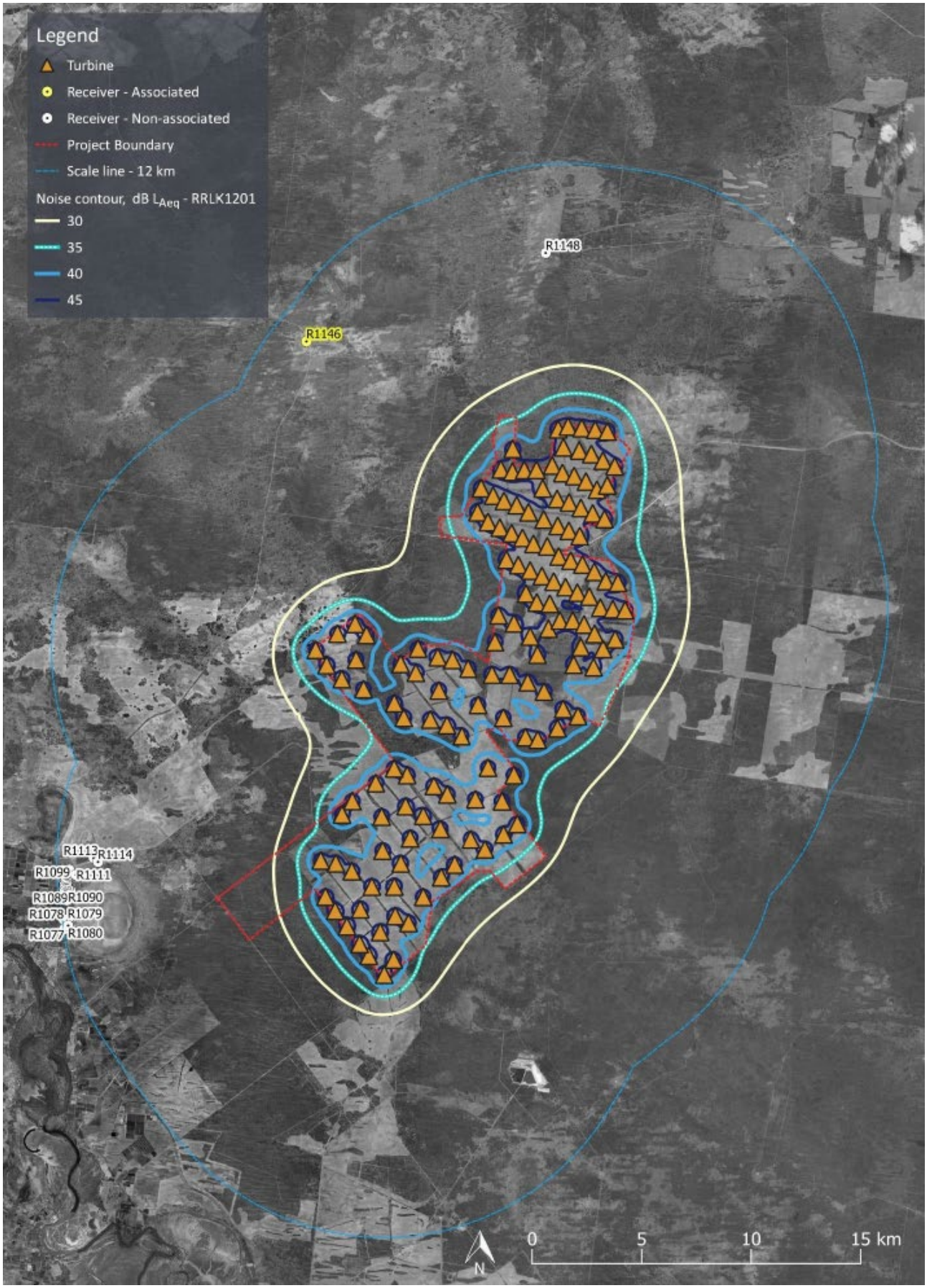


Figure 6.4 Highest Predicted Noise Levels (Hub Height Wind Speed of 9 m/s or Greater)

6.2.2.2 Noise and Vibration Impact Assessment Methodology

Operational wind farm noise levels are predicted using:

- noise emission data for the WTGs
- a 3D digital model of the site and the surrounding environment
- international standards used for the calculation of environmental sound propagation.

At this preliminary stage of assessment, the primary consideration is potential A-weighted noise levels associated with operation of the Project. The method selected to predict A-weighted noise levels is *International Standard ISO 9613-2: 1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO 9613-2*). The ISO 9613-2 method is used in conjunction with a set of input choices and procedural modifications that are specific to wind farm noise assessment, based on international research and guidance.

A detailed Noise and Vibration Impact Assessment (NVIA) will be prepared as part of the EIS in accordance with the Noise Bulletin (DPE, 2016c), NSW EPA Noise Policy for Industry (NPfI) (EPA, 2017), Interim Construction Noise Guideline (DECC, 2009), NSW Road Noise Policy (DECCW, 2011) and Assessment Vibration: A technical Guideline (DECC, 2006). The NVIA will:

- establish the relevant level of background noise
- provide predictive noise modelling of the Project's construction and operational activities
- assess the road traffic noise during construction and operational activities
- assess any vibration impacts at sensitive receivers, and
- identify any reasonable and feasible mitigation and management measures.

Reasonable and feasible mitigation and management measures for noise will be considered as part of the NVIA process and may include, but will not necessarily be limited to:

- removal or repositioning of WTGs from the Project
- fixed construction noise sources such as concrete batching plant, generators and compressors being located at the maximum practicable distance to the nearest non-associated dwellings, where practicable
- investigate alternative construction processes where feasible and reasonable to reduce noise
- implement a Construction Environmental Management Plan (CEMP), including regular updates to the local community
- entering into negotiated agreements with impacted landholders.

6.2.3 Biodiversity

The biodiversity assessment for the Project will be undertaken following the NSW Biodiversity Assessment Method (BAM). The assessment has been commenced including desktop analysis and field survey to inform the detailed design for the Project.

A Biodiversity Constraints Report has been prepared for the Project, which is summarised in the sections below. Refer to **Appendix 5** for the full report. Two rounds of surveys have currently been completed to inform the biodiversity constraints for the Project, including a one-day preliminary survey undertaken by GHD in December 2021 (GHD, 2022), as well as a nine-day site visit undertaken by Umwelt in September 2022. These surveys included general habitat assessments, Plant Community Type (PCT) data collection and vegetation mapping. Extensive seasonal field surveys commenced for the Project in October 2022, these are expected to be ongoing throughout the EIS.

6.2.3.1 Desktop Searches

The following information database tools were utilised for the biodiversity constraints analysis.
The likelihood of occurrence of threatened species listed under the EPBC Act or BC Act in the Project Area was assessed through use of the following search tools (using a 10 km buffer around the Project Area):

- Mallee Wind Farm Preliminary Ecological Assessment (GHD, 2022)
- DPE Threatened Biodiversity Data Collection (DPE, 2022a)
- Biodiversity Values Map Viewer (DPE, 2022b)
- DCCEEW EPBC Act Protected Matters Search Tool (PMST) (DCCEEW, 2022)
- DPE BioNet Atlas Search Tool (DPE, 2022c).

In addition to the databases mentioned above, regional vegetation community mapping and the Biodiversity Assessment Method Calculator (BAM-C) were also used to gain an understanding of the potential ecological values of the Project Area.

Table 6.2 documents the threatened species that are known or highly likely to occur within the Project Area, including results from the database searches and ecological surveys completed across the Project Area.

Table 6.2 Threatened Species known or highly likely to occur within Project Area

Scientific Name	Common Name	NSW BC ACT*	EPBC Act*	SAII?***	Likelihood of Occurrence	Credit Type
Circus assimilis	Spotted Harrier	V		No	Known	Ecosystem
Hieraaetus morphnoides	Little Eagle	V		No	Known	Species/ Ecosystem
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		No	Known	Ecosystem
Lophochroa leadbeateri	Major Mitchell's Cockatoo	V		No	Known	Species/ Ecosystem

Scientific Name	Common Name	NSW BC ACT*	EPBC Act*	SAII?***	Likelihood of Occurrence	Credit Type
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V		No	High	Ecosystem
Hydroprogne caspia	Caspian Tern		J	No	High	N/A
Leipoa ocellata	Malleefowl	E	V	No	Known	Ecosystem
Certhionyx variegatus	Pied Honeyeater	V		No	High	Ecosystem
Epthianura albifrons	White-fronted Chat	V		No	Known	Ecosystem
Daphoenositta chrysoptera	Varied Sittella	V		No	Known	Ecosystem
Pachycephala inornata	Gilbert's Whistler	V		No	Known	Ecosystem
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V		No	Known	Ecosystem
Cinclosoma castanotum	Chestnut Quail-thrush	V		No	Known	Ecosystem
Calidris ruficollis	Red-necked Stint		C,J,K	No	High	N/A
Cercartetus concinnus	Western Pygmy Possum	E		No	Known	Ecosystem
Chalinolobus picatus	Little Pied Bat	V		No	High	Ecosystem
Vespadelus baverstocki	Inland Forest Bat	V		No	High	Ecosystem
Aprasia inaurita	Mallee Worm-lizard	E		No	High	Ecosystem
Swainsona pyrophila	Yellow Swainson-pea	V	V	No	High	Species
Acacia acanthoclada	Harrow Wattle	E		No	High	Species
Santalum murrayanum	Bitter Quandong	E		No	High	Species

** where V = vulnerable, E = Endangered, J = JAMBA**, K = ROKAMBA**, C = CAMBA**.*

*** International Migratory Bird Agreements.*

**** SAII = species or ecological communities with the potential for serious and irreversible impacts.*

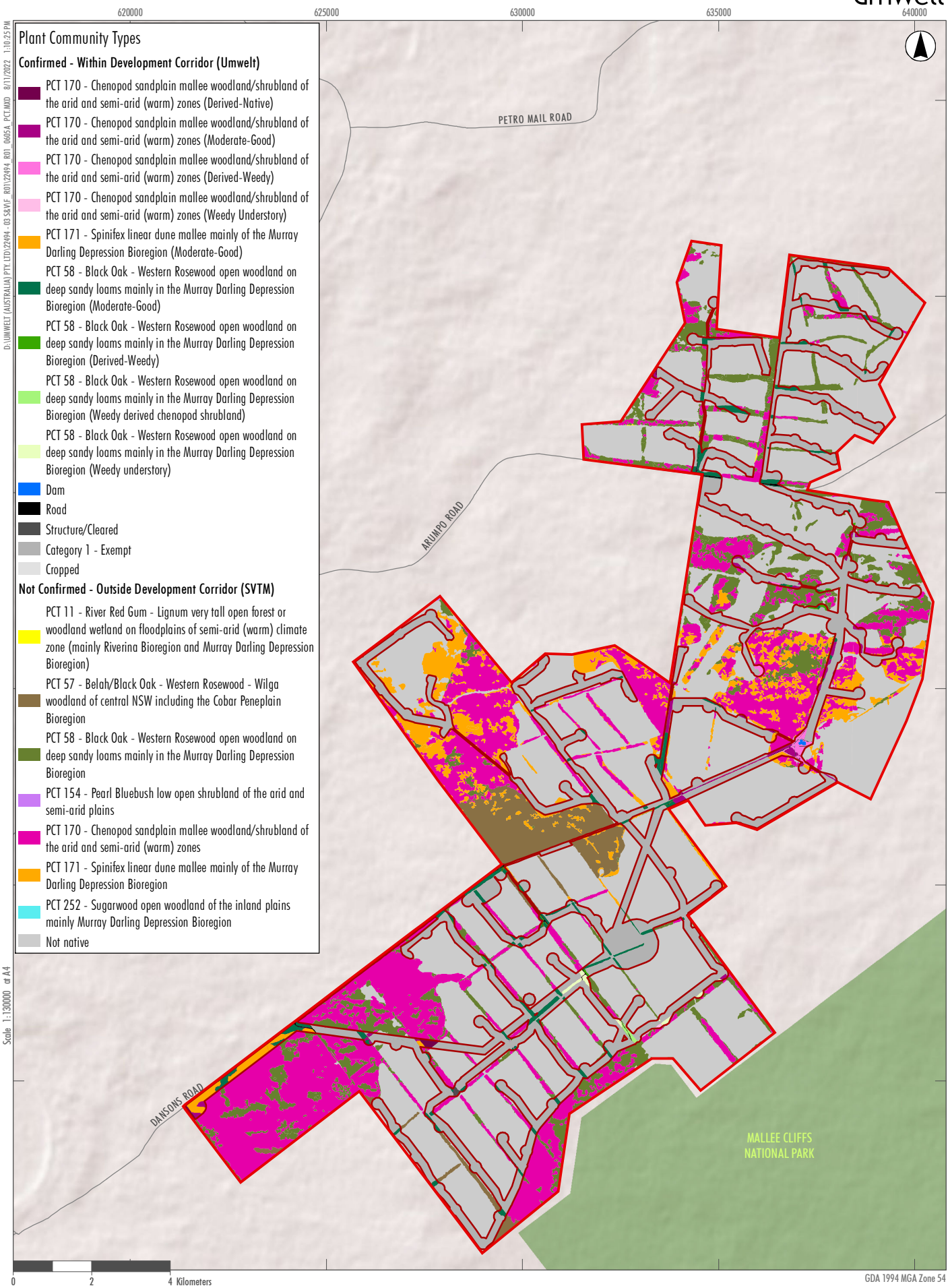
Table 6.3 provides a list of threatened species (species credit species and dual credit species) that have been predicted to occur within the Project Area. These species will be surveyed within the appropriate season during the biodiversity assessment.

Table 6.3 Threatened Species Predicted by the BAM-C to Occur Within the Project Area

Scientific Name	Common Name	BC Act Listing	EPBC Act Listing	Credit Type
Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Listed	Species/Ecosystem
Hamirostra melanosternon	Black-breasted Buzzard	Vulnerable	Not Listed	Species/Ecosystem
Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Listed	Species/Ecosystem
Lophoictinia isura	Square-tailed Kite	Vulnerable	Not Listed	Species/Ecosystem
Burhinus grallarius	Bush Stone-curlew	Endangered	Not Listed	Species
Lophochroa leadbeateri	Major Mitchell's Cockatoo	Vulnerable	Not Listed	Species/Ecosystem
Lucasium stenodactylum	Crowned Gecko	Vulnerable	Not Listed	Species
Neobatrachus pictus	Painted Burrowing Frog	Endangered	Not Listed	Species
Amytornis striatus	Striated Grasswren	Vulnerable	Not Listed	Species
Pseudomys desertor	Desert Mouse	Critically Endangered	Not Listed	Species
Ardeotis australis	Australian Bustard	Endangered	Not Listed	Species
Polytelis anthopeplus monarchoides	Regent Parrot (eastern subspecies)	Endangered	Vulnerable	Species/Ecosystem
Lasiorhinus latifrons	Southern Hairy-nosed Wombat	Endangered	Not Listed	Species
Manorina melanotis	Black-eared Miner	Critically Endangered	Endangered	Species
Pachycephala rufogularis	Red-lored Whistler	Critically Endangered	Vulnerable	Species
Calotis moorei	A burr-daisy	Endangered	Endangered	Species
Cratystylis conocephala	Bluebush Daisy	Endangered	Not Listed	Species
Leptorhynchos waitzia	Button Immortelle	Endangered	Not Listed	Species
Lepidium monoplocoides	Winged Peppercress	Endangered	Endangered	Species
Atriplex infrequens	A saltbush	Vulnerable	Vulnerable	Species
Swainsona colutoides	Bladder Senna	Endangered	Not Listed	Species
Swainsona pyrophila	Yellow Swainson-pea	Vulnerable	Vulnerable	Species

6.2.3.2 Preliminary Vegetation Mapping

A preliminary vegetation map of the Project Area has been prepared utilising the available regional vegetation mapping (Western SVTM) (DPIE, 2016b) (refer to **Figure 6.5A** and **Table 6.4**), which provides valuable information at the landscape scale of the PCTs and associated TECs in the Project Area. Detailed vegetation mapping surveys and floristic surveys were conducted for the current Development Corridor in September 2022, which present a more detailed, field verified vegetation map (refer to **Figure 6.5B** and **Table 6.5**). Through this process, a total of three PCTs, in various condition types, have been mapped across the Development Corridor. Potential TECs listed under the BC Act and EPBC Act are shown on **Figure 6.5C** and **Figure 6.5D**. Umwelt identified one TEC that is likely present within the Development Corridor during field surveys, which is listed under the EPBC Act (refer to **Figure 6.5D**). Further surveys and data analysis will be completed to confirm the TECs present on site.

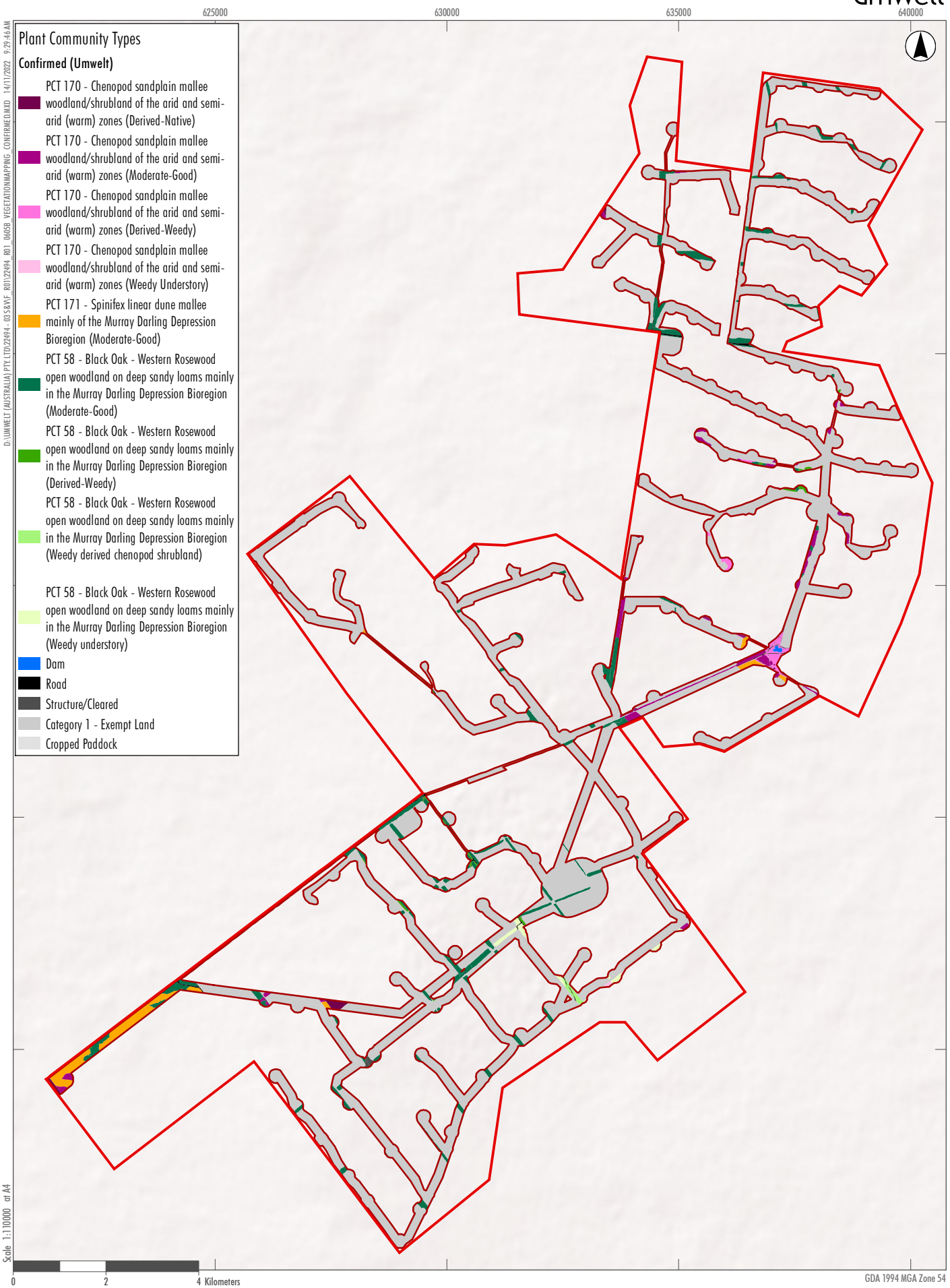


Legend

- Project Boundary
- Development Corridor
- National Parks (NPWS Estate)
- Road

FIGURE 6.5 A
Plant Community Types within the Project Boundary

Image Source: ESRI (2022) Data source: DSFI (2020)



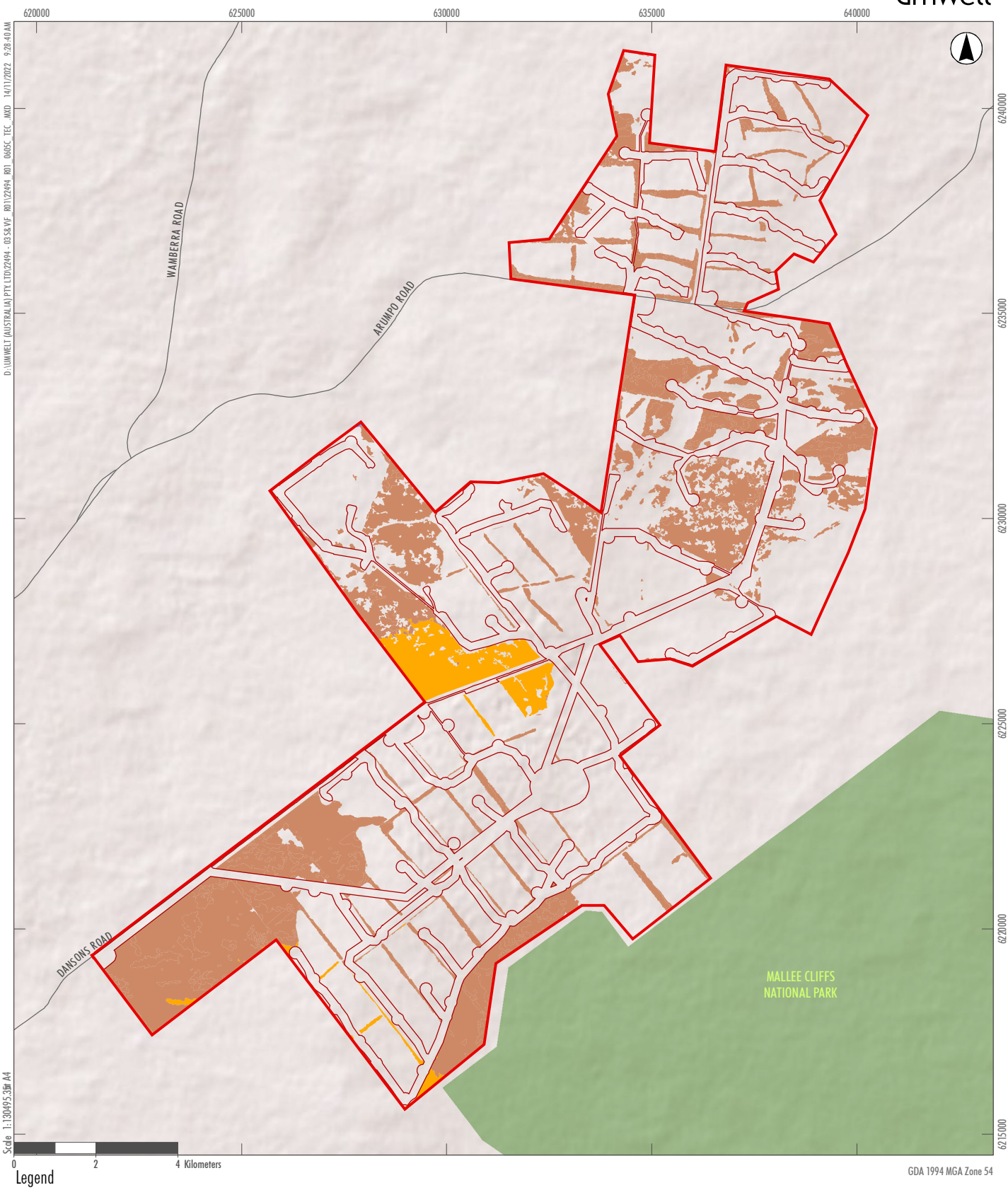
Legend

- Project Boundary
- Development Corridor

FIGURE 6.5 B

Confirmed Vegetation Mapping within the Development Site

Image Source: ESRI (2022) Data source: DSFI (2020)



Legend

- Project Boundary
- Development Corridor (no TECs Confirmed within Development Corridor)
- National Parks (NPWS Estate)
- Road

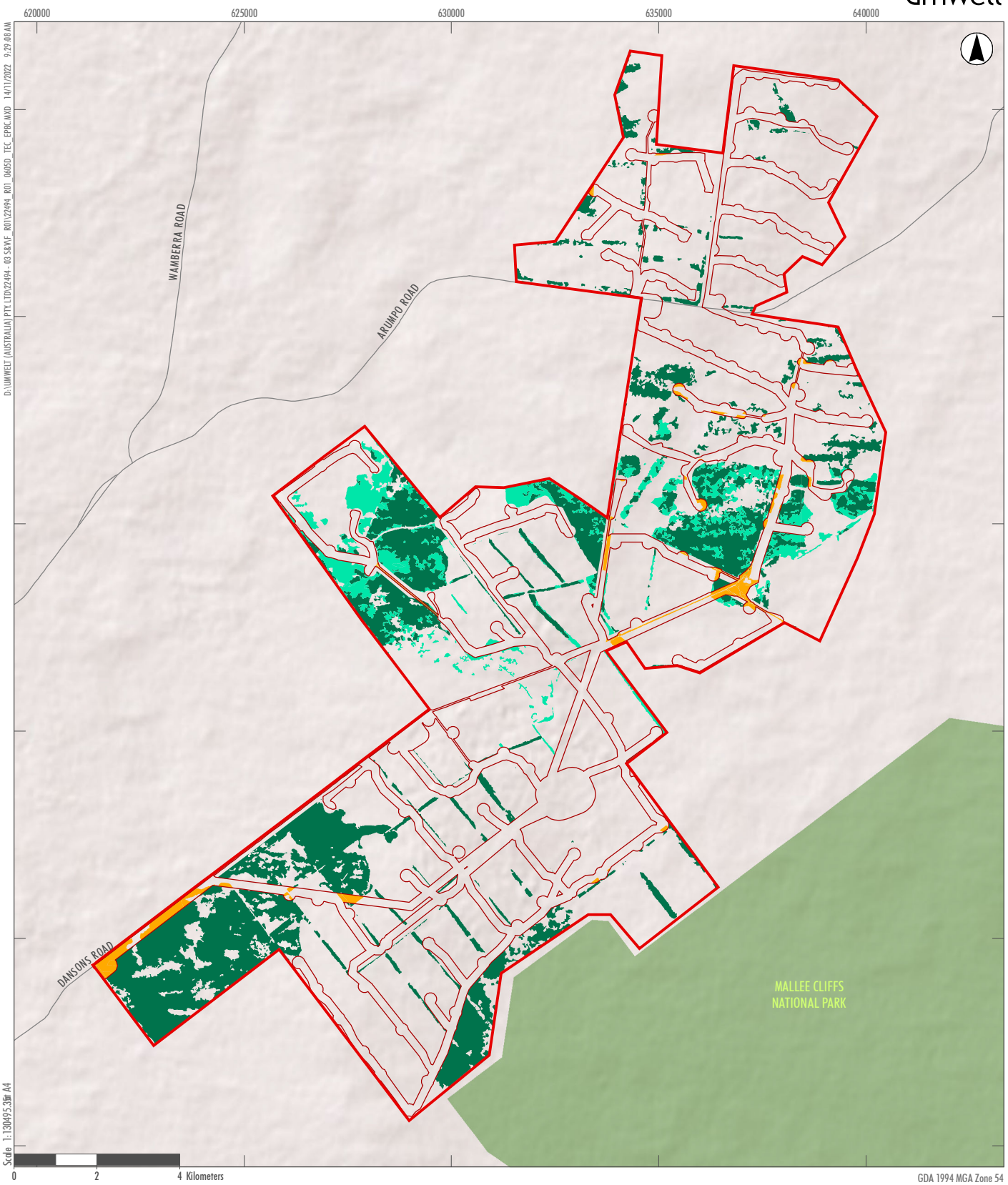
Regional Vegetation Mapping - Potential TEC under BC Act

- In part *Acacia loderi* shrublands EEC
- In part *Acacia loderi* shrublands EEC / In part *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions EEC
- In part *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions EEC

FIGURE 6.5 C

Potential TECs within Project Boundary under BC Act

Image Source: ESRI (2022) Data source: DSFI (2020)



Legend

- Project Boundary
- Development Corridor
- National Parks (NPWS Estate)
- Road

Umwelt Vegetation Mapping Potential TEC under EPBC Act (Confirmed - within Development Corridor)

- Mallee Bird Community of the Murray Darling Depression Bioregion EEC

Regional Vegetation mapping Potential TEC under EPBC Act (Not confirmed - outside Development Corridor)

- Mallee Bird Community of the Murray Darling Depression Bioregion EEC
- Mallee Bird Community of the Murray Darling Depression Bioregion EEC / Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions CEEC

FIGURE 6.5 D

Potential TECs within Project Boundary under EPBC Act

Image Source: ESRI (2022) Data source: DSFI (2020)

A formal process of collecting detailed floristic data will be required to make a final determination as to whether or not vegetation within the Project Area conforms with BC Act and/or EPBC Act listed TECs.

Table 6.4 Plant Community Types in the Project Area

PCT ID	PCT Name	Potential BC Act Status	Potential EPBC Act Status	Preliminary Area (ha)
0	Not native vegetation	-	-	11,787.8
11	River Red Gum - Lignum very tall open forest or woodland wetland on floodplains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	-	-	1.6
57	Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion	Listed as in part conforming to *Acacia loderi* shrublands EEC according to the VIS database	-	598.9
58	Black Oak - Western Rosewood open woodland on deep sandy loams mainly in the Murray Darling Depression Bioregion	Listed as in part conforming to *Acacia loderi* shrublands EEC according to the VIS database Listed as in part conforming to *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions according to the VIS database	-	1,749
154	Pearl Bluebush low open shrubland of the arid and semi-arid plains	Listed as in part conforming to *Acacia loderi* shrublands EEC according to the VIS database	-	0.6
170	Chenopod sandplain mallee woodland/shrubland of the arid and semi-arid (warm) zones	Listed as in part conforming to *Acacia loderi* shrublands EEC according to the VIS database Listed as in part conforming to *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions according to the VIS database	Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions CEEC Mallee Bird Community of the Murray Darling Depression Bioregion EEC	3,522

PCT ID	PCT Name	Potential BC Act Status	Potential EPBC Act Status	Preliminary Area (ha)
171	Spinifex linear dune mallee mainly of the Murray Darling Depression Bioregion	-	Mallee Bird Community of the Murray Darling Depression Bioregion EEC	905.5
252	Sugarwood open woodland of the inland plains mainly Murray Darling Depression Bioregion	-	-	0.7
Total				**18,566.2**

EEC – Endangered Ecological Community; CEEC – Critically Endangered Ecological Community.

Table 6.5 Plant Community Types in the Development Corridor

PCT ID	PCT Name	Potential BC Act Status	Potential EPBC Act Status	Preliminary Area (ha)
0	Not native vegetation	-	-	3,085.6
58	Black Oak - Western Rosewood open woodland on deep sandy loams mainly in the Murray Darling Depression Bioregion	Listed as in part conforming to *Acacia loderi* shrublands EEC according to the VIS database. Ruled out due to absence of *A. loderi* Listed as in part conforming to *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions according to the VIS database Ruled out due to absence of *A. melvillei*	-	301.5
170	Chenopod sandplain mallee woodland/shrubland of the arid and semi-arid (warm) zones	Listed as in part conforming to *Acacia loderi* shrublands EEC according to the VIS database. Ruled out due to absence of *A. loderi* Listed as in part conforming to *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions according to the VIS database. Ruled out due to absence of *A. melvillei*	Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions CEEC. Ruled out given *Eucalyptus dumosa* was not dominant within the vegetation community and therefore did not meet the key diagnostic requirements of the conservation advice. Mallee Bird Community of the Murray Darling Depression Bioregion EEC	112.5

PCT ID	PCT Name	Potential BC Act Status	Potential EPBC Act Status	Preliminary Area (ha)
171	Spinifex linear dune mallee mainly of the Murray Darling Depression Bioregion	-	Mallee Bird Community of the Murray Darling Depression Bioregion EEC	75.9
Total				**3,575.5**

CEEC – Critically Endangered Ecological Community.

6.2.3.3 Indicative Clearing of Native Vegetation

The Project site selection has sought to minimise native vegetation clearing by utilising historically cleared areas that are presently subject to cropping. The vast majority (86%) of the development corridor has been sited on land considered to be Category 1 – Exempt Land with minimal ecological value.

Based on the information above and the indicative Project layout represented in **Figure 3.1**, there is approximately 490 ha of native vegetation within the development corridor that may be subject to clearing. As discussed in **Section 3.7,** the development corridor is a conservative area for early assessment purposes and the proposed disturbance area will likely be significantly smaller, subject to further detailed assessments and design. The area of native vegetation clearing required is likely to reduce further from this conservative estimate as the project design is developed and ongoing biodiversity investigations are used to refine the project footprint. The disturbance footprint and hence the likely area of native vegetation that would be cleared as a result of the Project will be confirmed during the EIS.

Biodiversity aspects relating to options for the Project's grid connection and associated transmission line alignment (and design) will be investigated further during the EIS. As noted in **Section 3.8.1** , environmental and social impacts will be considered with a focus on the potential to avoid and/or minimise impacts to existing native vegetation and habitat that is present in the south-western extent of that proposed transmission line alignment. The aim being to assist reduce the estimated 490 ha of native vegetation within the development corridor that may be subject to clearing. Other transmission line alignment options would be contingent on securing appropriate landowner agreement.

6.2.3.4 Project Location in the Landscape

The following landscape features have been identified as notable features for birds and bats in the area:

- Mallee Cliffs National Park – located approximately 200 m east of the Project Area
- Mungo National Park – located approximately 47 km north-east of the Project Area
- conservation mapped land – located immediately along the north, west, south and eastern edges of the Project Area
- Willandra Lakes Region World Heritage Area – located approximately 25 km north-east of the Project Area
- Mourquong Saltwater Disposal Basin – located approximately 13 km west of the Project Area

- the Murray and Darling Rivers – located approximately 9 km south and 37 km west of the Project Area, respectively
- Lake Gol Gol and Gol Gol Swamp – located approximately 8 km west and 4 km south-west of the Project Area, respectively
- large areas of remnant native vegetation surrounding the Project Area – located immediately along the north, west, south and eastern edges of the Project Area.

6.2.3.5 Biodiversity Development Assessment

Further detailed biodiversity surveys will be undertaken to support the EIS phase for the Project. Following the completion of the surveys, a Biodiversity Development Assessment Report (BDAR) will be prepared. The BDAR will include:

- GIS mapping.
- Three rounds of seasonal flora and fauna surveys:
  - Spring threatened species surveys
  - Summer threatened species surveys
  - Autumn threatened species surveys.
- Bird and Bus Utilisation Surveys (BBUS) will be completed to aid the Prescribed Impact Assessment (Turbine Strike). These surveys will be conducted in each season and will survey a mixture of vantage point and woodland areas.
- Methods and results of vegetation surveys including a vegetation community map (based on PCTs and including TECs).
- Methods and results of surveys targeting species-credit species.
- Assessment of prescribed impacts.
- Outcomes of the calculator assessment identifying the credits generated by the PCTs (and ecosystem-credit species) and species-credit species.
- Relevant data and mapping for agency submission including field data, figures and associated GIS files.

6.2.4 Heritage

6.2.4.1 Introduction

A Preliminary Heritage Constraints Assessment (PHCA) has been undertaken by Austral Archaeology in accordance with the *National Parks and Wildlife Act 1974* (NPW Act), EPBC Act, NSW *Heritage Act 1977* (Heritage Act), Wentworth LEP 2011, and Wentworth Shire Development Control Plan 2011 (Wentworth DCP). The results of the PHCA are summarised below, with the full report provided in **Appendix 6.**

6.2.4.2 Aboriginal Heritage

In July 2022, an extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted, where 64 Aboriginal archaeological sites were identified within a 25 km radius of the Project Area. One of the registered sites, C1 River Margin, comprising of a shell midden and an open artefact site, is located within the Project Area. Two (2) sites are located within 1 km of the Project Area, which are shown on **Figure 6.6**.

The results of the AHIMS search are described below:

- forty-two (42) culturally modified trees
- sixteen (16) open artefact sites
- three (3) cultural shell deposits
- one (1) combination of open artefact site; hearth; cultural shell deposit
- one (1) ancestral burial
- one (1) hearth.

It is expected that additional Aboriginal sites and values may be present in the Project Area and a detailed Aboriginal Cultural Heritage Assessment (ACHA) will be undertaken to assess potential impacts in accordance with the registered Aboriginal parties for the Project.

The ACHA will be undertaken in accordance with the following key guidelines:

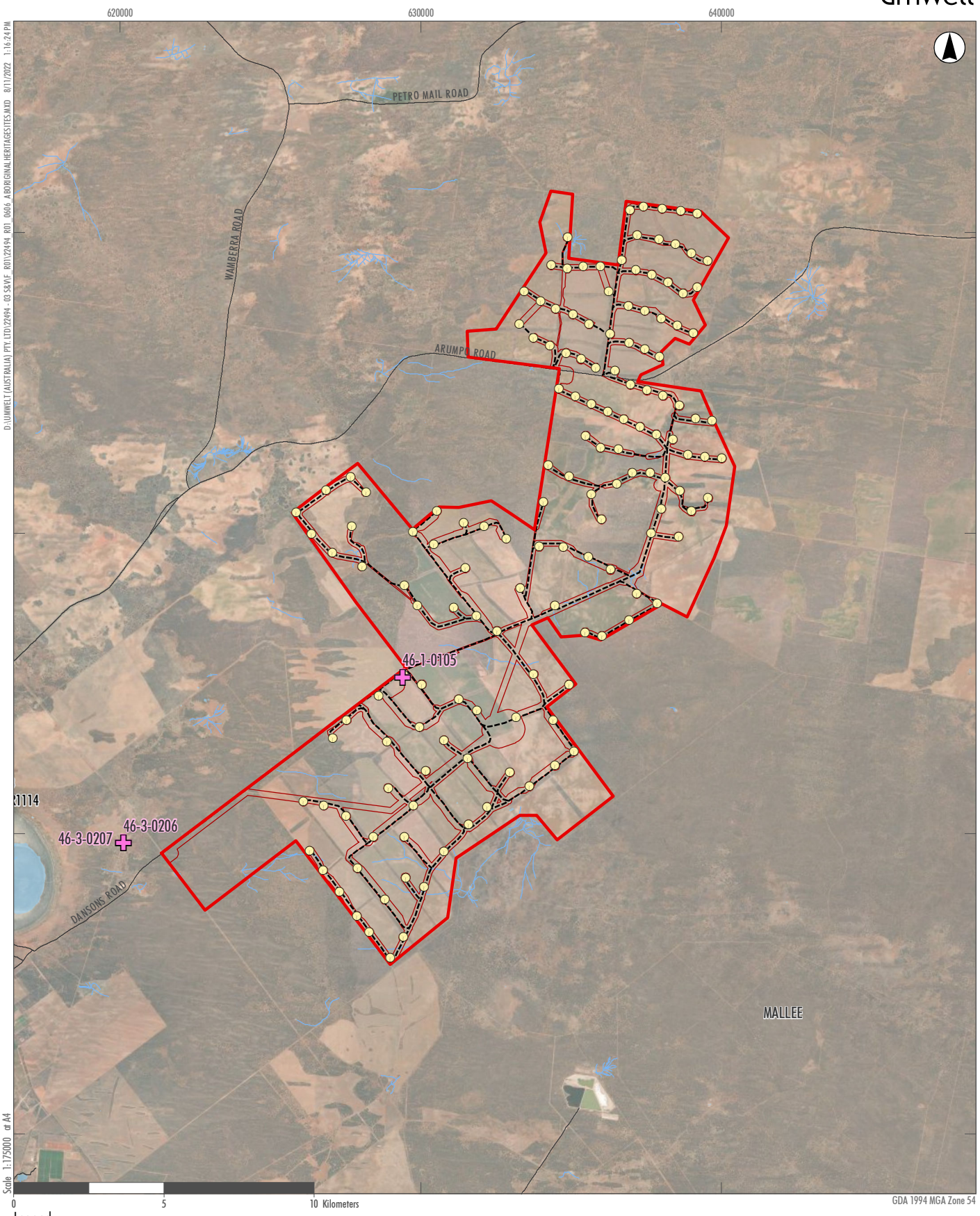
- the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011)
- the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010a).

The ACHA will include consultation with the registered Aboriginal parties for the Project in determining and assessing impacts, developing and selecting options and mitigation measures, having regard to the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010b). A range of management strategies may be available in relation to the Project that include varying levels of mitigation of identified sites or potential harm to Aboriginal cultural heritage. The micro-siting of infrastructure will allow for some flexibility in the management of Aboriginal cultural heritage. When impacts to sites or areas of archaeological potential are unavoidable, a strategy will be developed that involves implementing appropriate measures to manage and mitigate these impacts with reference to the archaeological and Aboriginal cultural significance of the sites/areas of potential.

6.2.4.3 Historic Heritage

The Register of the National Estate (RNE) and the State Heritage Register (SHR) were reviewed in July 2022, which did not identify any State listed heritage items, or items listed on the RNE, within the Project Area. Additionally, there are no heritage items listed on any Section 170 Heritage and Conservation registers within the Project Area, nor on Schedule 5 of the Wentworth LEP.

Despite no registered non-Aboriginal heritage items being located within the Project Area, the EIS will be supported by a historical heritage assessment (HHA) which will be prepared with regard to the NSW Heritage Manual, relevant Heritage Council of NSW guidelines and with consideration of the principles contained in *The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance* (ICOMOS, 2013).



Legend

- Project Boundary
- Development Corridor
- Potential Wind Turbine Generator Locations
- Potential Access Tracks
- Waterbodies
- Watercourses
- Road

Aboriginal Sites

- Open Artefact Site

FIGURE 6.6

Aboriginal Heritage Sites

Data source: DFSI (2021); NSW OEH (2022)

6.2.5 Traffic and Transport

Access to the Project Area is proposed via the existing road network. Primary access will likely be via the Sturt Highway, which provides connection to Adelaide and Wagga Wagga, and to the project via Arumpo Road. Calder Highway and Silver City Highway may be used when accessing the Project from Melbourne and Broken Hill respectively. The Sturt Highway (travelling through Wentworth) and Calder Highway (intersecting at Deakin Avenue) are directly south-west of the Project Area at a distance of 12 km and 15 km respectively, and Arumpo Road traverses the Project Area in an east to west direction. Additional access via Dansons Road is not planned but may be proposed as it is adjacent to the southern extent of the Project Area.

The preferred transport route of WTG components and other Project related materials will be confirmed via a port and transport route assessment, which will be prepared as part of the EIS. As noted in **Section 3.5**, a preferred port and transport route have not yet been established.

It is expected that upgrades to local roads (secondary access routes) may be required to allow access for heavy vehicles (where considered suitable) prior to any deliveries occurring as part of the construction phase of the Project. There may also be some minor works required along the primary transport route from the selected port to facilitate the path of OSOM vehicles. However, it is noted that several other renewable energy developments within the South-West REZ may also require these works being completed.

Access tracks will be constructed on site to provide access to the proposed WTG locations (refer to **Section 3.0**, **Figure 3.1**). The proposed delivery route, access tracks and level of construction/maintenance required will be confirmed and assessed during the preparation of the EIS. All access tracks will be maintained during the construction phase of the Project.

The construction phase of the Project will result in increased traffic movements by both light vehicles transporting construction personnel and minor light construction materials, and also heavy vehicle movements (including OSOM vehicles) transporting the WTGs, blades and other heavy-duty equipment required for construction purposes. Traffic increases associated with the operational phase of the Project will be minimal and will generally only involve the movement of light vehicles transporting operational staff around the site intermittently.

A Traffic and Transport Impact Assessment (TTIA) and route assessment will be undertaken as part of the EIS to assess the potential transport routes required for the construction of the Project and any potential impact to the road network. The assessments will be undertaken following relevant NSW Government guidelines and assessment standards including Guide to Traffic Generating Developments (RTA, 2002), Road Design Guide and relevant Austroads Standards and Austroads Guide to Traffic Management.

The TTIA will be include:

- a review and assessment of the existing road network
- a review of any previous traffic impact assessments undertaken for the surrounding area
- traffic counts in selected areas along the proposed traffic routes (if data is not readily available)

- a detailed assessment of the likely Project-specific and cumulative traffic impacts during the construction and operational phases of the Project (including intersection performance, capacity, and safety) and
- identification of any mitigation and management measures that may be required.

Potential mitigation measures to reduce traffic impacts may include, but will not necessarily be limited to:

- preparation of a Construction Traffic Management Plan (CTMP) that will outline the controls required during the construction phase and will be prepared in consultation with relevant roads authorities
- undertaking any necessary road upgrade works to facilitate access to the site and along the proposed transport route
- undertake consultation with relevant Councils regarding an infrastructure or maintenance agreement to cover any required mitigation works to manage the expected pavement impacts of the Project on the lower order, local government-controlled road links.

It is reiterated that other approvals would be required for the transport of wind turbines and associated infrastructure by OSOM vehicles, under National Heavy Vehicle Law. These requirements will be assessed via a route analysis study as part of the EIS. Should a transportation route be selected that interacts with other States i.e. South Australia or Victoria, the TIA and EIS would only assess aspects associated with NSW portions of the route.

6.2.6 Social Impacts

A SISR has been undertaken by Umwelt in accordance with the scoping phase requirements of the SIA Guideline (DPIE, 2021e). The SISR has been provided in **Appendix 2** and is summarised in the subsequent section below.

6.2.6.1 Regional Setting

Wentworth Shire LGA is situated within the Riverina region of NSW. The LGA has a population of 7,453 and covers an area of 26,269 km^2 (ABS, 2021). The LGA currently has a population density of 0.3 residents per square kilometre, much lower than NSW at 10.2 (ABS, 2021). The southern extent of the LGA has the greatest population density, with population located in the townships of Buronga, Wentworth, Dareton and Gol Gol (Wentworth Shire Council, 2017).

The township of Buronga is especially relevant to the Project as it is the nearest centre to the Project. Buronga sits on the banks of the Murray River and has a population of 1,252. The town is serviced by a small retail area and is home to several industrial businesses and suppliers.

Bordering Buronga to the south of the Murray River is Mildura. Located in Victoria, and with a population of 34,565, Mildura is the closest regional city to the Project Area, approximately 20 minutes south. Mildura is a major regional and agricultural service centre of the Murray River catchment, providing delivery transport, warehousing, health, education and professional services to NSW and South Australia (Regional Development Victoria, 2021). As such, Mildura is expected to be the centre for service provision for the Project.

6.2.6.2 Perceived and Likely Social Impacts

Feedback from the community and other stakeholders' engagement activities outlined in **Section 5.0** identified perceived social impacts from the Project. These social impact categories and perceived impacts are summarised in **Table 6.7** and will be subject to assessment as part of the SIA, along with any other potential social impacts resulting from the Project.

A key part of addressing the perceived social impacts identified in **Table 6.7** will be the stakeholder engagement program. Spark, with the support of Umwelt, will continue to implement the stakeholder engagement program to engage the community throughout the environmental assessment and approval process, and the operational life of the Project. This early engagement will inform the assessment of the social and economic impacts associated with the Project. The program has been designed in line with the following objectives:

- keep the community informed about the Project, its likely impacts and likely benefits, through the provision of accurate and timely information
- provide multiple opportunities and mechanisms for meaningful information exchange with stakeholders
- ensure that the team developing the Project fully understands the local context, including any local impacts that it may have or opportunities that it could provide
- integrate feedback received into the Project planning and design as far as possible
- build and maintain positive, trust-based relationships with the local community.

Table 6.6 Perceived Social Impacts

Category	Perceived Social Impact
Community and Way of Life	• Impacts on Sense of Community due to community division. • Differing levels of social acceptance of the Project and REZ more broadly creating social division. • Increase in human capital for local communities (expertise) due to the provision of training and skills development resulting labour pool growth. • Community investment initiatives and funds allocated to improve social outcomes for local communities. • Changes to rural amenity, due to industrialisation of the landscape, impacting people's sense of place and community. • Incoming construction workforce may decrease levels of community cohesion.
Accessibility/ Cumulative	• Temporary increase in population, increasing pressure on local services and infrastructure, particularly housing and accommodation (affordability and availability).
Culture	• Impacts to Aboriginal Cultural Heritage values, including artefacts, cultural sites, and connection to Country.
Health and wellbeing	• Project development may increase stress and anxiety for community members who feel uncertain about their future and changes to their community.
Surroundings	• Concern for the impact on local flora and fauna species, particularly migratory bird species due to potential for bird strikes.

Category	Perceived Social Impact
	• Construction-related traffic may result in increased noise (disturbance), a deterioration of road conditions, increased travel times, and decreased road safety. • Visual amenity changes impacting the rural landscape. • Rehabilitation and production of waste during the decommissioning phase leading to environmental degradation. • Increase in construction-generated noise that may cause disturbance and annoyance for Host landholders. • Impacts on social amenity due to operational wind turbine noise. • Safety risks for aircraft due to height and quantity of turbines.
Livelihoods	• Increased economic spend in local communities and townships due to the influx of construction workers. • Provision of additional sources of income for landholders, enhancing local livelihoods. • Training and education opportunities through sourcing of local employment. • Competing land use with agriculture – potential fragmentation of farming practices and/or restricted access to farming land.
Decision Making Systems	• Positive role in the energy transition through provision of green energy. • Uncertainty regarding the process for selection of the site as a wind farm. • Distributive inequity of Project benefits – energy generation and access. • Lack of trust in decision making and engagement systems.

A SIA will be submitted with the EIS and will be prepared in accordance with the NSW SIA Guideline (DPIE, 2021e). Subsequent phases of the SIA program will involve the following key activities:

- A detailed update of the baseline social profile to ensure that any further baseline data relevant to the impacts identified is obtained.
- Further validation of the area of social influence and identification of affected communities and vulnerable groups.
- Provision of feedback to those consulted during the scoping phase on the outcomes and issues raised and communication of the Project SEARs (once issued), including an outline of the next steps in the assessment process and opportunities for community input.
- Further engagement with a range of community and stakeholder groups, including but not limited to near neighbours, host property owners, local government, community members, interest groups, local businesses, and service providers. This consultation will focus on the detailed investigation into social impacts associated with the Project. Further, it will involve the provision of feedback on the outcomes of EIS technical studies and will provide opportunities for community input to the development of appropriate mitigation and enhancement measures to address impacts and residual effects.
- A comprehensive assessment and evaluation of social impacts against existing baseline conditions.

6.2.7 Hazards and Safety

The following section addresses the proposed approach to assessing potential hazards and safety impacts associated with the Project, including aviation safety, electromagnetic fields (EMF), impacts to telecommunications, blade throw, shadow flicker, blade glint, bushfire threat, and potential hazards associated with the introduction of BESS facilities.

6.2.7.1 Aviation Safety

The Project, like all wind farms, will need to consider the potential for interaction with air services. WTG height and placement will consider potential safety hazards for aircraft including intrusion into the airspace and potential for effects on navigation instruments. Mildura Airport is located approximately 22 km south-west of the Project Area.

The EIS will include an Aviation Impact Assessment (AIA), which will include the following specific requirements as advised by Airservices Australia:

- Aerodromes
    - specify all registered/certified aerodromes that are located within 30 nautical miles (55.56 km) of the Project Area
    - nominate all instrument approach and landing procedures at these aerodromes
    - review the potential effect of the Project on the operational airspace of the aerodromes.
- Air Routes
    - nominate published air routes which are located near/over the Project Area and review potential impacts of the Project on aircraft using those air routes.
- Airspace
    - nominate the airspace classification where the Project Area is located.
- Navigation/Radar
    - nominate radar navigation systems with coverage overlapping the Project Area.

A risk assessment in relation to night lighting of the WTGs will also be undertaken in accordance with Australian Standard AS/NZS ISO 31000:2018 Risk Management – Guidelines.

During the development of the AIA, consultation will be undertaken with Airservices Australia, the Department of Defence, relevant local Councils and aerodrome operators.

6.2.7.2 Electromagnetic Fields

EMF are present where electric current flows, including overhead and underground transmission lines and substations and electrical appliances. The Project will involve the generation of EMF during operation from the proposed transmission lines and substations. The standard SEARs for wind farm developments require proponents to *"consider and document any health issues having regard to the latest advice of the National Health and Medical Research Council, and identify potential hazards and risks associated with electric and magnetic fields and demonstrate the application of the principles of prudent avoidance."*

The EIS will include an EMF assessment which will consider potential health issues and risks associated with EMF produced by the wind farm and associated electrical infrastructure within the Project Area in accordance with the ICNIRP Guidelines for Limiting Exposure to Time-varying Electric, Magnetic and Electromagnetic Fields (1998).

6.2.7.3 Telecommunications

Telecommunications and radar services (civil and meteorological) can be impacted by WTGs through electromagnetic interference (EMI).

As part of the preliminary constraint assessments prepared to inform the design of the Project, a review of telecommunications services in the area was undertaken. This included point to point microwave links, meteorological radar, mobile voice-based communications, wireless and satellite internet services, broadcast and digital radio, and broadcast, digital and satellite television.

Appropriate buffer distances have been applied in the current Project layout to avoid potential interference from WTGs with these communication links.

The EIS will include an EMI Assessment which will address any impact to radiocommunication services within and surrounding the Project Area, as a result of the Project and identify any required mitigation measures.

6.2.7.4 Blade Throw

Blade throw typically involves the failure of the turbine rotor which has the potential to result in the turbine blade becoming detached from the turbine. This risk will be addressed through the WTG design, however, an assessment will be undertaken for the Project. The blade throw assessment will consider the potential risk of blade throw associated with the proposed WTG layout.

The assessment will include:

- general review and assessment of the likelihood of blade throw occurring and typical blade throw distances
- calculation of the separation distance between WTGs, BESS and neighbouring dwellings and property boundaries
- consideration of mechanisms to reduce the likelihood of blade throw occurring, including:
    - relevant standards against which WTGs should be certified
    - typical overspeed and failsafe protection mechanisms
    - management and maintenance procedures, including regular inspections
    - provisions for blade replacement.

6.2.7.5 Shadow Flicker and Blade Glint

Shadow flicker is a moving shadow cast by the blades of a WTG from the sun, which can cause a nuisance at surrounding dwellings, and in rare cases, can cause health impacts such as photosensitive epilepsy or motion sickness. Blade glint can result from sunlight reflecting off the white components of the WTGs. The risk of blade glint from WTG is low given that majority of manufacturers treat the WTGs with non-reflective finishes to reduce the risk of this occurring.

The EIS will include a Shadow Flicker Assessment, which will:

- review sensitive receiver locations
- estimate the annual hours of shadow flicker received at each dwelling
- identify any dwellings where there is potential for the shadow flicker duration to exceed the limits specified in the relevant guidelines
- identify the specific WTGs contributing to the shadow flicker for each dwelling
- assess the likely reduction in shadow flicker duration due to WTG orientation and cloud cover
- generate maps of theoretical and predicted actual shadow flicker duration
- consider the potential sources of conservatism in the assessment.

The Shadow Flicker Assessment will also include an assessment of blade glint.

As discussed in **Section 6.2.1**, a number of visual mitigation measures will be considered for the Project.

6.2.7.6 Preliminary Hazard Analysis

The Project will result in the introduction of a limited number of hazardous materials, including lithium ion batteries (LIBs), that present potential risks to the environment and public safety.

Hazardous materials that are likely to be transported to the Project Area, stored and used at the Project Area and transported from the Project Area are presented in **Table 6.8** below.

Table 6.8 Project Hazardous Materials

Material	Dangerous Goods Class/Division and (Packing Group)	Phase(s) of Project
Lithium-Ion Batteries (LIBs)	9 (II)	Construction, Operations and Decommissioning
Unleaded Petrol	3 (II)	Operations
Diesel Fuel	C1	Construction, Operations and Decommissioning
Herbicides	9 (II)	Operations
Transformer Oil	-	Construction, Operations and Decommissioning

Material	Dangerous Goods Class/Division and (Packing Group)	Phase(s) of Project
Aerosols	Class 2.1	Construction, Operations and Decommissioning
Solvents	3 (II)	Construction, Operations and Decommissioning

A preliminary risk screening for all hazardous materials and dangerous goods to be stored and transported to/from the Project will be undertaken in accordance with Chapter 3 of Hazardous and Offensive Development of State Environment Planning Policy (Resilience and Hazards), 2021 (the Resilience and Hazards SEPP) to determine the requirement for a Preliminary Hazard Analysis (PHA).

Notwithstanding the preliminary risk screening process, it is anticipated that a PHA incorporating a Level 1 Qualitative Risk Analysis and Level 2 Semi-quantitative will be required to estimate the level of risk posed to surrounding off-site land users due to the large capacity of the proposed BESS. During normal use, LIBs are sealed and, unlike lead acid batteries, do not vent to the atmosphere during normal operation. However, if subject to abnormal heating (external or internal) or other abuse, flammable electrolyte and electrolyte decomposition products can vaporise, rupture the battery cell and be vented. Vented electrolyte and electrolyte decomposition products may ignite (resulting in fire or explosion) if exposed to an ignition source including sparks, open flames and LIB cells undergoing thermal runaway.

Thermal runaway occurs when the internal temperature of a LIB cell increases beyond its operating range leading to exothermic decomposition reactions generating additional heat. If the additional heat is not dissipated, the cell temperature is further elevated accelerating the process of decomposition and heat generation. LIBs are susceptible to thermal runaway which can be initiated by a range of mechanisms including electro-chemical abuse (e.g. from overcharging, over-discharging and over voltage charging), mechanical abuse (e.g. physical damage to cell causing a short circuit), thermal abuse (overheating from an external source), manufacturing defects (e.g. internal short circuits) and design faults (e.g. inadequate clearance between cells or modules to allow heat dissipation).

The vented gases from LIBs during thermal runaway can exceed 600°C and are likely to include flammable (alkyl-carbonates, methane, ethylene, ethane, hydrogen gas) and toxic species (carbon monoxide, hydrogen fluoride), soot and particulates containing oxides of nickel, aluminium, lithium, copper and cobalt.

The PHA will address these risks as well as other potential hazards by taking the following steps:

- a preliminary risk screening for all hazardous materials and dangerous goods to be stored and transported to/from the Project will be undertaken in accordance with Chapter 3 of the Resilience and Hazards SEPP
- risk classification and prioritisation and estimation of societal risk in accordance with Multi Level Risk Assessment (NSW Department of Planning, 2011)
- a qualitative risk assessment (for the Level 1 analysis) workshop to identify Project hazards that pose an off-site risk

- consequence (e.g. fire, explosion, toxic release) and frequency analysis (Level 2 analysis) for hazard scenarios identified as requiring further assessment in the qualitative risk assessment
- assessment of the Level 2 analysis results with respect to Hazardous Industry Planning and advisory Paper No 4 Risk Criteria for Land Use Planning (NSW Department of Planning, 2011)
- consultation with Fire and Rescue NSW regarding fire and life safety systems as well as the unique challenges posed by BESSs during incident response.

The PHA will consider relevant contemporary standards and guidelines with respect to BESSs, including:

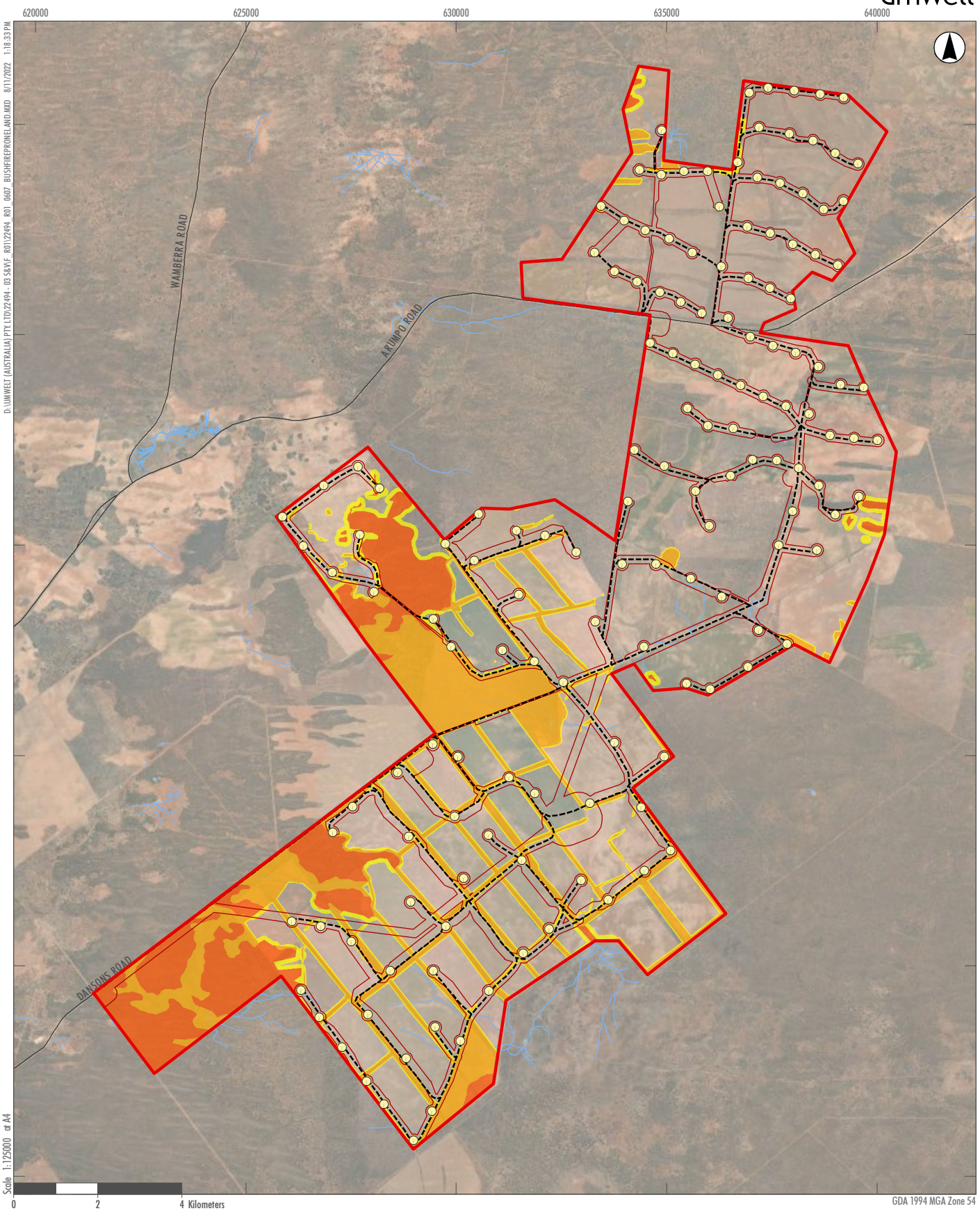
- UL 9540 Standard for Safety of Energy Storage Systems and Equipment, Underwriters Laboratory, 2020
- UL 9540A Standard for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems, Underwriters Laboratory, 2019
- NFPA 855 Standard for the Installation of Stationary Energy Storage Systems, National Fire Protection Association, 2020
- AS/NZS 5139:2019 Electrical Installations – Safety of battery systems for use with power conversion equipment, Standards Australia, 2019
- Property Loss Prevention Data Sheet 5-33, Electrical Energy Storage Systems, FM Global, 2020.

6.2.7.7 Bushfire Hazard

The north-western extents of the Project Area are identified as 'Vegetation Category 1' and 'Vegetation Category 2' bushfire prone land under the NSW RFS Bushfire Prone Land Mapping Tool (refer to **Figure 6.7**). Additionally, there are several pockets of 'Vegetation Category 1' and 'Vegetation Category 2' bushfire prone land along the northern and eastern extents of the Project Area.

Although portions of the Project Area have been subject to extensive clearing associated with agricultural land use, there are areas of remnant vegetation throughout, which form a potentially significant fuel load capable of sustaining and spreading bushfire. Areas of vegetation within the Project Area also represent a potential linkage between vegetated areas within and adjoining the Project Area, with the potential to support the spread of bushfire.

A bushfire threat assessment will be undertaken in accordance with the requirements of Planning for Bushfire Protection 2019 (PBP) (NSW Rural Fire Service, 2019), which will consider fire risk and identification of potential fire ignition sources, including the proximity of the Project to the Mallee Cliffs National Park and surrounding vegetation. The 'Mallee Cliffs National Park Plan of Management' (NPWS, 2018) and 'Mallee Cliffs National Park Fire Management Strategy' (NPWS, 2013) will be considered. Consultation with the NSW RFS will also be undertaken during the preparation of the EIS.



Legend

- Project Boundary
- Development Corridor
- Potential Wind Turbine Generator Locations
- Potential Access Tracks
- Waterbodies
- Watercourses
- Road

Bushfire Prone Land Vegetation Category Mapping

- Vegetation Category 1 (High Risk)
- Vegetation Category 2 (Medium Risk)
- Vegetation Buffer (100m to Category 1 Vegetation and 30m to Category 2 Vegetation)

FIGURE 6.7

Bushfire Prone Land

Data source: DFSI (2021); NSW RFS (2021)

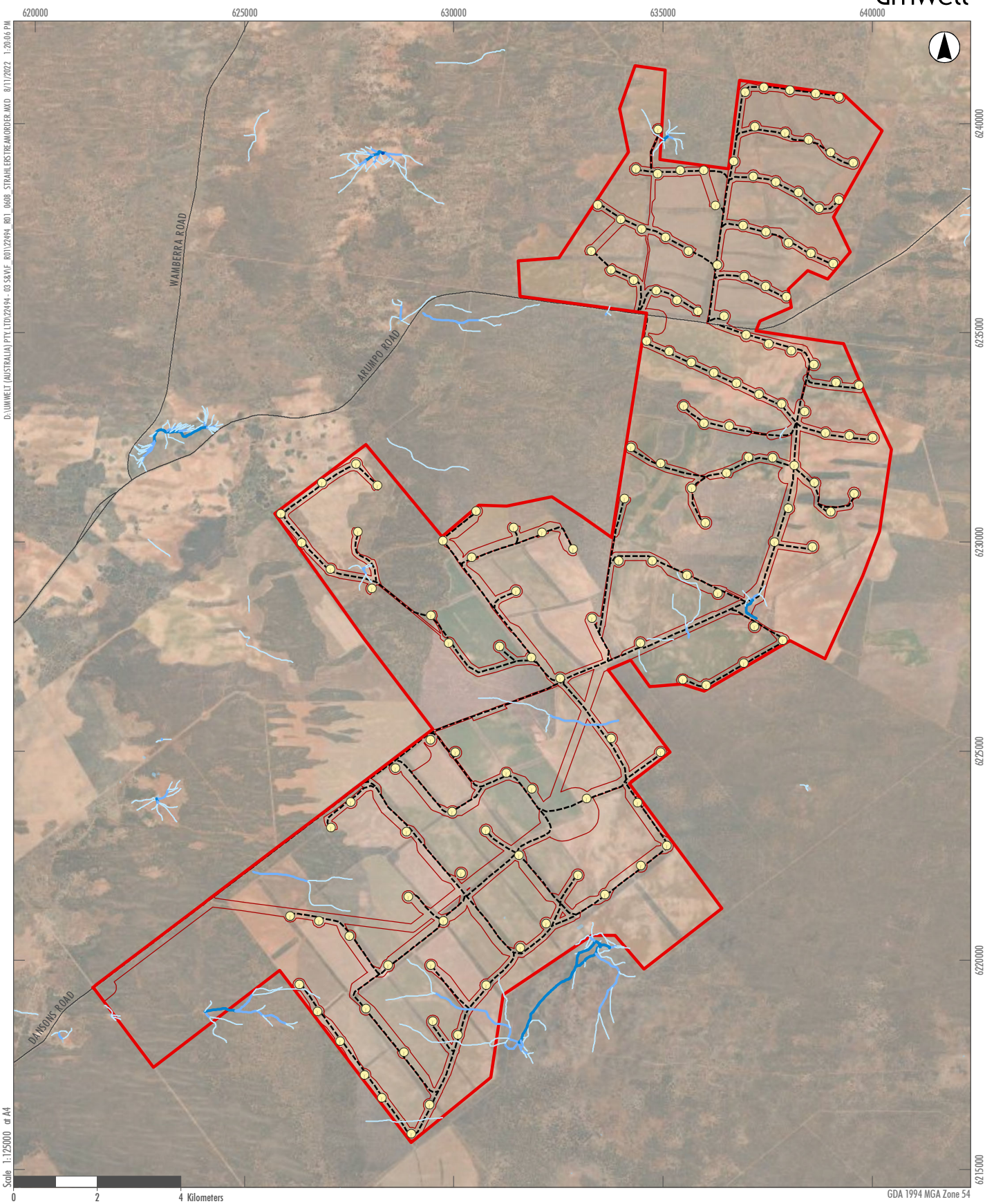
6.2.8 Water and Soil Resources

6.2.8.1 Surface Water

The Project is located within the Lower Murray-Darling River region, approximately 12 km to the north-east of the Murray River at Gol Gol. There are limited mapped watercourses within the Project Area, all of which are of a minor nature. The mapped watercourses within the Project Area are of 1st and 2nd Strahler stream order, and the proposed transmission line transverses a 3rd order watercourse, south-west of the Project Area (refer to **Figure 6.8**).

The Project Area is primarily located along a low elevation ridge line, with a maximum elevation of around 130 m AHD. Natural surface drainage occurs either side of the ridge towards the west and east from localised catchments, and towards a typically poorly defined and discontinuous watercourse network (including the watercourses described above). Off the main ridgeline, the topography generally grades down towards the lower river floodplain. There are numerous local depressions within the floodplain topography, which reinforces the discontinuous nature of the local watercourses and drainage network. The lowest elevation in close proximity to the Project Area is around the Buronga Substation to the west, at approximately 50 m AHD.

Lake Gol Gol and Gol Gol Swamp are located to south-west of the Project Area. Naturally these wetland waterbodies are connected to the Murray River via Gol Gol Creek, however, river regulation (including levee and flow control structures) controls river inflow to the system during flood events.



Legend

- Project Boundary
- Development Corridor
- Potential Wind Turbine Generator Locations
- Potential Access Tracks
- Road
- Waterbodies

Strahler Stream Order

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream
- 4th Order Stream

FIGURE 6.8

Strahler Stream Order

Data source: DFSI (2021); NSW RFS (2021)

6.2.8.2 Groundwater

Groundwater Bores

There are three WaterNSW registered groundwater bores in close proximity to the Project Area (refer to **Figure 6.9**). Two bores (GW087530 and GW087531) are monitoring bores and the use of the third bore (GW087606) is unknown. The details of the three bores are as follows:

- GW087530 is described as being drilled to 19 m in depth and the last groundwater depth was recorded as -0.3 m below ground on 21/07/2021
- GW087531 is described as being drilled to 14 m in depth and the last groundwater depth was recorded as 11.15 m below ground on 21/07/2021
- GW087606 is described as being drilled to 50 m in depth and the last groundwater depth was recorded as 34.04 m below ground on 21/07/2021.

There are other groundwater bores located within and surrounding Lake Gol Gol and Gol Gol Swamp.

Groundwater Dependent Ecosystems

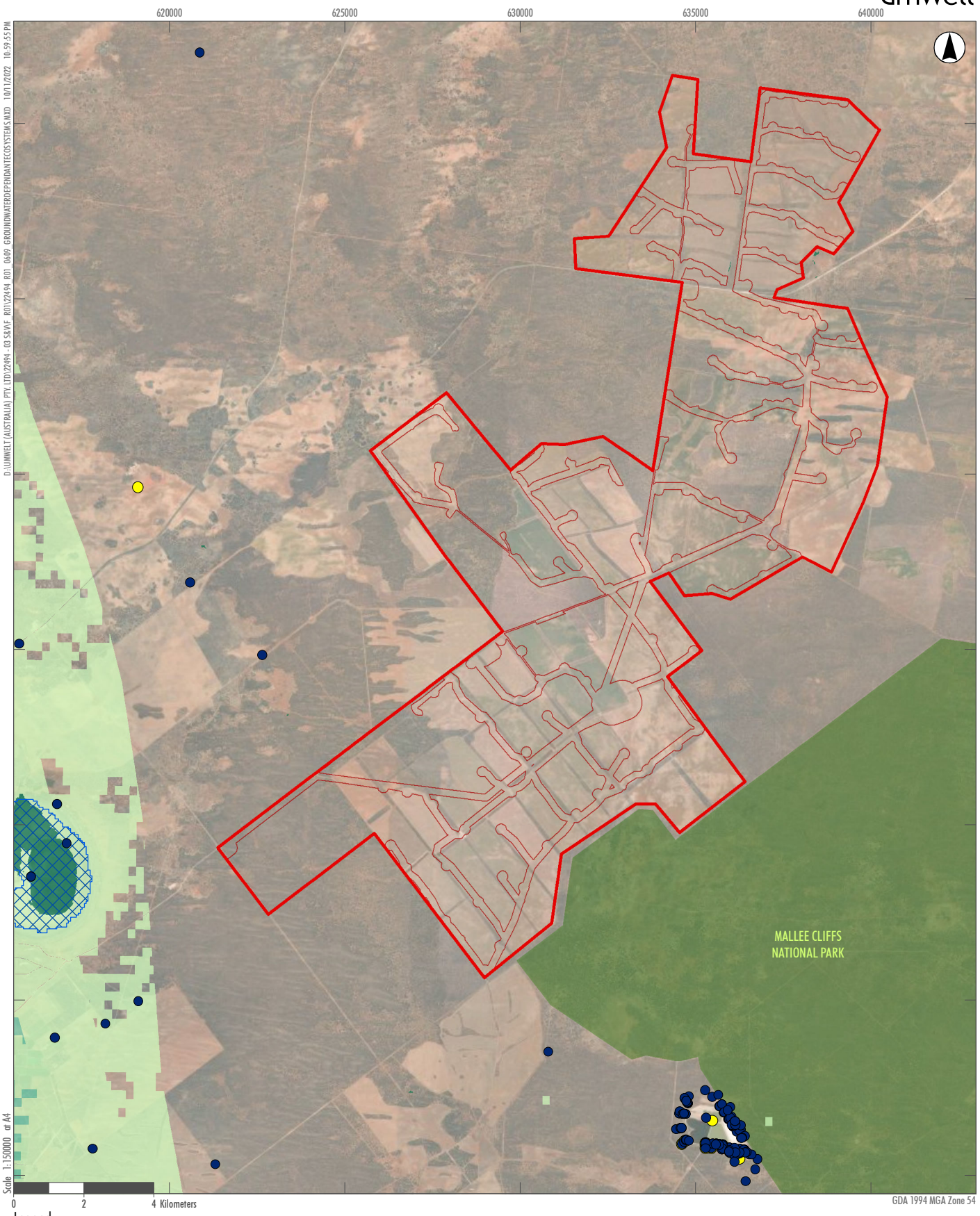
Groundwater dependent ecosystems (GDEs) rely on the presence of groundwater to function and sustain the resident assemblage of species, populations, and ecological communities. The level of groundwater dependence of vegetation communities in the Project Area has been identified using the GDE Atlas (BoM 2017).

The GDE Atlas delineates and provides information about the following three types of GDEs (BoM 2022):

- Aquatic ecosystems that rely on the surface expression of groundwater – this includes surface water ecosystems which may have a groundwater component, such as rivers, wetlands, and springs. Marine and estuarine ecosystems can also be groundwater dependent, but they are not mapped in the GDEs Atlas.
- Terrestrial ecosystems that rely on the subsurface presence of groundwater – this includes all vegetation ecosystems.
- Subterranean ecosystems – this includes cave and aquifer ecosystems.

Within the aquatic and terrestrial ecosystem type, an area of vegetation can be classified as either a high potential, moderate potential or low potential GDE.

According to the GDEs Atlas, the Project Area has no mapped aquatic GDEs and not been analysed in a regional or national study for the presence of terrestrial GDEs, however there are several terrestrial and aquatic GDEs in the vicinity of the Project Area (refer to **Figure 6.9**).



Legend

- Project Boundary
- Development Corridor
- National Parks (NPWS Estate)

Monitoring Bores

- Monitoring
- Unknown

Aquatic Groundwater Dependant Ecosystems

- Moderate potential GDE - from national assessment

Terrestrial Groundwater Dependant Ecosystems

- High potential GDE - from national assessment/regional studies
- Moderate potential GDE - from regional studies
- Low potential GDE - from regional studies

FIGURE 6.9

Groundwater Dependent Ecosystems

Data source: DFSI (2021); NSW DPE (2022); Bureau of Meteorology (2022)

Water Usage and Source

The Project area is located within the Lower Darling catchment. This catchment is within the Barwon, Darling and West region water source and is subject to the following water sharing plans (NSW Department of Planning, Industry and Environment, n.d):

- Lower Murray–Darling Unregulated River Water Source 2011
- NSW Murray and Lower Darling Regulated Rivers Water Sources 2016
- NSW Murray–Darling Basin Fractured Rock Groundwater Sources 2020
- NSW Murray–Darling Basin Porous Rock Groundwater Sources 2020.

6.2.8.3 Flooding

Wentworth Shire Council is responsible for flood planning in the Project Area and surrounds. Flood planning levels along the Murray River in this locality are based on peak flood level observations from the 1956 flood event. The 1956 event has been adopted as representative of the design 1% Annual Exceedance Probability (AEP) event for flood planning purposes.

The Murray River Floodplain Atlas (GHD et al, 1986) contains the flood inundation mapping based on historical flood level observations. The mapping is based on the 1956 peak flood level observations including the local records of 39.2 m AHD at Mildura Weir and 40.2 m AHD at Bruces Bend (12 km upstream of the weir). The Gol Gol Creek confluence with the Murray River is located approximately midway between these locations.

The Floodplain Atlas mapping is annotated with "FLOODED BEYOND STUDY BOUNDARY" at the Gol Gol Creek confluence. Accordingly, it is expected that the flood inundation from the Murray River extends into Gol Gol Swamp to an elevation of approximately 40 m AHD. Similar inundation would be expected into Lake Gol Gol through the connectivity from the Swamp afforded by the Gol Gol North Creek.

The Buronga Substation is positioned at a lower elevation than the Project Area, at an elevation of approximately 50 m AHD. Accordingly, the Project Area will not be impacted by flooding from a representative Murray River 1% AEP flood event.

6.2.8.4 Soils and Land Capability

A soil and land capability assessment scheme was developed in 2008 by DPE (formerly known as the Department of Infrastructure, Planning and Natural Resources), which aimed to assist in assessing the environmental impact of clearing native vegetation under the *Native Vegetation Act 2003*.

The scheme defines land and soil capability classes based on the biophysical features of the land, including the capability of the land to sustain its current land use. The classes range between Class 1 to Class 8, where Class 1 is land capable of high soil impact and Class 8 represents land that is only capable of sustaining low impact. The land and soil capability classification is determined through:

> *the assessment of eight key soil and landscape limitations (water erosion, wind erosion, salinity, topsoil acidification, shallow soils/rockiness, soil structure decline, waterlogging and mass movement)* - DPE, 2021

A review of eSPADE soil type mapping (NSW Government, 2022) indicates that the land and soil capability classification varies throughout the Project Area, as shown on **Figure 6.10**. The majority of the Project Area consists of Class 4 land and soil capability with a moderate to severe limitation soil, where the land is generally not capable of sustaining high impact land uses, including cropping activities, unless using specified management practices with high knowledge, expertise, inputs and investment. All except one proposed WTGs are located within this land and soil capability.

There are two small patches of land classified as Class 7 within the Project Area, one located in the north-western and south-eastern regions. This classification has extremely severe limitations and is incapable of sustaining most land uses, with these limitations unable to be overcome.

In the north-eastern region of the Project Area, the land and soil capability is classified as Class 5. This classification has severe limitations and is unable to sustain high impact land uses, unless highly specialised land management practices are implemented. One proposed WTG is located within this land and soil capability.

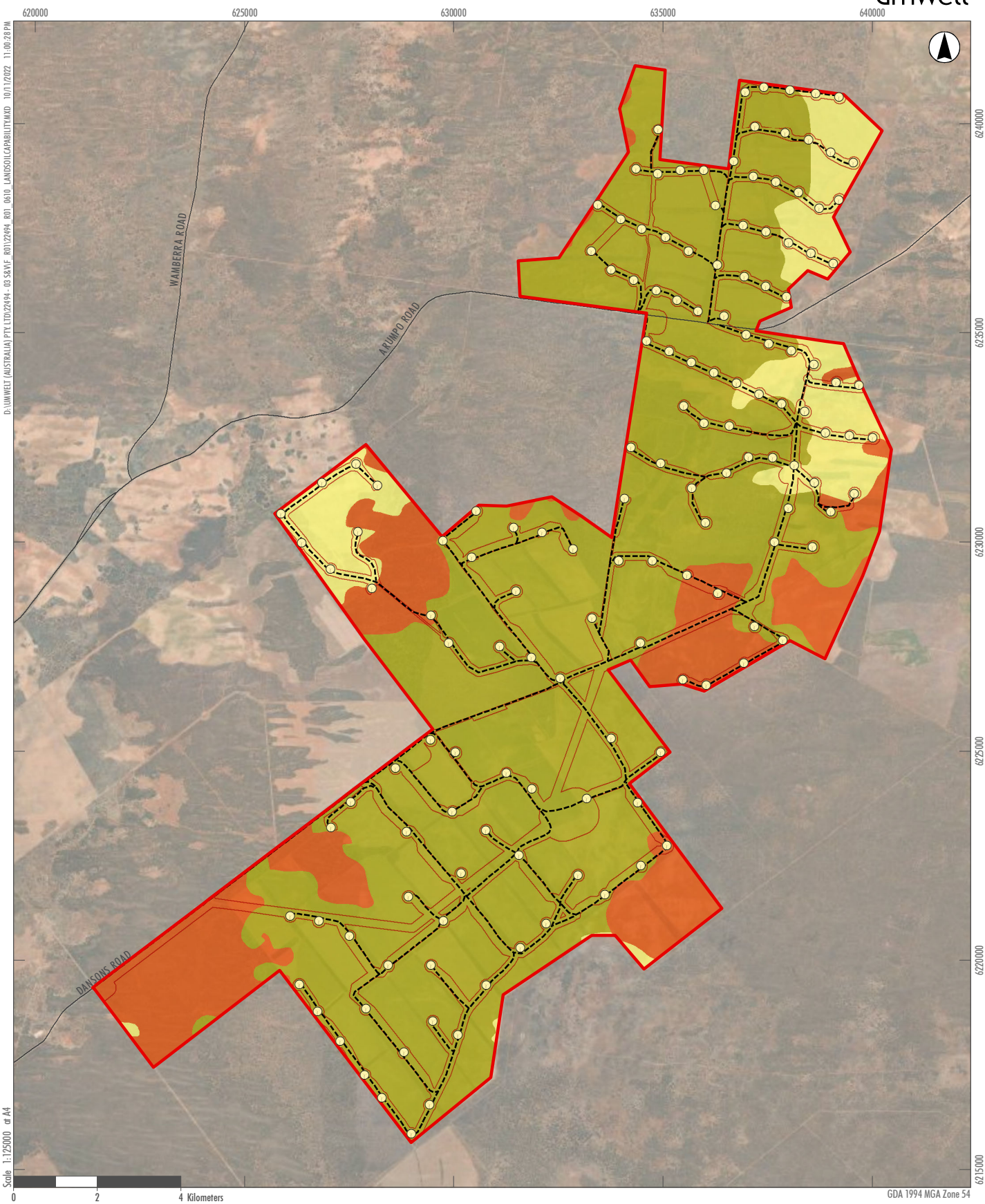
Maintaining Existing Land-use and Capability

Notwithstanding the above information, large portions of the Project Area are used for non-irrigated cropping and successfully produces several grains and pulses crops such as wheat, beans and chickpeas that are distributed to the national food market. The site is also used for agricultural research activities throughout the year which contribute to knowledge of productive land management in the region.

Spark has optimised the Project design in consultation with Host landholders, so that the proposed wind farm and existing farming activities can coexist with limited or no reduction in production capacity. For example, WTGs have been placed in areas of cropped land to avoid potential biodiversity impacts, and these locations have been optimised in consultation with Host landholders to ensure that large-scale farming equipment can still be used in those cropped areas without any major constraint.

Similarly, Spark is working closely with the Host landholders to understand and plan for the temporary disruptions that may occur during construction works e.g. farm roads may require upgrades to achieve all-weather access tracks standards for the Project, and Spark is consulting with Host landholders to best plan the timing and delivery of these upgrades to limit impacts to farming.

The above examples are provided to illustrate Spark's ongoing commitment to consult with Host landholders on this matter, and its intent to maintain the existing farming land use and capability within the Project Area.



Legend

- Project Boundary
- Development Corridor
- Potential Wind Turbine Generator Locations
- Potential Access Tracks
- Road

Land and Soil Capability Mapping

- 4 - Moderate to Severe Limitations
- 5 - Severe Limitations
- 7 - Extremely Severe Limitations

FIGURE 6.10

Land and Soil Capability

Data source: DFSI (2021); NSW DPE (2022)

6.2.8.5 Potential Impacts and Matters Requiring Further Assessment

An overview of potential impacts on water and soil resources associated with the Project is provided in **Table 6.9** below, which also provides a preliminary overview of impacts that may occur as a result of the Project, and will therefore require further assessment in the EIS.

A Water Resources Impact Assessment (WRIA) will be undertaken as part of the EIS that will consider potential impacts on both surface water and groundwater resources and the catchment, including flooding, erosion and sediment control, water quality, water users, water sourcing and licensing, and any required management and mitigation measures to minimise the potential impacts of the Project on water and soil resources. **Table 6.9** provides an overview of matters requiring specific consideration in the WRIA, including a summary of potential mitigation measures to address these impacts.

Table 6.7 Potential Impacts Associated with the Project

Aspect	Nature of Potential Impact	Matters Requiring Further Assessment/Consideration in EIS	Potential Mitigation Measures
Surface Water	• Potential changes to surface water runoff quantity and distribution associated with localised earthworks, including obstruction of overland flows and increased runoff potential due to vegetation removal and the establishment of hardstand and compacted areas • Potential erosion and sedimentation associated with vegetation clearing and earthworks • Potential fish passage obstruction and impacts to downstream riparian ecology associated with erosion and sedimentation • Potential water quality impacts associated with accidental spills or leaks from sources such as construction machinery, stored construction and waste materials, fertilisers used for revegetation.	• The WRIA would include: • A baseline assessment of regional catchments, existing hydrological regimes, geomorphic character and condition. • A qualitative assessment of potential surface water impacts (including impacts to downstream water users and riparian ecosystems) over the life of the Project and detailed measures to mitigate potential impacts.	• Implementation of appropriate erosion and sediment control measures, developed in accordance with relevant guidelines. • Implementation of spill containment measures, including bunding where appropriate.
Flooding	• Potential loss of floodplain storage and/or flow obstruction and associated changes to flood behaviour/risk.	• The WRIA would include a Flood Impact Assessment, which would comprise: • A review of existing flood information, including historical studies for the Murray River. • Additional flood modelling (e.g. direct rainfall coarse grid TUFLOW 2D) to define local flood conditions in where no existing information is available.	• Minimising the disturbance footprint and rehabilitating areas impacted during the construction phase that are not required for ongoing operations. • Minimising works within protected lands along waterways.

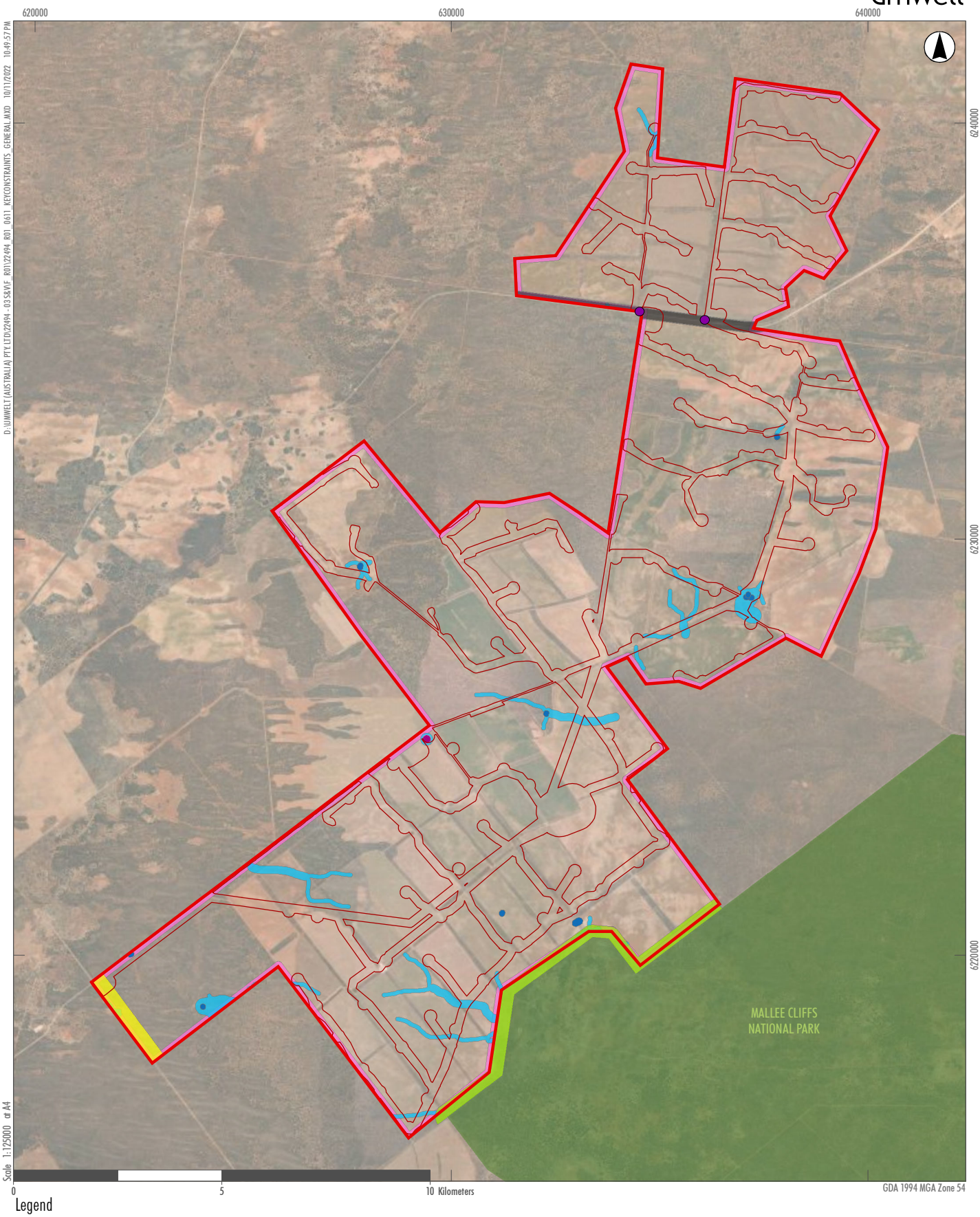
Aspect	Nature of Potential Impact	Matters Requiring Further Assessment/Consideration in EIS	Potential Mitigation Measures
		• An assessment of likely impacts on low flow and high flow regimes, with consideration of potential changes to flood depth, velocity and hazard classification, and an overview of avoidance and mitigation measures.	• Refinement of Project design (e.g. re-siting of Project infrastructure, where required) based on preliminary modelling.
Water Supply	• Project-related demands on local water supply, particularly during drought periods.	• The WRIA would include: • a high level assessment of water demands over the life of the Project • identification of suitable water sources and transport arrangements to meet the demands of the Project, informed by stakeholder consultation • identification of any relevant water licensing requirements under the WM Act, and a strategy for meeting those requirements.	• Identification of potential water sources in consultation with key stakeholders (e.g. the local Councils) and having regard to cumulative water demand associated with other renewable energy projects in the locality.
Groundwater Resources	• Impacts to the quantity and quality of groundwater and associated impacts to GDEs.	• The WRIA would include a qualitative assessment of impacts to groundwater resources and GDEs, including consideration of potential cumulative impacts, and detailed measures to mitigate potential impacts.	• Minimising the extent and depth of ground disturbance.

6.2.9 Summary of Key Constraints

The key constraints currently mapped or known to be within the Project Area are presented in **Figure 6.11** and **Figure 6.12** below. They are based on the:

- existing Spark strategies to avoid and/or minimise impacts i.e. the Development Corridor discussed in **Section 3.9** of this Scoping Report, and
- the environmental matters discussed in **Section 6.2** above.

Figure 6.12 shows mapped PCT and potential TEC across the Project Area and is provided separately to **Figure 6.11** to improve readability, but these environmental constraints have been to date, and will continue to be, considered collectively during the EIS.



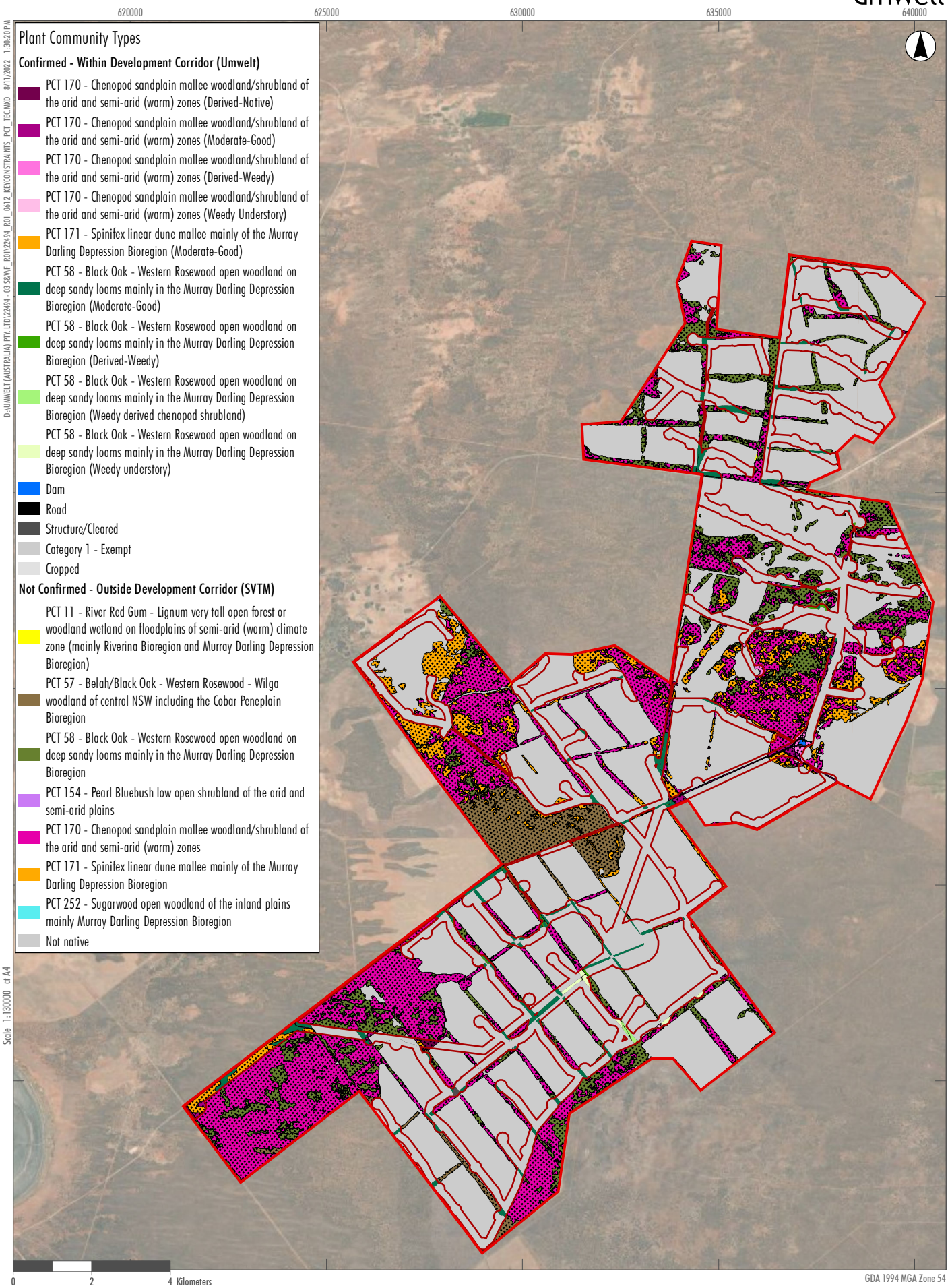
Legend

- Project Boundary
- Development Corridor
- National Parks (NPWS Estate)
- Site Entrances
- Existing 220kV Transmission Line Constraint Buffer (300m)
- Road Corridor Constraint Buffer (100m)
- Mallee Cliffs National Park Constraint Buffer (300m)
- Waterbody Constraint Buffer (50m)
- Aboriginal Site Constraint Buffer (50m)
- Archaeology Watercourse Constraint Buffer (50m/100m/200m)
- Internal Project Boundary Constraint Buffer (100m)

FIGURE 6.11

Key Environmental Constraints (General)

Image Source: ESRI (2022) Data source: DSFI (2020)



Legend

- Project Boundary
- Development Corridor
- TECs (BC and/or EPBC) - Confirmed within Development Corridor; Unconfirmed outside Development Corridor)

Image Source: ESRI (2022) Data source: DSFI (2020)

FIGURE 6.12

Key Environmental Constraints (PCT & TEC)

6.2.10 Cumulative Impacts

The NSW Wind Energy Guideline (DPE, 2016a) identifies the requirement to address cumulative impacts in relation to any other proposed, approved or operating wind energy projects in the vicinity particularly with regard to landscape, noise, biodiversity and traffic impacts. The NSW CIA Guidelines (DPIE, 2021g) are also applicable to the Project.

As discussed in **Section 2.3**, the Project is located within the South-West REZ and there are a number of other existing and proposed renewable energy projects within the region (refer to **Section 2.1.1.2** and **Figure 2.1**). The relevant detailed environmental assessments will include an assessment of the potential cumulative impacts associated with the Project and will follow the relevant guidelines.

Appendix 1 outlines where a CIA will be undertaken for the relevant matters including the level of assessment and engagement. **Table 6.10** below provides a summary of the key considerations in relation to CIA for the Project.

Table 6.8 Cumulative Impact Assessment Considerations

Scoping Cumulative Impact Assessment	Detail
What projects to include?	The effects of past developments and actions, as well as currently operating projects will be captured in the baseline environmental studies for the Project. The CIA will consider the cumulative impacts of the Project on key matters with other proposed developments, including those outlined in **Table 2.1**, as relevant. This includes changes to existing projects, approved projects or projects under assessment.
What to assess?	As outlined in **Appendix 1**, the following key matters will require consideration of CIA: • visual amenity • noise and vibration • biodiversity • traffic and transport • hazards and risks • socio-economic.
What study area?	The study area will vary depending on the specific characteristics of the assessment matter and the scale and nature of the potential impacts on the matter resulting from the Project with other relevant future projects. Each CIA will be undertaken in accordance with the relevant guidelines, where applicable, and broad enough to capture all relevant cumulative impacts.
Over what time period?	Life of the Project including construction, operation and decommissioning.
What is the approach to assessment?	All CIAs will be undertaken in accordance with approved assessment methods for relevant matters (e.g. the NPfI and the BAM).
What are the key uncertainties?	Key uncertainties to undertaking the CIAs will include availability and quality of data on proposed future projects at the time of preparation of assessments. Relevant CIAs will identify realistic development scenarios with the relevant future projects over the life of the Project.

6.2.11 Other Matters

The EIS will also address other issues relating to:

- Land use – the EIS will assess the potential interactions of the Project with other land uses, including agricultural land uses. This assessment will draw on the findings of other related assessments including impacts on visual amenity, water, soil, noise, air quality, traffic, hazards and safety.
- Waste – the EIS will describe the likely waste streams to be generated during construction and operation and describe measures to manage, reuse, recycle and dispose of this waste in accordance with relevant guidelines.
- Air quality – the EIS will assess the potential air quality impacts from the construction and operation of the Project, in accordance with relevant NSW guidelines in relation to construction via a qualitative assessment, including specifying relevant construction phase air quality controls.
- Decommissioning and rehabilitation.

Whilst these matters will be appropriately assessed in the EIS, detailed assessments are not proposed as the issues can be readily defined, assessed and mitigated using well recognised approaches.

6.2.11.1 Unexploded Ordnance (UXO)

A review of the Department of Defence (Defence) UXO Mapping Application identified areas of land mapped as having 'Substantial Potential' (red) and 'Slight Potential' (orange) for the presence of UXO within or adjacent to the Project Area, as illustrated on **Figure 6.13** below.

Both categorised areas of potential UXO presence are associated with the Royal Australian Airforce (RAAF) 'Air to Air Range' site that was operational during World War II.

Figure 6.13 Defence UXO Mapping Application Record

Source: https://www.whereisuxo.org.au/, Department of Defence, 2022.

Note: Substantial Potential' is shown in red and 'Slight Potential' is shown in orange

As per Defence guidance, sites categorised as being 'Substantial' will have a confirmed history of military activities that often results in numerous residual hazardous munitions, components or constituents. There will be a history of numerous UXO finds or heavy residual evidence, such as fragmentation. Areas likely to be assessed as 'Substantial' include high explosive impact areas, target areas within wider manoeuvre training areas, areas of heavy explosive ordnance disposal and burials.

Similarly, sites categorised as being 'Slight' will have a confirmed history of military activities that often results in numerous residual hazardous munitions, components or constituents, but where confirmed UXO affected areas cannot be defined. Alternatively, sites categorised as 'Slight' may have a confirmed history of military activities of a type that sometimes results in occasional residual UXO. UXO or explosive ordnance fragments / components may have occasionally been recovered from the site. Sites likely to be assessed as 'Slight' include identified buffer zones around impact areas, field firing areas used for manoeuvre training, ranges used for non-high explosive practices and areas where historical disposal and burial activities may have occurred.

Current Defence advice is reproduced below for each category:

- **Substantial:** '*Whilst current land usage may continue without specific UXO search or remediation, Defence recommends that specialist advice is obtained. A detailed UXO Risk Assessment and UXO Management Plan should be developed as necessary. Defence recommends that any development, land usage re-zoning proposals or other significant changes in proposed activities for land parcels classified as 'Substantial' should only proceed once an appropriate UXO Risk Assessment has been conducted by a suitable specialist and mitigations implemented to address the risks identified. Such mitigations could typically include one or more of the following as identified in the UXO Risk Assessment:*
    - *Field investigations to refine hazard areas.*
    - *Remediation to remove or neutralise hazards (remediation provides the highest level of confidence that potential risks have been reduced to tolerable levels); and/or*
    - *A formal UXO Management Plan and/or UXO risks included in the construction site safety management plans.*'
- **Slight:** '*Whilst current land use may continue without further UXO investigation or remediation, Defence recommends that consideration is given to obtaining specialist advice and undertaking a detailed UXO Risk Assessment and developing a UXO Management Plan as necessary. Defence recommends that any development, land usage re-zoning proposals or other significant changes in proposed activities for land parcels classified as Slight are preceded by an appropriate UXO Risk Assessment. A project- or activity-specific UXO Management Plan may be considered for ongoing activities and the possibility of encountering munitions should be adequately addressed in activity plans (e.g. construction site safety management plans).*'

The current development corridor avoids the area of substantial potential that has been identified. While the Project Area includes some sections identified as having some slight potential for UXO these are considered to be low risk due to the active nature of cropping production and regular historical ground disturbance across most of the project area. The project design will be further refined during the EIS phase and consideration will be given to the area identified as having substantial potential. If any works are required in these areas detailed UXO Risk Assessment would be carried out and suitable construction management measures identified prior to works.

6.3 Matters Requiring No Further Assessment in the EIS

Table 6.9 outlines the matters that are considered to not require further assessment in the EIS based on the scoping phase assessment along with a comment justifying why no further assessment is required.

Table 6.9 Matters Requiring No Further Assessment in the EIS

Issue	Comment
Greenhouse gas and energy	As the Project will generate renewable energy, the emissions resulting from the construction, operation or decommissioning will be readily offset by the reduction in energy generation emissions. GHG emissions will be addressed in the justification for the Project as part of the EIS.
Port and airport facilities	The Project does not result in any change to port or airport facilities. Other than the delivery of Project components to the port, the transportation of Project components to the Project will be assessed as part of the TTIA.
Rail facilities	The Project does not propose to utilise any rail facilities.
Odour	The Project is not anticipated to cause any odour.
Coastal hazards	The Project is not located within a coastal zone and will not result in any impacts to coastal zones.
Dam safety	The Project does not require the construction or maintenance of a dam.
Land movement	The Project is not anticipated to result in any land movement. The Project results in relatively minor excavation works only.

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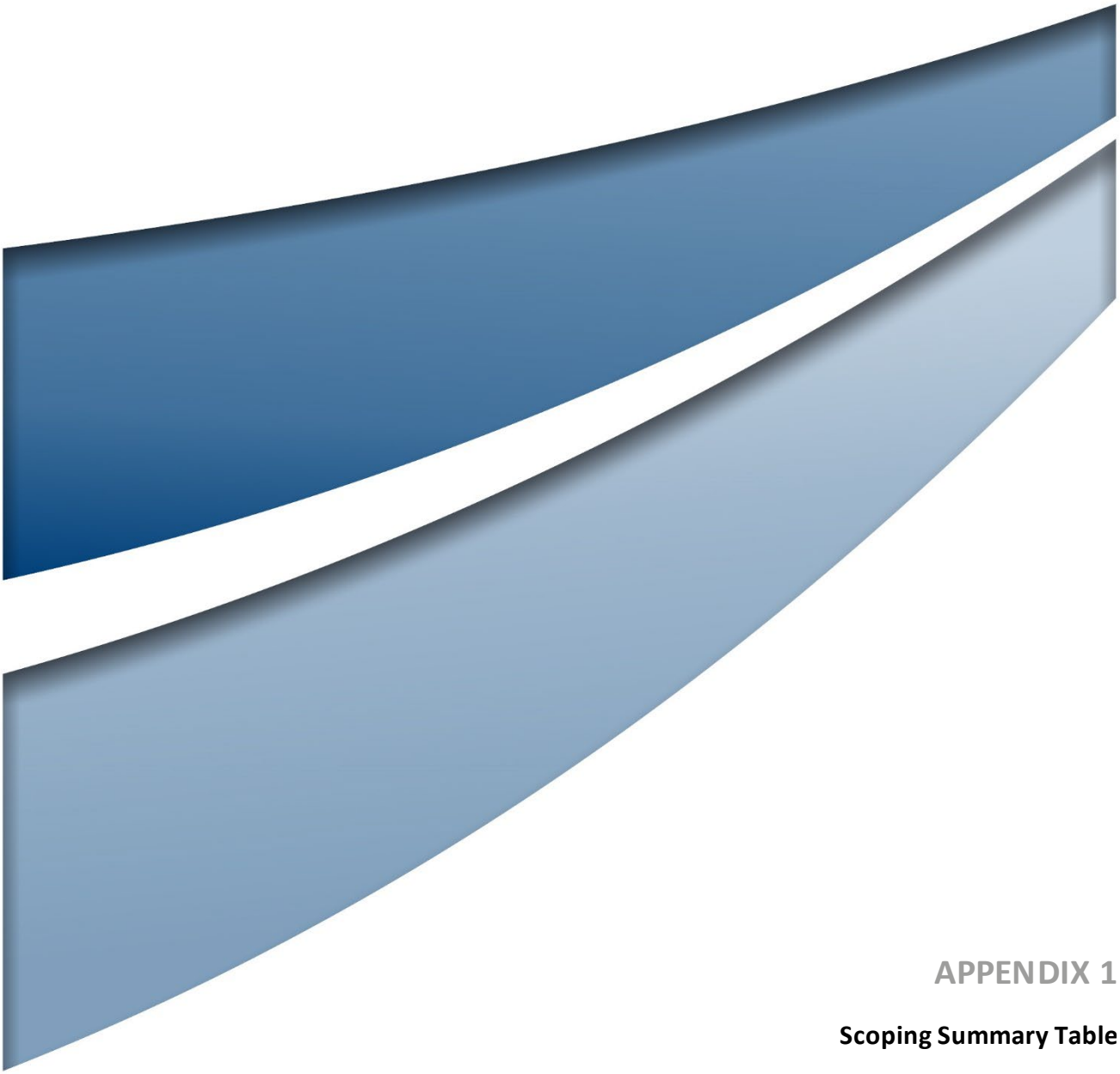


APPENDIX 1

Scoping Summary Table

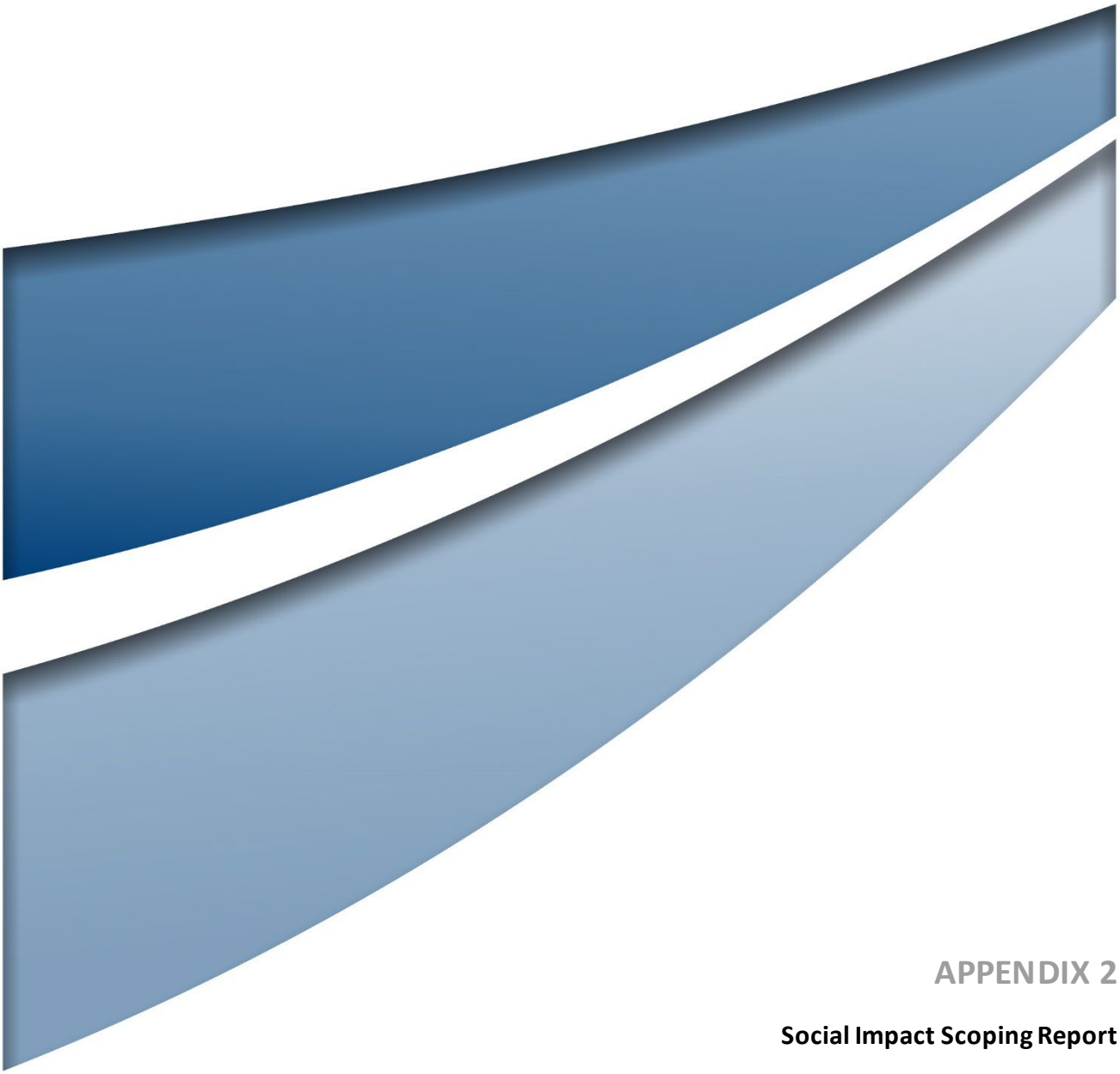
Scoping Summary Table

Group	Matter	Scale of Impact	Nature of Impact	Sensitivity of Receiving Environment	Level of Assessment	Mitigation Measures Required	CIA Required?	Engagement	Relevant government plans, policies and guidelines	Section in Scoping Report
Access	Traffic Port facilities Road facilities	Moderate	Direct Indirect Cumulative	Sensitive (change in road usage/ amenity, nearby dwellings, townships and land uses)	Detailed	Likely	Yes	Specific	• Austroads – Guide to Road Design (Austroads) – Part 1 to 7 • Austroads - Guidelines for Traffic Management (Austroads) • Guide to Traffic Management – Part 3 Traffic Studies and Analysis (Austroads, 2013).	**Section 3.6**
Air	Atmospheric emissions Gases Particulate matter	Low	Direct Indirect	Sensitive (local and regional air quality)	Standard	Likely	No	General	• NSW Climate Change Policy Framework – Office of Environment and Heritage (OEH), dated 2016 • National Greenhouse Accounts Factors – Australian Government, dated 2021.	**Section 6.2.11**
Noise	Noise	High	Direct Cumulative Perceived	Sensitive (change in noise amenity, nearby dwellings, townships, and land uses)	Detailed	Likely	Yes	Specific	• Noise Bulletin (DPE, 2016c) • NSW Government – Environment Protection Authority (EPA) – Noise Policy for Industry, dated 2017 (NPfI, 2017) • NSW Government – Department of Environment, Climate Change – Interim Construction Noise Guidelines, dated 2009 (ICNG, 2009) • NSW Government – Department of Environment, Climate Change and Water (DECCW) – Road Noise Policy, dated 2011 (RNP, 2011) • NSW Government – Department of Environment and Conservation – Assessing Vibration: A Technical Guideline, dated 2006 (vibration guideline, 2006).	**Section 6.2.2**
Amenity	Visual	High	Direct Cumulative Perceived	Sensitive (change in visual amenity, nearby dwellings, townships and public view-points)	Detailed	Likely	Yes	Specific	• Visual Bulletin (DPE, 2016b).	**Section 6.2.1**
Biodiversity	Conservation areas Terrestrial flora and fauna	High	Direct Indirect Cumulative	Sensitive (potential high sensitivity for areas of conservation and proximity to National Park)	Detailed	Likely	Yes	Specific	• NSW Biosecurity Strategy 2013-2021 – NSW Department of Primary Industries, dated 2013 • Biodiversity Assessment Method (BAM) – NSW Government, dated 2020.	**Section 6.2.3**
Economic	Livelihood	Low	Indirect Perceived Cumulative	Sensitive (potential resource sterilisation,	Standard	Likely	Yes	General	• SIA Guideline (DPIE, 2021f) • Engagement Guideline (DPIE, 2021g).	**Section 6.2.6**

Group	Matter	Scale of Impact	Nature of Impact	Sensitivity of Receiving Environment	Level of Assessment	Mitigation Measures Required	CIA Required?	Engagement	Relevant government plans, policies and guidelines	Section in Scoping Report
				reduced agricultural land uses)						
Hazards and risks	Bushfire	Low	Direct Indirect	Sensitive (emergencies, safety)	Standard	Likely	No	Specific	• Planning for Bushfire Protection – NSW Rural Fire Service, dated 2019.	**Section 6.2.7** and **Section 6.2.8**
	Flooding	Low	Direct Indirect	Sensitive (onsite activities, emergencies, safety)	Standard	Likely	No	General	• Floodplain Risk Management Guidelines (OEH), dated 2019 • Floodplain Development Manual: The management of flood liable land – NSW Government, dated 2005.	
	Hazardous and offensive development (Battery Energy Storage System, BESS)	Low	Direct	Sensitive (emergencies, safety)	Detailed	Likely	No	General	• State Environmental Planning Policy No 33—Hazardous and Offensive Development – 1992 EPI 129 • Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 – Department of Planning, dated 2011 • Assessment Guideline: Multi-level Risk Assessment – Department of Planning and Infrastructure (DPI), dated 2011 • Hazardous Industry Planning Advisory Paper No 6: Hazard Analysis – Department of Planning, dated 2011.	
	Waste	Low	Direct Indirect	Sensitive (safety, environment)	Standard	Likely	No	General	• NSW Government – DECCW – Waste Classification Guidelines, dated 2009 (waste classification guideline, 2009).	
	Aviation	Moderate	Direct Cumulative	Sensitive (impacts on to local/regional agricultural/recreational aviation)	Detailed	Likely	No	Specific	• Department of Infrastructure, Transport, Regional Development and Communications – National Airports – Safeguarding Framework – Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation, dated 2019.	
	Tele-communications and EMI	Moderate	Direct Cumulative	Sensitive (interference with local/ regional communications)	Detailed	Likely	No	Specific	• Wind Energy Guideline (DPIE 2016a).	
	EMF	Low	Direct Indirect Perceived	Sensitive (amenity of nearby residences, community concern)	Standard	Likely	No	General	• National Health and Medical Research Council advice, as updated from time to time.	
	Blade Throw	Low	Direct	Sensitive (safety)	Standard	Likely	No	General	• Applicable international standards for design of wind turbine components.	
	Shadow Flicker	Low	Direct Cumulative Perceived	Sensitive (change in visual amenity, nearby dwellings,	Standard	Likely	No	General	Refer **visual** above.	

Group	Matter	Scale of Impact	Nature of Impact	Sensitivity of Receiving Environment	Level of Assessment	Mitigation Measures Required	CIA Required?	Engagement	Relevant government plans, policies and guidelines	Section in Scoping Report
				townships and public viewpoints)						
Heritage	Aboriginal, encompassing any natural heritage	High	Direct Indirect Cumulative Perceived	Sensitive (Aboriginal cultural heritage value, Traditional Custodians)	Detailed	Likely	Yes	Specific	• NSW Government – OEH – Department of Premier and Cabinet – Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW, dated 2011 • NSW Government – DECCW – Aboriginal Cultural Heritage Consultation Requirements for Proponents, dated 2010 • NSW Government – DECCW – Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW, dated 2010.	**Section 6.2.4**
	Historic	Low	Direct Indirect	Sensitive (potential heritage values)	Standard	Likely	No	General	• Local and State heritage registers • Heritage Office – NSW Skeletal Remains: Guidelines for Management of Human Remains, dated 1998.	
Land	Land capability	Low	Direct Indirect Perceived	Sensitive (existing local agricultural activity and economy)	Standard	Likely	No	General	• DPI – Agricultural Land Use Mapping Resources in NSW, dated 2017 • NSW Government – OEH – The Land and Soil Capability Scheme, dated 2012.	**Section 6.2.8**
	Soil chemistry			Sensitive (erosion, contamination and fertility of soils)					• NSW Government – OEH – The Land and Soil Capability Scheme, dated 2012 • Soil and Land Survey Handbooks • Landcom – Managing Urban Stormwater: Soils and Construction Volume 1, dated 2004 • NSW Government – Department of Environment and Climate Change – Managing Urban Stormwater: Soils and Construction Volume 2, dated 2008 • DPI – Agricultural Land Use Mapping Resources in NSW, dated 2017.	
Social	Way of life Community Accessibility Culture Health and wellbeing Surroundings Livelihoods Decision-making systems	Moderate	Direct Indirect Cumulative Perceived	Sensitive (social, environmental and economic values of local community)	Detailed	Likely	Yes	Specific	• SIA Guideline (DPIE 2021f) • Engagement Guideline (DPIE 2021g).	**Section 6.2.6**

Group	Matter	Scale of Impact	Nature of Impact	Sensitivity of Receiving Environment	Level of Assessment	Mitigation Measures Required	CIA Required?	Engagement	Relevant government plans, policies and guidelines	Section in Scoping Report
Water	Hydrology Water availability Water quality	Moderate	Direct Indirect Cumulative	Sensitive (local hydrology, groundwater and water quality) + access to water (local community values)	Detailed	Likely	No	General	• Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018) • NSW Government – NSW Water and River Flow Objectives, dated 2006 • NSW Government – Department of Environment and Climate Change – Floodplain Risk Management Guidelines, dated 2016 • NSW Government – Floodplain Development Manual: The management of flood liable land, dated 2005 • Landcom – Managing Urban Stormwater: Soils and Construction Volume 1, dated 2004 • NSW Government – Department of Environment and Climate Change – Managing Urban Stormwater: Soils and Construction Volume 2, dated 2008 • Department of Land, Water and Climate – NSW State Groundwater Dependent Ecosystem Policy, dated 2002.	**Section 6.2.8**
Cumulative Impacts	Overall cumulative impacts associated with the Project	Moderate	Direct Indirect Perceived	Sensitive (local and regional social, environmental and economic values)	Detailed	Likely	Detailed	Specific	• CIA Guideline (DPIE 2021h).	**Section 6.2.10**



APPENDIX 2

Social Impact Scoping Report

umwelt
Environmental & Social Consultants

SPARK RENEWABLES

MALLEE WIND FARM

Social Impact Assessment (SIA) Scoping Repot

FINAL

November 2022

MALLEE WIND FARM

Social Impact Assessment (SIA) Scoping Repot

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Spark Renewables

Project Director: Nathan Baker
Project Manager: Bridie McWhirter
Technical Director: Dr Sheridan Coakes
Technical Manager: Rhiannon Jaeger-Michael
Report No. 22494/R03
Date: November 2022

Environmental & Social Consultants

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
1	Dr Sheridan Coakes	8 November 2022	Nathan Baker	9 November 2022
2	Nathan Baker	11 November 2022	Nathan Baker	11 November 2022

Author Declaration

As outlined in Appendix B of the SIA Guideline, (DPE, 2021), suitably qualified and experienced practitioner/s should be involved in the preparation of the SIA scoping report and the SIA report. A suitably qualified person must have:

- Suitable qualifications in a relevant social science discipline
- Proven experience over multiple years and substantial competence in social science research methods and SIA practices

This SIA has been prepared by Rhiannon Jaeger-Michael (the SIA Project Manager) under the guidance and review of Dr Sheridan Coakes (the SIA Project Director). We declare that this SIA, completed on 11 November 2022:

was prepared by a team that has suitable qualifications, proven experience and competence in SIA practice, and relevant professional memberships as outlined in **Table 1.1**;

that the authors understand their legal and ethical obligations in the preparation of the SIA;

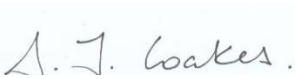
that none of the information included in the SIA is false or misleading; and

that the SIA contains all relevant information.

Project Manager

Rhiannon Jaeger-Michael

Project Director



Dr Sheridan Coakes

Table 1.1 Author Qualifications

Requirement	SIA Project Manager – Rhiannon Jaeger-Michael	SIA Project Director – Dr Sheridan Coakes
Suitable qualifications	Bachelor of Science – Psychology Master of Disaster Resilience and Sustainable Development	Bachelor of Applied Science – Psychology Honours First Class – Psychology Doctor of Philosophy – Psychology
Proven experience in SIA practice	4 years	25 years
Professional memberships	International Association of Impact Assessment - Member Environmental Institute of Australia and New Zealand – Associate Member	Environmental Institute of Australia and New Zealand – Co-convenor of the SIA Community of Practice Board Member - Certified Environmental Practitioner Scheme

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Abbreviations

Abbreviation	Definition
ABS	Australian Bureau of Statistics
AEMO	Australian Energy Markey Operator
BESS	Battery Energy Storage System
CSEP	Community and Stakeholder Engagement Plan
EIS	Environmental Impact Statement
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
DPE	Department Planning and Environment
IRSD	Index of Relative Socio-economic Disadvantage
LALC	Local Aboriginal Land Council
LGA	Local Government Area
LOTE	Language other than English
NSW	New South Wales
REZ	Renewable Energy Zone
SEARs	Secretary's Environmental Assessment Requirements
SEIFA	Socio-Economic Indexes of Area
SIA	Social Impact Assessment
SSD	State Significant Development

1.0 Introduction

This Social Impact Scoping Report documents the process and outcomes of the scoping phase of the social impact assessment (SIA) undertaken by Umwelt for the Mallee Wind Farm (the Project). It forms part of the Project's Request for Secretary's Environmental Assessment Requirements (SEARs) lodged with the New South Wales (NSW) Department of Planning and Environment (DPE) by Spark Renewables, as part of the Project's State Significant Development (SSD) application under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

This Report has been prepared in alignment with the DPE Social Impact Assessment Guideline (2021) or 'the Guideline' and represents the 'Phase 1 SIA' for the Project. The 'Phase 2 SIA' for the Project will form part of the detailed environmental impact assessment and will be incorporated in the Environmental Impact Statement (EIS) for the Project.

1.1 Project Overview

The Project Area is located approximately 16 km north-east of Buronga, close to the NSW-Victorian state border and covers approximately 18,500 hectares. The Project Area is located on relatively flat land at an elevation of approximately 100 metres above sea level with a good available wind resource. There is one residential dwelling approximately 8 km from the proposed wind turbines at the time of this assessment.

The Project Area is located primarily on land zoned RU1 Primary Production under the Wentworth Local Environmental Plan 2011. The Project Area is currently used for cropping and grazing, with patches of remnant native vegetation present. The Project EnergyConnect transmission line corridor is located to the south-west of the Project Area. The Project Area is bordered by Mallee Cliffs National Park to the south-east.

The proposed development will generate up to 1,000 MW (1 GW) of renewable energy via up to 150 wind turbines, with a maximum blade-tip height of 280 m above ground level (AGL). A single grid-scale BESS is also proposed and will allow for the capture and storage of dispatchable energy for up to four. The power generated by the Project (from wind turbines or released from battery storage) will feed into the electricity grid either via:

a) the 330 / 220 kV Buronga Substation connecting into the new Project EnergyConnect interconnector that will link Robertstown (South Australia) with Wagga Wagga (NSW), or

b) direct connection to the 220 kV transmission line,

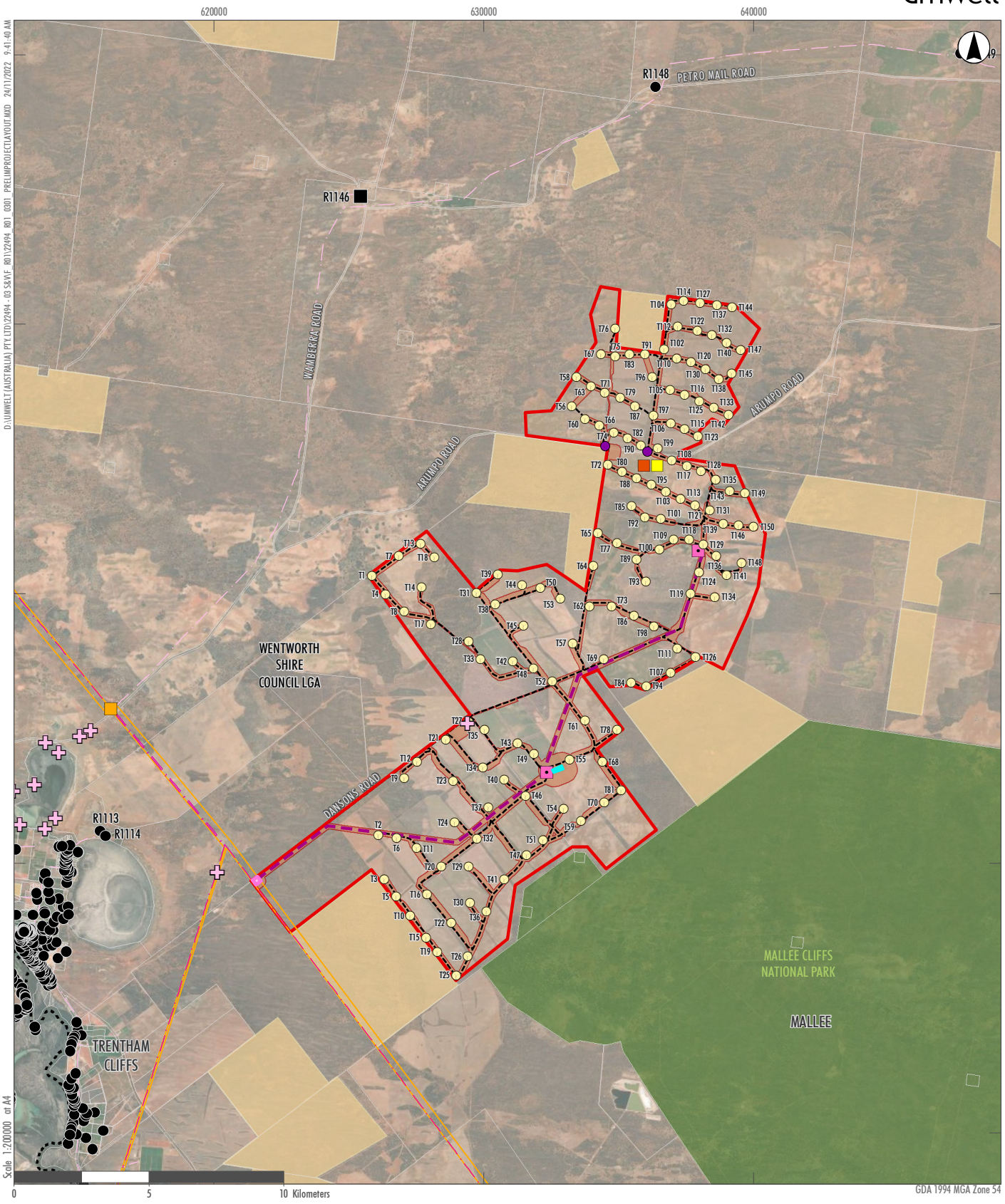
c) or direct connection to 330 kV Project EnergyConnect.

Although subject to change, the proposed development would comprise:

- 150 wind turbines (indicative only), with a maximum blade-tip height of 280 m above ground level (AGL).
- Power infrastructure providing connection to the Buronga Substation or direct connection to the 220 kV transmission line or Project EnergyConnect transmission line i.e. on-site substations/switchyards.

- Internal electrical reticulation network (consisting of a combination of underground cables and overhead powerlines), hardstands, new access tracks, upgrades to existing access tracks and access points from public roads.
- Permanent meteorological monitoring masts.
- Temporary infrastructure including construction compound and site office buildings, storage areas and concrete batching plants, and laydown area used for wind turbine installation and storage of wind turbine components.
- Operation and maintenance building.
- A single grid-scale BESS (~300 MW, up to four-hour battery).
- Targeted road network upgrades to facilitate the delivery of wind turbine components to the Project Area, as required.

The preliminary Project layout is shown on **Figure 1.1** below.



Legend

- Project Boundary
- Lot Boundary
- Local Government Area Boundary
- National Parks (NPWS Estate)
- C2 Environmental Conservation - Land Zoning
- Project EnergyConnect Corridor
- Buronga Substation

Existing Powerlines

- Voltage 66 kV and above
- Voltage below 66 kV

- Aboriginal Sites

Dwellings

- Host Landholder Dwellings
- Non-associated Landholder Dwellings

Project Infrastructure

- Potential Transmission Line
- Potential Access Tracks
- Potential Wind Turbine Generator Locations
- Potential Internal Substation Locations
- Operations & Maintenance Facility
- Construction Site Compound
- Site Entrances

- Development Corridor
- Potential BESS Location
- Potential Switchyard Substation

FIGURE 1.1

Preliminary Project Layout

Image Source: ESRI (2022) Data source: DSFI (2020)

2.0 Methodology

2.1 Social Impact Assessment Requirements

This Social Impact Scoping Report has been prepared in accordance with the NSW Government's Social Impact Assessment Guideline (SIA Guideline) (DPE 2021) as part of the Environmental Impact Assessment (EIS) process, as per **Figure 2.1**. Further detail on the NSW planning framework can be found in the Scoping Report (Umwelt, 2022).

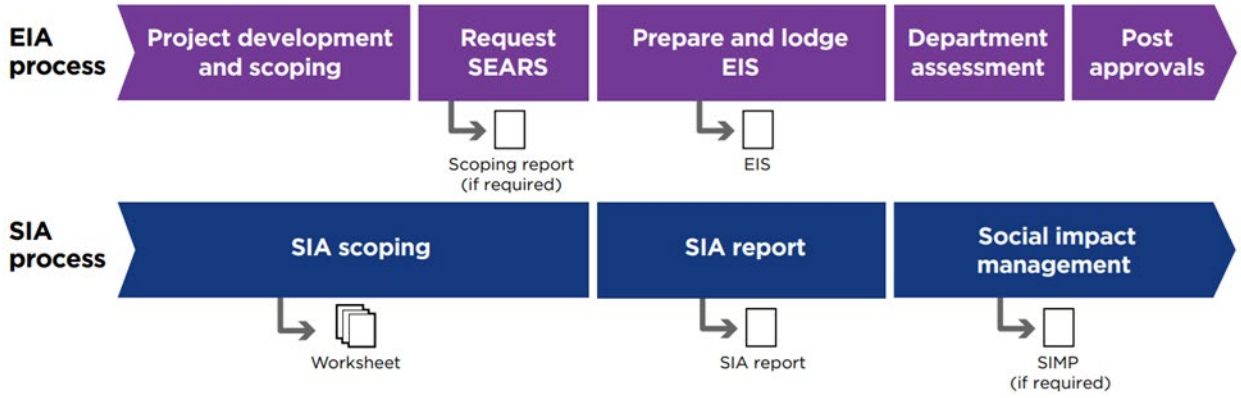


Figure 2.1 SIA and EIA Process

Source: DPE, 2021.

It is a requirement of the SIA Guideline that the SIA Scoping be completed, and the findings incorporated into the proponent's Scoping Report and Request for SEARs, and that the SIA Scoping Report includes the following:

- an understanding of the Project's social locality
- initial analysis of the defining characteristics of the communities within the Project's social locality, including any vulnerable groups (the social baseline)
- initial evaluation of likely social impacts for different groups in the social locality
- any Project refinements or approaches to Project development in the early phases of Project planning that will be undertaken in response to likely social impacts
- how the engagement strategy will help to identify and assess social impacts
- the proposed approach for undertaking the SIA process.

Figure 2.1 (above) provides an overview of the key SIA program phases of which this report relates to the Scoping Phase.

According to the SIA Guideline, and as outlined in **Figure 2.2**, social impacts can be grouped into several categories and may involve changes to people's way of life, community, accessibility, culture, health and wellbeing, surroundings, livelihoods, and decision-making systems.

Figure 2.2 Social Impact Categories

© Umwelt, 2021 (Derived from: DPE, 2021).

2.2 Defining the Social Locality

A baseline social profile gathers knowledge from both primary and secondary data sources to understand the existing social environment in which a project is proposed, and of potentially affected communities. The social baseline profile is a foundational component of SIA, as it provides the basis for assessing and predicting a Project's social impacts.

The SIA Guideline (DPE, 2021) outlines the key components that should be considered in developing a social baseline, namely:

- the scale and nature of the project
- who may be affected, including any vulnerable or marginalised groups
- any built or natural features on or near the project
- relevant social, cultural, and demographic trends and other change processes
- the history of the proposed project and/or development in the area, including community response to previous change.

Statistical areas as defined by the Australian Bureau of Statistics (ABS) and the land tenure composition of properties nearby or proximal to the Project have been used to define the Project's social locality. The area of social influence for this Project is defined as:

- The landholdings, property owners and residents situated on or intersecting with the Project Area as well as the footprint of any ancillary infrastructure associated with the Project.
- The Suburb and Localities, as per the ABS statistical areas, of Buronga and Gol Gol.
- The host Local Government Area (LGA) of Wentworth.
- The LGA of Mildura.

2.3 Social Baseline Profile

The social baseline draws on a range of indicators and data sources to understand the socio-economic, cultural, and demographic characteristics of the communities within the social locality and is used to determine how the Project may affect different aspects of people's lives (refer to **Table 2.1**).

Data to inform the baseline, has been gathered and summarised from publicly available secondary datasets, including the most recent Australian Census (2020) and Social Health Atlas of Australia (PHIDU, 2021), as well as through a review of local media, and local, regional, and State government plans and strategies relevant to the social locality.

Statistical and comparative analysis using ABS data has been undertaken at the LGA and state level to better capture key trends and themes relevant to the Project. LGA level data is also used to inform regional characteristics and trends relevant to the Project, including regional strategic planning priorities and directives.

The data sources used and key indicators of interest, including a brief explanation of their relevance to the Project is outlined in **Table 2.1**. An overview of the data collected for the social locality can be found in **Appendix B**.

Table 2.1 Social Baseline Profile Indicators and Data Sources

Category	Indicator	Source
Political Capital Political representation Political identity Inclusion, voice, and power Democratisation Decision-making systems	Elected representatives and recent political history Traditional Owners and Native Title Claims and Determinations Community strategic planning and development priorities Community perceptions of local governance systems Community priorities and concerns	State representative and electoral information (Parliament of New South Wales, n.d.) NSW Aboriginal Land Council (NSW LALC, 2022) LGA Council Strategic Planning Documents
Natural Capital Natural resources (e.g., water, metals, energy) Ecosystems (fisheries, agricultural soils) Beauty of nature (marine reefs, National Parks)	Areas of Native Vegetation Importance of National Parks Water Resources Prevalence of natural resources	Regional Economic Profiles (Department of Primary Industries, 2021) Local and Regional Strategic Planning Documents NSW National Parks and Wildlife Services (NSW National Parks and Wildlife Service, 2022)
Human Capital Workforce skills and abilities Education and health Vulnerable/at risk groups	Population and median ages Population Projections Post-secondary education attainment Occupations SEIFA Index of Education and Occupation	ABS General Community Profiles (2021) DPE NSW Population Projections (2022) Social Health Atlas of Australia (PHIDU, 2021) Socio-Economic Indexes for Areas (SEFIA, 2022)
Cultural Capital Worldview Language Traditions and customs Connection to Country Community identity Community values and perceptions of place	Place of Birth Language spoken at home Proportion of the population identifying as Aboriginal and/or Torres Strait Islander Built heritage and tangible heritage items Community perceptions and values	ABS General Community Profiles, 2021 Native Title Tribunal (2020) Heritage Management Systems (Heritage NSW, 2021) Local and Regional Strategic Plans
Social Capital Family and neighbours Community networks and inter-relationships Governance Sense of community History and heritage	Living at a different address one year age & five years ago Participation in volunteering Population born overseas & in Australia Family and household composition Prevalence of major health issues SEIFA Index of Socio-economic Disadvantage	ABS General Community Profiles, 2021 NSW Bureau of Crime Statistics and Research, 2021 Socio-Economic Indexes for Areas (SEFIA, 2022) Social Health Atlas of Australia (PHIDU, 2021)

Category	Indicator	Source
Economic Capital Economic resources Key industry sectors Wealth of individuals, households, and organisations	Gross economic value of industry Proportion (%) of the labour force that are: employed full-time, part-time, unemployed, and trends Median household income Median rental payment Median mortgage repayments Rental vacancy rate Industries of Employment Strategic economic planning SEIFA Index of Economic Resources Herfindahl Index Score	Small Area Labour Markets (SALM), 2022 ABS General Community Profiles, 2021 Social Health Atlas of Australia (PHIDU, 2016) Local and regional strategic planning documents
Physical Capital Built infrastructures Accessibility to key community services and infrastructure Information accessibility	Car ownership by households Housing tenure characteristics Financial housing stress Dwellings with internet access Strategic infrastructure planning and development Access to health services and infrastructure	ABS General Community Profiles (2021) Social Health Atlas of Australia (PHIDU, 2021) NSW Health (2022) Transport for NSW (2022) NSW Department of Education (2021) Local and regional strategic planning documents

2.4 Stakeholder Identification

Social impact assessment involves the participation and collaboration of people who have an interest in, or those that are affected by, a project. As Burdge (2004) outlines, stakeholders may be affected groups or individuals that:

- live, work, or recreate near the Project
- have an interest in the proposed action or change
- use or value a resource associated with the Project
- are directly affected by the Project.

Stakeholders for the Project were identified in the early stage of planning to inform the SIA and included the identification of any potentially vulnerable or marginalised groups.

Key stakeholder groups that have been consulted or engaged during the scoping phase, and whose engagement outcomes have been incorporated in the SIA, are outlined in **Figure 2.3**. Subsequent phases of the SIA will seek broader involvement across the stakeholder groupings identified and will include consultation with community groups, service providers and residents more broadly.

Figure 2.3 Key Stakeholder Groups

2.4.1 Community Consultation

Spark Renewables have undertaken early community and stakeholder engagement with near neighbours and key stakeholders to inform Project design and development, to establish and build ongoing relationships with key stakeholders. This early engagement has assisted in identifying and understanding stakeholder views and the perceived benefits, issues and impacts early in the planning and assessment process.

Table 2.2 details the range of engagement mechanisms utilised to obtain input from various stakeholder groups for the Scoping Report, as well as mechanisms to be implemented in subsequent phases of the Project's assessment. The Community and Stakeholder Engagement Plan (CSEP) (**Appendix A**) outlines the engagement approach and strategy used to inform this Social Impact Scoping Report and the scoping phase of the SIA.

Table 2.2 Communication and Engagement Mechanisms

Mechanism	Targeted stakeholder	Engagement Objective	Description	First Round of Consultation	Second Round of Consultation
Website	Traditional Owners Host landholders Community groups Broader community Local businesses and service providers Local media	Inform	A website dedicated to the Project including a description and overview of the Project, development application process, company information, responses to key concerns, risk management plans, maps, media releases and contact information.	A website and email established in August 2022.	The website and email address will be monitored and updated when required across subsequent phases of the Project. Links to the website will be included in Community Newsletters to enable access to further Project information.
Media release	Local Government Traditional Owners Host landholders Neighbouring/proximal landholders Community groups Wider community Local businesses and service providers Local media	Inform	To introduce the project to the broader community through local and regional media channels.	Advertising in local newspapers and radio stations in August 2022 to advise of upcoming consultation opportunities and provide Project updates.	Subsequent media releases will be developed as required in the EIS phase.
Community Newsletters	Broader community	Inform	Project information sheets to distribute information about the Project to the broader community and targeted stakeholders.	No. 1 – Project overview and invitation to drop-in session was distributed in August 2022.	No. 2 - To provide a Project update and share notes and feedback received from the community during the scoping phase. No. 3 - To provide a Project update and present the draft findings of EIS & SIA and inform the community of the exhibition process.

Mechanism	Targeted stakeholder	Engagement Objective	Description	First Round of Consultation	Second Round of Consultation
Drop-in session	Broader community Community groups Local businesses and service providers	Consult	Multi-hour time periods when stakeholders can drop in to speak to the Project team and experts, view documents and plans and ask questions of the Project team.	One session held at Buronga Midway Centre on Tuesday 22 August between 3 pm and 6 pm.	A session to summarise the draft results of the technical studies and gain feedback for the SIA will be held in the EIS phase.
Online Survey	Broader community	Consult	Online or offline surveys to obtain input and feedback on Project decision-making, as well as specific information about the needs, desires and impacts on stakeholders related to the Project.	Established in August 2022, with all feedback until the 9 September considered in the Social Impact Scoping Report.	The survey will be updated and distributed in the second phase to provide opportunity for the community to provide further feedback and validate impacts from the scoping phase. Also used to understand potential mitigation and enhancement measures.
Personal Meetings or Interviews	Local Government Community groups Traditional Owners	Involve	Introductions to the Project, semi-structured interview discussions to listen to individual concerns, interests, and issues to gather preliminary feedback, including sensitivities, understanding of information needs and future engagement preferences.	One on one meetings held throughout the month of August and September 2022.	Follow up interviews and meetings will occur during the preparation of the SIA and EIS. Interviews with local businesses and services providers will occur during the preparation of the SIA and EIS.
Project briefings	State Government Local Government Traditional Owners Community groups	Involve	Formal briefings to key stakeholders and government agencies, with Project Information Sheets and/or slide decks to formally introduce the Projects.	Initial Project briefings undertaken in August and September 2022.	Further Project briefings will be undertaken across subsequent phases of the Project as required.

Table 2.3 outlines the stakeholders that have participated in the scoping phase of the Project, as well as those who have informed the development of this Social Impact Scoping Report.

Table 2.3 Stakeholders Consulted During Scoping Phase

Stakeholder Group	Mechanism Used	Number Contacted	Number Engaged
Host landholders	Consultation with Spark Renewables	3	3
Broader Community Residents	Media Release	5	4
	Project Website	-	-
	Community Newsletter	~1,100 households	-
	Drop in Session	-	22
	Surveys	-	9
Local Government	Project briefing and interview	2	2
Traditional Owners	Project briefing and interview	3	-
Local Community, Environmental and Special Interest Groups	Project briefing and interview	10	4
		Total	**37**

Quantitative and qualitative information collected through the engagement activities in the scoping phase have been analysed to inform the preliminary analysis of social impacts associated with the Project, as outlined in **Section 4.0**.

2.4.2 Preliminary Impact Evaluation

As noted above, a preliminary evaluation of the issues and impacts identified during the scoping phase (outlined in **Section 4.0**) has been undertaken to understand the level of assessment required for each impact in the EIS/SIA-preparation phase, and to inform Project refinements, design, and planning.

The significance assessment has been undertaken using the risk matrix provided in the NSW DPE SIA Guideline (2021) which considers social impact likelihood, and magnitude through the assessment of key characteristics of impact (extent, duration, intensity or scale, sensitivity or importance and level of concern or interest).

A significance rating has also been assigned from the perspective of the affected stakeholder group, as well as a significance rating derived from the risk matrix in the SIA Guideline. Social impacts to be further investigated and validated as part of the EIS are also noted.

2.4.3 Assumptions or Limitations

The following dot points outline assumptions of importance in the development of the preliminary SIA scoping assessment, and any limitations in approach at this stage of the Project. It is intended that these will be addressed in subsequent phases of the SIA.

- No proximal landholders have been identified in the stakeholder analysis for Umwelt to consult as part of the SIA during the scoping phase as there is only one private residence within 8 km of the Project area. Consultation with this landholder has been conducted by Spark and feedback will be incorporated into the SIA for inclusion in the EIS.
- Consultation has been initiated with various Aboriginal stakeholders, however no Project briefings or personal meetings have been held to date. There is a commitment by the company to build ongoing relationships with Aboriginal stakeholders through the planning and assessment phases of the Project, with engagement to be scheduled as part of Round 2.
- Efforts have been made to consult the broader community through advertisement of the community information session in two local newspaper print advertisements. The community newsletter was also distributed to ~1,100 households in Buronga, Gol Gol, Mallee, Arumpo, Monak, Trentham Cliffs, and Mourquong via Australia Post's unaddressed mail system.
- The newsletter invited residents to attend the community drop-in session, to complete a short online survey or to contact the project team directly. Interest from broader community residents and groups to date, however, has been low, with 22 stakeholders attending the initial three (3) hour community information session.
- Further effort will be made in the assessment phase of the SIA to provide the broader community with the opportunity to engage with the Project.

3.0 Social Baseline Profile

This section describes the social baseline profile of the communities defined within the Project's social locality. It provides initial analysis of the defining characteristics of the communities, considering a range of demographic, social and economic indicators as outlined in **Table 2.1** and data outlined in **Appendix B**. Further, it considers the natural and physical attributes of the social locality and an understanding of how people currently live, work and recreate in the area, and how they value the area in which they reside.

The following components have been considered in the development of the social baseline for this Project:

- ***Development context*** – a review of recent development history in the local community, including how people have felt or experienced these changes, and different issue trends or patterns.
- ***Geographic and spatial*** – identification of communities of interest and relevant stakeholders.
- ***Socio-political setting*** – an understanding of the relevant governance structures, including those of Traditional Owners and the Local Aboriginal Land Council, and government authorities.
- ***Community capital/assets*** – an assessment of the social, cultural, and demographic characteristics of the identified communities and their resilience and adaptive capacity.
- ***Key community values, issues, and concerns*** – documentation of current community issues and values, as identified in key strategic planning documents, regional plans and/or community studies, as well as through analysis of local and regional media sources.

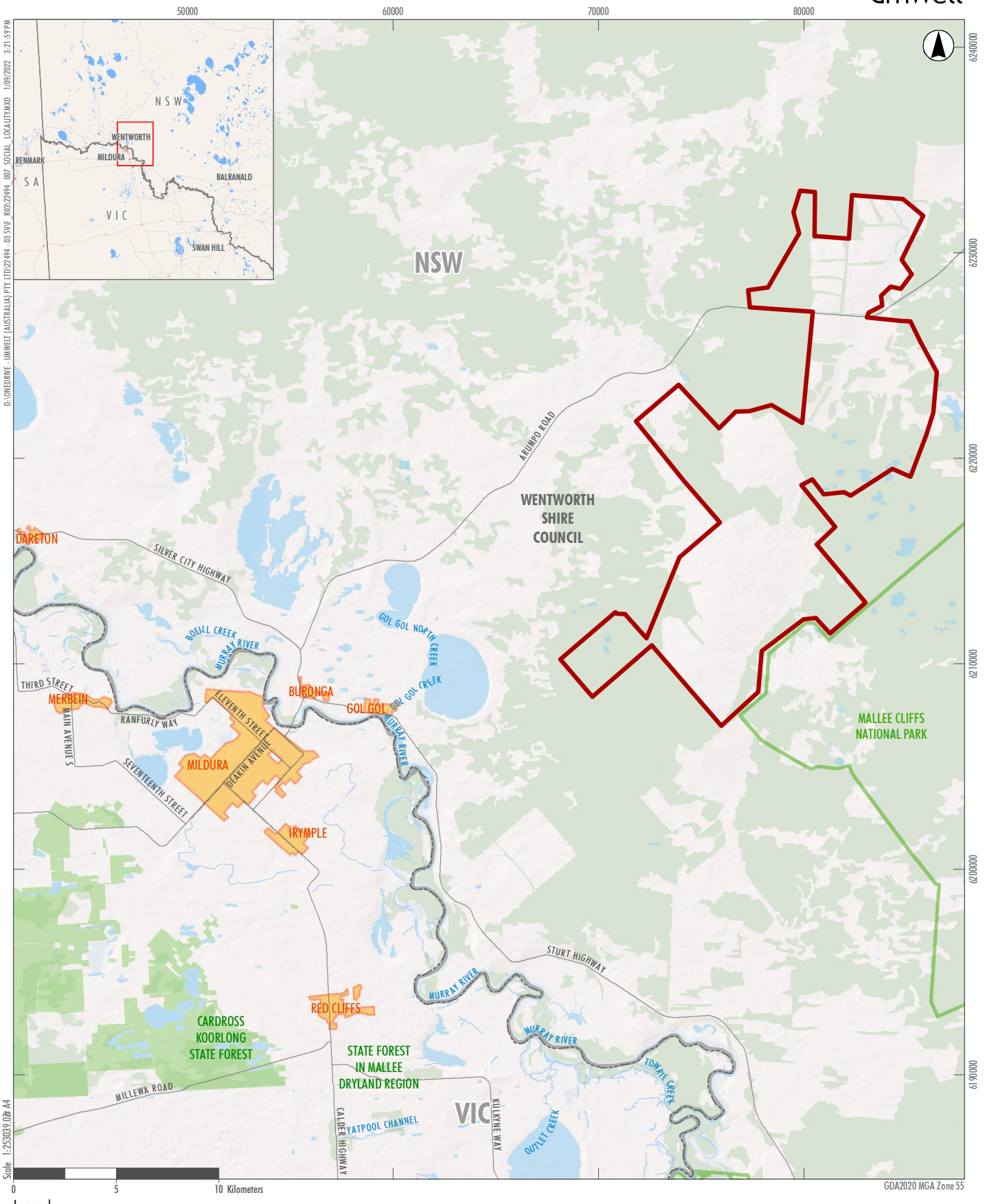
3.1 Local and Regional Setting

The area is predominantly rural with the nearest town being Buronga, NSW, which borders the state of Victoria and is located within Wentworth Shire LGA. The proposed Project Area borders the Mallee Cliffs National Park and is in proximity to the Murray River.

Wentworth Shire LGA is situated within the Riverina region of NSW. The LGA has a population of 7,453 and covers an area of 26,269 km^2 (ABS, 2021). The LGA currently has a population density of 0.3 residents per square kilometre, much lower than the NSW average at 10.2 (ABS, 2021). The southern extent of the LGA has the greatest population density, with population located in the townships of Buronga, Wentworth, Dareton and Gol Gol (Wentworth Shire Council, 2017).

The township of Buronga is especially relevant to the Project as it is the nearest centre to the Project. Buronga sits on the banks of the Murray River and has a population of 1,252. The town is serviced by a small retail area and is home to several industrial businesses and suppliers.

Bordering Buronga to the south of the Murray River is Mildura. Located in Victoria, and with a population of 34,565, Mildura is the closest regional city to the Project site, approximately 20 minutes south. Mildura is a major regional and agricultural service centre of the Murray River catchment, providing delivery transport, warehousing, health, education and professional services to NSW and South Australia (Regional Development Victoria, 2021). As such, Mildura is expected to be the centre for service provision for the Project.



Legend

- Project Area
- Local Government Areas
- State Forest
- NPWS Estate Boundary
- Built Up Areas
- Native Vegetation Areas
- Hydro Areas
- Major Roads
- Watercourses

FIGURE 3.1

Social Locality

Image Source: ESRI Basemap (2022) Data source: NSW LPI (2021), NSW DFSI (2021), NPWS Estate (2019), VIC DVC (2021), Forestry Corporation of VIC (2019)

3.2 Development Context

This section draws on several data sources to build an understanding of the development context within the region, and the social locality in which the Project is based. Understanding the locality's historical response to change assists in predicting how the Project may be perceived and accepted locally; and the degree to which the Project aligns with community values and local sentiment.

3.2.1 Energy Policy in NSW

The NSW Government's current energy security policy and approach to a clean energy transition is being delivered through the strategic development of the renewable energy sector, as outlined through the NSW Government's Renewable Energy Action Plan (2013), Electricity Strategy (2019) and the Electricity Infrastructure Roadmap (2020). This policy context is relevant to inform the planning and development of the Mallee Wind Farm.

3.2.2 Development History

The NSW Government's Electricity Strategy (2019) and Electricity Infrastructure Roadmap (2020) sets out a plan to deliver the state's first five (5) Renewable Energy Zones (REZs) in the South-West, Central-West Orana, New England, Hunter-Central Coast and Illawarra regions. This builds on the NSW Transmission Infrastructure Strategy (2018) and supports the implementation of the Australian Energy Market Operator's (AEMO) 'Integrated System Plan'. REZs co-locate renewable energy generation, energy storage, and transmission infrastructure with the aim of providing affordable, reliable and low-emissions electricity to the grid through attracting private investment and enabling the transition to an electricity network powered by renewable energy sources.

The South-West REZ has been chosen due to an abundance of high-quality wind and solar resources, proximity to Project EnergyConnect (a proposed interconnector linking the NSW, South Australian and Victorian electricity transmission networks), relative land-use compatibility, and a strong pipeline of proposed projects (EnergyCo NSW, 2022). EnergyCo NSW is responsible for planning the geographical extent of the REZ and its infrastructure. The Project is located entirely within the boundaries of the declared South-West REZ (refer to **Figure 3.2**).

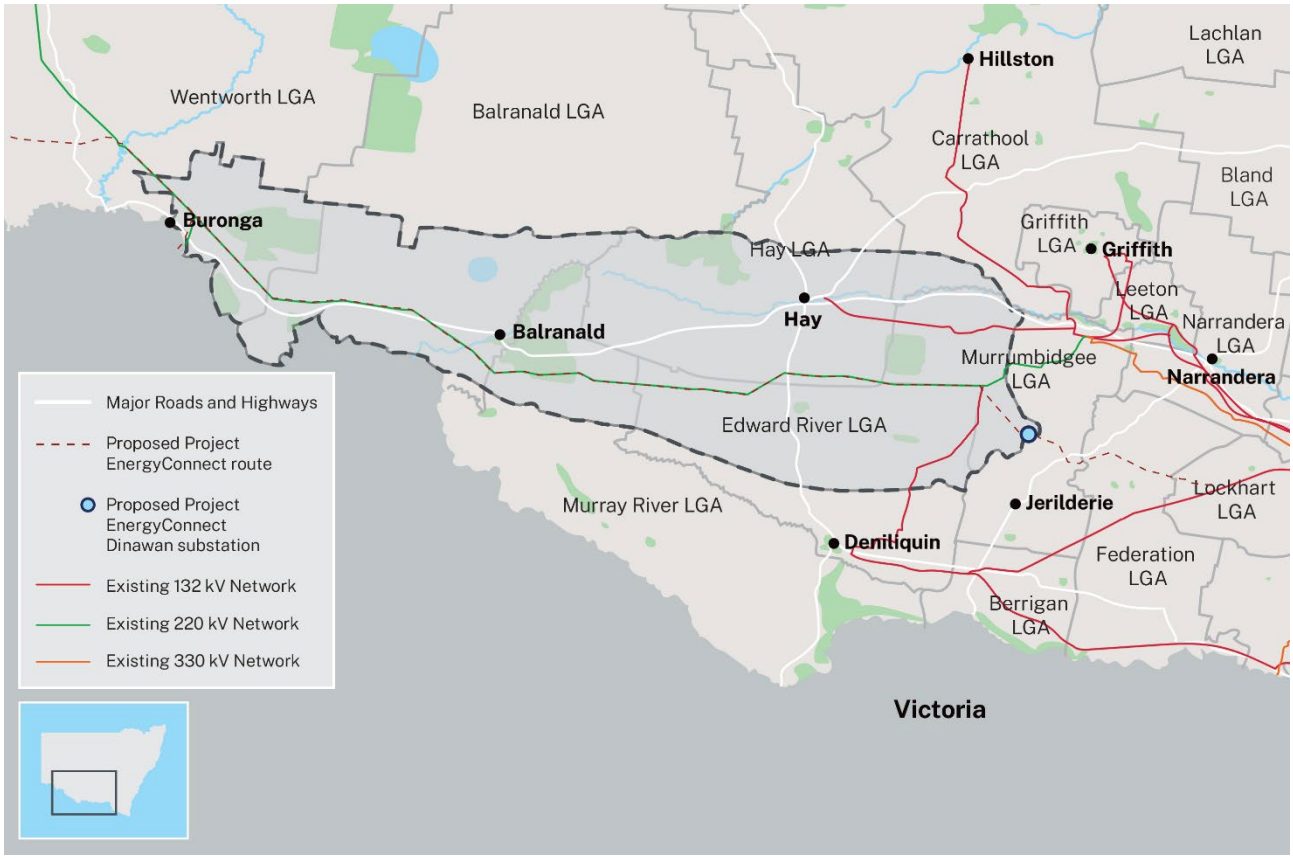


Figure 3.2 Indicative South-West Renewable Energy Zone

Source: (EnergyCo NSW, 2022).

Between October and November 2021, EnergyCo NSW undertook a Register of Interest (ROI) process to seek information from developers interested in being part of the South-West REZ, in which they received 49 registrations of interest. Ongoing consultation with local stakeholders and the Southwest Regional Reference Group will be considered alongside details from the ROI to help inform the development of the REZ (EnergyCo NSW, 2022).

Since the announcement of the South-West REZ, there has been a focus on renewable projects in the area to support the development of this zone. Whilst the proposed Project site is situated in the REZ, it is located on the far west boundary. Currently, there are no proposed projects in the immediate vicinity of the proposed site, with other renewable projects largely located to the east of Balranald.

The South West REZ was formally declared by the Minister for Energy under section 19(1) of the Electricity Infrastructure Investment Act 2020 (the Act) and published in the NSW Gazette on Friday 4 November 2022. The REZ declaration is the first step in formalising the REZ under the Act. It sets out the intended network capacity (size), geographical area (location) and infrastructure that will make up the REZ. This enables and sets the scope of key legislative functions under the Act, including access schemes and REZ network solutions.

The declaration follows an assessment of feedback received during the draft declaration exhibition held between 25 March and 22 April 2022. All consultation feedback was addressed and resulted in some minor changes being made to the specified network infrastructure in the (final) declaration order.

As noted by, EnergyCo this stylised map of the specified geographical area of the REZ is included for reference and accessibility purposes only. **Figure 3.2** does not form part of the abovementioned declaration. It includes the existing 132 kV, 220 kV and 330 kV transmission infrastructure near and in the REZ as a geographical reference. In the future, the Minister may amend the declaration to expand the specified geographical area of the REZ, increase the intended network capacity, specify additional generation, storage and network infrastructure, provide further details and specifications or correct a minor error.

The construction of an energy interconnector between South Australia and New South Wales to improve energy security has also commenced. When completed, Project EnergyConnect will run between Wagga Wagga, NSW and Robertstown, SA, with an additional connection to Red Cliffs, Victoria. This project is expected to generate 800 regional jobs in NSW during construction and 700 during operation; with EnergyConnect providing purpose-built camps based along the alignment, each housing between 200 and 400 people (Transgrid, 2021). Construction of the transmission line began in early 2022, with construction of the eastern alignment running from Buronga to Wagga Wagga, anticipated to commence in 2023 (Transgrid, 2022).

3.2.3 Key Community Values, Needs and Aspirations

During consultation, stakeholders were asked to consider their values, needs and aspirations. The natural beauty of the area and proximity to the Murray River was noted by some as a key attraction of the area, with the river recognised as a key location for visitors and for recreational activities such as swimming and boating. The natural landscape and local flora and fauna were also valued (refer to **Figure 3.3**) followed by connections to farming, family and community and aboriginal cultural heritage.

Those consulted also identified the connection that Mildura has to other major cities and towns, facilitated by the frequency and availability of flights from Mildura airport as well as road connections to Adelaide and Melbourne.

The area is known for its sporting communities, with Buronga and Gol Gol, alongside Mildura, having a range of sporting teams. Recent investment in the Mildura South Sporting Precinct was seen as a significant benefit to the community, and as a way of continuing to attract tourism to the region.

Whilst some key stakeholders commented that Mildura has good access to key services and facilities (i.e., health care and education), residents of Buronga and Gol Gol reflected a lack of "good services", such as GPs, suggesting that both localities require additional services to support a growing population.

> *Very limited services at all for the Gol Gol/Buronga area. We need a major influx of money for facilities with our growing population* – Community Member

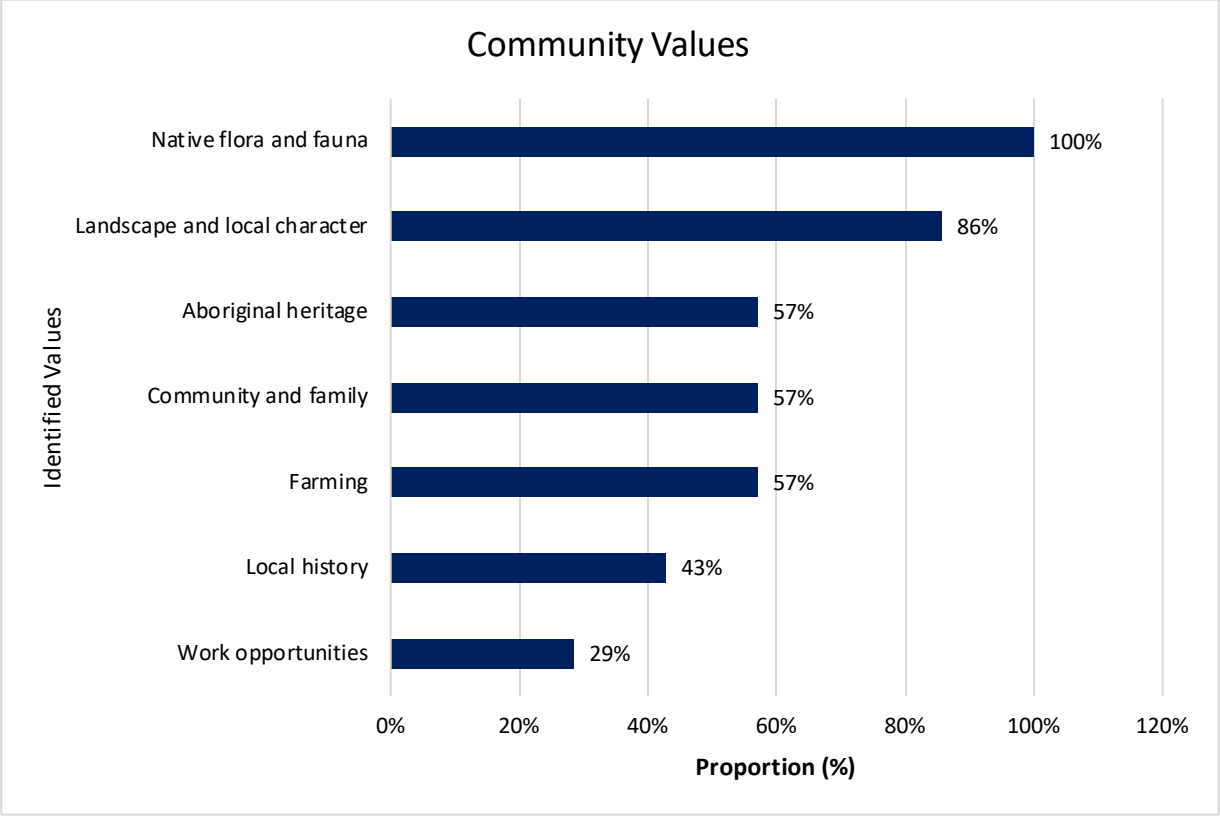


Figure 3.3 Community Values

Note: Multiple responses allowed. Data based on survey completions (n=9).

3.2.4 Identification of Vulnerable Groups

During consultation, various community and special interest groups commented on entrenched disadvantage within the community; and that despite the region having a significant amount of wealth and job opportunities, unemployment is embedded in certain pockets of the community, with individuals struggling to overcome disadvantage.

Youth disengagement was also listed as a challenge within the community, with this particularly salient for Indigenous youth.

Through the development of the social baseline profile, local Aboriginal and Torres Strait Islander residents, elderly residents of Wentworth LGA and users of short-stay accommodation and tenants in the private rental market, may be more vulnerable or susceptible to the social or economic changes associated with the Project.

3.3 Sustainable Livelihoods Approach – Community Capital

To better understand the social locality, and to evaluate community resilience and adaptive capacity, the social baseline has utilised the Sustainable Livelihoods Approach (U.K. Department for International Development (DFID, 2001), and the community capitals approach outlined in the IAIA SIA Guidance (IAIA, 2015), for analysis purposes.

According to the Sustainable Livelihoods framework, people seek to maintain their livelihood within a context of vulnerability. Specifically, threats to their livelihood including shocks (such as sudden onsets of natural disasters, health problems, conflicts, and economic crises), trends (for instance, those relating to the economy, health, resources, and governance) and seasonality (such as cyclical fluctuations in prices or employment), with people drawing on these assets to build and maintain their livelihood. Consequently, a livelihood is considered sustainable '…when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base' (DFID, 2001).

The DFID approach draws on a number of broad categories of community capital as a fundamental basis to identifying and further enhancing community capacity and resilience, with this approach used in many SIA studies (Coakes and Sadler, 2011) (refer to **Figure 3.4**).

Figure 3.4 Capital Framework

Adapted from Coakes and Sadler (2011).

3.3.1 Natural Capital

Natural capital refers to the natural assets and resources that contribute to community sustainability. Natural capital can include resources such as minerals, land, forests, and waterways, which provide benefit to the community, as well as environmental assets that provide social, cultural, or recreational value. A summary of the natural capital in the social locality is provided below.

Wentworth LGA is the meeting place of the Darling and Murray Rivers. As noted in **Section 3.2.3**, the Murray River is an important feature in the local community, with both rivers also important when considering landscape and current land use in Wentworth. The agriculture sector present in Wentworth relies heavily on the river systems as well as the Murray Darling Basin. The Wentworth Irrigation Area is an important resource to many agriculturalists in the region as irrigated horticulture accounts for 80% of the gross value of the agriculture sector, making water security into the future an important consideration. Mildura LGA is also a large agriculture producer, supplying a large proportion of Australia's grapes, citrus fruits and olives (Aussie Towns, 2021).

In addition to its agricultural production, Wentworth LGA is home to various national parks and heritage areas. Mallee Cliffs National Park, located to the east of the Project site, covers an area of 57,969 hectares. The Mallee Cliffs National Park is currently a wildlife conservation area, managed to protect the sand plan and sand dune ecosystem (NSW National Parks Wildlife Service, 2022). The Mallee Cliffs National Park has seen the recent introduction of the Mitchells Hopping Mouse, presumed extinct in NSW, as a part of a broader rewilding project that has contributed to the doubling of bilby numbers in the National Park (ABC, 2022). The Mallee Cliffs National Park does not currently provide public access.

Mungo National Park is also an important National Park that sits within the Wentworth LGA, approximately 55 km north-east of the Project Area. This National Park is well known for its rich Indigenous cultural heritage being the home of the Mungo Lady and Mungo Man, 42,000-year-old ritual burials, some of the oldest modern human remains found outside of Africa (Mungo National Park, n.d.). In May 2022, the remains of Mungo Lady and Mungo Man were reburied, which was subject to criticism by Traditional Owners, due to a lack of consultation.

Mungo National Park sits within the Willandra Lakes Regional World Heritage Area. Recognised for its natural (representing major stages in evolutionary history) and cultural value (bearing testimony to past civilisation) (Mungo National Park, n.d.) the area has been jointly managed by the National Parks Wildlife Service and Traditional Tribal Groups Elders Council since 2001. The Willandra Lakes also contains wetlands of international importance (RAMSAR wetlands).

In addition to the large National Park in Wentworth, the LGA is also home to the smaller Kemendok National Park, which sits to the north of the Murray River, approximately 27 km south of the Project Area. The National Park is utilised by locals, providing an area for bird watching and camping.

Wentworth LGA also has one of the state's major mineral sand resources, which the Wentworth Council recognising this as an important industry to protect and nurture. There are various active mines in the LGA which continue to contribute to the LGA's economy and overall employment (discussed further in **Section 3.3.2**). In addition to existing mines, there are various exploration licenses located throughout the LGA. Iluka Resources has submitted an application for a mineral sands exploration license over parts of the Project Area.

Whilst Wentworth Shire Council recognise the importance of mineral sand extraction, the Council also has a goal of working to enhance the natural and physical assets of the LGA by planning for, and developing the right assets and infrastructure, as well as adapting to climate change (Wentworth Shire Council, 2017).

3.3.2 Economic Capital

Examining a community's economic capital involves consideration of several indicators, including industry and employment, workforce participation and unemployment rates, income levels and cost of living pressures, such as weekly rent or mortgage repayments. This section provides a summary of the key characteristics of the social locality from an economic capital perspective.

- Agriculture, Forestry and Fishing is Wentworth LGA's largest sector by output, generating an estimated $264.340 million annually. Mining and manufacturing are also important industries within the LGA, generating an estimated $223.073 and $215.743 million respectively (REMPLAN, 2022). Given the LGA's high agriculture production, manufacturing in the LGA is largely centred around food and beverage manufacturing (Wentworth Shire Council, 2020).

- Manufacturing and agriculture are also significant industries of output in Mildura LGA. Manufacturing is Mildura's largest output generating sector, with an estimated output of $1,025.341 million annually. Agriculture accounts for $791.365 million of Mildura's output. Unlike Wentworth, construction is also a significant contributor to output in Mildura, accounting for $750.448 million (REMPLAN, 2022).

- Agriculture accounts for the highest number of businesses in both Mildura (approximately 28%) and Wentworth (approximately 45%). Mildura also a significant number of construction businesses (15% of total). A high proportion of these construction businesses are non-employing or have fewer than 19 employees indicating they are small in nature. Similarly, all construction businesses in Wentworth have fewer than 19 employees (ABS, 2021).

- In 2016, health care and social assistance and retail trade were the industries with the highest rates of employment in Mildura. Despite its high economic output, agriculture was only the third largest sector, accounting for 10.6% of employment in Mildura. The percentage of people employed in agriculture in Wentworth was significantly higher, accounting for 27.8%. This was also significantly higher than any other industry in Wentworth. The percentage of people employed in construction in Mildura was 7%, higher than Wentworth at 4.8%.

- Wentworth LGA experienced relatively high rates of unemployment in 2018, reaching a peak of 13.1% in June. Following this peak, unemployment rates within the LGA declined until September 2020 to reach a low of 5.7% where the rate sits currently, following a short-term increase to 8.2% in September 2021. Unemployment rates in Mildura LGA are significantly lower than in the Wentworth LGA, and have remained relatively stable since September 2020, at 3.6% in March 2022.

- Wentworth has lower rates of household weekly median income when compared to the state ($1,392 compared to $1,829). Mildura ($1,341) and Buronga ($1,381) have similar median household incomes as Wentworth LGA, whereas Gol Gol has a higher household income, at $2,104. Monthly mortgage repayments are significantly lower than the state in Wentworth LGA and Buronga ($1,300 compared to $2,167), in comparison, repayments are significantly higher in Gol Gol than other localities ($1,733). Wentworth LGA and Buronga have similar rates of homes owned with or without a mortgage (72.7% and 72.9% respectively), these rates are significantly higher in Gol Gol (84.7%) and lower in Mildura (65.4%) with all localities sitting above the state average of 64%.

- The Socio-Economic Indexes of Areas (SEIFA) Index of Economic Resources, a product developed by the ABS to rank relative socio-economic advantage and disadvantage across LGAs and which reflects the general level of economic resources available by an LGA. Wentworth LGA sits in the 5th decile, meaning it sits within the top 50% of LGAs in NSW, however Mildura sits within the 1st decile, meaning it is within the bottom 10% of LGAs in Victoria and therefore, has a low availability of economic resources.

3.3.3 Human Capital

The level of human capital within a community is assessed by considering population size, age distribution, education and skills, general population health, and considers the prevalence of at-risk groups within a community. This section provides a summary of the key characteristics of the social locality from a human capital perspective.

- The median age in Buronga is 38 years and Gol Gol is 37 years, slightly lower than the state average of 39. The median age in Wentworth LGA is higher than all other localities, sitting at 43 years. An aging population was identified as a key challenge for the community by Wentworth Shire Council, with a significant increase in people aged 75 years and over between 2021 and 2041 (ABS, 2021).

- The population in Wentworth is predicted to decline at an annual rate of -0.17% until 2041. This contrasts with the state, which is predicted to see an annual increase of 0.95% (DPE, 2022). The LGA is expected to experience a decline in most age groups, notably those aged between 20 and 39 years, as well as those between the ages of 45 and 74 years.

- Wentworth LGA has a significantly lower rate of university qualifications than the state (3.9% compared to 15.3%). Whilst Gol Gol and Buronga have a slightly higher rate when compared to the Wentworth LGA, they are still below the state (5.3% and 5.4% respectively). Rates of university education in Mildura LGA are slightly higher than Wentworth LGA, however, are still relatively low (5.8%). Mildura does have a slightly higher percentage of people with a vocational (i.e. TAFE) education (8%) when compared to Wentworth (6.1%), however this is still below the NSW average of 8.5%. In 2016, the main field of study in Mildura was Management and Commerce, followed by Engineering and Related Technologies, consistent with the two top fields of study in Wentworth.

- Managers account for the highest rates of employment (22.6%) in the Wentworth LGA. The LGA also has high rates of labourers (19.5%), technicians and trades workers (13.2%) and machinery operators and drivers (12.9%). Similarly, Mildura LGA has high rates of manufacturers (14.9%), technicians (13.5%) and labourers (12.6%), however, professionals account for the highest percentage of those employed (17%).

- The Socio-Economic Indexes of Areas (SEIFA) Index of Education and Occupation (IEO) is a product developed by the ABS that ranks relative socio-economic advantage and disadvantage for the LGA, reflecting the general level of education and occupation-related skills of people within an area, indicative of relative disadvantage compared to other areas in NSW. Wentworth sits in the 5th decile, placing it in the bottom 50% of all LGA's across NSW. Mildura sits within the first decile, placing it within the lowest 10% of all LGA's across Victoria suggesting a lower level of educational and employment skills in the area comparatively.

Wentworth LGA has a lower percentage of people (53.7%) who reported that they don't have a long-term health condition when compared to the state (61%) with arthritis, asthma, and mental health conditions the most frequently reported long term health conditions for the LGA. These rates were reflected in Buronga (55.5%) and Mildura (54.7%), however a higher percentage of people in Gol Gol outlined that they did not have a long-term health condition (64.8%) (ABS, 2020).

3.3.4 Cultural Capital

Cultural capital refers to underlying factors that provide human societies with the means to adapt to their environment (Cochrane, 2006). It includes the way people know and understand their place within the world. It may also refer to the extent to which the local culture, traditions, or language, may promote or hinder wellbeing, social inclusion, and development (IAIA, 2015). This section provides a summary of the key characteristics of the social locality from a cultural capital perspective.

Wentworth LGA has a high Indigenous population, accounting for 8.3% of the population compared to 3.4% in NSW. Similarly, Buronga has 7.9% of its population identifying as Indigenous whilst Gol Gol has a significantly lower rate (2.8%). Mildura has a lower Indigenous population (4.6%) than the other localities, however this is still significantly higher than the Victorian state average of 1%.

Parts of Wentworth LGA are covered by Native Title determinations from the Barkandji Traditional Owners claim (National Native Title Tribunal, 2015), outside of the Project Area. The Native Title Act 1993 (Native Title Act) provides a legislative framework for the recognition and protection of native title rights. Native title is the recognition that, in certain circumstances, Aboriginal people continue to hold rights to their land and waters, which come from their traditional laws and customs. Native Title determinants have the right to consult or negotiate with anyone who wants to undertake a development project or activity on the area claimed.

The Barkandji Native Title determination is the largest in NSW (ABC, 2017). Part A of the Native Title claim that was determined in 2015 and covers more than approximately 128,000 square kilometres within the Far West Region of NSW, incorporates land within several LGAs including Balranald, Bourke, Broken Hill, Central Darling, Cobar, and Wentworth, and the Unincorporated land of the Far West Region. Part B of the claim was determined in 2017 adding further land parcels to the original determination. The determination area of Native Title registered to the Barkandji Traditional Owners (The National Native Title Tribunal NCD2015/001 and NCD2017/001) parts of the area of social influence.

The Barkandji Native Title Area is important to consider from a socio-economic and cultural impacts perspective, given the strong history and culture associated with the region and the strong representation of the Aboriginal community in the area. The Barkandji Traditional Owners have been actively organised to regain and repossess their traditional lands for at least the last twenty years when the Native Title Claim was first lodged in 1997 (National Native Title Tribunal, 2020). Since the claim was determined in 2015, Traditional Owners now have the right to hunt, fish and teach law and customs on the land (ABC, 2017). Furthermore, the NSW Government's *Far West Regional Plan 2036* identifies the Barkandji Traditional Owners determination as enabling opportunities for Aboriginal people to use the land for commercial purposes.

3.3.5 Social Capital

Various indicators can be used to examine and assess social capital. Such indicators include the level of volunteering, population mobility, crime rates and the demographic composition of the community, such as the percentage of people born overseas, language proficiency etc. This section provides a summary of the key characteristics of the social locality from a social capital perspective.

- Both Mildura and Wentworth LGA's have a more homogenous society than NSW, with low rates of languages other than English (LOTE) in the home, and high rates of people born in Australia. Wentworth LGA has a lower percentage (5.2%) of households where a LOTE is spoken when compared with the state (29.5%). The percentage of people who speak a LOTE in Buronga is slightly higher (8.7%) than other localities, although still relatively low when compared to NSW. Buronga (79%) and Gol Gol (88.3%), and the LGA's of Wentworth (80.1%) and Mildura (78%) have a significantly higher percentage of people born in Australia than NSW (65.4%).

- In Wentworth, 16% of people were engaged in voluntary activities, higher than the state average of 13%. Rates of volunteering within Buronga and Mildura were similar to the state average. Gol Gol had the highest rate of volunteering, at 17.3%. High rates of volunteering are often used as an indicator of connection, cohesion and sense of community in the local area.

- Wentworth LGA has a significantly higher rate of assaults and malicious damage to property incidents than the state average (NSW Bureau of Crime Statistics and Research, 2022). The LGA has reported no incidents of robbery since 2021 and has a lower rate of drug related offences than the broader state. Mildura has a significantly higher rate of property damage and theft than the Victorian average (Crime Statistics Agency, 2022). Rates of drug offences are also above average in Mildura when compared with Victoria.

- The Index of Relative Socio-economic Disadvantage (IRSD) is a SEIFA score prepared by the ABS which ranks areas in Australia according to relative socio-economic disadvantage. A low score indicates a greater degree of disadvantage. Wentworth LGA sits within the 4th decile within NSW and Mildura LGA sits within the 1st decile in Victoria when ranked within their respective states, indicating relatively high socio-economic disadvantage, particularly in Mildura.

3.3.6 Political Capital

Political capital refers to the individuals, institutions, and systems that contribute to a community's ability to maintain and uphold a governance structure. Political capital can determine the extent to which people are able to participate in decisions that affect their lives, the level of democratisation within a community, and the resources provided for this purpose. A summary of the political capital relating to the social locality is provided below.

Wentworth LGA is governed by the Wentworth Shire Council which has nine elected councillors. As of July 2022, Tim Elstone is the Mayor (Wentworth Shire Council, 2022). Tim Elstone has spoken favourably of the economic contribution that Project EnergyConnect has already provided to the LGA through the procurement of local services, also recognising the role it will play in integrating renewable energy into the grid and decarbonising the national economy.

In its *Local Strategic Planning Statement*, Wentworth Shire Council recognises the need to manage resources and renewables, however a clear priority within the Statement is to ensure that any renewables projects will not impact on strategic agricultural land, with the intention to avoid any development within pumped irrigation districts. A media statement by the Wentworth Shire Council indicates their overall support for the EnergyConnect transmission line, and the direct and indirect economic contribution it will provide to the shire through employment, service procurement and community funding (Wentworth Shire Council, 2022).

The Project Area lies within the Murray state electoral district. The seat has been held by Independent Helen Dalton since 2019. Dalton is an advocate for "saving family farms" aiming to ensure land and water continues to be owned and managed by rural families (Helen Dalton MP, n.d.). Susan Ley of the Liberal Party has held the Federal Seat of Farrer since 2001.

The state seat of Mildura District is held by Independent Ali Cupper. The federal seat is held by Anne Webster, member for the Nationals. Webster has historically advocated for the development of wind and solar infrastructure in the region and is committed to "driving down emissions while protecting [the] economy and jobs" (ABC, 2022).

The Project site sits within the boundaries of the Dareton Local Aboriginal Land Council (LALC), and the Traditional Owners of the land are the Barkandji People.

3.3.7 Physical Capital

Physical or built capital includes provision of infrastructure and services to the community. Within this capital area, it is important to consider the type, quality, and degree of access to public, built and community infrastructure (including amenities, services, and utilities), as well as housing. This section provides a summary of the key characteristics of the social locality from a physical capital perspective.

- Wentworth LGA and Mildura are well connected to the East Coast of NSW, Adelaide in South Australia, and Victoria via national highways. The Sturt Highway, connecting Adelaide to Canberra through Mildura is an important national freight route, as well as an important contributor to local tourism infrastructure (Wentworth Shire Council, 2017). Similarly, the Calder Highway is an important freight route between Mildura to Melbourne.

- Wentworth LGA is serviced by the Mildura Airport, the busiest airport in regional Victoria. The airport has daily flights to and from Melbourne, as well as regular flights to Sydney and Adelaide. The Wentworth Aerodrome, located to the north of the township of Wentworth is currently undergoing a major upgrade to extend and seal the runway (Wentworth Shire Council, 2021).

- The Buronga – Gol Gol area of Wentworth Shire is the major area of housing and population growth in the Wentworth LGA due to an increase in housing demand associated with the growth of Mildura (Wentworth Shire Council, 2017). Approximately 500 new large residential housing allotments are predicted to be made available following major subdivisions in the coming years. Recent news articles have commented on the fear of homelessness in Mildura and northwest Victoria more broadly due to increased cost of living and a shift in the number of people seeking social housing (ABC, 2022). Interestingly, despite commentary around housing demand in Mildura, Gol Gol and Buronga still have a higher-than-average rate of unoccupied dwellings (10.3% and 11.7% respectively) compared to the state (9.4%). Wentworth LGA has a significantly higher percentage of unoccupied dwellings (16%); however, Mildura LGA has a lower rate of unoccupied dwellings when compared with the other localities, at 9.1%.

- The Wentworth LGA has an average of 2.1 motor vehicles per dwelling. This is slightly lower in Buronga and Mildura (1.9), and higher in Gol Gol (2.3). These rates are unsurprising given the large distances between other regional centres and show a high reliance on the local road networks.

- The Buronga – Gol Gol area currently provides residents with access to the Gol Gol Public School and Buronga Public School. For high school, students are required to travel to Coomealla High School, approximately 15 km north-west of Buronga, or into Mildura. Residents have also gained access to the Buronga Health Hub that was opened in mid-2022 that offers a range of health services, as well as supporting visiting allied health professionals (NSW Health, 2022).

- Residents in the social locality also have access to a range of public infrastructure in Mildura. As Mildura is the regional centre, it offers a range of public and private education and health facilities. The Mildura Base Public is the largest hospital in the LGA, providing a range of services including intensive care, an emergency department, as well as a range of speciality services. In May 2022, the hospital declared a 'code yellow', as it was 'completely at capacity' after previously being criticised for not having the capacity to service Mildura and surrounds (ABC, 2022). Additionally, recent news articles highlight a shortage of ambulances and paramedics in Mildura, with these professionals having to be flown in to provide services (ABC, 2022).

3.4 Local Challenges and Opportunities

Table 3.1 outlines the key challenges and opportunities for the social locality as identified from the review of local, regional, and state government reports, strategies and plans, ABS Census data and other secondary data sources, and through community consultation.

Table 3.1 Local Challenges and Opportunities

Opportunity	Capital	Challenge
• Availability of natural resources for economic generation (i.e., mineral sands). • Strong tourism capabilities by drawing on natural capital (i.e., National Parks, world heritage listed sites and the Murray River).	**Natural**	Nil
• Economic diversity generated by the agriculture, mining and manufacturing industries.	**Economic**	• Small number of large construction businesses to service a growing need for housing.
• Relatively low median age. • High proportion of people trained in engineering and related technologies.	**Human**	• Predicted population decline within the Wentworth LGA. • Aging population. • Low rates of university education. • Low rates of vocational education. • Low level of educational and employment skills. • Lack of trained professionals to service the health sector.
• Rich cultural heritage. • Highly engaged Indigenous community.	**Cultural**	Nil
• High rates of volunteering. • Low rates of robberies and drug related offences in Wentworth.	**Social**	• High rates of assault and malicious damage to property in Wentworth and Mildura. • High rate of socio-economic disadvantage. • Youth disengagement.
• Support for renewables and new developments in the region by local government. • Political support for renewables from state members in Victoria.	**Political**	• Focus on agriculture from state and federal members in NSW.
• Access to major road networks, connecting the region with major cities. • Strong regional airport with daily flights. • Recent upgrades to medical facilities improving service capacity in Wentworth LGA. • Subdivision and construction of housing an area of growth for the Wentworth LGA.	**Physical**	• Strong reliance on local road networks, with high motor vehicle usage. • Recent reports of Mildura Base hospital reaching capacity. • Reports of fears of lack of suitable housing in Mildura, and potential for an increase in homelessness.

In summary, based on our understanding of the social locality and the characteristics of the community identified, the Project is:

- Located in the Wentworth LGA in NSW, but will rely heavily on employment and service provision from Mildura in Victoria.
- Consistent with government and community aspirations for renewable energy development in the area.
- Well connected via major road and air networks.
- Positioned to connect to infrastructure currently under construction.
- Located in an area with strong connection to the natural features and landscape.
- Located in an area with strong Aboriginal cultural values.
- Located in an area currently lacking affordable housing.
- Located in an LGA with predicted population decline, and an aging population.

4.0 Perceived and Likely Social Impacts

This section provides a summary of the analysis of scoped issues and impacts (positive and negative) in relation to the Project. Impacts have been framed in accordance with the social impact categories outlined in the SIA Guideline (DPE, 2021) and utilised in standard SIA practice, and distinguishes community consultation responses that were independently raised or top of mind (unprompted), as compared to those that were prompted through the Online Survey (see **Appendix C**) Prompted impacts raised by respondents in the online survey are displayed in **Figure 4.1** and **Figure 4.2**. Data collected during meetings with key stakeholders, and informal discussions at the drop-in session, are also integrated in the following sections where relevant.

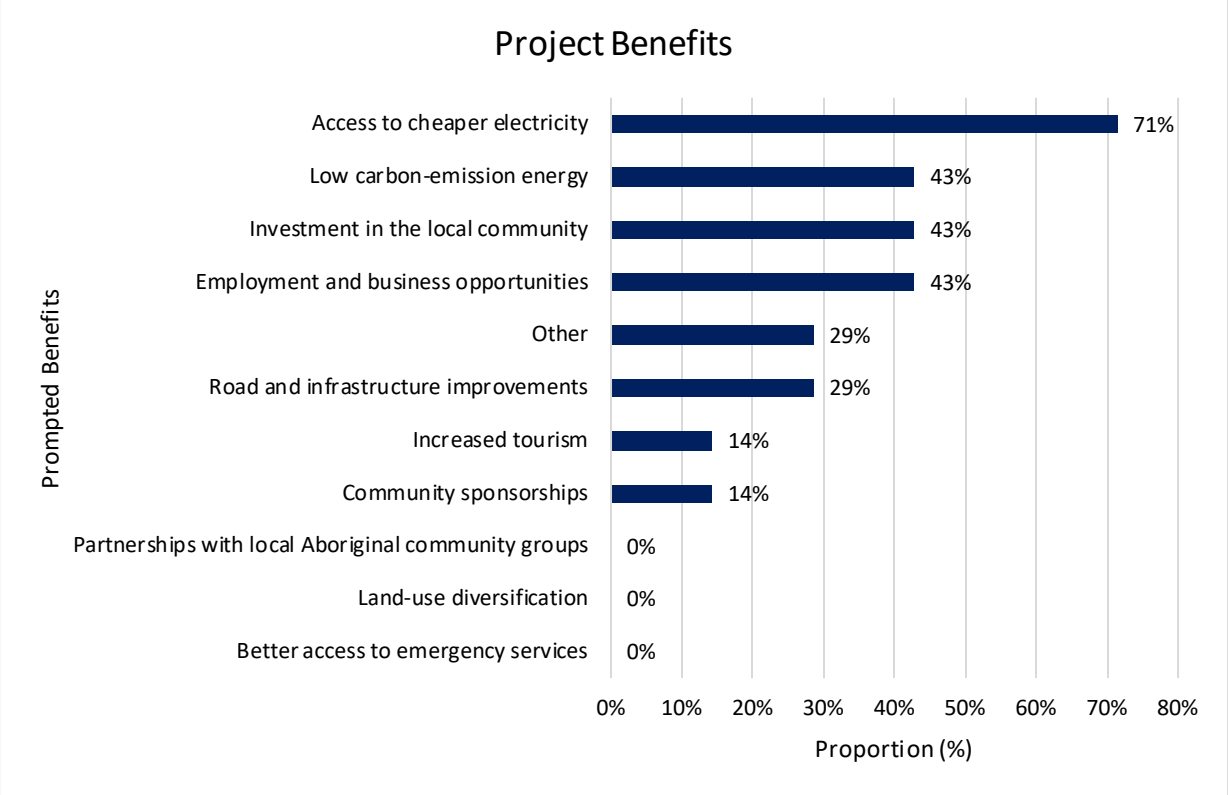


Figure 4.1 Perceived Project Benefits (Prompted)

Note: Multiple responses allowed. Data based on survey completions (n=9).

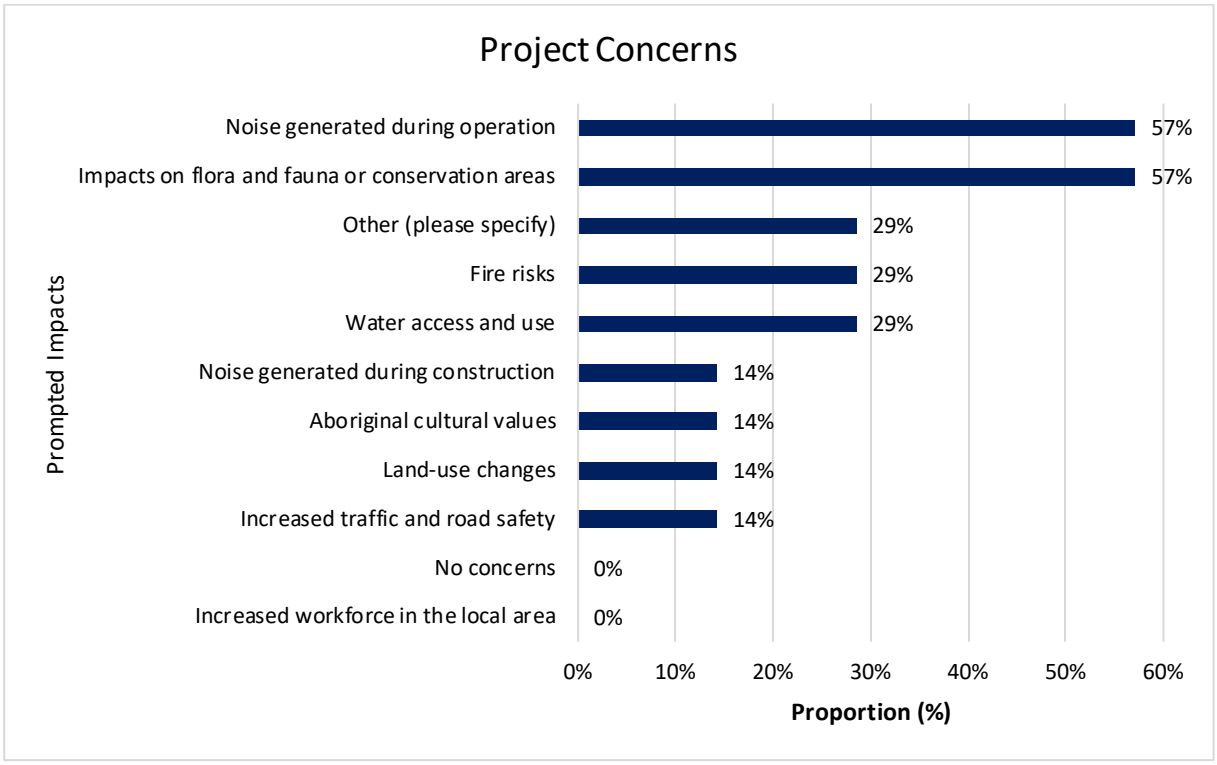


Figure 4.2 Perceived Project Concerns (Prompted)

Note: Multiple responses allowed. Data based on survey completions (n=9).

4.1 Surroundings

Various concerns were raised in relation to the social impacts that the Project may have on local surroundings, with particular focus on visual amenity, impacts on flora and fauna, social amenity impacts relating to noise, and concerns surrounding waste and rehabilitation.

4.1.1 Visual Amenity

Attendees at the community information session raised concerns around visual impacts associated with the Project. As mentioned in **Section 2.4.3**, there is one residential property (R1148) located within 8 km of the Project site. Given the relatively flat terrain, residents of nearby communities held concerns relating to changes the Project may have to the broader visual landscape in the area.

Other stakeholders commented that as the Project will be located some distance from Buronga and Gol Gol, they were relatively unconcerned about visual impacts.

> *Wouldn't worry me out there, but don't like seeing it on beautiful mountain ranges.* – Community Group

> *Not a lot of people go out that way, but it will make it look terrible* – Community Member

When asked to consider approaches that Spark Renewables could take to reduce the visual impact of the Project, one stakeholder suggested increasing the distance of the Project to Arumpo Road to reduce the visual impact of those travelling to Mungo National Park, wanting to maintain "*the remote feel of the place*". An additional stakeholder suggested the planting of trees as a visual screen. Others felt that no strategies could be put in place to reduce visual impacts of the project.

4.1.2 Impacts on Flora and Fauna

For those who completed the online survey, impacts to flora and fauna and specifically proximal conservation areas, was one of the most frequently raised concerns (n=4) (see **Figure 4.2**). During informal discussions, several stakeholders raised specific concerns relating to migratory birds, and the potential impact the Project may have due to bird strike. An attendee at the community information session commented that the area has already seen a loss in biodiversity of bird species including Brown Kites and Wedgetails, believing that the Project would "only make it worse".

Such a view was also noted in relation to the proximity of the Project to RAMSAR wetlands in the region. A representative from a local environmental group commented that the area is visited by birds listed in the JAMBA (Japan Australia Migratory Bird Agreement) and CAMBA (China Australia Migratory Bird Agreement) bilateral bird agreements, developed to preserve bird species that migrate through the area. This stakeholder in turn noted the role of their particular group in serving to preserve the habitat for these species and requested that further research be undertaken to better understand the migration patterns of particular species and any potential impacts. A representative from a further environmental group commented that whilst there are migratory species in the area, major impacts on bird species were not considered likely - "*can't imagine it will have a major impact on any*".

Impacts of traffic on other native flora and fauna was also noted, with concern relating largely to construction and less so operations. A further stakeholder commented on current efforts to maintain and rehabilitate local wildlife, with the breeding and releasing of bilbies in the Mallee Conservation Park (a private, 490-hectare conservation property in Mallee (Mallee Conservation, 2022)). Given these conservation efforts, it was stressed that they would not wish to see the impacts of the Project on the Mallee Cliffs National Park, given its proximity.

4.1.3 Social Amenity – Construction and Operational Noise

Some community members that attended the community drop-in session also queried the level of noise that would emanate from the turbines during operation (n=4). While some felt that noise would not be a great concern, others requested further clarification in this regard.

4.1.4 Water Access and Use

Discussions with Local Government representatives also highlighted that, despite a commitment to the development of renewable energy projects, they did not wish to see impacts experienced on the pumped irrigation network that many agriculturalists in the region rely upon. Water was less of a concern for other stakeholders (n=2), however was acknowledged to be an important value.

> *The environment is fragile. Water is scarce.* – Community member

4.1.5 Waste / Rehabilitation

Several community members that attended the community drop-in session raised concerns surrounding the disposal of materials following the decommissioning of the Project. While some stakeholders commented specifically on materials used in a BESS, others were more concerned about the quantity of material needed for the construction of the turbines, and what would happen to this material during the decommissioning phase of the Project.

Some attendees at the drop-in session also questioned how long the Project would need to be operational before it could be considered carbon neutral, given the fossil fuels used in the manufacturing of turbines, and in construction of the Project.

> *The damage done to the environment both local and from production of the wind turbines is enormous.* – Community member

4.1.6 Increased Traffic and Road Safety

Impacts to local roads and traffic was of less concern to those consulted, with only one respondent to the online survey identifying increased traffic and road safety as a prompted concern (refer to **Figure 4.2**).

When prompted, two (2) stakeholders noted the potential benefit of the project should upgrades to local roads and infrastructure occur (see **Figure 4.1**). A special interest group expanded on this sentiment, commenting that upgrades to Arumpo Road would be beneficial to, and welcomed by, the local community given the current state of the road. Similarly, an additional stakeholder noted that they would like to see Spark Renewables consider upgrades to local roads more generally, given potential impacts of the Project on road conditions due to increased traffic movements.

Despite the region having a low population density, the location of the Project site on a road that is considered highly utilised by tourists accessing the Mungo National Park, saw stakeholders request the need for a detailed traffic assessment to be undertaken, to determine traffic impacts associated with the Project.

4.1.7 Aviation

Whilst impacts to aviation were not raised by many stakeholders consulted, one attendee at the community drop-in session queried the impact that the Project may have on aviation in the area, especially given the recent upgrades to the Wentworth Airport and increased air traffic (refer to **Section 3.3.7**) and the presence of wind turbines and transmission lines associated with the Project.

4.1.8 Fire Risk

Few stakeholders were concerned about fire risk associated with the Project. When prompted, two (2) stakeholder raised fire safety as a concern, noting:

> *Our summers are very warm here and they [the turbines] must warm up a bit* – Community member

Whilst not raised specifically by stakeholders engaged in preparation of the Scoping Report, concerns are evident in the media regarding the potential fire hazards associated with BESS technology amongst communities throughout Australia, particularly following incidents of fire in a mega battery in Victoria in 2021. Whilst events like these are unlikely, events that are catastrophic, or memorable, are more likely to generate and exacerbate community concern (Sandman, 2003). Therefore, despite the technical risk of a fire being unlikely, it will be important for Spark Renewables to communicate the management measures that would be put in place to prevent potential fires, and company response should such an event occur.

4.2 Livelihoods

When considering the impacts on people's livelihoods, several themes were raised by those consulted. Overwhelmingly, community members and key stakeholder groups welcomed the positive impact of the Project in relation to **reduced energy cost, local employment and business procurement** and **training / skills development opportunities**. Some stakeholders, however, were concerned about the impact the Project may have on **existing land uses**.

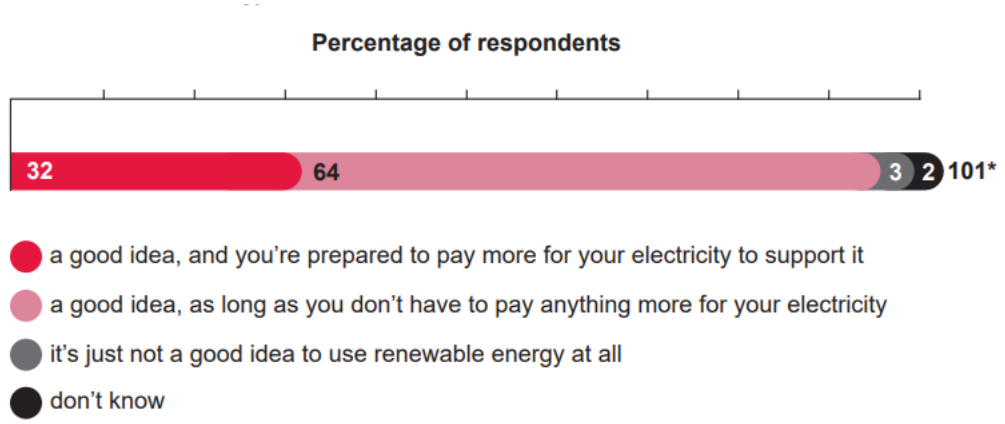
4.2.1 Energy Cost

When prompted five (5) stakeholders saw the benefits of the Project in contributing to cheaper access to electricity, noting that "*power prices are climbing*". Some stakeholders however were more sceptical as to how much impact the Project would have on electricity prices.

> *Hopefully cheaper power but doubt that, in the warmer months I generate 65 +kw daily and get basically get nothing for it but when I have to buy it, I have to pay 30plus cents* – Community member

> *Renewable energy is the only way forward, but it has to be priced accordingly.* – Community member

Support for renewable energy is often influenced by perceptions regarding the cost of electricity.
For instance, a study undertaken by the NSW Office of Environment and Heritage on attitudes towards renewable energy showed that 64% of respondents support renewable energy if they do not have to pay a higher price to obtain it, whereas only 32% of respondents would accept an increase in their electricity cost to support a transition to renewable energy (OEH, 2015) (refer to **Figure 4.3**).



* numbers have been rounded up. Number of survey respondents = 2000.

Figure 2.8: Overall views about using renewable energy to produce electricity in NSW.

Question A9. Overall, which one of the following best describes your view about renewable energy to produce electricity? Do you think it's... ?

Figure 4.3 Community Attitudes on Cost of Renewable Energy

Source: (Office of Environment and Heritage, 2015).

One stakeholder commented that renewables will be an important contributor to alleviating the problem of high energy costs, but also raised concerns regarding the shortfalls of renewable energy generation questioning *"What happens when the sun isn't shining, and the wind isn't blowing"*. Despite these concerns, the positives of having a BESS facility incorporated in the Project design to store excess energy was also noted.

Attendees at the community drop-in session suggested that renewables are the way forward and were needed as a part of the transition from fossil fuels. Given recent rises in the cost of living, and media attention surrounding rises in electricity prices across the country, it was suggested by one stakeholder that there needs to be clear messaging around the opportunities and impacts of renewable energy on local energy prices, rather than continuing to rely on media speculation.

One stakeholder expanded on this, commenting that there are areas in the region that continue to experience black and brown outs, reflecting that it will be important to ensure host communities are able to experience the benefits of having electricity generated in their backyard. This stakeholder suggested Spark Renewables, in collaboration with others renewable energy companies, should consider how they could develop small microgrids that could be provided as a part of a broader community benefit sharing program, to ensure positive impacts to local communities.

4.2.2 Local Employment, Procurement and Training

Local employment and opportunities for procurement were seen as positive impacts of the Project by community members (n=3). Additionally, local government, special interest groups and community drop-in session attendees identified the benefit the Project would bring to the region in terms of local employment. Local Government representatives also recognised the capacity of local businesses to service the renewable sector, with a number of workers already employed in the renewables space through the construction of solar farms within the Mildura LGA, and the capacity of local businesses to provide a range of services during construction periods, i.e., level of access to manufacturing plants and materials.

However, some stakeholders were dubious about Project benefits, questioning the scale of benefit likely to be experienced locally given likely small operational workforce numbers. A further stakeholder also felt that there would be limited employment opportunities due to the specific skillset required by companies throughout the construction period.

> *A few locals might be hired, just a select few.* – Community member

> *Will it actually lead to more locals being employed?* – Community member

The opportunity for skills development and training of local people to meet the needs of the construction workforce for the Project was considered an important strategy, to ensure that local employment was maximised. Some stakeholders also reflected on the need to ensure training opportunities for Indigenous people that are culturally appropriate, especially given the high Indigenous population within the region.

4.2.3 Alternate Land Use

As discussed in **Section 3.3.1,** the region is a large agricultural producer, with land particularly used for vineyards and other agricultural purposes. Despite the Project offering an alternate land use, little concern was raised regarding co-existence of the agricultural and renewable energy industries.

> *"I'm not concerned about the impact of renewables on agriculture, renewables are all part of the jigsaw"* – Community member

Mineral sands mining is also an important economic contributor to both Wentworth and Mildura LGAs. Wentworth Shire Council in particular places a relatively high importance on mineral sands extraction, with one local community member querying how the Project may impact the exploration and extraction of mineral sands within the Project Area, given the number of exploration licenses in the general region.

4.2.4 Property Value

One community member also raised concerns regarding **property value,** given that they were currently in the process of buying a residential block in Gol Gol, and were worried about how Project may influence purchase prices.

> *So long as it's well away from housing and new developments that people have purchased in an up-and-coming area. Too close and values will drop dramatically.* – Community member

4.3 Health and Wellbeing

Impacts relating to health and wellbeing and psychosocial impacts as a result of the Project were also not noted frequently by consulted stakeholders, with little concern noted that the Project would impact negatively on the health of the local Gol Gol and Buronga community.

Other renewable energy projects however, have resulted in high levels of stress and anxiety due to a fear of the unknown and feelings of uncertainty about how the Project may affect people. Given the Project is the first wind farm proposal in the region, it will be important for Spark Renewables to continue to proactively engage with the community to promptly respond to any community and/ or individual concerns that may arise in relation to the Project.

4.4 Community

4.4.1 Impacts on Sense of Community Due to Community Division

In relation to impacts on community, one stakeholder reflected on renewable energy projects having the capacity to impact sense of community, with specific concerns raised regarding a '*winners and losers'* effect that may develop between host and neighbouring landholders. This distributive inequity has been noted by stakeholders across other projects where opportunities to host turbines are readily accepted by some landholders given the compensation received, while neighbouring landholders are left to experience the visual impact of wind farm development with no compensation provided. Consequently, there was a request for benefits associated with the Project to be fairly and consistently distributed across landholders and a clear nexus established between compensation received and impact; and broader benefits received across the community (discussed in further detail in **Section 4.7.1**).

4.4.2 Change in Community Cohesion Because of Construction Workforce Influx

An influx of a construction workforce can also be seen to impact levels of **social cohesion** in communities and is often identified as a community impact associated with Project development. However, this issue did not feature prominently in consultation, with community members appearing familiar with the influx of transient workforces within the region e.g. fruit pickers (discussed further in **Section 4.6.1**). There was also a desire to see increased population growth in the area, particularly within the communities of Gol Gol and Buronga. Similarly, the Mildura Shire Council reflected that there are a proportion of families seeking to relocate to the northern side of the River (to NSW), to take advantage of government subsidies, resulting in further growth in the area.

4.5 Culture

4.5.1 Aboriginal Cultural Heritage

Potential impacts to Aboriginal cultural heritage were raised as a key concern for various key stakeholder groups during consultation. As noted in **Section 3.3.1** and **Section 3.3.4**, Wentworth LGA is rich in Aboriginal cultural heritage. Impacts to both tangible and intangible cultural heritage were noted, with comments made regarding the ceasing of other development due to the discovery of Aboriginal middens and the potential for wind farm development to impact on song and story lines due to visual amenity changes.

The need to establish and build long lasting relationships with First Nations peoples was recognised as important, with stakeholders outlining the need for the company to build strong relationships with all groups and to ensure that engagement is genuine and not "*tokenistic*".

One community group suggested Spark Renewables also seek out innovative ways to involve the Aboriginal community in the Project to mitigate against potential impacts to tangible heritage. One suggestion included collaborating with Aboriginal people to identify totems of the area, and, if any of these are birds (explored in **Section 4.1.2**), to come to an agreement that Aboriginal communities to have access to these species to gather material (i.e. feathers) for cultural purposes.

4.6 Accessibility

4.6.1 Access to Housing

During consultation, a representative from Wentworth Shire Council commented on the inability to house a large construction workforce, recognising the limited availability of temporary accommodation in Buronga and Gol Gol. Community members also commented on the difficulties for locals to find rental properties in Buronga, Gol Gol and Mildura, noting a current lack of housing stock, despite a comparatively low occupancy rate in the area (as outlined in **Section 3.3.7**).

Additionally, it was noted by the Mildura Shire Council that despite Mildura having a large amount of temporary accommodation, beds are highly utilised and largely fully booked throughout harvesting season (January to March), often seeing upwards of 13,000 workers entering the region through this period. Whilst peak harvesting season lasts only three months, jobs in fruit picking attract pickers to the region for nine months of the year, which in turn impacts the availability of short-term accommodation for extended periods of time.

The impact of COVID-19 on the availability of short-term accommodation was also raised by a key stakeholder, noting that the pandemic has seen some accommodation providers close their businesses, with some yet to reopen, and others altering the type of service they offer in response to the decline. For instance, some facilities that once provided hostel style accommodation are now privately owned by farming enterprises.

One stakeholder was particularly concerned about the cumulative impact on availability of accommodation associated with an influx of renewable energy projects, with community members and local governments querying whether Spark Renewables could explore extending the life of the EnergyConnect transmission line workers camp to accommodate the workforce required during the construction period. An attendee at the community drop-in session in turn noted the opportunities that this may provide for local employment through the hiring of local service providers e.g., cooks and cleaners.

To mitigate any negative impacts on the housing and accommodation sector in Mildura, an attendee at the community drop-in session also suggested Spark Renewables consider ways in which they could create a lasting legacy in the community by investing in housing, noting;

> *"To bring in specialised teams you would need to construct housing"* – Community member

One stakeholder also suggested the company consider ways in which the potential construction of housing for construction could be later repurposed to provide much needed access to social housing, leaving a positive community legacy.

Given the reliance within the region on the agricultural industry, across both Mildura and Wentworth, the impact of the Project, and any cumulative impacts of other projects, on housing and accommodation will need to be assessed.

4.7 Project Justification and Decision Making

Attendees at the community drop-in session frequently queried why a wind farm had been chosen over a solar farm for development, seeking further **justification for the project** and assessment of the overall suitability of the area for wind generation. As one stakeholder commented:

> *I do not believe there are sufficient, reliable winds to have the wind farm run efficiently in this area.*

Furthermore, questions were also raised as to whether other sites had also been considered in Victoria, prior to the selection of the Mallee Wind Farm site.

> *Have any Victorian sites been considered, or is it the poorer cousin that gets the eye sore?* – Community member

In relation to knowledge of wind farm developments and wind generation technology, an average of 4.6 out of 10 was obtained across survey participants. Similarly, when considering the level of acceptance of the Project at this stage, community members obtained an average of 4.6 out of 10.

In relation to attitudes towards wind technology, a survey undertaken by the NSW Office of the Environment and Heritage survey (2015) has indicated increased knowledge of wind farm technology, but increased support for solar farms over wind farms. In the context of Mildura and Wentworth LGAs, community members have had far greater exposure to solar farms due to the high number of these types of projects within the Mildura LGA. Given the limited exposure to wind energy generation in the region, a lower rate of acceptance may not be unexpected.

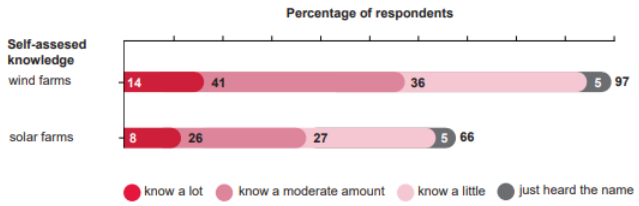


Figure 2.3: Awareness and self-assessed knowledge of wind farms and solar farms.
Question E1/F2. [Wind farms are groups of wind turbines or windmills used to generate electricity. / A commercial solar farm is about the size of a football field, with a large number of solar panels that generate electricity. The electricity is then fed into the national power grid.] Before today, had you heard about the use of wind farms or wind turbines or windmills/ the idea of solar farms being used to generate electricity?
Question E2/F3. Before this survey, how much did you know about wind/solar farms?
Number of survey respondents = 2000.

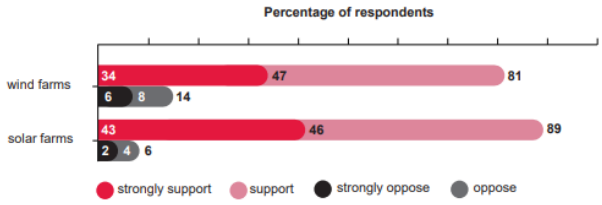


Figure 2.9: Support for building wind farms and solar farms in NSW.
Question E4/F4. Now thinking specifically about wind/solar farms in NSW. Overall, to what extent do you support or oppose wind/solar farms being built in NSW?
Number of survey respondents = 2000.

Figure 4.4 Knowledge and Support for Wind and Solar Farms in NSW

Source: (Office of Environment and Heritage, 2015).

One stakeholder also reflected that whilst they were supportive of renewable energy projects, they still held concerns that many projects were moving too quickly, and the grid was not prepared for these developments. Whilst recognising the important contribution the interconnector will play in ensuring that the energy generated from renewables will be captured and utilised, they commented that projects in Broken Hill have faced difficulties in feeding back into the grid and sought clarification as to how much of the energy generated will be harnessed and fed back into the grid.

When considering ways to engage with the community in relation to the Project, one stakeholder suggested that there should be a greater presence on social media to reach younger generations, indicating that newspapers no longer have the reach that they used to have.

Additionally, respondents listed newsletters and project updates, as well as community meetings, the local newspaper, website, letters, and local radio, as preferred methods of engagement through the planning and assessment process (refer to **Figure 4.5**).

There was also a view that information should be accessible for all groups, including those with low literacy, and that pop up stalls should also be considered at the local grocer to ensure that as many community members as possible were contacted, particularly given the more limited exposure to wind farm developments.

> *It can be hard for communities to respond to such a new concept (i.e. wind farms / energy production) – need upfront, easy to digest information to make sure they know what it means* – Special Interest Group

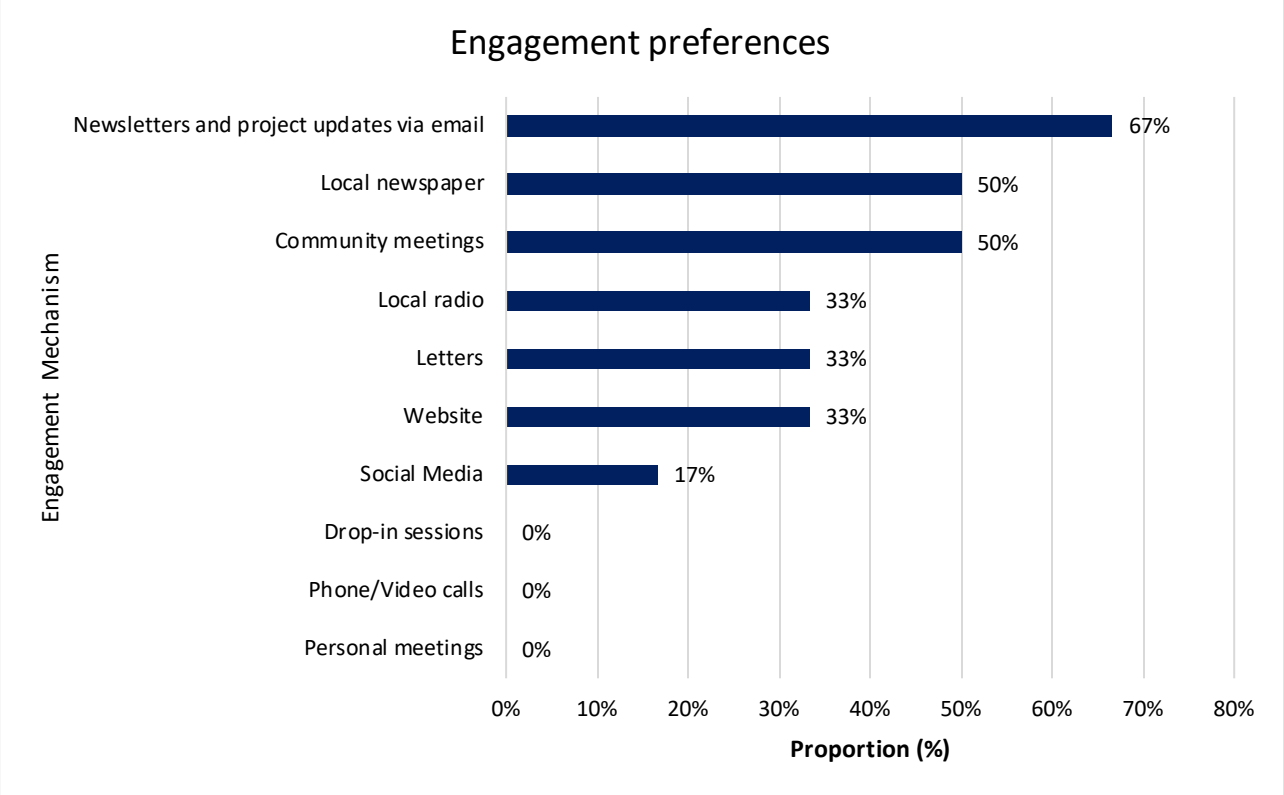


Figure 4.5 Preferred Method of Engagement

Note: Multiple responses allowed. Data based on survey completions (n=9).

4.7.1 Community Benefit Sharing

The development of a community benefit sharing scheme for the Project will be important in achieving a balance between positive and negative social impacts. Various community members commented on the positive contribution that such a scheme could have within communities in the local area, given that the locality was hosting the turbine infrastructure. Stakeholders also noted the importance of ensuring continued investment in Buronga and Gol Gol, rather than seeing most benefits realised in Mildura. The importance of ongoing collaboration to ensure community is at the forefront of decision making was also emphasised by one community organisation.

When asked to consider ways in which community benefits could be realised, stakeholders identified a range of potential investment opportunities including:

- Development of a look out to facilitate viewing of the wind farm with educational signage (potentially relating to important bird species in the area).
- A blade displayed along Arumpo Road offering the community and tourists an opportunity to increase their level of awareness of turbine infrastructure.
- Contribution to local school programs, including the Immersion Centre at Buronga Public School.
- Contribution to local organisations that rely heavily on grants for survival.
- Contribution to local road maintenance, including for Arumpo Road.
- Procurement of local businesses in Buronga and Gol Gol to benefit local families.
- Installation of 2-way radio / FM radio repeaters to existing towers.

Spark Renewables will continue to develop their community benefit sharing scheme with consideration of community suggestions and best practice.

5.0 Preliminary Social Impact Evaluation

As discussed in the above section, the scoping phase has identified a range of key social impacts of relevance to near neighbours, local community residents, and other key stakeholders in relation to the Project.

A preliminary evaluation of the likely social impacts associated with the Project has been developed in **Table 5.1**, with these to be further assessed and validated during the next phase of the SIA and through the EIS. Additionally, recommended mitigation and management measures have been suggested that will be further developed and refined in the EIS phase.

Table 5.1 Preliminary Impact Evaluation

Social impact category	Project aspect	Social impact description	Duration [1]	Extent/affected parties	Perceived Stakeholder Significance	Impact Significance	Recommended project refinements/ mitigation measures	Level of assessment
Decision making	Project operation	Positive role in the energy transition through provision of green energy (**Section 4.2.1**).	C & O	Community Groups Broader Community	High	Very High (+) (Almost certain, Major)	Actively engage and involve the community regarding the benefits of renewable energy and the natural environment. Open, transparent, and accessible communication of Project information.	Detailed
Surroundings	Project establishment and operations	Concern for the impact on local flora and fauna species, particularly migratory bird species due to potential for bird strikes (**Section 4.1.2**).	C & O	Environmental groups Aboriginal Stakeholders Broader Community National Parks and Wildlife Services (NSW)	High	High (Likely, Major)	Engage proactively with relevant community groups to support and protect local environmental values. Undertake a biodiversity assessment to assess the impact on flora and fauna and communicate outcomes to the community. Development of a management plan to protect the local wildlife, particularly migratory birds. Development of a biodiversity offset plan to protect the natural environment. Actively engage and involve key stakeholder groups in development of relevant environmental plans.	Detailed

[1] C – Construction O – Operation D – Decommissioning P – Planning

Social impact category	Project aspect	Social impact description	Duration [1]	Extent/affected parties	Perceived Stakeholder Significance	Impact Significance	Recommended project refinements/ mitigation measures	Level of assessment
Community **Way of life** **Accessibility**	Construction workforce influx	Temporary increase in population, increasing pressure on local services and infrastructure, particularly housing and accommodation (affordability and availability) (**Section 4.6.1**).	C	Neighbouring landholders and residents Broader Community Local Businesses and Service Providers	High	High (Likely, Major)	Develop local participation plan and workforce accommodation strategy. Investigate provision of temporary workforce housing to support the Project. Coordinate efforts and liaise with key stakeholders to coordinate provision of accommodation and other services and suppliers. Liaise with local service providers to develop a strategy for addressing increasing demand on services e.g., health, recreation etc.	Detailed
Surroundings	Project construction	Construction-related traffic may result in increased noise (disturbance), a deterioration of road conditions, increased travel times, and decreased road safety (**Section 4.1.6**).	C	Neighbouring landholders and residents Broader Community	Medium	High (Likely, Moderate)	Development and implementation of a Construction Environmental Management Plan (CEMP) in consultation with local communities and key stakeholders. Detailed planning transport routes with public safety considerations and information disclosure, consulting with and notifying residents, considering any sensitive user groups. Consider supporting upgrades to local roads or transport infrastructure.	Standard
Community **Livelihoods**	Construction workforce influx	Increased economic spend in local communities and townships due to the influx of construction workers (**Section 4.2.2**).	C	Local Businesses and Service providers Broader Community	Medium	High (+) (Likely, Moderate)	Coordinate efforts and liaise with key stakeholders to coordinate provision of accommodation and other services or suppliers. Develop a local participation plan.	Standard

Social impact category	Project aspect	Social impact description	Duration [1]	Extent/affected parties	Perceived Stakeholder Significance	Impact Significance	Recommended project refinements/ mitigation measures	Level of assessment
Community	Construction workforce influx	Increase in human capital for local communities (expertise) due to the provision of training and skills development resulting labour pool growth (**Section 4.2.2**).	C & O	Broader Community Business and Service Providers	Medium	High (+) (Likely, Moderate)	Proactive support for the establishment of programs that encourage and incentivise re-skilling and upskilling of local workers to remain in the region.	Standard
Community Livelihoods	Project establishment and operations	Community investment initiatives and funds allocated to improve social outcomes for local communities (**Section 4.7.1**).	O	Neighbouring landholders and residents Aboriginal Stakeholders Community and environmental Groups Broader Community Local Businesses and Service Providers Local Government	High	High (+) (Likely, Moderate)	Develop local employment and procurement plan. Proactive support for the establishment of programs that encourage and incentivise re-skilling and upskilling of local workers to remain in the region. Active involvement with the community to provide opportunities to improve social outcomes.	Detailed
Livelihoods	Project establishment and operations	Provision of additional sources of income for landholders, enhancing local livelihoods (**Section 4.4**).	C & O	Host landholders	Low	High (+) (Almost certain, Moderate)	Open, transparent, and accessible communication of Project information. Development of participatory local benefits scheme or good neighbour programs including financial compensation.	Minor
Surroundings Way of life	Project construction and establishment of infrastructure	Visual amenity changes impacting the rural landscape (**Section 4.1.1**).	C & O	Neighbouring landholders and residents Broader community (Gol Gol and Buronga) Environmental and community groups	Medium	Medium (Likely, Minor)	Further assessment of visual impacts.	Standard

Social impact category	Project aspect	Social impact description	Duration [1]	Extent/affected parties	Perceived Stakeholder Significance	Impact Significance	Recommended project refinements/ mitigation measures	Level of assessment
Surroundings	Decommissioning	Rehabilitation and production of waste during the decommissioning phase leading to environmental degradation (**Section 4.1.5**).	C, O & D	Special Interest Groups Neighbouring and host landholders Broader Community Aboriginal Stakeholders	High	Medium (Possible, Minor)	Development of a waste management and recycling plan for the Project. Development of environmental management plans for decommissioning.	Detailed
Decision making	Project design and justification	Uncertainty regarding the process for selection of the site as a wind farm (**Section 4.7**).	P	Broader Community	High	Medium (Likely, Minor)	Transparency of Project information and communication.	Detailed
Culture	Project establishment	Impacts to Aboriginal Cultural Heritage values, including artefacts, cultural sites, and connection to Country (**Section 4.5.1**).	C	Aboriginal Stakeholders	High	Medium (Possible, Moderate)	Inclusion of Indigenous groups and Registered Aboriginal Parties in decision-making processes. Active community engagement with Indigenous groups providing clear information of next steps of project development. Delivery of an Aboriginal Cultural Heritage Assessment.	Detailed
Community Decision-Making Way of Life	Project establishment and operations	Differing levels of social acceptance of the Project and REZ more broadly creating social division.	C & O	Broader Community Aboriginal Stakeholders Landholders Community Groups	Low	Medium (Possible, Minor)	Active community engagement throughout the lifecycle of the project, providing clear information of next steps of project development. Multiple information sessions as the community would benefit by better understanding how windfarm works and its impacts a bit more. Consideration of cumulative impacts in designing Project mitigation strategies. Collaboration with other proponents, namely, EnergyConnect re the reuse of their workers accommodation camp.	Minor

Social impact category	Project aspect	Social impact description	Duration [1]	Extent/affected parties	Perceived Stakeholder Significance	Impact Significance	Recommended project refinements/ mitigation measures	Level of assessment
Decision making	Project establishment and operations	Distributive inequity of Project benefits – energy generation and access (**Section 4.2.1**).	C & O	Broader Community Aboriginal Stakeholders Community groups	High	Medium (Likely, Minor)	Active community engagement. Investigate the development of a benefit sharing scheme to benefit affected stakeholders, and disadvantaged groups to maximise project benefits.	Detailed
Livelihoods	Construction workforce influx	Training and education opportunities through sourcing of local employment (**Section 4.2.2**).	C & O	Broader Community Local businesses and service providers	High	Medium (+) (Possible, Minor)	Develop local employment and procurement plan. Proactive support for the establishment of programs that encourage and incentivise re-skilling and upskilling of local workers to remain in the region. Social procurement and employment opportunities for women, Indigenous people and people with disabilities.	Detailed
Community Livelihoods	Project construction and operation	Changes to rural amenity, due to industrialisation of the landscape, impacting people's sense of place and community (**Section 4.4**).	C & O	Broader community Neighbouring landholders and residents	Low	Medium (Possible, Minor)	Consideration of property impacts and mechanisms to address personal issues on a case-by-case basis. Development of a Community Benefits Strategy to support community initiatives.	Minor
Community	Project establishment	Incoming construction workforce may decrease levels of community cohesion (**Section 4.4**).	C & O	Broader community Special Interest groups Neighbouring landholders and residents	Low	Medium (Possible, Minor)	Develop local employment and procurement plan. Open, transparent, and accessible communication of Project information. Assessment of housing and service provision options for the incoming workforce.	Minor

Social impact category	Project aspect	Social impact description	Duration [1]	Extent/affected parties	Perceived Stakeholder Significance	Impact Significance	Recommended project refinements/ mitigation measures	Level of assessment
Surroundings Health and Wellbeing	Production of noise and dust from construction	Increase in construction-generated noise that may cause disturbance and annoyance for host landholders (**Section 4.1.3**)	C	Host landholders	Medium	Medium (Likely, Minor)	Construction and operational management controls to be developed in consultation with landholders to ensure minimal disturbance associated with construction activities. Consider the use of water trucks nearby properties to alleviate the dust from construction activities. Open, transparent, and accessible communication of Project information.	Standard
Surroundings Health and Wellbeing	Project operations	Impacts on social amenity due to operational wind turbine noise (**Section 4.1.3**)	O	Host Landholders	Low	Medium (Possible, Minor)	Construction and operational management controls to be developed in consultation with landholders to ensure minimal disturbance associated with operational activities.	Minor
Way of Life Surroundings Livelihoods	Project establishment	Competing land use with agriculture – potential fragmentation of farming practices and/or restricted access to farming land (**Section 4.2.3**)	C & O	Host landholders	Low	Medium (Possible, Minor)	Identify and site infrastructure on properties: • where landholders have given formal consent to host project infrastructure • where property characteristics and agricultural activities are compatible with Project infrastructure. Plan and site transmission lines and access routes with sensitivity for existing land uses and landholder needs. Consider refinement to design and layout planning that allow for continued farming use of the land, in consultation with host landholders on a case-by-case basis. Construction and operational management controls to be developed in consultation with landholders to ensure maintained access across the Project Area with minimal	Minor

Social impact category	Project aspect	Social impact description	Duration [1]	Extent/affected parties	Perceived Stakeholder Significance	Impact Significance	Recommended project refinements/ mitigation measures	Level of assessment
							disturbance associated with construction activities. Open, transparent, and accessible communication of Project information. Investigate broader options for project to facilitate co-existence with agriculture.	
Health and wellbeing	Project establishment	Project development may increase stress and anxiety for community members who feel uncertain about their future and changes to their community (**Section 4.3**).	C & O	Broader Community	Low	Medium (Possible, Minor)	Active community engagement throughout the lifecycle of the project, providing clear information of next steps of project development.	Minor
Decision making	Project construction and operation	Lack of trust in decision making and engagement systems (**Section 4.1.3**).	C & O	All stakeholders	Medium	Medium (Possible, Minor)	Open, transparent, and accessible communication of Project information.	Standard
Surroundings Safety, Health & Wellbeing	Construction of turbines	Safety risks for aircraft due to height and quantity of turbines (**Section 4.1.7**).	C & O	Broader Community Businesses and Service Providers Neighbouring landholders Host landholders	Low	Medium (Possible, Minor)	Further consultation to characterise and assess specific circumstances, risk and extent.	Minor

6.0 Conclusion

This SIA Scoping Report has identified and profiled the social locality and has documented preliminary social impacts and opportunities associated with the Project. The SIA scoping report forms part of the broader Scoping Report for the Project to inform the issue of SEARs by the NSW DPE.

Phase 1 of the SIA has included the compilation of a social baseline profile for the Project, a summary of outcomes of early community and stakeholder consultation to inform the scoping of Project-related social impacts and opportunities, and preliminary social impact prediction and evaluation. The preliminary social impact evaluation has been undertaken to inform and support the refinement of Project design and plans to reduce negative project impacts and facilitate the enhancement of positive project benefits.

A detailed assessment of social impacts is required as part of the EIS and should be informed by an ongoing process of community consultation. As part of the EIS, future stages of the SIA for this Project will include a comprehensive prediction and assessment of social impacts and development of relevant strategies to mitigate the negative and enhance the positive impacts associated with the Project. Further SIA and technical environmental impact studies will address perceptions of impacts raised by key stakeholders during this phase.

Subsequent phases of the SIA program will involve the following key activities:

- An update of the baseline social profile so that any further baseline data relevant to the social impacts identified is obtained.
- Further validation of the area of social influence and identification of affected communities and vulnerable groups.
- Provision of feedback to Wentworth LGA and Mildura community members and key stakeholders on the outcomes of the issues raised in the scoping phase and communication of the Project's SEARs (once issued), including an outline of the next steps in the assessment process and further opportunities for community input.
- Update of the Project CSEP and further engagement with community members and other key stakeholders on key social impact areas as noted above. This will involve feedback on the outcomes of EIS technical studies and will provide opportunities for input to the development of appropriate management and enhancement measures to address social impacts and residual effects.
- A comprehensive assessment and evaluation of social impacts against existing baseline conditions.

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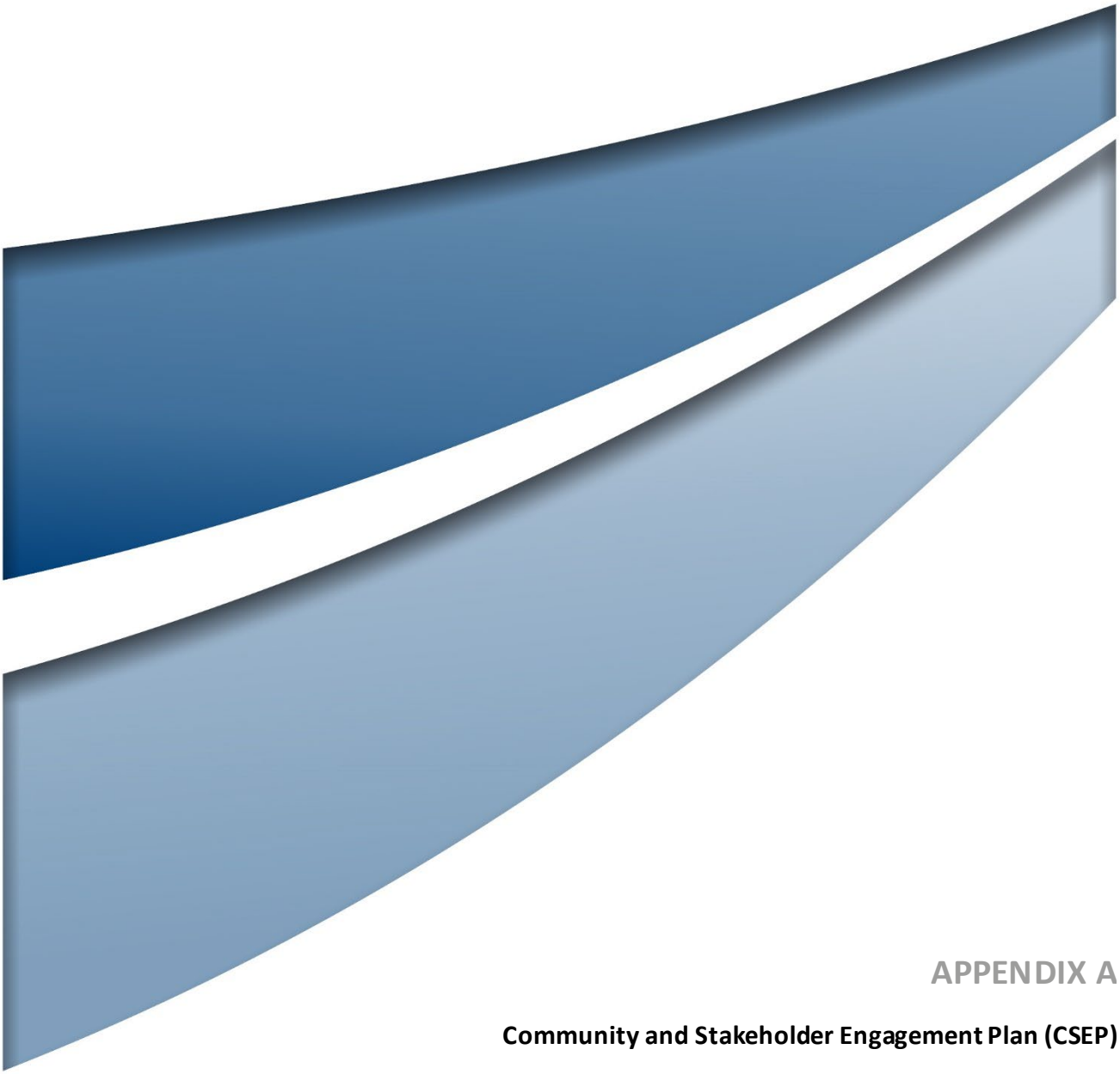

APPENDIX A

Community and Stakeholder Engagement Plan (CSEP)

Mallee Wind Farm
Community and Stakeholder Engagement Plan

WE ACKNOWLEDGE THE TRADITIONAL CUSTODIANS OF THE LAND ON WHICH THIS PROJECT IS LOCATED, THE BARKANDJI PEOPLE, AND RECOGNISE THEIR CONTINUING CONNECTION TO LAND, WATER AND COMMUNITY.

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Document control

Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
V01	Julian Kasby	11 November 2022	Julian Kasby	11 November 2022

Table of Contents

Abbreviations

Abbreviation	Definition
ABS	Australian Bureau of Statistics
AEMO	Australian Energy Market Operator
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
BESS	Battery Energy Storage System
CEC	Clean Energy Council
CER	Clean Energy Regulator
CO_2	Carbon dioxide
CSEP	Community and Stakeholder Engagement Plan
CPI	Consumer price index
DPE, Department	NSW Department of Planning & Environment
EIS	Environmental impact statement
EMFs	Electric and Magnetic Fields
EPA	NSW Environmental Protection Authority
FAQs	Frequently Asked Questions
FTE	Full Time Equivalent
GW	Giga Watt
IAP2	International Association for Public Participation
IPC	Independent Planning Commission
km	Kilometre(s)
kV	Kilovolt
LALC	Local Aboriginal Land Council
LGA	Local Government Area
MP	Member of Parliament
MW	Megawatt
NBN	National Broadband Network
NEM	National Electricity Market
NSW	New South Wales
PCU	Power conditioning unit
REZ	Renewable Energy Zone
RtS	Response to Submissions
SEARs	Secretary's Environmental Assessment Requirements
SIA	Social Impact Assessment
SSD	State Significant Development
SW REZ	South-West Renewable Energy Zone
VIC	Victoria
WTG	Wind turbine generator

Introduction

Purpose

This document entails a Community and Stakeholder Engagement Plan (CSEP) that outlines the methods and tools for effective engagement with stakeholders throughout the planning, development, construction, operation and decommissioning of the proposed Mallee Wind Farm (or "the **Project**"). This is a live document which is to be updated and revised throughout the life of the Project. Spark Renewables Pty Limited ("**Spark Renewables**" or "the **Proponent**") is the proponent for the Project.

Engagement Objectives

Spark Renewables aims to obtain and maintaining community acceptance (the social licence to operate) of the Project by ongoing community engagement and achieving objectives of this CSEP:

- Identify effective methods to inform the community of Project information and updates, which foster trust and build positive long-term relationships with community stakeholders.
- Ensure delivery of an honest, innovative, flexible and transparent community engagement process.
- Identify ways to facilitate engagement and collaborate with relevant community organisations, including for input into the social and environmental assessment of the Project and ongoing project design and planning including the development of community benefit sharing programs.
- Ensure the broader community and stakeholders are kept informed about benefits, potential impacts, and activities of the Project.
- Identify effective avenues for community members to communicate any concerns and provide valuable feedback with Project personnel.
- Ensure means of community involvement are known and distributed consistently.
- Ensure the commitments made to the community during the Project development stage are being met.

These objectives are in line with the NSW Department's *Undertaking Engagement – Guidance for State Significant Projects (2021)* community participation objectives for engaging on State Significant Development projects (refer to Figure 1).

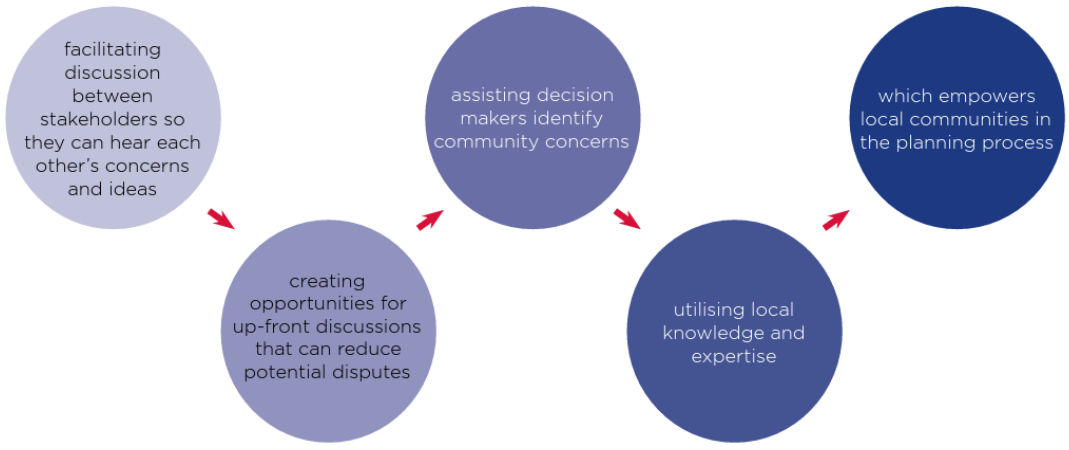


Figure 1 Community Participation Objectives (Community Participation Plan (DPE, 2019)

Governance

The Project is considered a State Significant Development and will require development consent under the NSW Environmental Planning and Assessment Act (EP&A Act). The development application is to be accompanied by a detailed

Environmental Impact Statement (EIS), which will include comprehensive assessments identifying the impacts of the Project and how to best manage these impacts.

A detailed Social Impact Assessment (SIA) will also be prepared as part of the EIS. The SIA will include a comprehensive community engagement program, which is incorporated within this CSEP, and be prepared following the NSW Department of Planning and Environment (DPE or 'the Department') *Social Impact Assessment Guideline for State Significant Projects (2021)* and 'Undertaking Engagement – Guidance for State Significant Projects' (2021). This guideline notes that respectful, inclusive, and meaningful engagement is a fundamental part of project planning and development. Engagement with affected communities and stakeholders provides first-hand insight into what people value and how they expect a project to affect them.

The Project may also require approval under the federal Environment Protection Biodiversity Conservation Act 1999 (EPBC Act).

The community will also have formal opportunities to be engaged on the project in line with the Department's Community Participation Plan (2019).

Conduct

Spark Renewables is committed to engaging respectfully and transparently with the community and stakeholders throughout the lifetime of the Project. Spark Renewables is committed to being sensitive to environmental, social and cultural values and to make a positive benefit-sharing contribution to the regions in which it operates.

As a member of the industry peak body, Clean Energy Council (CEC), Spark Renewables is signatory to the voluntary set of commitments outlined in the Community Engagement Best Practice Charter for Renewable Energy Developments (CEC, 2018). When developing, constructing and operating projects, Spark Renewables shall:

1. 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. Provide timely information and be accessible and responsive in addressing the local community's feedback and concerns throughout the life of the project.
3. Be sensitive to areas of high biodiversity, cultural and landscape value in the design and operation of projects.
4. Minimise the impacts on highly productive agricultural land and explore opportunities to integrate agricultural production.
5. Consult the community on the potential visual, noise, traffic and other impacts of the project, and on the mitigation options.
6. Support the local economy by providing local employment, training and procurement opportunities.
7. Offer communities the opportunity to share in the benefits of the Project, and consult them on the options available, including the relevant governance arrangements.
8. Commit to using the Project to support educational and tourism opportunities where appropriate.
9. 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 recycle waste materials where feasible, and commit to responsible decommissioning or refurbishment/repowering of the site at the end of the Project's life.

Industry practice

The document follows the Clean Energy Council's *Community Engagement Guideline (2018)*, which includes the engagement framework based on the public participation spectrum of the International Association for Public Participation (IAP2).

The spectrum outlines activities beyond informing and consultation that assist with achieving community support. The spectrum is used to communicate performance of community engagement, and shall inform the level of participation that stakeholders can have in the Project. The greater the impact of the Project on a stakeholder, the greater their input into the decision-making participation should be. There are five levels of participation that vary based on the stakeholder's involvement in the Project, where individuals or representatives of organisations can:

Be informed – they have access to the information about the Project and potential impacts on them.

Be consulted – they can provide suggestions and feedback about the Project.

Be involved – their material concerns relating to the Project are directly addressed in risk mitigation plan.

Collaborate – their advice and suggested alternatives are incorporated in the Project to the maximum extent possible.

Be empowered – they make the final decision that will be implemented in the Project.

Spark Renewables will strive to implement a diverse range of engagement activities that involve multiple levels of community and stakeholder participation.

Planning Process

There are eight phases within the planning process. Community consultation outcomes during this process will inform the ongoing project design. Specifically, during preparation of the Scoping Report and Social Impact Assessment, the preparation and exhibition of the EIS and, if approved, during construction and operation of the Project.

Figure 2 Planning and assessment process for state significant development in NSW

Roles and responsibilities

Spark Renewables has ultimate responsibility and accountability to ensure that the Project is developed, designed, built, operated, upgraded and decommissioned in accordance with the Project's Development Consent. Spark Renewables has engaged Umwelt Environmental and Social Consultants (or "**Umwelt**") to develop the EIS and SIA for the project, and thus, Umwelt also have responsibilities related to the implementation of the stakeholder engagement program in line with this CSEP.

Table 1 Key roles related to communication and stakeholder engagement

Organisation	Role	Responsibilities and authorities
Spark Renewables	Senior Development Manager	• Overall management of community engagement and public relations during development. • Face-to-face consultation, meetings, phone calls and correspondence with community members and stakeholders. • Lead public information drop-in sessions. • Ensuring that community raised issues are responded to quickly and mitigated where possible. • Local media interviews.
	Development Manager	• Assistance with research and management of stakeholder database.
	Senior Development Engineer	• Provide figures and maps to assist with stakeholder communication.
	Communications Manager	• Maintenance and updating of the Project website. • Prepare and distribute public information materials (e.g. newsletters/information sheet and media releases).
	Head of Development	• Provide oversight to community engagement activities.
	Head of Legal and Community	• Provide community engagement support and compliance oversight on engagement activities.
	Head of Renewables	• Overall accountability for obtaining and maintaining the social licence to operate, and reputation. • High profile/national media interviews.
Environmental Consultants (Umwelt)	Environmental assessment	• Provide technical information to assist Spark Renewables to prepare communication collateral, project updates, respond to stakeholder enquiries and review key messages as appropriate to ensure technical requirements are met. • Assistance with figures and maps to assist with stakeholder communication and engagement.
Social Impact Consultants (Umwelt)	Social impact assessment and associated engagement	• Assist Spark Renewables with the preparation and delivery of engagement materials • Collaborate with Spark Renewables to deliver targeted engagement to support the development and delivery of a social impact assessment and associated inputs.

Project overview

Key facts

Key facts of the Project as at November 2022 are provided below (**Table 2**).

Table 2 Project key facts summary (November 2022)

Proponent	Spark Renewables is a developer, and long-term owner and operator of renewable energy assets. Our operational portfolio includes the 100 MW Bomen Solar Farm near Wagga Wagga, which commenced operations in 2020, alongside a diversified portfolio of wind, solar and storage developments, in excess of 3 gigawatts (GW). Spark Renewables is owned by the Spark Infrastructure Group, an owner of critical energy assets, including generation, transmission, and distribution infrastructure across Australia.
Project generation capacity	Up to 1,000 megawatts (MW) with battery storage to provide firming.
Annual power	Up to 450,000 houses powered annually[1] and offsetting up to 2 million tonnes of CO_2 emissions annually[2].
Grid connection	The Project will connect to the National Electricity Market via transmission infrastructure upgraded as part of the recently approved development 'Project Energy Connect', i.e. the 330 kilovolt (kV) Buronga Substation (going through an expansion and upgrade as part of EnergyConnect) connecting into the EnergyConnect transmission line.
Community	Establishment of a community benefit sharing program to support the local community.
Contact & receiving information	Project website www.malleewindfarm.com Project email info@malleewindfarm.com Phone 1300 271 419

The Mallee Wind Farm is a proposed renewable energy project, located approximately 16 km to the north-east of Buronga in the Wentworth Shire Local Government Area of NSW (refer to **Error! Reference source not found.2Error! Reference source not found.**). The project site is within the South-West Renewable Energy Zone (REZ) in New South Wales.

The proposed Project site has been chosen as it has a number of highly favourable factors, including a strong wind resource, good location within the South-West REZ, and the very low density of housing within 10 km.

The proposed site features a flat terrain, meaning that complex earthworks would be avoided during construction, and the site can continue to be used for cropping purposes, with turbines taking up less than two percent of the proposed project site.

The Project is expected to offer one of the lowest build costs per megawatt in NSW, which is vital to the provision of abundant, reliable and affordable renewable energy.

[1] Based on household consumption of 6700kWh/year.
[2] National Greenhouse Accounts Factors (DCCEEW, 2021).

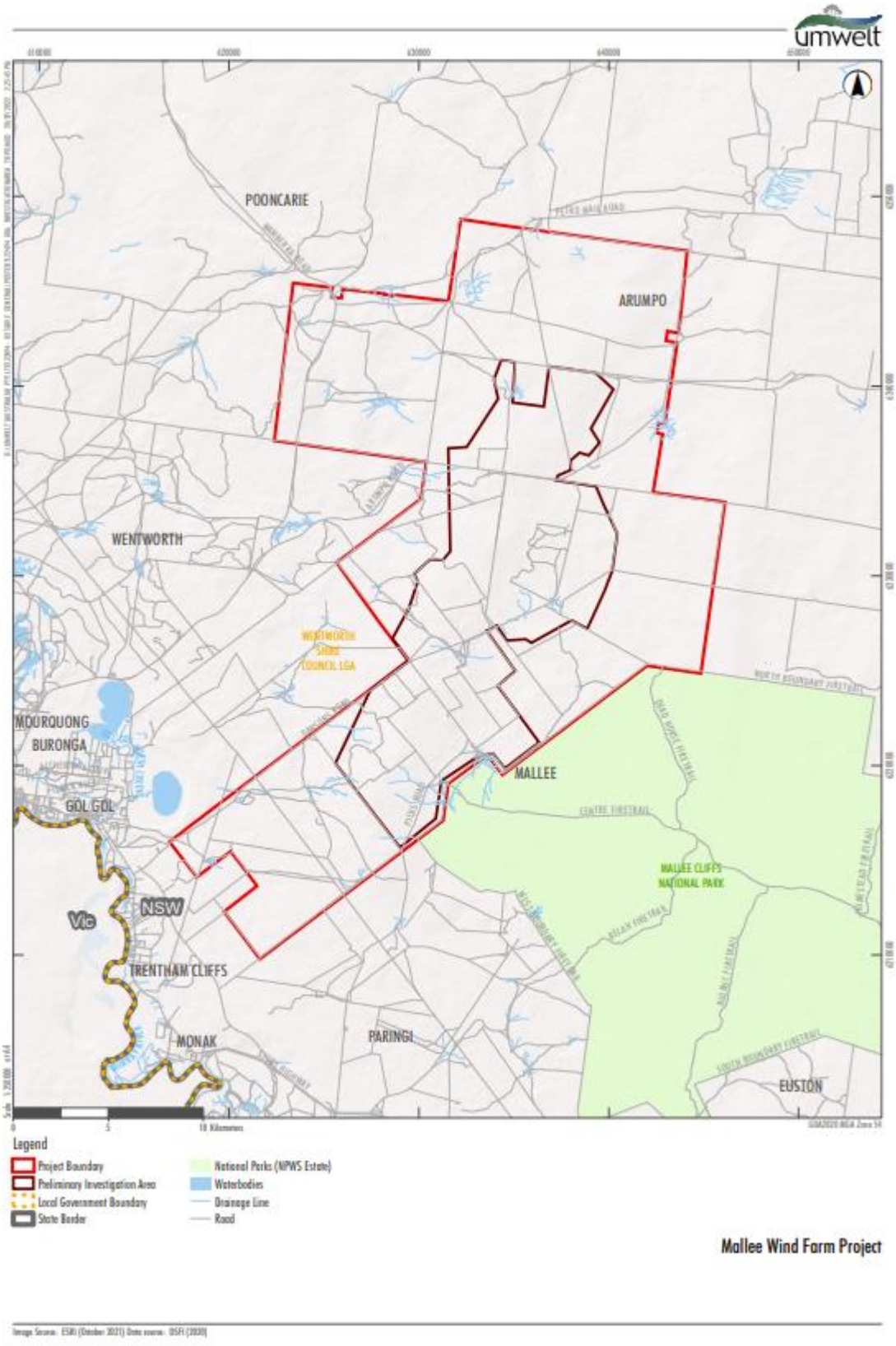


Figure 3 The Project site

The Project is strategically located within the SW REZ (shown below in **Error! Reference source not found.**3) to take advantage of the planned upgrades as part of 'EnergyConnect Project' to the electricity transmission network. The Project would be well-positioned to provide additional network services within the SW REZ using two batteries, if Spark Renewables' Dinawan Energy Hub located at the other side of the SW REZ commences operations.

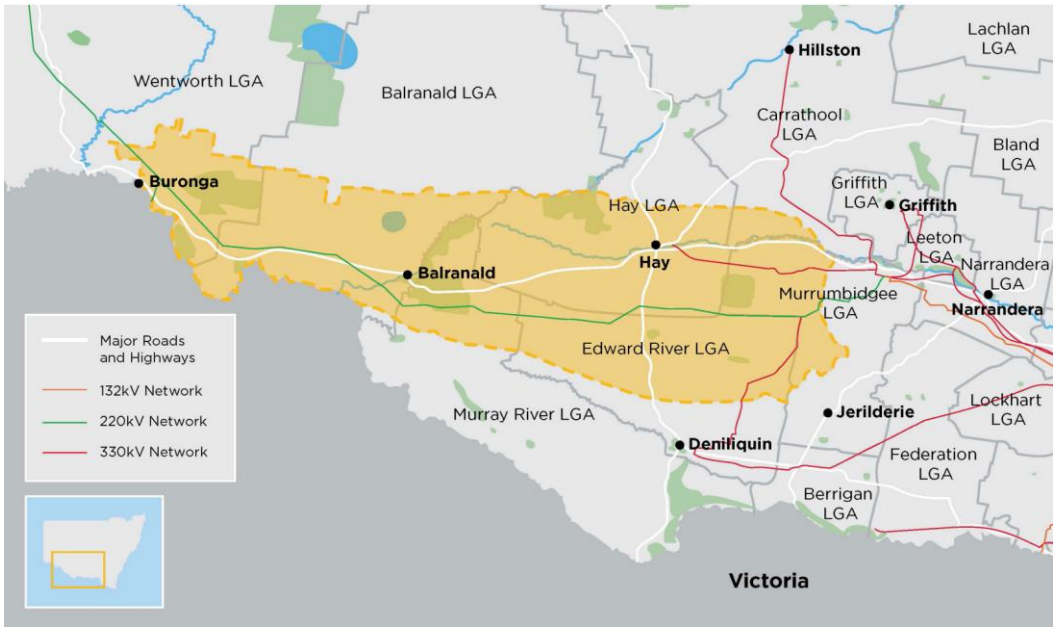


Figure 4 Indicative location of South-West Renewable Energy Zone (EnergyCo, August 2022)

Community Context

The site sits within the boundaries of the Dareton Local Aboriginal Land Council (LALC), and the Traditional Owners of the land are the Barkindji People and is on land that is subject to a Native Title Determination by the Barkandji Traditional Owners (Tribunal No. NCD2015/001) that extinguished Native Title.

The Project site and proximal area is predominantly rural with the nearest town being Buronga, NSW, which borders the state of Victoria within Wentworth Shire. The proposal site is located off Arumpo Road approximately 25 km north-east of the city of Mildura. The proposed Project site borders the Mallee Cliffs National Park and is in proximity to the Murray River.

Wentworth Shire LGA is situated within the Riverina region of NSW. The LGA has a population of 7,453 and covers an area of 26,269km^2 (ABS, 2021). The population density of the LGA is 2 residents per km^2 (Office of Local Government, 2022), and has a higher-than-average median age (43). The southern boundary of the LGA has the greatest population density in the townships of Buronga, Wentworth, Dareton and Gol Gol (Wentworth Shire Council, 2017).

Buronga's population is 1,252 people, with the community largely based on viticulture, horticulture and light industry (Wentworth Shire Council, n.d.). Wentworth Shire Council has a goal of working to enhance the natural and physical assets of the LGA by planning for, and developing the right assets and infrastructure, as well climate change (Wentworth Shire Council, 2017).

Bordering Buronga to the south of the Murray River is Mildura. Located in Victoria, and with a population of 34,565, Mildura is the closest regional city to the Project site, approximately 20 minutes to the south. Mildura is a major regional and agricultural service centre of the Murray River catchment, with the LGA supplying a large proportion of Australia's grapes, citrus fruits and olives (Aussie Towns, 2021). Mildura is an important hub for the region, providing delivery transport,

warehousing, health, education and professional services to NSW and South Australia (Regional Development Victoria, 2021).

To inform community engagement planning, a number of key community characteristics and subsequent considerations relevant to the Mildura and Wentworth LGAs have been identified in Table 3.

Table 3 List of stakeholders and their issue, interest or concerns

Characteristics Wentworth LGA (NSW)	Characteristics Mildura LGA (VIC)	Consideration for engagement
Median age 43	Median age 40	A higher than state average median age suggests more personal face-to-face mechanisms may be more suitable to facilitate engagement e.g., telephone surveys, personal meetings. Likely to have an interest in the Project.
Lower rates of internet access than State average	Lower rates of internet access than State average	Communities with low rates of internet access require a diverse range of offline engagement methods, including media releases, radio, newspapers, over the phone, and in person engagement. Phone calls are more suitable than emails for engagement.
72.7% of housing owned outright/with mortgage compared to 64.0% in NSW	65.4% of housing owned outright/with mortgage	Landholders are likely to be more invested in outcomes of the Project/concerned about the impacts on their property and livelihoods
5.2% of households speak a language other than English in Wentworth, compared to 29.5% across NSW	13.7% of households speak a language other than English in Mildura	Low proportion of Culturally and Linguistically Diverse communities suggests it is unlikely to require translation of materials into other languages.
The site is located near or within the newly identified South-West REZ		Given the significant increase in proposed projects in the REZ, there is a chance of consultation fatigue, as well as high levels of interest in renewable energy development projects.
Higher rates of volunteering than the State average	Higher rates of volunteering than the State average	Volunteering rates are used as an indicator of how well connected and cohesive a community is. High rates suggest that there may be a fast spread of information throughout the community and investment in the sense of community in the local area.
58.6% of residents in Wentworth lived in the same residential address for the last 5 years	54.1% of residents in Mildura lived in the same residential address for the last 5 years	Low household mobility rates are indicators of how established and invested people are in their local community.
Wentworth has high unemployment, 5.7% in March 2022 (compared to the State average of 4.1%). In 2016, the largest industries of employment in Wentworth were Agriculture, Forestry and Fishing (20.0%), Health Care and Social Assistance (9.9%), and Retail Trade (8.1%).	Mildura has low unemployment, 3.6% in March 2022 (compared to the State average of 4.3%). In 2016, the largest industries of employment in Mildura were Health Care and Social Assistance (13.2%), Retail Trade (12.3%) and Agriculture, Forestry and Fishing (10.8%)	Opportunities for the Project to provide employment and/or contractor/supplier opportunities may be limited due to the existing skills profile and a limited labour pool. Collaboration with local Council, employment services and business groups will be key to maximise opportunities.

Potential concerns

In recent times, proposed renewable energy projects across NSW have had diverse responses from local communities in relation to their perceived environmental and social impacts. Following a preliminary review of submission reports and other publicly available documentation on nearby renewable energy projects within the region, we understand the following key local issues to be of importance in the planning and potential development of the Project:

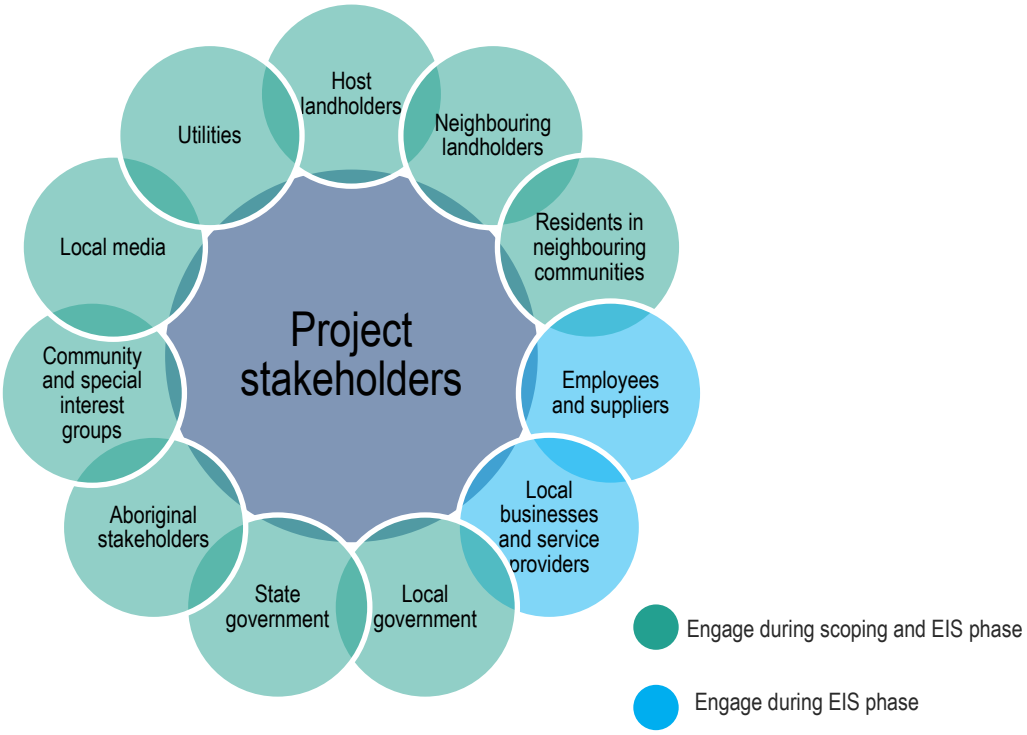
- Concern relating to the number of concurrent proposed projects in response to the designation of the SW REZ and resulting cumulative impacts on service provision and township infrastructure, and sense of community from incoming construction workforces.
- Visual impact on social amenity due to view lines.
- Land use conflict due to renewables development in productive agricultural areas, with land primarily used for grazing.
- A perception that the economic benefit of the project won't be experienced locally.
- Perceived public health and safety concerns of neighbouring residents associated with Electric and Magnetic Fields (EMFs), radiation, hazardous materials, sleep disturbance from noise impacts and heat generation and flow on effects on livestock e.g., cattle and sheep.
- Concern regarding the management of project land and the potential spread of noxious weeds to surrounding properties.
- Interaction with the Mallee Cliffs National Park and impacts on access, visual amenity, ecosystems, and wildlife.

There are a number of key aspects of the Project that would benefit from the input from community members and key stakeholders, namely:

- Preferred methods and tools for ongoing engagement with the community and key stakeholders
- Identification of potential Project impacts to inform investigations for the EIS and SIA
- Suggestions for mitigation and enhancement measures to manage the Project's potential impacts
- Design of the wind farm and BESS
- Community and stakeholder benefit-sharing programs and initiatives.

Stakeholders

Spark Renewables will consult widely as part of the planning and EIS/SIA for the Project, and ongoing throughout the construction, operation and decommissioning of the Project. Stakeholder groups include but are not limited to:



The contact details of individual stakeholders and organisations will be kept securely by Spark Renewables in a database (Simply Stakeholders).

Engagement tools and methods

A range of online, in-person and offline tools and methods may be used to communicate with and engage the community and other stakeholders during the Project. Face-to-face activities will be subject to any public health orders in effect at the scheduled time for delivery. Tools and methods are open to suggestion by the community and other stakeholders and may be modified in response to stakeholder feedback.

All engagement undertaken will be stored in Simply Stakeholders, an online secure platform to record engagement with Project stakeholders and keep track of commitments made to or suggestions or concerns raised.

Table 4 Tools for engagement and indicative participation level

Tool/Method	Detail	Participation level
Advertising	Advertising in local newspapers and radio stations to advise of upcoming consultation opportunities and provide Project updates.	Inform
Briefings	Formal letters, phone calls, and face-to-face or virtual meetings with key stakeholders including MPs, councillors and council staff to provide updates on the Project.	Inform
Community contact cards	Business card with project contact details provided to specialists and contractors to give to community stakeholders if approached.	Inform
Community Newsletters	Project information distributed by email or in hard copy to registered stakeholders.	Inform
Drop-in sessions	Multi-hour time periods when stakeholders can drop in to speak to the Project team and experts, view documents and plans and ask questions.	Inform Consult

Tool/Method	Detail	Participation level
Email inbox	A dedicated Project email address (info@malleewindfarm.com) for managing community and stakeholder correspondence.	Inform
Frequently Asked Questions (FAQs)	A generalised brochure (both online, sent to emails, and handed out at information sessions) responding to common questions from the community regarding project impacts, benefits, mitigation efforts, and technology.	Inform
Letterbox drops or unaddressed mail	Unaddressed collateral containing information about the Project delivered by the Project team or Australia Post.	Inform
Letters	Addressed mail containing information, clarification, response or request to a particular household, business or individual.	Inform
Media releases/statements	Proactive or responsive media announcements distributed to the media outlets and other key stakeholders to provide updates on the development application process, reaching Project milestones, address concerns, and clarify information.	Inform
Meetings	One-on-one or small group meetings to discuss Project issues and concerns in more detail. Meetings and discussions will be recorded in Simply Stakeholders.	Inform Consult Involve Collaborate
Phone line	A dedicated number for stakeholders to contact Spark Renewables. The number is 1300 271 419.	Inform Consult
Photography	Photos, composites, concept and artist imagery can help illustrate processes and make technical information more accessible.	Inform
Pop-up stalls	An engagement booth/stall set up at community events and centres to engage and consult with stakeholders.	Inform Consult
Posters	Printed material visualising Project information such as location of the proposed site, background information of the proponent, technology overview, approximate timeline, steps in the planning process, milestones, potential studies required to address impacts to the environment, construction activities, benefit-sharing options and mitigation of impacts on the community.	Inform
Presentation	A presentation about the Project delivered to a group of interested persons, club or committee on request or by invitation, provided in digital and written form.	Inform
Project overview	A high-level summary of the Project that includes the Project scope, location (including regional and locality maps), the strategic context and rationale for the Project, the Project's potential impacts and benefits, contact information for the Project team and information on the consultation process.	Inform
Signage	Identification, directional, informational, and regulatory signs, boards and banners used to inform and direct people around the Project site.	Inform
Surveys	Online or offline surveys to obtain input and feedback on Project decision-making.	Consult
Website	A website (www.malleewindfarm.com) dedicated to the Project including a description and overview of the Project, development application process, company information, responses to key concerns, risk management plans, maps, media releases and contact information.	Inform
Workshops	A structured method working with groups of stakeholders or key stakeholders to identify and suggest solutions for Project issues and concerns.	Inform Consult Involve

Delivery plans

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 in line with the SIA Guideline (the Department, 2021) and Community Engagement guideline (the Department, 2021). However, as the Project evolves, and based on stakeholder and community feedback, the delivery plans for the Project and/or stages may be updated. Therefore, all dates in the delivery plans are indicative and subject to change. .

Table 5 Delivery plans during phases of the planning process

Phase	Approach
Scoping phase: *Delivery plan for community engagement during the scoping phase*	Spark Renewables understands the vital role the Department plays in the SSD planning and approvals process and understands, that as part of the Application for SEARs it will: • consult with relevant government agencies and councils when preparing projects • publish the SEARs on the major projects website and notify the relevant councils • publish the SEARs on the major projects website (once issued).
EIS development phase: *Delivery plan from receipt of SEARs to lodgement of the EIS*	Engagement activities during the development of the EIS have been designed in line with the requirements in the SIA Guideline (the Department, 2021) and Community Engagement Guideline (the Department, 2021). Issues raised during engagement will inform the social and environmental assessment and the preparation of the EIS. Spark Renewables will continue with engagement with the community, through various methods and collection of feedback, to understand people's perceived impacts, to appropriately manage identified social impacts, and to develop an appropriate community benefit-sharing program suitable to the local community.
EIS exhibition phase: *Delivery plan from receipt of SEARs to lodgement of the EIS*	This engagement would build on the communication and stakeholder relationships formed during the Scoping and EIS development phases and would continue to provide information about the Project and seek feedback from the community and stakeholders on the impacts and proposed mitigation measures in the EIS. The EIS will be placed on public exhibition for a period of at least 28 days, or as per any requirements outlined in the SEARs, and may be extended on request and with the agreement of Spark Renewables. During the exhibition period, any stakeholder may make a written submission on the EIS and lodge this with the Department through the NSW Government Major Projects website. The formal feedback process in this phase will be managed by the Department in line with their Community Participation Plan (2019).
Engagement following exhibition of the EIS	Following the exhibition period, Spark Renewables will respond to submissions received during exhibition of the EIS. Once the EIS has been assessed and a decision determined for the Project, Spark Renewables will seek clarification from the Department about any aspects of the approval that are unclear. Post approval, Spark will continue to engage with the community, relevant council and government agencies during the pre-construction, construction, operation and decommissioning of the Project (and/or rehabilitation of the site) in line with the conditions of approval. Spark Renewables would develop and lead a detailed construction community engagement program that would ensure it responds to community and stakeholder expectations on ongoing involvement. Once the Project is operational, Spark Renewables will continue to maintain a high level of engagement with the community, and regular updates to the Project website and in local media. Spark Renewables will continue to be the single point of contact for the Project through all stages of the Project's development.

Timeline

It is anticipated that the EIS and SIA for the project will be lodged in 2023 and, pending project approval, construction would commence in 2024 (refer to Figure 3).

Figure 3 Indicative milestones for the Project

Communication management protocols

Communication management system

Spark Renewables will use Simply Stakeholders to securely record details of all contact and correspondence with stakeholders and the community. Simply Stakeholders will be updated to:

- Record all contacts with stakeholders and the community, and the actions resulting from these contacts.
- Track the progress and closeout of enquiries and complaints.
- Identify trending issues and opportunities.
- Enable the implementation of mitigation strategies.
- Maintain accurate contact details of stakeholders.
- Prepare regular reports for Spark Renewables on communication and engagement activities.

Complaints and enquiries

An enquiry is defined as a question or request for information. A complaint is defined as a statement that something is unsatisfactory or unacceptable. Complaints and enquiries may be received via phone, email, dedicated social media channels, post or in person.

Spark Renewables will acknowledge and/or respond to complaints about the Project:

- Within a reasonable timeframe from the time of a complaint, aiming for no later than end of the following business day.
- Record the complaint, all contact with the complainant and its resolution in Simply Stakeholders.

Spark Renewables will acknowledge and/or respond to enquiries about the Project:

- Within a reasonable timeframe from the time of an enquiry, aiming for no later than withing three business days.
- Provide a response to the enquiry, depending on the input required, within 5 business days for emails and phone calls or ten business days for letters.
- Record the enquiry, all contact with the enquirer and its resolution in Simply Stakeholders.

Reporting, evaluation and monitoring

Reporting

Progress against this CSEP will be reported to Spark Renewables, the Department and the community and other stakeholders via the Spark Renewables website, regular electronic and postal Project updates (newsletters and notifications), in the Scoping Report, in the SIA and EIS and by request.

Monitoring

Regular monitoring of engagement and communication activities ensures the delivery plan is helping to deliver on the engagement outcomes.

Monitoring can take many forms and includes pulse checks and environmental scanning to track community and stakeholder sentiment. This can be by way of media and social media monitoring, feedback received through formal and informal channels, feedback received through the establishment of a Community Consultative Committee (CCC) and regular analysis of complaints and enquiries received.

Evaluation

Community and other stakeholder engagement will be evaluated against the engagement outcomes identified during Scoping stage and referenced in the SEARs. Spark Renewables shall identify measures and evidence of engagement success, through implementation of techniques to meet the engagement outcomes. The evaluation shall be reported similar to the example table below.

Table 12 Example of evaluation methodology

Engagement outcome	Method used to achieve the outcome	Results to measure the outcome	Evaluating the success of the outcome
Work with the community and other stakeholders to understand their values and opinions of the Project and the opportunities to reflect these values and opinions in decision-making.	Community drop-in sessions to identify the values and opinions of the community and other stakeholders and the perceived impacts of the Project on these. Phone or online surveys to establish a baseline for awareness, sentiment and levels of acceptance towards the Project and renewables in general.	Number of people attending drop-in sessions. Number of people surveyed. People who attended or surveyed the drop-in sessions identified their values and opinions about the Project.	Responses to address the Project's impact on the values and opinions of the community can be determined (e.g. the community has concerns about visual amenity). Mitigation measures to address the Project's impact on the values and opinions of the community and other stakeholders can be finalised (e.g. landscaping options are negotiated with the community). Future engagement to address issues identified can be planned (e.g. complaints protocol established). Ongoing engagement to provide updates on decision-making can be established (e.g. regular project updates and photography to show change over time).

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Appendix A: Engagement throughout the Planning Process

Scoping Phase: Delivery plan from Project announcement to lodgement of Scoping Report

Activity	Targeted stakeholder group	Objectives	Timing	Tasks	Responsibility
Meeting	the Department	Pre-scoping meeting with the Department to present the Project timeline	Dec 2021	Organise and attend meeting with the Department	Spark Renewables
Briefing letters	Council State MP Federal MP NSW Energy Minister AEMO CEO	To provide a Project overview, process and timeline.	Aug 2022	Develop and distribute briefing letters	Spark Renewables
Meetings, emails, phone calls	Host Landholders	To negotiate land access agreements for the Project site and gain feedback to inform the SIA.	Ongoing	Identify, undertake and record landholder engagement	Spark Renewables
Project website	All	To provide a comprehensive online portal for Spark Renewables and its projects. The website will include information and channels to interact with community stakeholders. The website will include FAQs, maps, plans, documents, CCC minutes, videos, photos and schematics, consultation events and announcements, a Project timeline and information about Spark Renewables.	Aug 2022	Review website materials and content	Umwelt
			Aug 2022	Develop and update website	Spark Renewables
Briefing meetings	Wentworth Shire Council staff Mildura Council staff Councillors State MP Federal MP Councillors	To seek input into the Scoping Report, specifically the identification of perceived Project impacts.	Aug 2022	Send invitation to stakeholders regarding a briefing meeting	Spark Renewables
			Aug 2022	Organise and attend briefing meeting	Umwelt/Spark Renewables
Information sheet/ newsletter	Broader community	To provide high level project and proponent information, introducing the broader community to Spark Renewables and the Project. The information	Jul-Aug 2022	Develop information sheet/newsletter	Umwelt/Spark Renewables

		sheet/newsletter will also outline upcoming engagement and communication channels.	Aug 2022	Organise printing and distribution	Umwelt
Community survey	Broader community	To provide opportunity for the community to provide feedback, for Umwelt to understand project acceptance and scope social impacts.	July 2022	Review draft community survey	Umwelt
			Aug 2022	Finalise and upload community survey	Spark Renewables
Key Stakeholder interviews	Community groups Environmental groups Service providers Business representatives Aboriginal groups Council	Gather information to inform the scoping and assessment of social impacts. It will also provide the SIA team with detailed and specific information about the needs, desires and impacts on stakeholders related to the Project.	July 2022	Develop interview guides	Umwelt
			Aug 2022	Review interview guides	Spark Renewables
			Aug 2022	Set up key stakeholder interviews and conduct	Umwelt/Spark Renewables
Newspaper/ Radio advertising/ Media interviews	Broader community	To inform the community about the Project and upcoming community events	Aug 2022	Develop and organise newspaper and radio advertising Organise and prepare for media interview	Umwelt/Spark Renewables
Information session	Broader community	Face-to-face engagement with the community, providing opportunity for community members to meet the project team and ask questions relating to the Project and/or how they may be impacted or benefited. Opportunity for Umwelt to take detailed notes to better inform the team's understanding of social impacts and benefits.	Aug 2022	Organise and advertise info session	Umwelt
			Aug 2022	Attend information session	Umwelt/Spark Renewables
Scoping Meeting and site tour, if requested	the Department Referral agencies	To provide an opportunity for agencies to tour the site and speak to the Project team to help them provide input into the SEARs.	If requested	Organise and attend scoping meeting	Spark Renewables

Development of the EIS: delivery plan from receipt of SEARs to lodgement of the EIS

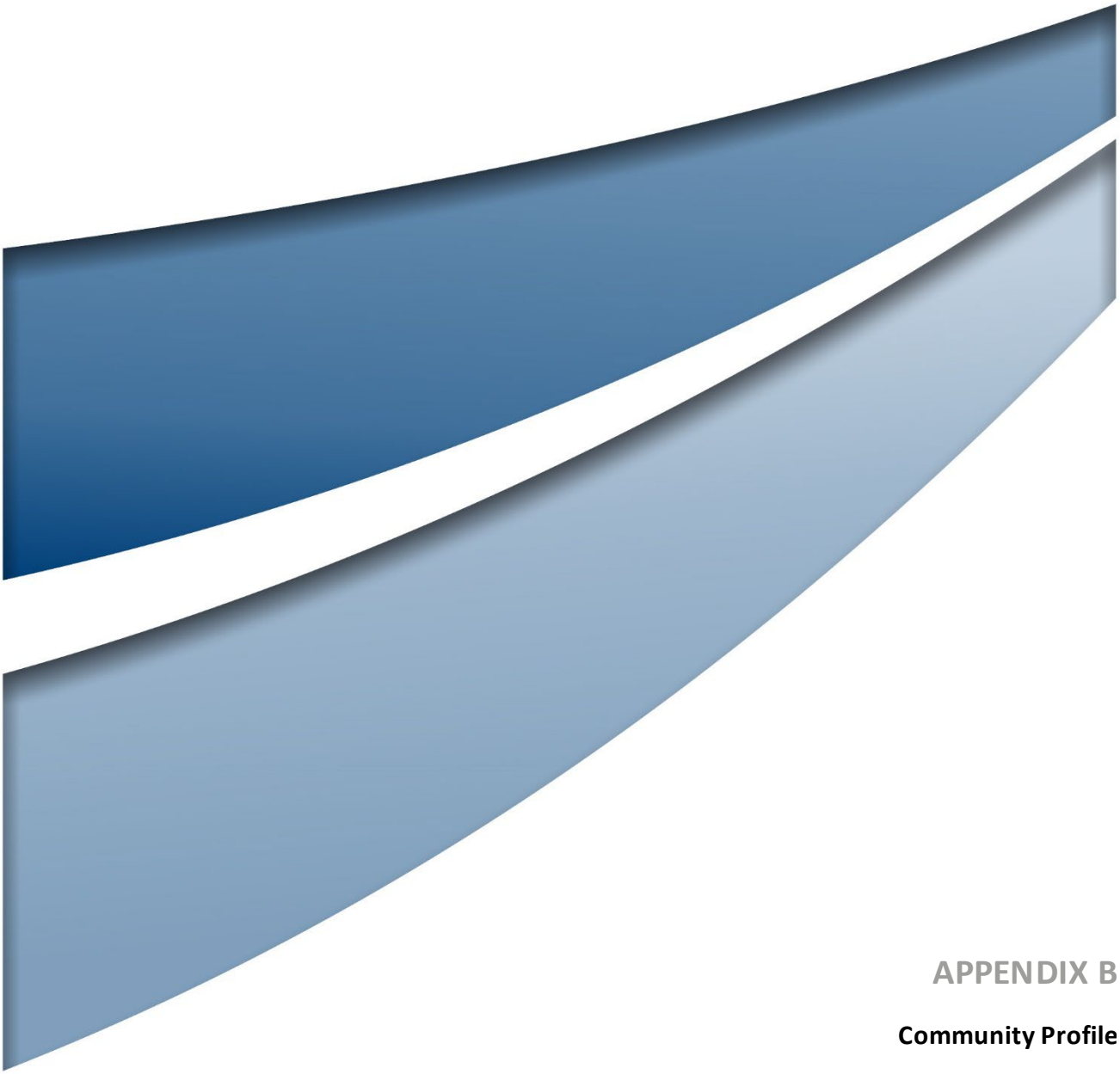
Activity	Targeted stakeholder group	Objectives	Timing	Tasks	Responsibility
2nd community newsletter / information sheet	Broader Community	To provide a Project update and share notes and feedback received from community received during the scoping phase.	Q1 2023	Develop information sheet/newsletter Organise printing and distribution	Umwelt/Spark Renewables
Briefing letters	Wentworth Shire Council Mildura Council State MP Federal MP Community and interest groups	To advise key stakeholders about the SEARs, upcoming consultation opportunities and offer a meeting	Q1 2023	Develop and distribute briefing letters	Spark Renewables
Meetings, emails, phone calls	Host Landholders	To provide continued engagement to landholders within and adjacent to the Project site. Gather insights for the SIA regarding potential project impacts and mitigation/ enhancement measures.	Q1 2023	Identify, undertake and record landholder engagement	Spark Renewables
Project website	All	Update project website to include information about the SEARs, EIS process, next steps and upcoming community engagement. The website will include FAQs, maps, plans, documents, CCC minutes, videos, photos and schematics.	Q1 2023	Update website	Umwelt/Spark Renewables
Briefing meetings	Wentworth Shire Council staff Mildura Council staff Councillors State MP Federal MP	Discuss Project updates, planning pathways and engagement opportunities. Gather insights for the SIA regarding potential project impacts and mitigation/ enhancement measures.	Q1 2023	Send invitation to stakeholders regarding a briefing meeting Organise and attend briefing meeting	Umwelt/Spark Renewables
Community survey	Broader community	To provide opportunity for the community to provide feedback, for Umwelt to understand project acceptance and scope social impacts. Validate impacts from scoping phase, understand potential mitigation and enhancement measures.	Q1 2023	Review draft community survey Finalise and upload community survey	Umwelt/Spark Renewables

Activity	Targeted stakeholder group	Objectives	Timing	Tasks	Responsibility
Key Stakeholder interviews	Council Community groups Environmental groups Service providers Business representatives Aboriginal groups	Gather information to inform the assessment of social impacts and discuss potential mitigation and enhancement measures. It will also provide the SIA team with detailed and specific information about the needs, desires and impacts on stakeholders related to the Project.	Q1 2023	Develop interview guides, set up key stakeholder interviews and conduct	Umwelt/Spark Renewables
Newspaper/ Radio advertising/ Media interviews	Broader community	To inform the community about the Project and upcoming community events	Q1 2023	Develop and organise newspaper and radio advertising Organise and prepare for media interview	Umwelt/Spark Renewables
Information session	Broader community	Face-to-face engagement with the community, providing opportunity for community members to meet the project team and ask questions relating to the Project and/or how they may be impacted or benefited. To present the draft findings of EIS & SIA to the community with Q&A	Q1 2023	Organise, promote and attend information session	Umwelt/Spark Renewables
3rd community newsletter / information sheet	Broader Community	To provide a Project update and present the draft findings of EIS & SIA. To inform the community of the EIS exhibition process.	Q1 2023	Develop information sheet/newsletter Organise printing and distribution	Umwelt/Spark Renewables

Exhibition of the EIS: delivery plan from receipt of SEARs to lodgement of the EIS

Activity	Targeted stakeholder group	Objectives	Timing	Tasks	Responsibility
Briefing letters	Wentworth Shire Council Mildura Council State MP Federal MP Community and interest groups Industry Traditional Owners	To advise key stakeholders about public exhibition process, consultation opportunities and offer a meeting.	First week of public exhibition	Develop briefing letters Distribute briefing letters	Spark Renewables
Project website	All	Update to the project website to advise the community about public exhibition, opportunities to speak to the Project team and how to make a submission.	First week of public exhibition	Update website	Umwelt/Spark Renewables
Media release	All	To advise the community about public exhibition, opportunities to speak to the Project team and how to make a submission.	First week of public exhibition	Develop media release	Umwelt/Spark Renewables
Umwelt/Spark Renewables4th Information sheet/ newsletter	Broader community	To advise the community about public exhibition, opportunities to speak to the Project team and how to make a submission.	First week of public exhibition	Develop info sheet/ newsletter Design info sheet/newsletter Organise printing and distribution of info sheet/ newsletter	Umwelt/Spark Renewables
Meetings (face-to-face, phone or virtual)/ expert presentations	Wentworth Shire Council staff Mildura Council staff Councillors State MP Federal MP Councillors Community groups Environmental groups Traditional Owners	To present an overview of the EIS, answer questions and inform groups how to make a formal submission	First week of public exhibition	Organise and conduct meetings/ expert presentations as requested	Umwelt/Spark Renewables

Activity	Targeted stakeholder group	Objectives	Timing	Tasks	Responsibility
Information session	Broader community	To provide an opportunity for residents to speak to the Project team about the EIS, view information, ask questions and find out how to make a formal submission.	TBC	Organise, promote and attend information session	Umwelt/Spark Renewables



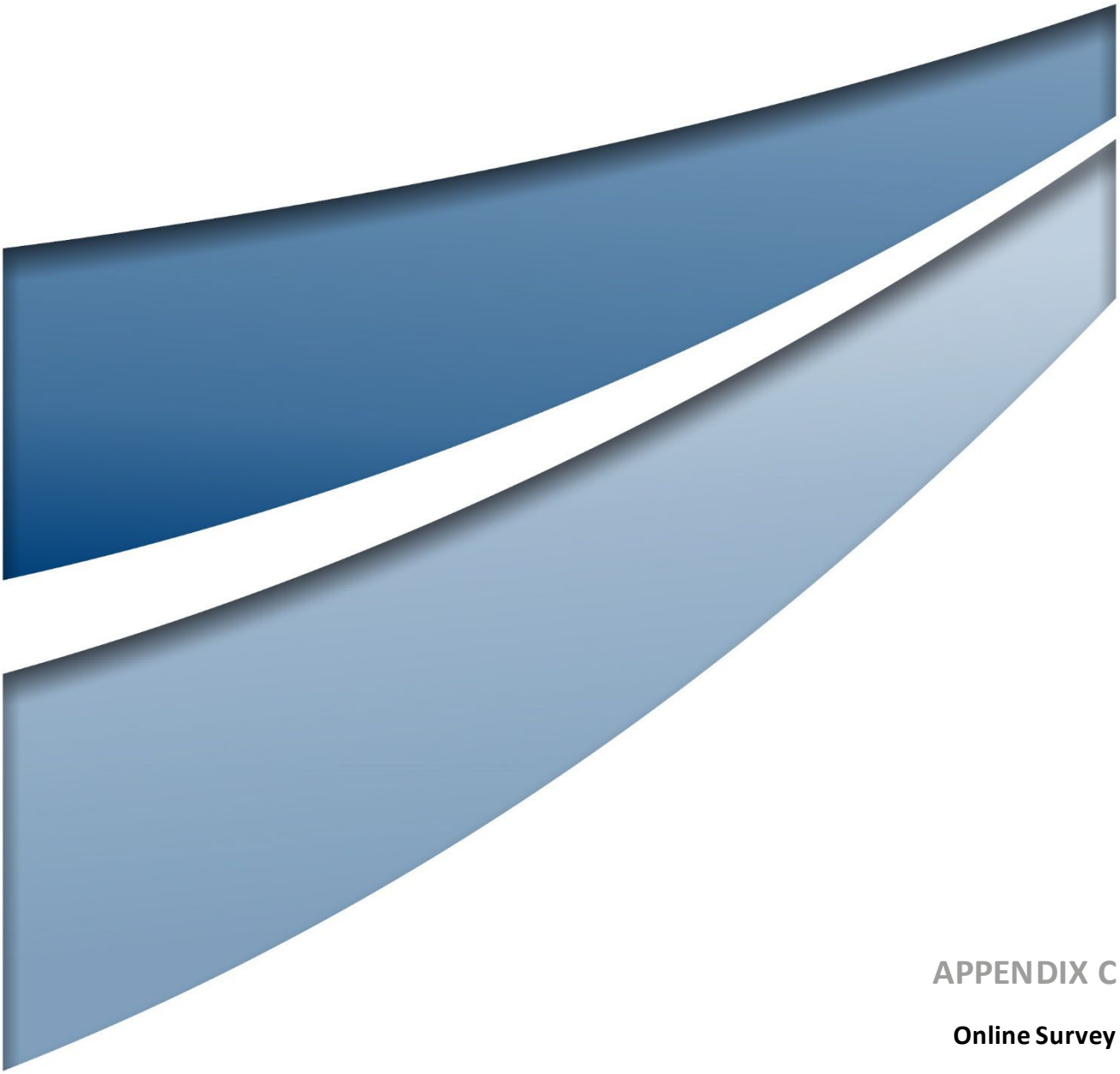
APPENDIX B

Community Profile

1.0 Community Profile

Indicator	Buronga	Gol Gol	Wentworth LGA	Mildura LGA	NSW
Human Capital					
Population Size	1,252	1,956	7,453	56,972	8,072,163
Proportion Indigenous Population (%)	7.9	2.8	8.3	4.6	3.4
Median Age	38	37	43	40	39
University (%)	5.4	5.3	3.9	5.8	15.3
Vocational (%)	6.8	6.4	6.1	8.0	8.5
No long term health condition (%)	55.5	64.8	53.7	54.7	61
Social Capital					
Households where a non-English language is used	8.7	5.1	5.2	13.7	29.5
Proportion of population aged 15+ who volunteer (%)	13.3	17.3	16	13.7	13
Proportion of population born in Australia (%)	79%	88.3	80.1	78	65.4
Proportion of family households (%)	73.5	84.1	73.6	67.7	71.2
Proportion of group households (%)	1.6	0.5	1.6	29.0	25.0
Proportion of lone person households (%)	24.9	15.4	24.8	3.2	3.8

Indicator	Buronga	Gol Gol	Wentworth LGA	Mildura LGA	NSW
Economic Capital					
Proportion of the labour force unemployed (%)	-	-	5.7	3.6	3.4
Median household income ($/week)	1,381	2,104	1,392	1,341	1,829
Median mortgage repayment ($/month)	1,300	1,733	1,300	1,283	2,167
Median rent ($/week)	203	315	200	265	420
Physical Capital					
Unoccupied dwellings (%)	11.7	10.3	16	9.1	9.4
Proportion of occupied private dwellings that are fully owned (%)	32.3	36.3	39.4	33.3	31.5
Proportion of occupied private dwellings that are being purchased/ owned by a mortgage (%)	40.6	49.4	33.3	32.1	32.5
Proportion of occupied private dwellings that are being rented (%)	24.7	12.0	19.6	29.8	32.6
Average number of vehicles per dwelling	1.9	2.3	2.1	1.9	1.8



APPENDIX C

Online Survey

Mallee Wind Farm - Community Values Questionnaire

Introduction

The Mallee Wind Farm Project is a wind and battery energy storage development proposed in the Wentworth Shire and is being developed by Spark Renewables.

Who are Spark Renewables?
Spark Renewables is a developer, long-term owner, and operator of renewable energy generation assets. Spark Raenewables is part of the Spark Infrastructure Group. Spark Renewables has an operational portfolio comprising the 100MW Bomen Solar Farm near Wagga Wagga which commenced operations in 2020 and a large portfolio (in excess of 3GW) of development assets including wind, solar, storage and green hydrogen projects across NSW and South Australia.

The Project: Mallee Wind Farm
The proposed location is in Mallee within a 20-minute drive north-east of Mildura (Victoria) and 15-minute drive from township of Buronga. The Project seeks to provide renewable energy and storage to improve energy reliability and security within the NSW South-West Renewable Energy Zone.

It is important for Spark Renewables to now better understand people's views and feedback on the proposed Project to ensure that the Project is planned with the participation and input of the local community.

This community survey is part of a broader engagement program for the Mallee Wind Farm Project. The purpose of the survey is to provide an online and, if preferred, an anonymous process for community members to provide feedback on the Project and local issues.

The outcomes of the community survey will be used to inform the Engagement and Social Impact Assessment part of the Scoping Report.

Mallee Wind Farm - Community Values Questionnaire

Demographics

1. **To which of the following age group do you belong? (If you prefer not to disclose, then move to the next question)**

- ◯ Below 18
- ◯ 18-34
- ◯ 35-54
- ◯ 55-64
- ◯ 65-74
- ◯ 75+

2. **To which of the following gender groups do you belong?**

- ☐ Female
- ☐ Male
- ☐ Non-binary
- ☐ Self identify

3. **Do you identify as Aboriginal and/or Torres Strait Islander?**

- ◯ Aboriginal
- ◯ Torres Strait Islander
- ◯ Both
- ◯ Neither

4. **Which of the following best describes where you live?**

- ☐ Buronga
- ☐ Gol Gol
- ☐ Mourquong
- ☐ Mildura
- ☐ Another area in the Wentworth Shire LGA
- ☐ Another area in the Mildura LGA
- ☐ Other (please specify)

5. **How long have you lived in the locality (years)?**

SPARK RENEWABLES

Mallee Wind Farm - Community Values Questionnaire

Awareness and interest

6. **Are you aware of, or do you have knowledge of Spark Renewables?**

- ◯ No
- ◯ Yes, if so, how have you heard about them?

7. **Have you heard of, or are you aware of the Mallee Wind Farm Project?**

- ◯ No
- ◯ Yes, if so, how have you heard about it?

8. **On a scale of one (1) to ten (10) how would you rate your level of knowledge of wind generation technology, where one (1) is a low level of knowledge and ten (10) is a high level of knowledge.**

1	2	3	4	5	6	7	8	9	10
◯	◯	◯	◯	◯	◯	◯	◯	◯	◯

Why did you provide that rating?

9. **On a scale of one (1) to ten (10) how would you rate your level of acceptance of renewable energy projects in the region, where one (1) is a Low level of acceptance and ten (10) is a high level of acceptance.**

1	2	3	4	5	6	7	8	9	10
◯	◯	◯	◯	◯	◯	◯	◯	◯	◯

Why did you provide that rating?

SPARK RENEWABLES

Mallee Wind Farm - Community Values Questionnaire

Impacts

10. **What aspects about the proposed project would you consider to be most beneficial to your local community?**

- [ ] Employment and business opportunities
- [ ] Investment in the local community
- [ ] Road and infrastructure improvements
- [ ] Better access to emergency services
- [ ] Land-use diversification
- [ ] Community sponsorships
- [ ] Access to cheaper electricity
- [ ] Partnerships with local Aboriginal community groups
- [ ] Increased tourism
- [ ] Low carbon-emission energy
- [ ] Other (please describe)

11. **Please explain why the benefit you selected would be beneficial to your local community?**

12. **What aspects of the proposed project would you consider to be your <u>main concerns</u>?**

- [ ] Increased traffic and road safety
- [ ] Potential impacts on flora and fauna or conservation areas
- [ ] Increased workforce in the local area
- [ ] Land-use changes
- [ ] Aboriginal cultural values
- [ ] Water access and use
- [ ] Noise generated during construction
- [ ] Noise generated during operation
- [ ] Fire risks
- [ ] No concerns
- [ ] Other (please specify)

13. **Please explain why your chosen concerns are your main concerns?**

14. **Based on your knowledge of the project today, on a scale of one (1) to ten (10) how would you rate your overall level of <u>acceptance of the project</u>, where one (1) is a low level of acceptance and ten (10) is a high level of acceptance.**

1	2	3	4	5	6	7	8	9	10
○	○	○	○	○	○	○	○	○	○

Why did you provide that rating?

Mallee Wind Farm - Community Values Questionnaire

Community values and needs

15. What aspects do you value most in the area? Select all that apply.

- [ ] Landscape and local character
- [ ] Farming
- [ ] Native flora and fauna
- [ ] Community and family
- [ ] Work opportunities
- [ ] Aboriginal heritage
- [ ] Local history
- [ ] Other (please specify)

16. **Thinking about your local area and community, are there community needs that are currently not being met? This may include, but is not limited to, access to health care services, youth programs, community programs etc.**

17. **Spark Renewables is in the early stages of developing a benefit-sharing program for this project. Do you have any recommendations or considerations you would like to share (e.g., community groups, previous programs, current programs) etc.**

Mallee Wind Farm - Community Values Questionnaire

Landscape and character

18. **Are there any landscapes or views close to the proposed Project site that are of significant value to yourself, your business, or your community?**

19. **What are the best lookouts or public vantage points in the area? For example, if you have a visitor, where do you take them to showcase your local area?**

20. **Are there things Spark Renewables could do to reduce the visual impact of the wind farm or make it more visually appealing?**

SPARK RENEWABLES

Mallee Wind Farm - Community Values Questionnaire

Future engagement

21. **What are some of the better ways for Spark Renewables to provide you with information and project updates?**

- [ ] Newsletters and project updates via email
- [ ] Website
- [ ] Letters
- [ ] Community meetings
- [ ] Personal meetings
- [ ] Phone/Video calls
- [ ] Drop-in sessions
- [ ] Local newspaper
- [ ] Local radio
- [ ] Other (please specify)

22. **Would you like to be kept up-to-date with Project information in the future? If yes, please ensure you have entered your contact details below.**

- [ ] No
- [ ] Yes

23. **How would you like to be informed about the project?**

- [ ] Receive emails and online newsletters
- [ ] Participate via online forums via phone or video calls
- [ ] Receive phone calls from the Spark Renewables team
- [ ] Receive newsletters via post
- [ ] Other (please specify)

24. **Do you have anything else to add or any further questions?**

25. **Contact details**

Name:	
Email:	
Phone:	
Address:	
Postal address if different:	

umwelt
Environmental & Social
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APPENDIX 3

Preliminary Visual Impact Assessment

moir
landscape architecture

Mallee Wind Farm

Preliminary Visual Impact Assessment

v

Mallee Wind Farm

Preliminary Visual Impact Assessment

Prepared for
Umwelt (Australia) Pty Ltd on behalf of Spark Renewables

Issue
03

Date
24.11.2022

Project Number
2201

Revision	Date	Author	Checked	Comment
01	31.10.2022	SW	DM	For Review
02	11.11.2022	SW	DM	For Review
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Contents

1.0 Introduction

1.1 Introduction

Moir Landscape Architecture has been commissioned by Umwelt (Australia) Pty Ltd on behalf of Spark Renewables (the Proponent) to prepare a Preliminary Visual Impact Assessment (PVIA) for the proposed Mallee Wind Farm (the Project).

The PVIA for the Project has been prepared in accordance with the *Wind Energy: Visual Assessment Bulletin December 2016* (referred to hereafter as the Bulletin). The PVIA will form part of the Scoping Report seeking the Secretary's Environmental Assessment Requirements (SEARs) from the NSW Department of Planning & Environment (DPE). The PVIA includes an assessment of all aspects of the Project including project activities and associated infrastructure.

1.2 Relevant Experience

The Bulletin states: *the proponent is expected to engage professionals from relevant natural resource management and design professions (for example environmental planners, geographers, landscape architects, or other visual resource specialists), with demonstrated experience and capabilities in visual assessment to carry out a wind energy project visual assessment*.

Moir LA is a professional design practice and consultancy specialising in the areas of Landscape Architecture, Landscape Planning and Landscape and Visual Impact. Our team has extensive experience in undertaking Landscape and Visual Impact Assessments for wind energy projects. In the context of our experience and with guidance from the Visual Assessment Bulletin we have developed methodologies to ensure a comprehensive and qualitative assessment of the Project.

Relevant experience includes the preparation of Preliminary Visual Impact Assessments and Landscape and Visual Impact Assessments for the following Wind Energy Projects:

- *Uungula Wind Farm LVIA (Wellington, NSW) - Approved May 2021*
- *Hills of Gold Wind Farm LVIA (Nundle, NSW)*
- *Thunderbolt Energy Hub Stage 1 (Kentucky, NSW)*
- *Valley of the Winds Wind Farm LVIA (Coolah, NSW)*
- *Jeremiah Wind Farm PVIA (Gundagai, NSW)*
- *Burrawong Wind Farm PVIA (Balranald, NSW)*
- *Barneys Reef Wind Farm PVIA (Gulgong, NSW)*
- *Winterbourne Wind Farm LVIA (Walcha, NSW)*
- *Keri Keri Energy Park PVIA (Balranald, NSW)*
- *Paling Yards Wind Farm PVIA (Paling Yards, NSW)*

1.3 Overview of Preliminary Visual Impact Assessment

The purpose of this Preliminary Visual Impact Assessment (PVIA) is to provide a preliminary assessment of the potential visual impacts of the Project and has been prepared in accordance with the Bulletin.

The assessment process is broken into two main phases, (see ***Figure 1***):

Phase 1: Scoping Phase and
Phase 2: Environmental Impact Statement (EIS) Phase

This PVIA forms a part of *Phase 1: Scoping Phase*, which involves the submission of the Scoping Report for the request for SEARs to be submitted to DPE.

In regard to the visual assessment, the requirements of Phase 1: Scoping Phase are as follows:

At the PVIA stage, a process consisting of community consultation regarding key landscape values and application of preliminary assessment tools has been developed in accordance with the Bulletin.

The preliminary assessment tools have been designed to assist proponents to drive better outcomes. They will assist in identifying early in the process the locations where wind turbines may have impacts that warrant further consideration. This in turn provides an opportunity to refine the proposed wind turbine layout to avoid or minimise impacts, or justify the proposed design prior to lodgement of the Development Application (DA).

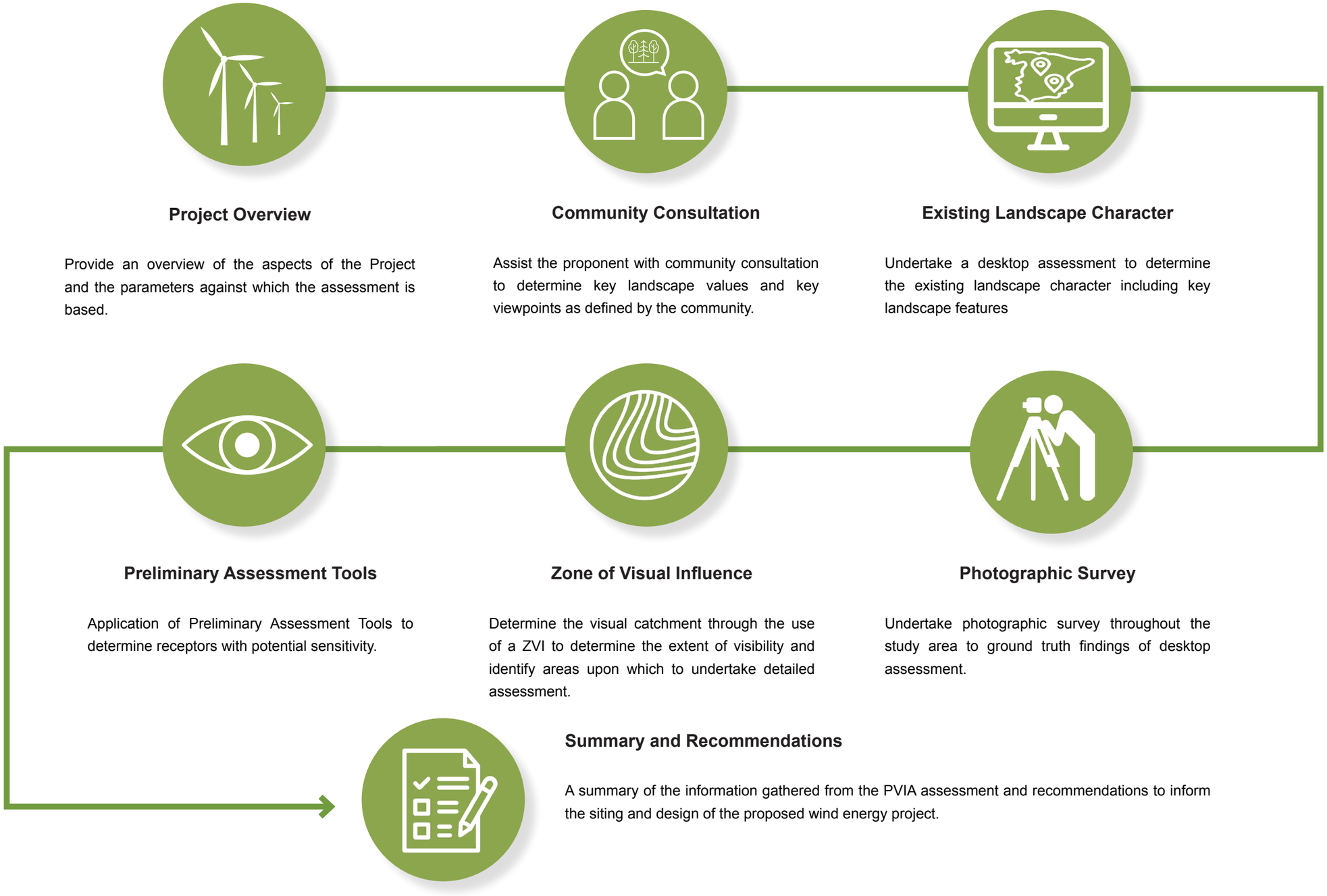
Proponents will be required to submit, with the request for SEARs, a PVIA that includes a map with key information, results of community consultation and the application of the preliminary assessment tools. This will be included in the Scoping Report which forms basis for the issue of the SEARs that will identify the matters that must be addressed in the EIS.

Figure 1 Steps in Visual Impact Assessment (Source: Wind Energy Assessment Bulletin, 2016)

2.0 Study Method

2.1 Study Method

The following has been undertaken to develop the PVIA:



The following has been undertaken to develop the PVIA:

Desktop Assessment:

- Application of Preliminary Assessment Tools to determine receptors with potential sensitivity.
- Preparation of a preliminary Zone of Visual Influence (ZVI) to establish a theoretical zone of visibility of the Project.
- Identification of key viewpoints and landscape features using available mapping and background documents.

Site Inspection:

Photographic survey work for the assessment was undertaken in August 2022 to carry out a preliminary assessment of the existing landscape character from publicly accessible land within the Study Area (as defined in **Section 3.3**). The findings of the site inspection have been included in the 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 the community consultation have also 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 Bulletin and where these have been addressed in the PVIA:

Preliminary Visual Impact Assessment Report Structure:	
PVIA Report:	**Bulletin Requirements:**
Refer to Section 3.0: Project Overview	
Refer to Section 4.0: Community Consultation	*Undertake targeted community consultation to establish key landscape features valued by the community, key viewpoints in the area (both public and private) along with information about the relative scenic quality of the area. Allow the community to have input into the ranking of those features and scenic quality into high, moderate or low visual significance.*
Section 5.0 : Existing Landscape Character	*Production of a map detailing key landscape features (informed by community consultation and any ground-truthing undertaken), the preliminary wind turbine layout, the location of dwellings and key public viewpoints, and an overlay of the wind resource.*
Section 6.0: Preliminary Assessment Tools	*Results of the preliminary assessment tools for both the visual magnitude and multiple wind turbine parameters.*
Section 7.0: Preliminary Dwelling and Viewpoint Assessment	*The visual assessment will involve the combination of desktop and field evaluations of the proposed wind energy project and its various components, turbines and ancillary facilities. The visual performance objectives form the principal framework and guide for assessing the proposed wind energy project when applied to individual viewpoints. All key public viewpoints and individual dwellings within the visual catchment should be identified and assessed.*
Section 8.0: Cumulative Visual Impacts	
Section 9.0: Preliminary Zone of Visual Influence	*The use of Geographic Information Systems (GIS) to facilitate the application of the tools will streamline the evaluation phase of a project during the pre-lodgement stage. Most GIS systems can establish the theoretical 'zone of visual influence' of the proposal (the area from which the proposal is theoretically visible or the 'visual catchment').*
Section 10.0: Summary and Recommendations	

Table 1 Overview of Report Structure

3.0 Project Overview

3.1 Regional Context

Spark Renewables are proposing a renewable energy development featuring up to 150 wind turbines with a generation capacity of up to 1,000 Megawatts (MW) and a containerised Battery Energy Storage System (BESS). The Project is currently in the early stages of landowner consultation, stakeholder engagement and overall design. The Project is located within the Wentworth Shire Council area in the Riverina region of New South Wales. It is situated approximately 16 kilometres (km) east of Buronga and approximately 114 km west of Balranald. Mildura in Victoria is located approximately 20 km south west of the Project.

The Project is located on expansive operating pastoral and farming land. Arumpo Road passes through the Project. Arumpo Road is an important road connecting the surrounding towns to the World Heritage Listed Mungo National Park. Mungo National Park lies approximately 54 km north east of the Project. The Project can be accessed directly from Arumpo Road which is the proposed access point for the Project (refer to ***Figure 2***).

The Project is located within the South-West Renewable Energy Zone (REZ). The South-West REZ was formally declared bvy the NSW Minister for Energy on 4 November 2022. The declared South-West REZ has an intended transmission capacity of 2.5 GW (EnergyCo NSW, 2022). The Project is therefore strategically located in a broad area identified as suitable for renewable energy project.

The South-West Region has been identified as having high solar and wind renewable energy resource potential. Preliminary investigations undertaken by the Proponent have guided the development of the preliminary turbine layout for the Project. The Project will deliver energy produced into either, the 220 kV transmission line, or the new 330 kV line, recently approved under Project EnergyConnect (EnergyCo NSW, 2022).

The Project is in the preliminary stages of design and Moir LA will provide input and recommendations in regard to visual impacts to assist in refining of the design layout.

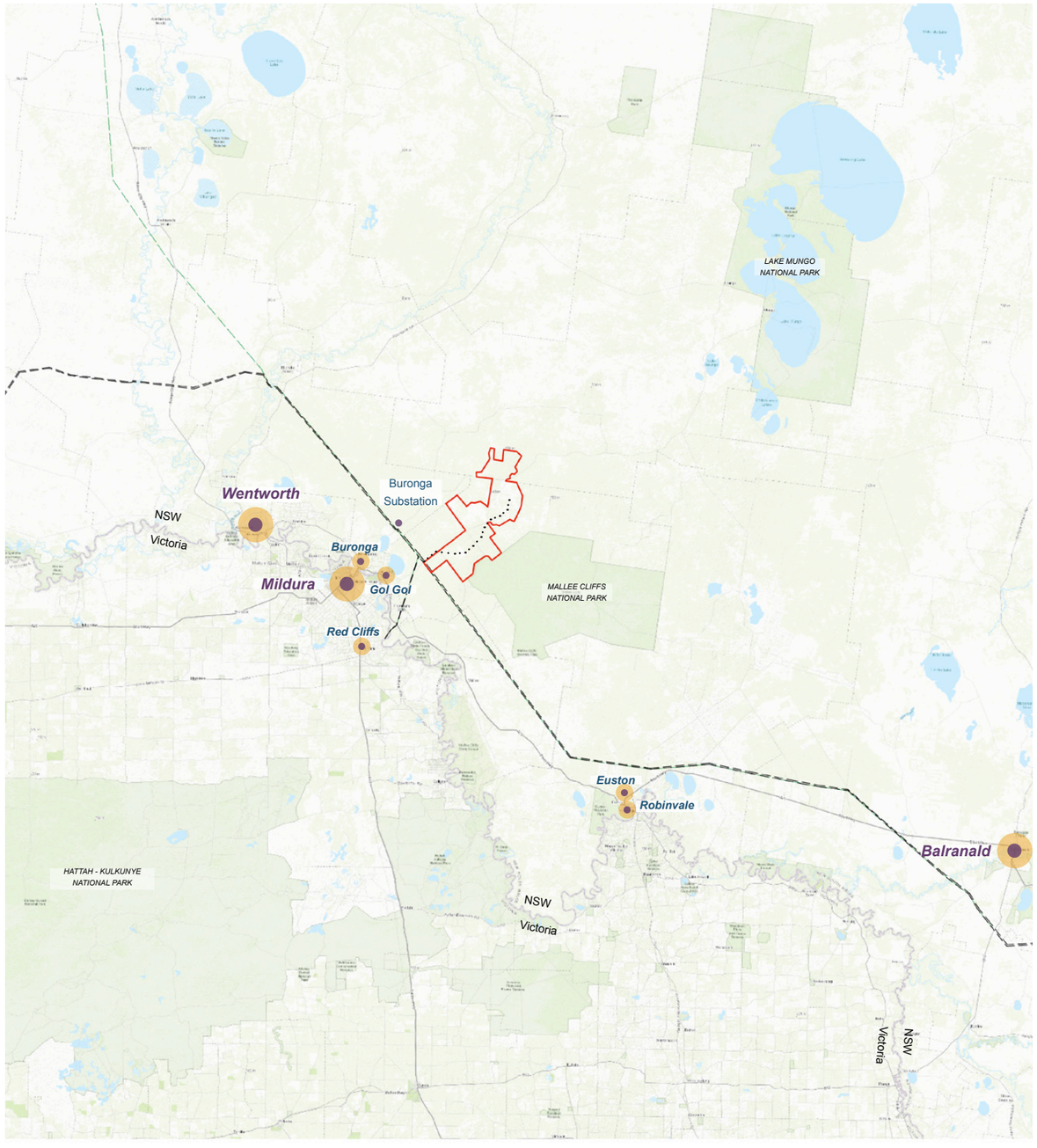


Figure 2 Regional Context (Not to scale)

3.2 The Project Area

The Project Area is located approximately 16 km north-east of Buronga, close to the NSW-Victorian state border and covers approximately 17,300 hectares. The Project Area is located on relatively flat land at an elevation of approximately 100 metres above sea level with a good available wind resource. There is one (1) non-involved dwelling approximately 8 km of the nearest proposed wind turbine.

The Project Area is located primarily on land zoned RU1 Primary Production under the Wentworth Local Environmental Plan 2011 (Wentworth LEP). The Project Area is currently used for cropping and grazing, with patches of remnant native vegetation present. The Project EnergyConnect transmission line corridor is located to the south-west of the Project Area. A portion of land zoned as C2 Environmental Conservation is located in the north-western section of the Project Area, outside of the proposed development footprint. The Project Area is bordered by Mallee Cliffs National Park to the south-east.

3.3 The Study Area

Referred to in this report, the Study Area is generally defined as the Project Area and surrounding land which requires assessment. Due to relatively flat topography of the surrounding landscape the Study Area is generally defined as the land up to 10,000 m from the nearest turbine. In accordance with the Bulletin, dwellings within 8,000m of the nearest turbine have been assessed to understand the preliminary visual impacts and viewpoints within the Study Area have been assessed to understand potential visual impacts on public viewing locations. Towns and settlements located in closest proximity are Buronga, Gol Gol and Mildura in Victoria as shown in ***Figure 2***.

3.4 The Project

The Project includes the construction, operation and decommissioning of up to approximately 150 wind turbines (and associated infrastructure) within the 17,300 ha Project Area. The Project would generate up to 1000 MW (1GW) of renewable energy, with a maximum blade-tip height of 280 m above ground level (AGL). Associated infrastructure includes a Battery Energy Storage System (BESS), internal access roads, operation and maintenance buildings, civil works and electrical infrastructure (including substations and switching station) required to connect to the existing electricity transmission network. The preliminary layout for the Project (refer to ***Figure 4***) will be subject to further review and refinement as the environmental and social impact assessment progresses.

The Project will generate up to 1,000 MW (1GW) of renewable energy. A single grid-scale BESS is also proposed and will allow for the capture and storage of dispatchable to the electricity grid along with providing additional grid Services. The power generated by the Project will feed into the electricity grid (National Energy Market, NEM) either via the 330/220kV Buronga Substation connecting into the new Project EnergyConnect interconnector that will link Robertstown (South Australia) with Wagga Wagga (NSW), or direct connection to 220kV transmission line or 330kV Project EnergyConnect.

The preliminary layout for the Project (refer to Figure 3) has been prepared to locate the turbines within areas identified as having high wind resources and land that has been previously modified by pastoral and agricultural activities. Figure 3 also includes the locations of involved and non-involved dwellings mapped from aerial photographs. These locations are subject to further ground truthing.

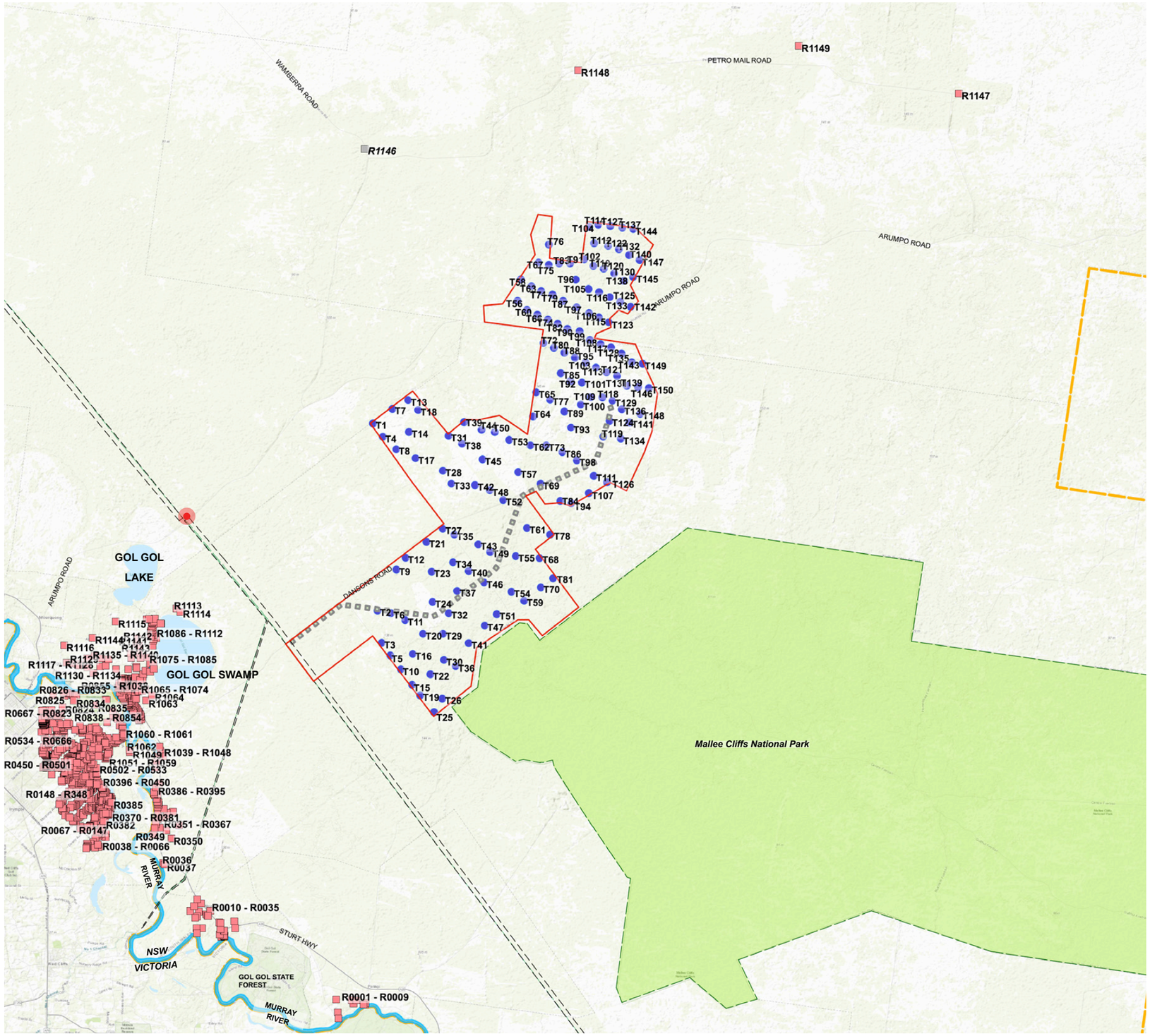
Key components of the Project include:

- Approximately 150 (3 blade steel) wind turbines with a maximum blade-tip height of 280m AGL.
- Power infrastructure providing connection to the NEM i.e. on-site substation / switchyards.
- Internal electrical reticulation network, access roads, and access points from public roads.
- Permanent meteorological monitoring masts.
- Temporary infrastructure including construction compound and site office buildings, storage areas and concrete batching plants.
- Hardstand and laydown area used for wind turbine installation and storage of wind turbine components.
- Operation and maintenance buildings.
- A single grid-scale BESS.

The proposed transmission line connection to the south, the proposed infrastructure would be contained within the Project Area including all turbine rotor sweep paths. The proposed layout will allow for micro-siting and will be subject to further detailed design as the environmental and social impact assessments progress.

Project Layout

Proposed Mallee Wind Farm



LEGEND

- Project Boundary
- Proposed Turbine Location
- Involved Dwellings
- Non-Involved Dwellings
- Existing 220kV transmission line
- Proposed HV Interconnector (Project Energy Connect)
- Main Road
- Minor Road
- Nature Reserve / State Conservation Area
- LGA Boundary
- Potential Transmission Line Option
- Existing Buronga Substation (Transgrid)

N

0 2 4 6 8 10km

Figure 3 Project Layout (Map Source: Six Maps)

4.0 Community Consultation

4.1 Overview of Community Consultation Process

In accordance with the Visual Assessment Bulletin: *community consultation at this early stage may be broad, but should include discussions about the proposed project area, likely corridors of development, or preliminary turbine layouts and must involve people from the visual catchment.*

The purpose of community consultation undertaken in the preparation of the PVIA is to:

- Establish key landscape features
- Defined areas of scenic quality; and
- Identify key public viewpoints valued by that community.

The results of community consultation have also been used to inform the preliminary scenic quality ratings assigned to landscape features in **Section 5.5** of this report.

Community engagement will continue through the EIS Phase and provide the community with further opportunities to provide input into the Visual Baseline Study of the Landscape and Visual Impact Assessment (LVIA).

4.2 Results of Community Consultation

Understanding of the community perception towards the proposed development is an intrinsic component of the Landscape and Visual Impact Assessment process. A CSIRO study published in 2012: *Exploring community acceptance of rural wind farms in Australia* provides a snapshot of community acceptance levels regarding Australian wind farms from a variety of stakeholder perspectives. It found levels of acceptance among the public are highly subjective and can differ depending on location, local context and place attachment.

In accordance with the Bulletin ongoing community consultation has been undertaken by the Proponent through one-on-one meetings, a community drop-in session, newsletter distribution, and a community survey distributed to both involved and non-involved landholders and interest groups between August 2022 and October 2022. The survey was also placed on the Project website.

As of October 2022, a total of nine (9) surveys had been completed.

4.2.1 Landscape Features and Values

In addition to a review of existing landscape maps and detailed field work undertaken by Moir LA (see **Section 5.0**) the community consultation questionnaire asked respondents to identify key landscape features of importance to them. Attendees at the community information session raised concerns around visual impacts associated with the Project. There is one (1) non-involved dwelling located approximately 8km of the nearest proposed wind turbine, however given the relatively flat terrain, residents of nearby communities held concerns relating to changes the Project may have to the broader visual landscape in the area. Other stakeholders commented that as the Project will be located some distance from Buronga and Gol Gol, they were relatively unconcerned about visual impacts.

Wouldn't worry me out there, but don't like seeing it on beautiful mountain ranges. – Community Group

Not a lot of people go out that way, but it will make it look terrible – Community member.

Responses given to the question: ***"Are there things Spark Renewables could do to reduce the visual impact of the wind farm or make it more visually appealing?"***, One stakeholder suggested increasing the distance of the Project to Arumpo Road to reduce the visual impact of those travelling to Mungo National Park, wanting to maintain ***"the remote feel of the place"***. An additional stakeholder suggested the planting of trees as a visual screen. Others felt that no strategies could be put in place to reduce visual impacts of the project.

4.2.2 Key Public Viewpoints

Of the nine (9) responses, four (4) responses were given to the question: ***"What are the best lookouts or public vantage points in the area? For example, if you have a visitor, where do you take them to showcase your local area?"***

- *"The river in Gol Gol is amazing"*
- *"The river"*
- *"The river and Mungo National Park"*
- *"Mungo"*

Where possible, key viewpoints have been mapped in **Section 5.0** of this PVIA. Additional consultation and further detailed assessment of these features and viewpoints will be undertaken during the EIS phase.

5.0 Existing Landscape Character

5.1 Overview of Bioregion

The Project is located within the Murray Darling Depression Bioregion (see ***Figure 4***) in southwest NSW. The area is distinctly characterised by quaternary deposits in shallow lakes, swamps and depressions with a range of vegetation character.

Topography is generally flat with very minor and isolated rises of calcareous sands material with soils predominantly ranging from red, brown and yellow calcareous soils typical of the dunefields to heavier brown grades on sandy isolated rises (DPE, 2021). Typically, dominant species include Rosewood (*Heterodendrum oleifolium*), belah (*Casuarina cristata*) along sandplains with diverse mixed communities predominately Mallee (*Eucalyptus sp.*) (DPE, 2021). A detailed description of the character is discussed in ***Section 5.3*** of this report. ***Images 1 - 2*** illustrate the typical character of the landscape within the Study Area.

Image 1 *Typical character of vegetation within the Project Area.*

Image 2 *Typical character of the Riverina plains in the area - intermittent stands of vegetation with variable understorey vegetation.*

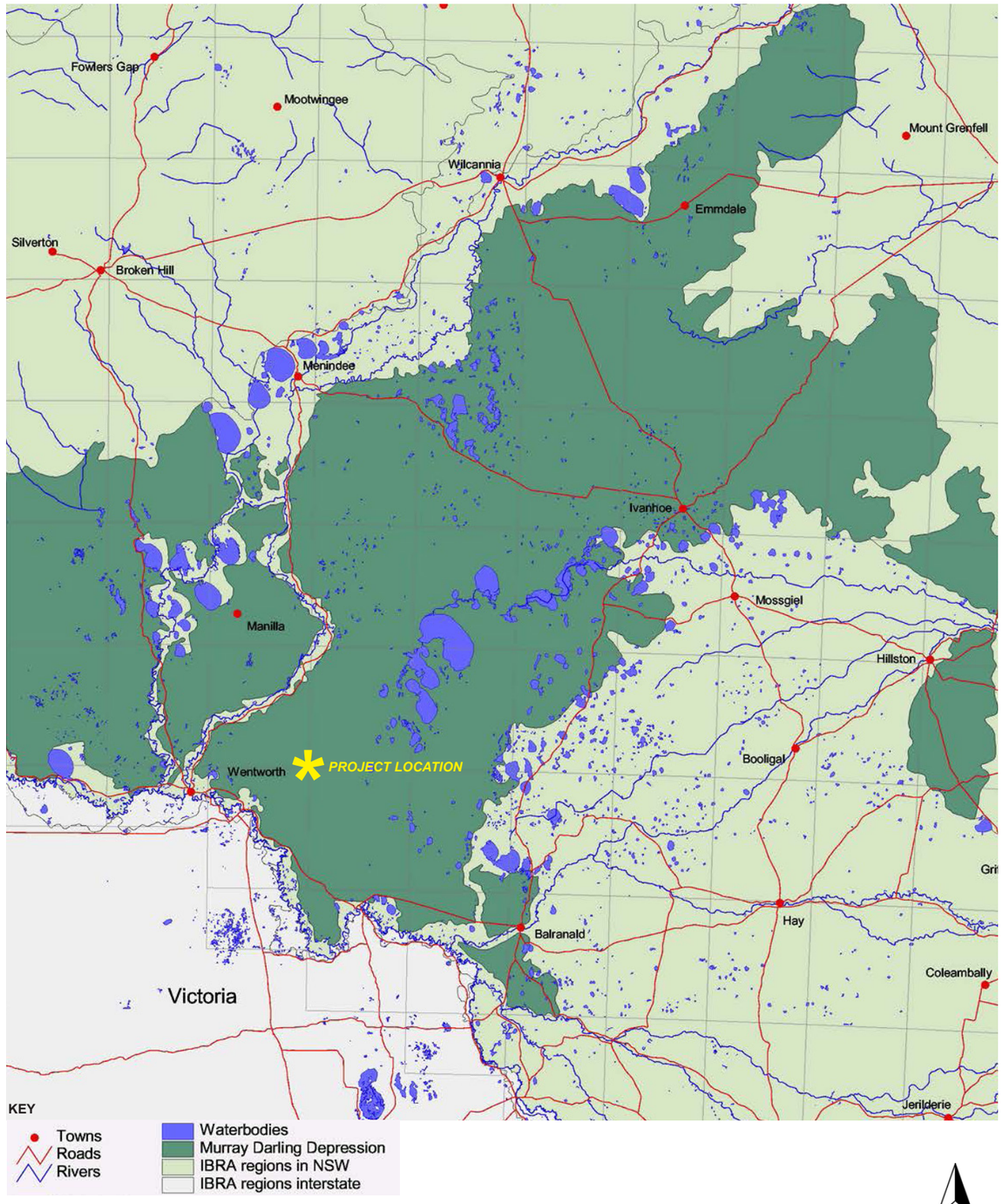


Figure 4 NSW Riverina Bioregion (Source: NPWS, 2016)

5.2 Land Use

5.2.1 Land Use Zoning

The Project is located within the extents of the Wentworth Shire Council. Hence the Wentworth Shire Local Environmental Plan 2011 (LEP 2011) applies to the Project. The following gives an overview of the main land use zoning within the Study Area (see ***Figure 5***):

RU1 - Primary Production

The Project Area and majority of the surrounding land is zoned *RU1 - Primary Production*. The Wentworh LEP 2011 states the following objectives of the *RU1 - Primary Production* zoning:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To ensure the protection of both mixed dryland and irrigation agricultural land uses that together form the distinctive rural character of Wentworth.*
- *To ensure land is available for intensive plant agricultural activities.*
- *To encourage diversity and promote employment opportunities related to primary industry enterprises, including those that require smaller holdings or are more intensive in nature.*

C1 - National Parks and Nature Reserves

Mallee Cliffs National Park (MCNP) with its associated reserves including Banya Nature Reserve, Wilddog Nature Reserve and Gulthul Nature Reserve fall within the extents of land that is categorised as *C1- National Parks and Nature Reserves*. The Project shares its south eastern boundary with a portion of the MCNP. The MCNP extends further south east to the Project.

Mallee Cliffs National Park Plan of Management (MCNPPM) refers to the area as 'the parks' in the Plan of Management, '*protects native ecosystems that are greatly diminished in extent or degraded by grazing and other land uses in the broader landscape'* (NSW & OEH, 2018). The MCNPPM focuses on protection of the natural environment, preservation of cultural heritage, public use of the park, and educational values.

As stated in the MCNPPM, public access to the park is restricted. The primary purpose of the park has been nature conservation and access by the public has been limited mostly to researchers and bird

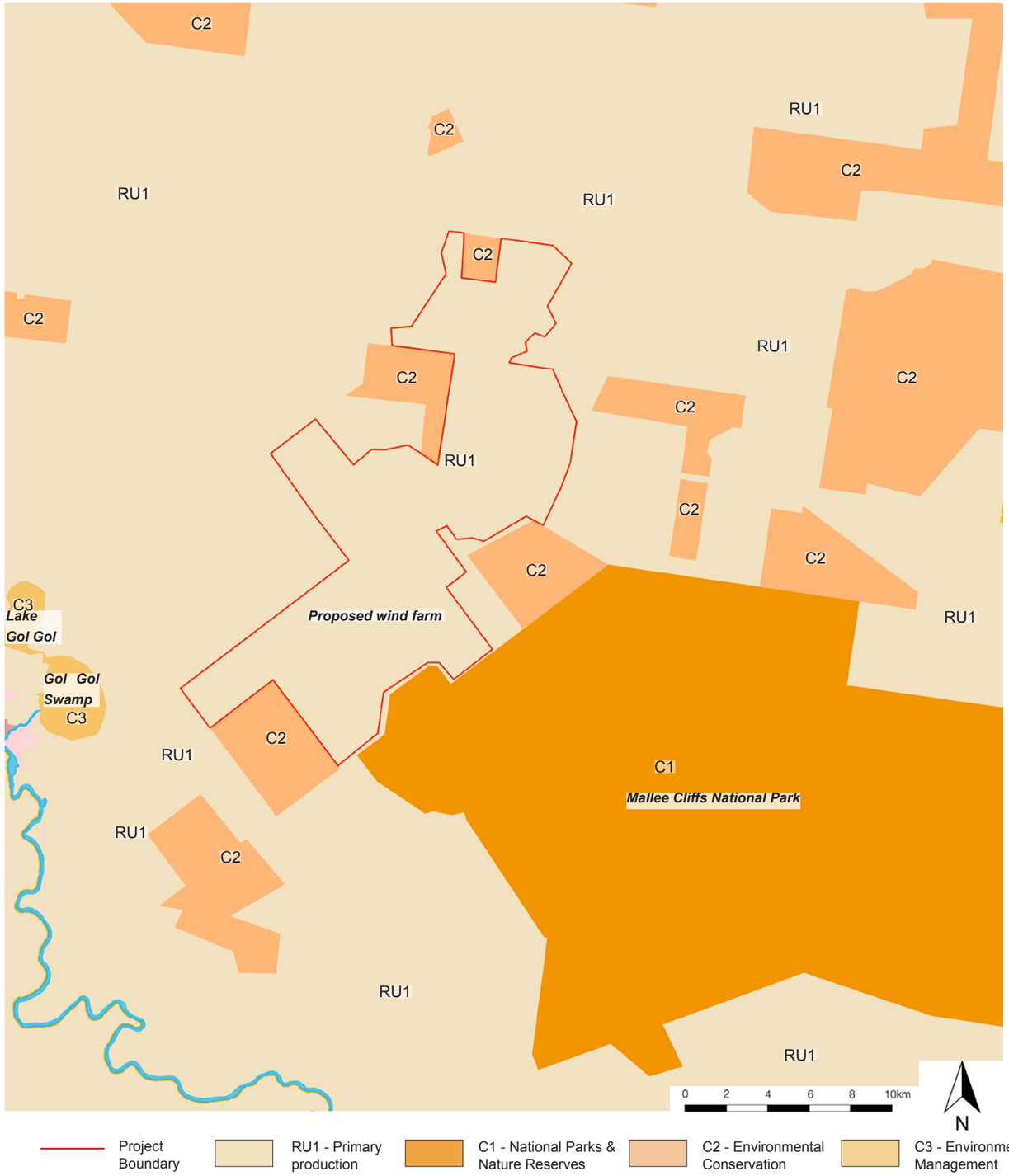


Figure 5 Land Use Zoning (Source: NPWS, Environment NSW 2016)

watching groups who visit a few times a year. Since reservation, recreation has been excluded from Mallee Cliffs as access to the park is via private roads. The Reintroduction of Locally Extinct Mammals project commenced in 2017 and will include managed public access. A visitor strategy will be developed as part of the project and is expected to provide special opportunities for visitors to observe threatened species in the reintroduction area.

Low-relief landscapes typical of Murray Darling Basin Bioregion are characteristic of this Park. Topography is generally flat lacking natural streams or water bodies. Vegetation is characteristic of semi-arid environment with dominant Mallee communities supplemented with derived grasslands, patchy belah-rosewood woodlands or mulga - bluebush shrublands. Primary objectives of the MCNPPM include:

- *Restore vegetation and native animal habitat values in the park include decommissioning of artificial water points, monitoring and control of herbivores, weed control and fire management.*
- *Provide patchiness and multiple age classes while maximising the amount of older mallee which has optimum habitat features.*
- *To maximise the number of threatened species that can be secured in the wild in New South Wales for 100 years.*
- *To minimise adverse impacts of introduced pest species on biodiversity and other park values.*
- *Involvement of Local Aboriginal Community in managing the parks within the native title area.*

Parts of the Banya and Willdog Nature Reserve are located along the south eastern border of the Project Area. These parcels are categorised as *C2 - Environmental Conservation* and are associated with the National Park. MCNPPM applies to all areas associated with the National Parks.

5.2.2 Land Use

Land use within and around the Study Area predominantly is typically associated with grazing, native vegetation and modified land for agriculture. The Project will be situated in areas that are currently dedicated to dryland cropping and grazing pastures (see ***Figure 6***). Mallee Cliffs National Park (MCNP) and associated nature reserves are subject to nature conservation because of their significant natural, landscape, cultural and educational values. It's immediate surrounds consist of natural grazing pastures and dryland cropping. Grazing and modified pastures are also prevalent to the north, east and west of the Project Area. These areas are flat and open. All water channels remain dry and exhibit vegetation characteristics that are unique to this region. Sturt Highway serves as an important transport corridor connecting the towns of Buronga and Gol Gol to Euston, Balranald and Hay. Minor roads within Gol Gol and Buronga provide connections to Mildura in Victoria. Arumpo Road is a significant tourist route serving as a connection to the World Heritage listed Mungo National Park located approximately 52 km northeast from the Project.

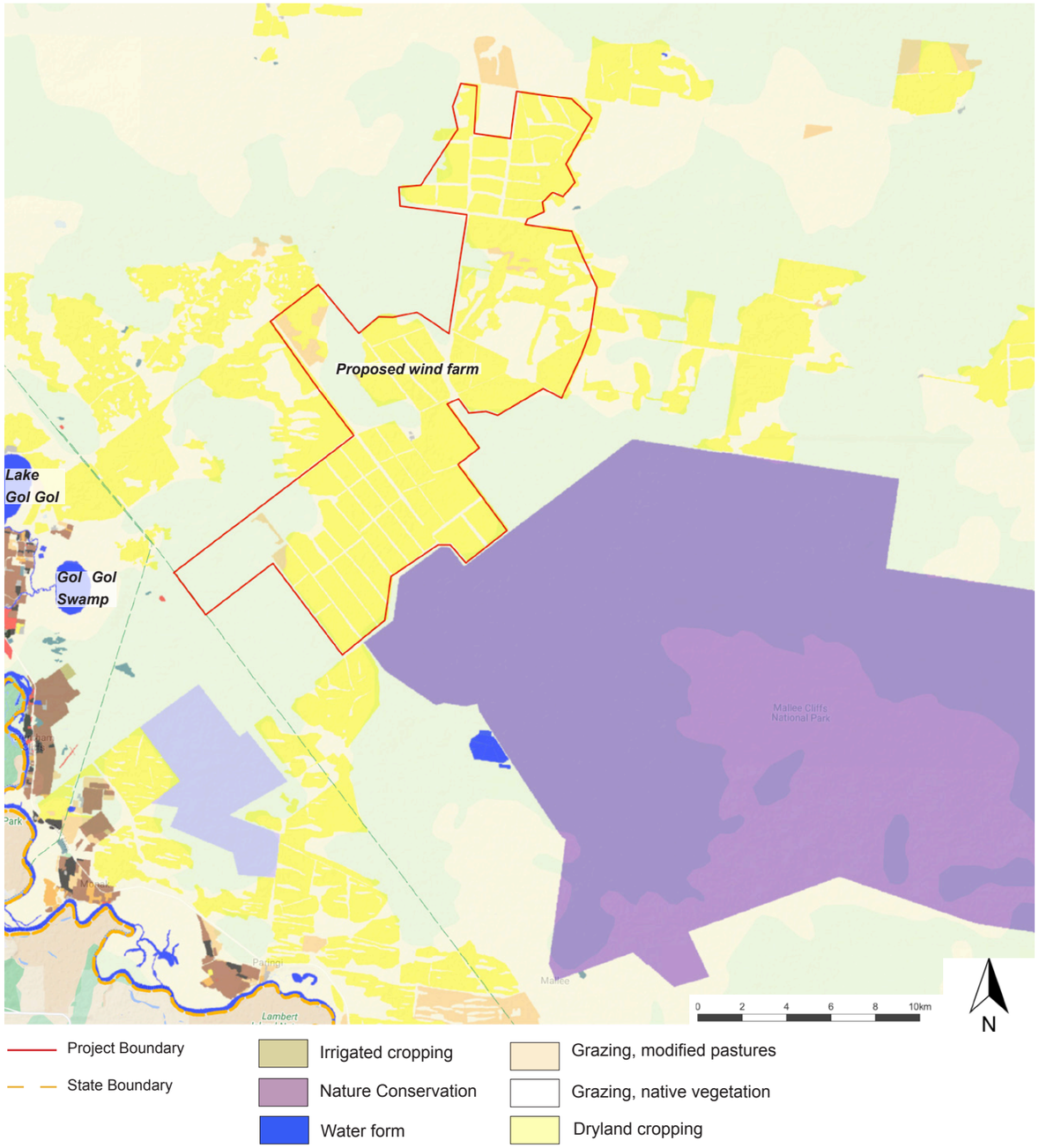


Figure 6 Land Uses (Source: NPWS, Environment NSW 2016)

5.3 Key Landscape Features & Viewpoints

The Bulletin states: *proponents must identify key landscape features, dwelling locations and key public viewpoints*. The following section provides an overview of the key features identified within and around the Study Area. Refer to **Figure 7.** Some information below is produced from publicly available sources and this third party data has not been verified for this PVIA. Furthermore, a Biodiversity Development Assessment Report (BDAR) will be prepared following extensive surveys for the Project, such that some features described below may change.

Geology and Landform

The region is made up of Tertiary and Quaternary sediments deposited due to constant movement of shallow seas over the last 50 - 60 million years modelling the landforms into extensive dunes and sandplains (Department of Planning and Environment, 2003). Dry lakes and saline groundwater basins along with lateral dunefields and sandplains form characteristic land typologies within the region (Department of Planning and Environment, 2003). Shallow depressions in the form of dry lakes and swamps display well formed lunettes along its edges with scattered and isolated bedrock ridges rising above the sandplains (National Parks and Wildlife Service (NSW), 2003).

Vegetation Character

Vegetation within the surrounding landscape is typical of the Murray Darling Depression Bioregion. Vegetation character evolves in accordance with the landforms within the landscape. Semi-arid conditions support dominant Mallee communities with derived grasslands, belah (*Casuarina pauper*)-rosewood (*Heterodendrum oleifolium*) woodland communities and isolated mulga (*Acacia aneura*) and bluebush (*Maireana pyramidata*) shrublands (NSW & OEH, 2018). Variable spear grass (*Stipa variabilis*), cane grass (*Eragrostis australasica*), lignum (*Muehlenbeckia cunninghamii*) with clumps of black box (*Eucalyptus largiflorens*) form part of the unique vegetation character of the surrounding area (National Parks and Wildlife Service (NSW), 2003). Lack of tall canopy species provides an expansive landscape. Thick clumps of Mallee vegetation forms a rich habitat for a diversity of fauna including the endangered Mallee fowl and other species found in the region. Other areas to the north, east and west of the Project Area show predominantly low vegetation allowing easier grazing opportunities for sheep, thus rendering the area favourable for livestock grazing.

Dry lakes and Swamps

Given the semi-arid conditions of the region, dry lakes and swamps remain dry through most of the year. Rivers and waterways are viewed as significant features within the landscape and hold notable visual amenity within the region. These include the Murray River, Gol Gol Creek, Lake Gol Gol and Gol Gol Swamp (Amoateng, 2020).

Lakes or depressions are generally shallow with clay floors and typically have defined vegetation such as lignum, nitre goosefoot (*Chenopodium nitrariaceum*) and canegrass species (National Parks and Wildlife Service (NSW), 2003). The closest fresh water sources are Gol Gol Creek, Gol Gol Lake and Murray River which are located approximately south west of the Project Area.

National Park and Nature Reserve

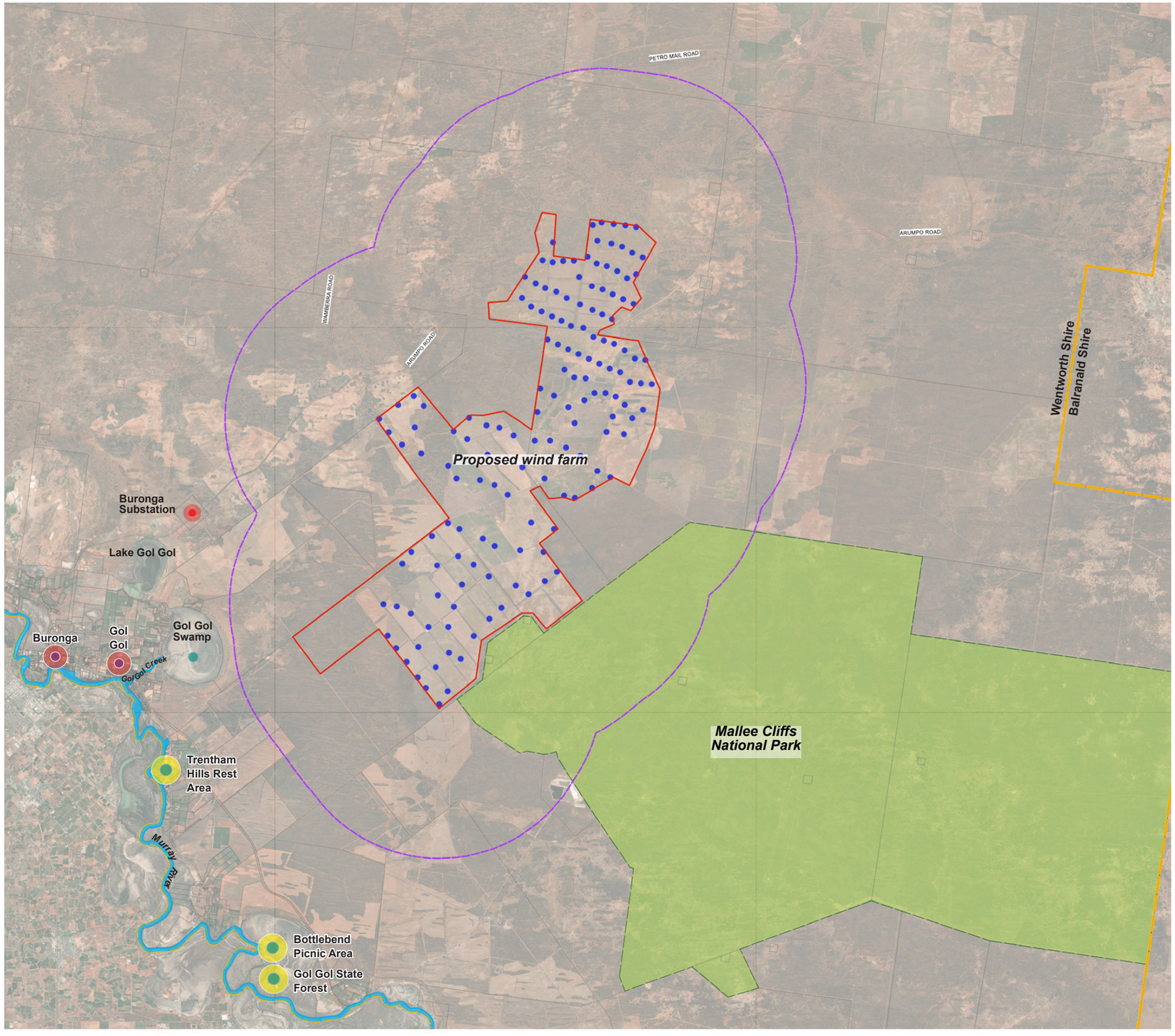
The MCNP and associated Nature Reserves are located to the immediate south east of the Project Area. The MCNP exhibits characteristics of the Murray Darling Depression Bioregion. The MCNP and Nature Reserve contain undisturbed patches of dense belah - rosewood, mallee, mulga - bluebush communities with abundant grasses and dillon bush (National Parks and Wildlife Service (NSW), 2003). The MNCP is extensively managed to protect the unique red sandplains and linear dunefields formed nearly 500,000 years ago. The MCNP is part of Country for the Barkandji People and an Indigenous Land Use Agreement (ILUA) with the Barkandji native title holders focuses on managing the parks within the native title area (NSW & OEH, 2018). The MCNP serves as a habitat for native flora and fauna including 11 Native plant communities and 293 native plant species and 27 threatened fauna species such as the Mallee Fowl (NSW & OEH, 2018).

Mungo National Park located within the Willandra Lakes Region World Heritage Area is located approximately 52 km north east of the Project. Arumpo Road is a primary connector corridor which provides access to the Mungo National Park.

Recreation Associations and Points of Interest

Recreational associations within the wider Study Area are limited. Bottle bend Picnic Area and Stockyard Camp Ground within the Gol Gol State Forest is the closest publicly accessible recreation spot (approximately 15 km south) which offers opportunities for short bushwalks and birdwatching. Dense mallee, belah and rosewood communities dominate the region.

Other areas of interest include the Trentham Cliffs Rest Area on Sturt Highway. This area serves as an important resting spot for commuters travelling towards the towns of Buronga and Mildura. For the purposes of this PVIA, an assessment of impacts from all these rest areas will be relevant due to its proximity to the Project Area.



Existing Landscape Features
Proposed Mallee Wind Farm

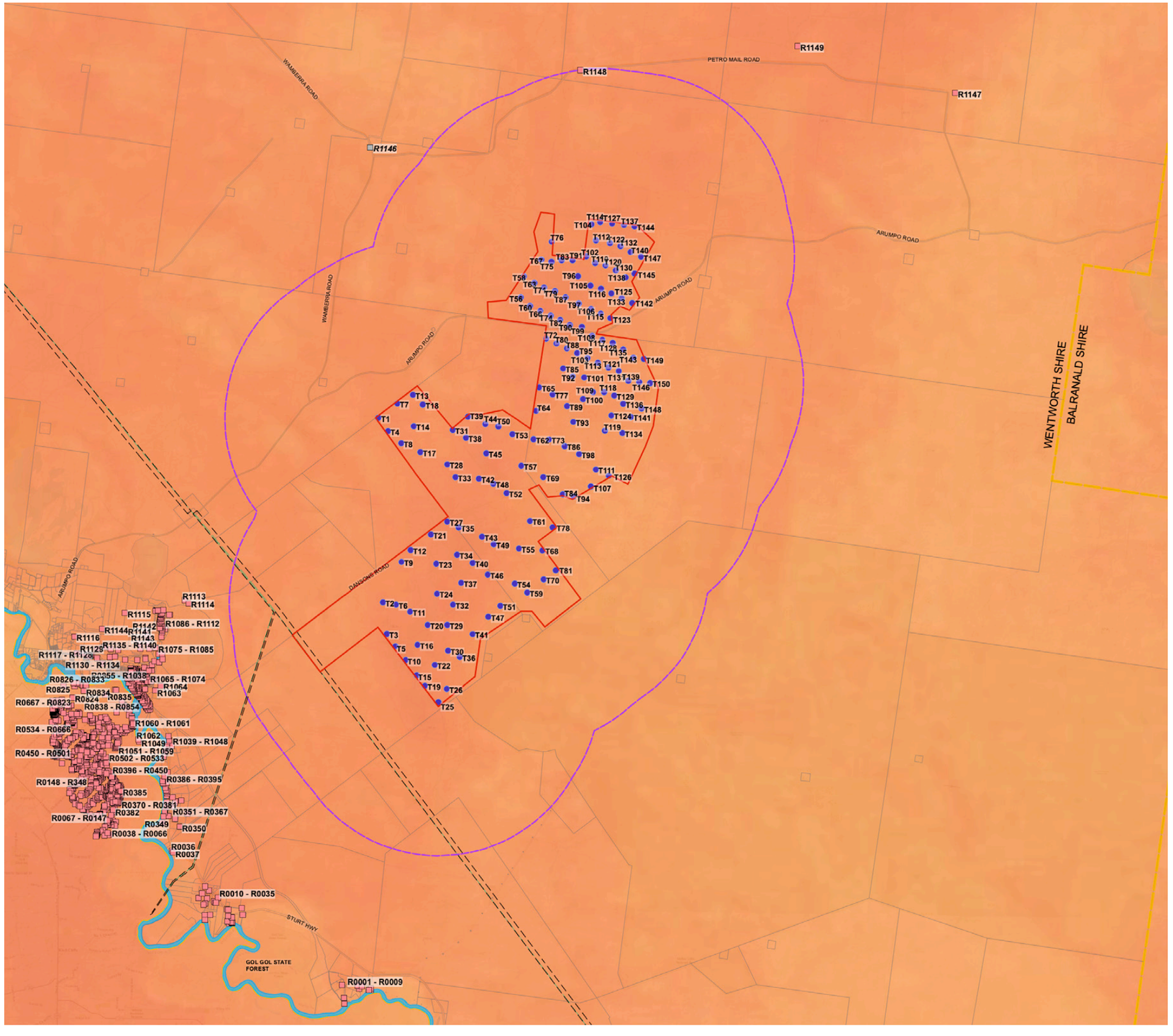
LEGEND

- Project Boundary
- Proposed Turbine Locations
- Main Road
- Minor Road
- 8000 m from nearest proposed wind turbine locations
- National Park / SCA / Nature Reserve
- Points of Interest
- Swamp
- Townships / Settlements
- Substation
- Rivers, creeks and channels

N

0 2 4 6 8 10km

Figure 7 Existing Landscape Features (Map Source: ESRI Aerial Imagery)

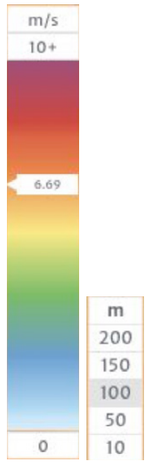


Relative Wind Source

Proposed Mallee Wind Farm

LEGEND

- Project Boundary
- Proposed Turbine Locations
- 8000 m from nearest proposed wind turbine locations



Relative ranges of average wind strength in metres per second

Figure 8 Wind Resource (Map Source: Badger et al. 2019)

5.4 Preliminary Landscape Character Units and Scenic Quality Rating

The Bulletin states: *the baseline study inputs, including key landscape features and sensitive land use designations, should lead to the identification of Scenic Quality Classes. Scenic quality refers to the relative scenic or aesthetic value of the landscape based on the relative presence or absence of key landscape features known to be associated with community perceptions of high, moderate or low scenic quality. It is both a subjective and complex process undertaken by experts in visual impact assessment, taking into account community values identified in early community consultation*.

In accordance with the Bulletin, a Scenic Quality 'frame of reference' has been formulated by Moir LA (**Table 2**) utilising *An approach to landscape sensitivity assessment* by Natural England. The preliminary frame of reference developed for the Project is in keeping with the example frame of reference provided in the Bulletin.

Each category of the 'frame of reference' has been quantified for each Landscape Character Unit to determine a Scenic Quality Rating of **low**, **moderate** or **high.** The resulting *Scenic Quality Rating* is used during the EIS phase to assist in defining the Visual Influence Zones in accordance with the Bulletin.

SCENIC QUALITY RATING		
Description	**LOW** ⟷	**MODERATE** ⟷ **HIGH**
Landform	- Flat Topography - Absence of Landscape Features - Open, broad extents of spaces	- Diversity in Topographical Range - Unique Landscape Features - Intimate spaces
Waterforms	- Absence of Water	- Presence of Water - Visually prominent lakes, reservoirs, rivers streams and swamps.
Vegetation	- Absence of vegetation - Lack of diversity - Land cleared of endemic vegetation - Low level of connection between vegetation and landscape / topography	- Abundant vegetation - High diversity - High retention of endemic vegetation. - High level of connectivity between natural landscape and landforms.
Human Influence	- High population. - High density in settlement - High presence of Infrastructure - High levels of landscape modification	- Low / dispersed population - No settlement - Absence of infrastructure - Landscape in natural state
Activity	- High levels of traffic movement - Presence of freight and passenger transport networks - Presence of production or industry.	- Low traffic movement - Absence of freight and passenger transport - Absence of production or industry
Rarity	- Typical landscape within a local and regional context	- Unique combination of landscape features in a local and regional context
Relationship with Adjoining Landscapes	- Low visible connection with adjoining landscapes - Low variability between adjoining landscapes. - Landscape features do not contribute to amenity from adjoining landscapes	- High visibility with adjoining landscapes. - High variability and contrast with adjoining landscapes - Landscape features contribute significantly to amenity of adjoining landscapes

Table 2 Scenic Quality Class Frame of Reference

5.5 Preliminary Landscape Character Units

An assessment of existing land use and landscape features suggests that the Project Area and its surrounds exhibit a strong agricultural history of grazing and cropping along with ecological associations with the adjacent Mallee Cliffs National Park and associated Nature Reserves. Several Landscape Character typologies exist within the Study Area (refer to ***Figure 9***). As a part of the Preliminary Landscape Character Assessment, a total of five (5) key landscape typologies referred to hereafter as Landscape Character Units (LCUs) have been identified.

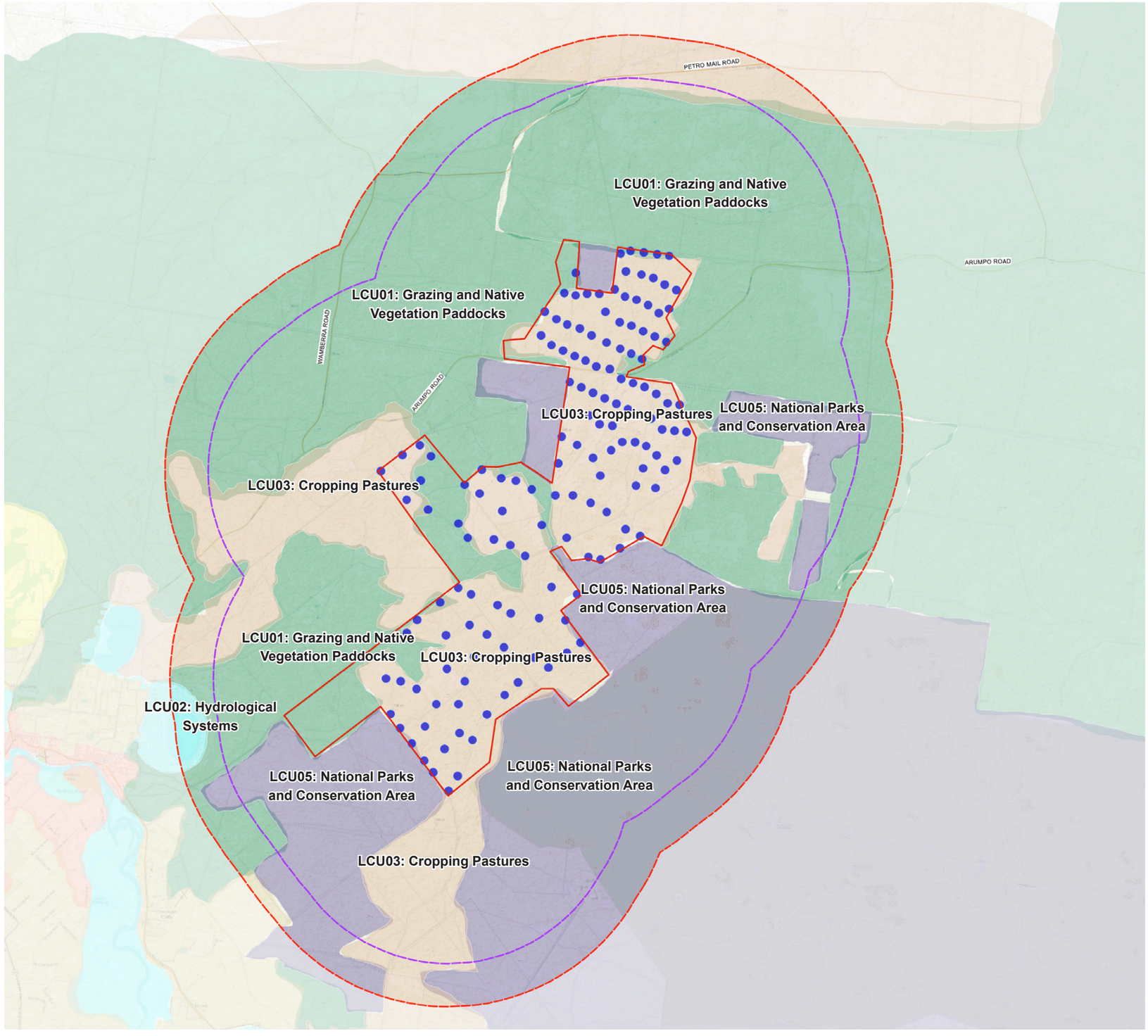
Table 3 provides an overview of the LCUs and preliminary Scenic Quality Ratings applied. These ratings have been developed using a standard frame of reference provided in the Bulletin and the results from ongoing community consultation. The LCUs and Scenic Quality Ratings will be refined in the EIS Phase of the Project to reflect input provided by the community during ongoing consultation.

Table 4 provides a brief overview of the potential visibility of the Project from each of the LCUs.

Landscape Character Units

LCU:	Name:	General Character:	Preliminary Scenic Quality Rating:
LCU01	**Grazing and Native vegetation paddocks**	*Clear, flat expanses of land used for grazing or cropping. Most prominent character of the region with minor to no elevation changes.*	**Low**
LCU02	**Hydrological systems**	*Characteristic riverine vegetation along river channels, creeks and lakes. Features include Gol Gol Creek, Lake Gol Gol, associated floodplains and swamps.*	**Moderate**
LCU03	**Cropping pastures**	*Expansive lots with modified land to support pastoral farming and irrigated agriculture. Vegetation character is predominantly Mallee shrubland scattered throughout the landscape.*	**Low**
LCU04	**Townships**	*Dense urban development is characteristic of this LCU and includes the towns of Buronga and Gol Gol.*	**Low**
LCU05	**National Parks and Conservation Areas**	*Comprises of dense woodlands of dense mallee, rosewood, bluebush and belah woodlands that are spread across the extents of Riverina plains within the extents of the Mallee Cliffs National Parks and associated Nature Reserves and other vegetated areas in close proximity.*	**High**

Table 3 Overview of Preliminary Landscape Character Units



Preliminary Landscape Character Units

Proposed Mallee Wind Farm

LEGEND

- Project Boundary
- Main Road
- Minor Road
- 8,000 m from nearest proposed wind turbine locations
- 10,000 m Study Area
- LCU01: Grazing and Native Vegetation Paddocks
- LCU02: Hydrological Systems
- LCU03: Cropping Pastures
- LCU04: Townships
- LCU05: National Park and Conservation Areas

N

0 2 4 6 8 10km

Figure 9 Preliminary Landscape Character Units (Map Source: Six Maps)

LCU01: Grazing and Native Vegetation Paddocks

The LCU is defined by vast, open land parcels that are utilised for livestock grazing. The LCU portrays the most dominant character in the region. It comprises of open plains with scattered or no tree cover and vast extents of Chenopod Mallee and Shrubland. Common land uses include grazing, dryland cropping, modified and irrigated pastures.

Scenic quality rating: Low

See Images 3 and 4.

Image 3

Naturally cleared land with patchy tree cover utilised for livestock grazing.

Image 4

Typical characteristic of the area surrounding the Project. Generally modified paddocks with cleared vegetation to support grazing and other activities.

LCU02: Hydrological Systems

This LCU is defined by characteristic riverine vegetation along its extents. Gol Gol Swamp, Gol Gol Creek, Murray River and Gol Gol Lake are some significant features within the LCU. Human intervention is through urban development along the river fringes. Tree density varies in different locations and native vegetation has been modified as a result of urban development. Wetlands located within the surrounding areas serve as retention basins for both the urban and agricultural run-offs. Vegetation is mostly Red Gum / Black Box riparian forests and woodlands.

Scenic quality rating: Moderate

See Images 5 and 6.

Image 5

View of the Murray River - a significant hydrological feature within the region. Urban development is visible along the river fringes.

Image 6

Typical view of Gol Gol Creek leading into Gol Gol Swamp characterised by clumps of belah trees, rosewood, grasses and forbs in gently sloping to flat tracts of lands.

LCU03: Cropping Pastures

The LCU is characterised by vast extents of land modified for dryland cropping and irrigated agriculture. Vegetation is patchy and serves only as wind breaks or screening. Expansive lots have been modified to support pastoral farming and irrigated agriculture. This LCU is typically visible within and around the Project Area.

Scenic quality rating: Low

See Images 7 and 8.

Image 7

Typical character of vast modified pastoral lands modified for agriculture. Landscape is usually highly modified.

Image 8

Characteristic expansive irrigated farmlands with sparse or no vegetation. Land has undergone modifications to support agricultural production.

LCU04: Townships

The LCU is typically defined by dense urban development with significant human intervention. Buronga and Gol Gol are the closest townships to the Project and are important town centres within the Riverina region. Both towns are included within the wider Sunraysia region along the Murray River and are key producers of fruits and vegetables.

Scenic quality rating: Low

See Images 9 and 10.

Image 9

Typical character of Buronga Town.

Image 10

Typical characteristic of land surrounding Gol Gol. Land has been modified to support production of fruits and vegetables.

LCU05: National Park and Conservation Area

This LCU is defined by the densely vegetated Mallee shrublands that fall within the extents of the Mallee Cliffs National Park and associated nature reserves. Land is subjected to minimal use and represents unique characteristics defined by the flat topography and dense mallee, black box and belah woodlands. Primary function within the LCU is nature conservation. Public access is limited to researchers and bird watching groups. Since reservation recreational activities have been excluded from Mallee Cliffs as access is via private roads.

Scenic quality rating: High

See Images 11 and 12.

Image 11

LCU defined by significant shrubland with limited or no public access.

Image 12

Low lying Shrubland are characteristic of this LCU.

Landscape Character Units		
LCU:	**Name:**	**Preliminary Visual Impact Assessment**
LCU01	**Grazing and Native Vegetation**	Views towards the Project will be available from this LCU due to the relatively flat topographical character and its proximity to the Project. Land within this LCU is modified for pastoral farming and grazing pastures lacking tree cover. Scattered vegetation in the form of screening or wind breaks will likely screen views towards the Project. Slight undulations in the topography will likely fragment views towards the Project.
LCU02	**Hydrological Systems**	Views from this LCU will likely be fragmented by vegetation within the LCU. Some parts of the LCU may likely have views towards the Project. However, due to the distance of this LCU the turbines may be indiscernible. Additionally, intervening vegetation will assist in filtering views of the Project.
LCU03	**Cropping Pastures**	This LCU is the most prominent character around the Project Area. The Project is located within the LCU. Views are generally expansive due to flat topography and lack of intervening elements. Views of the Project are likely to be clear and open. Scattered vegetation will help limit views from certain locations from this LCU. It is likely that views of the Project will be available but fragmented.
LCU04	**Townships**	Views towards the Project will likely be filtered by built structures and vegetation associated with development. Towns within this LCU are Buronga and Gol Gol located approximately 16 and 12 km from the Project Area, respectively. There are no townships within the 10km Study Area.
LCU05	**National Parks and Conservation Areas**	The Project is located adjacent to the LCU. Access within the LCU is limited. It is likely that views towards the Project will be available due to the relatively flat topography and elevated position of the turbines. However, due to the limited public access within the LCU, resulting visual impact will likely be substantially reduced.

Table 4 Overview of Preliminary Visual Impact Assessment of LCUs

6.0 Preliminary Assessment Tools

6.1 Overview of Preliminary Assessment Tools

To assist in defining the visual catchment, preliminary assessment tools have been developed in the Bulletin. In accordance with the Bulletin, the purpose of the preliminary assessment tools are: *to provide an early indication of where turbines require careful consideration because of potential visual impacts. The tools apply to both dwellings and key public viewpoints in the study area. The tools provide an early indication of where placement of turbines will require further assessment and justification, and where consultation with potentially affected landowners needs to be focused – including discussions for landholder agreements.*

The preliminary assessment tools involve analysis of two key visual parameters:

1. Visual Magnitude (**Refer to Section 6.2**)
2. Multiple Wind Turbine Tool (**Refer to Section 6.4**)

Once defined, the Bulletin states: *Further assessment and justification for placement of turbines located in these sensitive areas in the EIS will be required, along with a description of mitigation and management measures being employed to reduce impacts. This assessment may identify that factors such as topography, relative distance and existing vegetation may minimise or eliminate the impacts of the project.*

Dwellings identified through the application of the Preliminary Assessment tools have been assessed in detail in **Appendix A** of this PVIA.

6.2 Preliminary Assessment Tool 1: Visual Magnitude

The Visual Magnitude Threshold is based on the height of the proposed wind turbines to the tip of the blade and distance from dwellings or key public viewpoints as shown in **Figure 10.**

In accordance with the Bulletin: *proposed turbines below the black line must be identified along with the dwellings or key public viewpoints as part of the request for SEARs.* The proposed wind turbines are based on a worst case scenario with a tip height of *280 metres*. The 'black line' intersects at a distance of *3,750 metres* and the 'blue line' intersects at *5,500 metres*.

For the purpose of the Preliminary Assessment, the Visual Magnitude thresholds are based on a 2D assessment of the Project alone. Further assessment indicates factors such as topography, relative distance and existing vegetation may minimise or eliminate the impacts of the Project from residences.

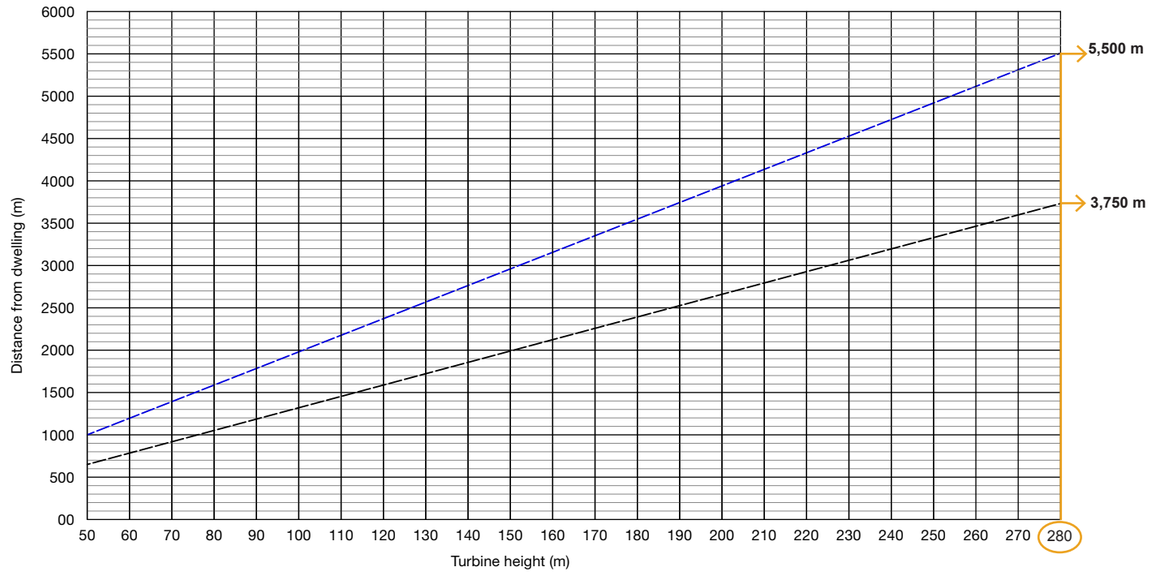
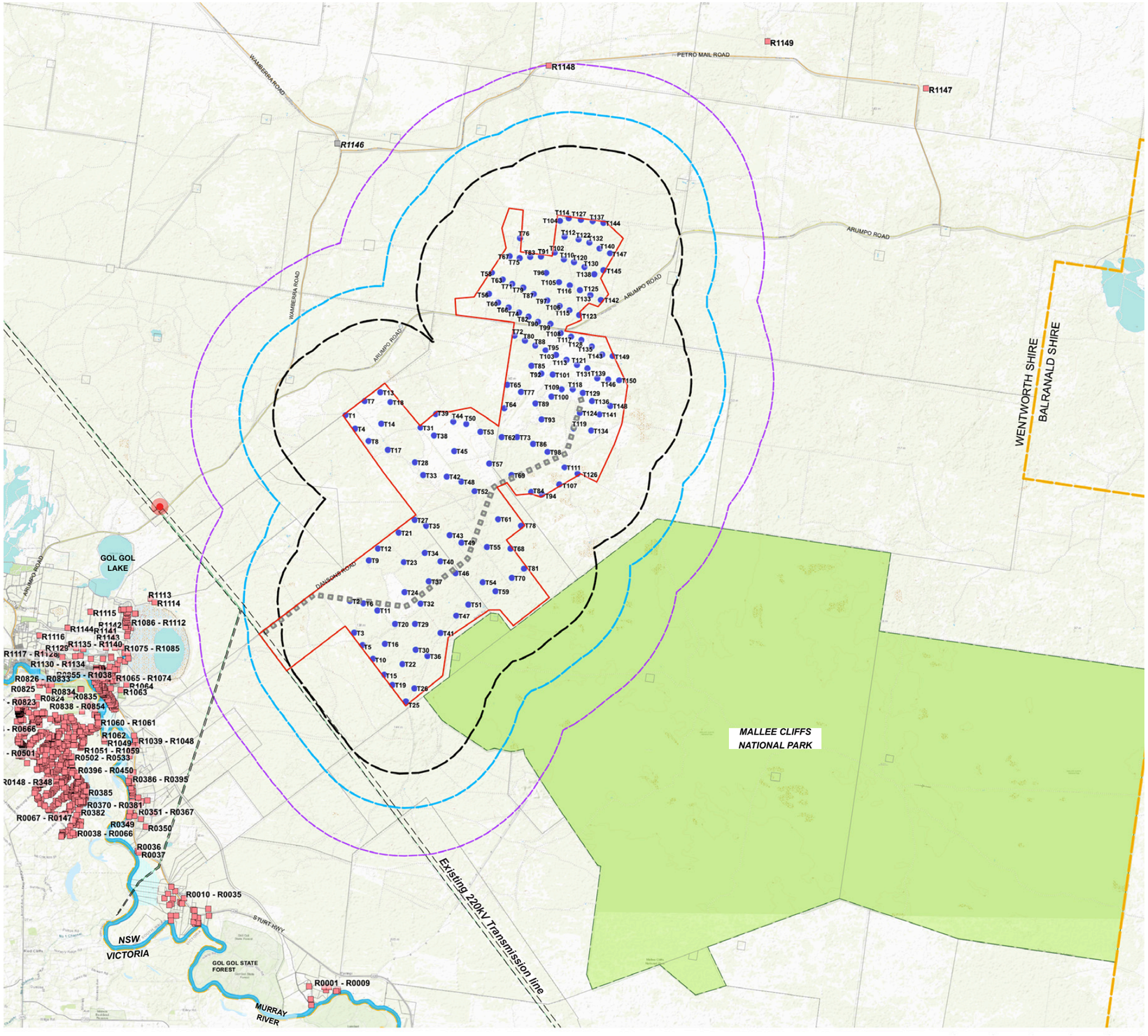


Figure 10 Visual Magnitude Thresholds for Mallee Wind Farm
(Adapted from Visual Assessment Bulletin)

6.3 Results of Preliminary Assessment Tool 1: Visual Magnitude

Application of the Preliminary Assessment Tools to the Project identified one (1) dwelling which requires further assessment in accordance with the Bulletin, due to its proximity within 8km of the nearest proposed wind turbine location. Non-involved dwellings identified within the Study Area are shown on **Figure 11.**

- No non-involved dwellings were identified within 3,750 or 5,500 metres of the proposed wind turbine locations (within the black line or blue line of visual magnitude).
- One (1) non-involved dwelling (R1148) has been identified within 5,500 - 8,000 metres of the proposed wind turbine locations.
- Preliminary assessment of one (1) non-involved dwelling (R1148) within 8,000 m of the proposed turbines have been included in **Appendix A**. This assessment illustrates that existing intervening elements such as vegetation surrounding this non-involved dwelling is likely to fragment views to the Project. Further detailed assessment and site inspections of sensitive receptors to ground-truth this analysis will be undertaken during the EIS phase.



Visual Magnitude

Proposed Mallee Wind Farm

LEGEND

- Project Boundary
- Proposed Turbine Location
- Non-Involved Dwellings
- Involved Dwellings
- Buronga Substation
- Main Road
- Minor Road
- 3,750 m from nearest proposed wind turbine locations
- 5,500 m from nearest proposed wind turbine locations
- 8,000 m from nearest proposed wind turbine locations
- LGA Boundary
- Existing 220kV transmission line
- Proposed HV Interconnector (Project Energy Connect)
- National Park / Nature Reserves
- Potential Transmission Line Option

Note:

Preliminary Assessment Tool 1: Visual Magnitude is based on a 2D Assessment alone and does not take into account topography, vegetation or other screening factors which may reduce the potential for viewing turbines.

N

0 2 4 6 8 10km

Figure 11 Preliminary Assessment Tool 1: Visual Magnitude (Map Source: Six Maps)

6.4 Preliminary Assessment Tool 2: Multiple Wind Turbine Tool

The Multiple Wind Turbine Tool provides a preliminary indication of potential cumulative impacts arising from the proposed Project. To establish whether the degree to which dwellings or key public viewpoints may be impacted by multiple wind turbines, the proponent must map into six sectors of 60° any proposed turbines, and any existing or approved turbines within eight (8) kilometres of each dwelling or key public viewpoint. **Figure 11** provides examples of where a dwelling or key public viewpoint may have views to turbines in multiple 60° sectors.

In accordance with the Bulletin: *Where wind turbines are visible within the horizontal views of the dwelling or key public viewpoints in three or more 60° sectors, the proponents must identify the turbines, relative dwelling and key public viewpoint, along with the relative distance and submit these to the Department as part of the request for SEARs.* These turbines will become a focus for assessment in the EIS.

Figure 12 provides an overview of the number of 60º sectors visible from each of the dwellings identified within eight (8) kilometres.

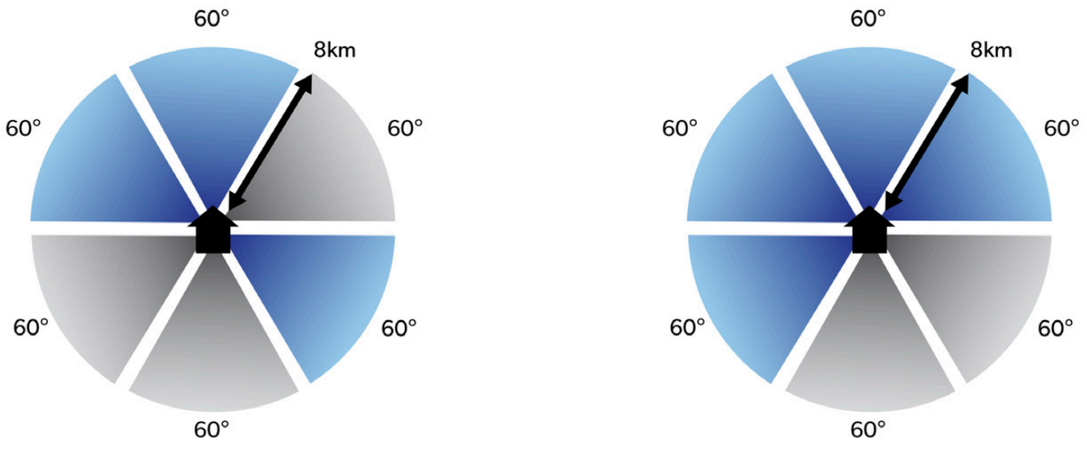


Figure 12 Multiple Wind Turbine Tool
(Source: Visual Assessment Bulletin)

6.5 Results of Preliminary Assessment Tool 2: Multiple Wind Turbine Tool

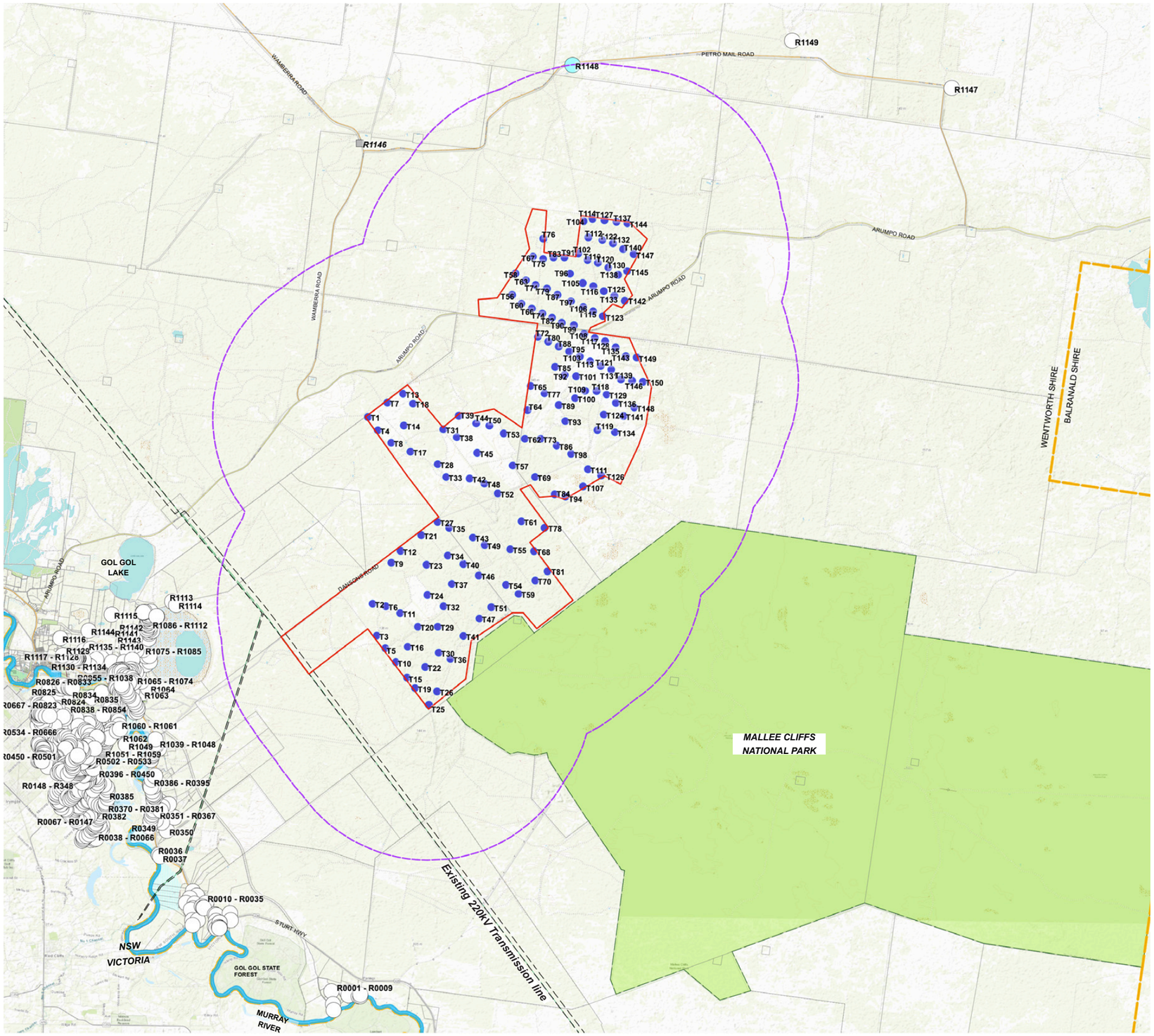
When applied to the Project, the 2D Multiple Wind Turbine Tool (see **Figure 13**) identified one (1) dwelling (R1148) that will view turbines associated with the Project. This non-involved dwelling will have views in up to one (1) 60 degree sectors (see **Table 5**).

The following summary is based on a 2D assessment and considers turbines associated with the Project.

Further assessment of this dwelling using 3D topographic mapping has delivered the same results. Existing screening factors (including vegetation and structures) may reduce visibility of the turbines. This has been discussed further in ***Appendix A***.

Dwelling ID	Distance to nearest WTG:	Number of 60º Sectors (Based on a 2D Assessment):	Number of 60º Sectors associated with the Project:	Screening Factors:
Non-involved dwellings with turbines in up to one (1) or two (2) 60º Sectors (up to 60º and 120º):				
R1148	**7.99 km**	One (1) 60º Sectors (up to 60º)	One (1) 60º Sectors (up to 60º)	*Existing intervening vegetation. Existing Farm structures*

Table 5 Non-involved dwellings identified using Multiple Wind Turbine Tool



Multiple Wind Turbine Tool

Proposed Mallee Wind Farm

LEGEND

- Project Boundary
- 280 m Mallee Wind Farm (MWF) Turbine Location
- Involved dwellings
- 8000 m from nearest proposed wind turbine locations
- Existing 220kV electrical transmission line
- Proposed HV Interconnector (Project Energy Connect)
- National Park / Nature Reserves

MWTT Results for Non-involved Dwellings & key viewpoints:

- Dwellings or viewpoints in excess of 8,000 m
- One (1) 60º Sector (60º)
- Up to two (2) 60º Sectors (120º)
- Up to three (3) 60º Sectors (180º)
- Up to four (4) 60º Sectors (180º)
- Up to five (5) 60º Sectors (180º)
- Up to six (6) 60º Sectors (180º)

Note:

Preliminary Assessment Tool 2: Multiple Wind Turbine Tool is based on a 2D Assessment alone and does not take into account topography, vegetation or other screening factors which may reduce the potential for viewing multiple turbines.

N

0 2 4 6 8 10km

Figure 13 Preliminary Assessment Tool: Multiple Wind Turbine Tool (Map Source: Six Maps)

7.0 Preliminary Zone of Visual Influence

7.1 Overview of Preliminary Zone of Visual Influence

The Bulletin states *'the use of Geographic Information Systems (GIS) to facilitate the application of the tools will streamline the evaluation phase of the evaluation phase of a project during the pre-lodgement stage. This can also assist in refining the number of turbines and viewpoints that will ultimately need more detailed assessment.'*

A Zone of Visual Influence (ZVI) diagram has been prepared for the Project to illustrate the theoretical visibility of the proposed turbines from the blade tip height. **Figure 14** depicts the areas of land from which the proposed development may be visible and provides an indicative number of wind turbines based on the blade tip height of 280 metres.

The ZVI (also known as a Zone of Theoretical Influence Model) represents the area over which a development can theoretically be seen and is based on a Digital Terrain Model (DTM). The ZVI usually presents a bare ground scenario - ie. a landscape without screening, structures or vegetation, and is usually presented on a base map (Scottish Natural Heritage, 2017).

The ZVI has been determined through the use of digital topographic information and 3D modelling software *WindPro*. The ZVI has been assessed to approximately 30 km from the Project. Although it is possible for the development to be visible from further than 30 km away, it is generally accepted that beyond 10 km visibility is diminished.

7.2 Summary of Preliminary Zone of Visual Influence

The following provides a summary of the Zone of Visual Influence diagrams prepared for the Preliminary Layout of the Project.

- Due to the relatively a flat topography, the majority of the turbines associated with the Project will be visible from the surrounding areas.
- Certain areas to the southwest and west of the Project are characterised by shallow topographical changes by embankments along lakes and swamps. The ZVI identifies these areas to have limited views due to the minor topographical differences between them and the Project.
- Views to most turbines associated with the Project are likely to be available to the dwelling located approximately eight (8) kilometres of the nearest proposed turbine. This assessment is based on a consideration of topography alone and does not consider intervening elements such as vegetation and existing structures.
- Following the development of the ZVI, detailed site investigations (in the form of a viewpoint analysis inventory and dwelling assessments) have been undertaken to ground-truth the findings. Preliminary viewpoint analysis been included in ***Appendix A*** and ***Appendix B***.
- Further detailed assessment from areas identified in the ZVI will be undertaken in the EIS Phase of the assessment.

It is important to reiterate that this is a preliminary assessment based on worst case scenario that does not consider the impact of vegetation or structures. Based on the preliminary assessments in ***Appendix A*** and ***Appendix B***, it is likely that existing intervening vegetation surrounding non-involved dwellings is likely to reduce views of turbines from a number of locations.

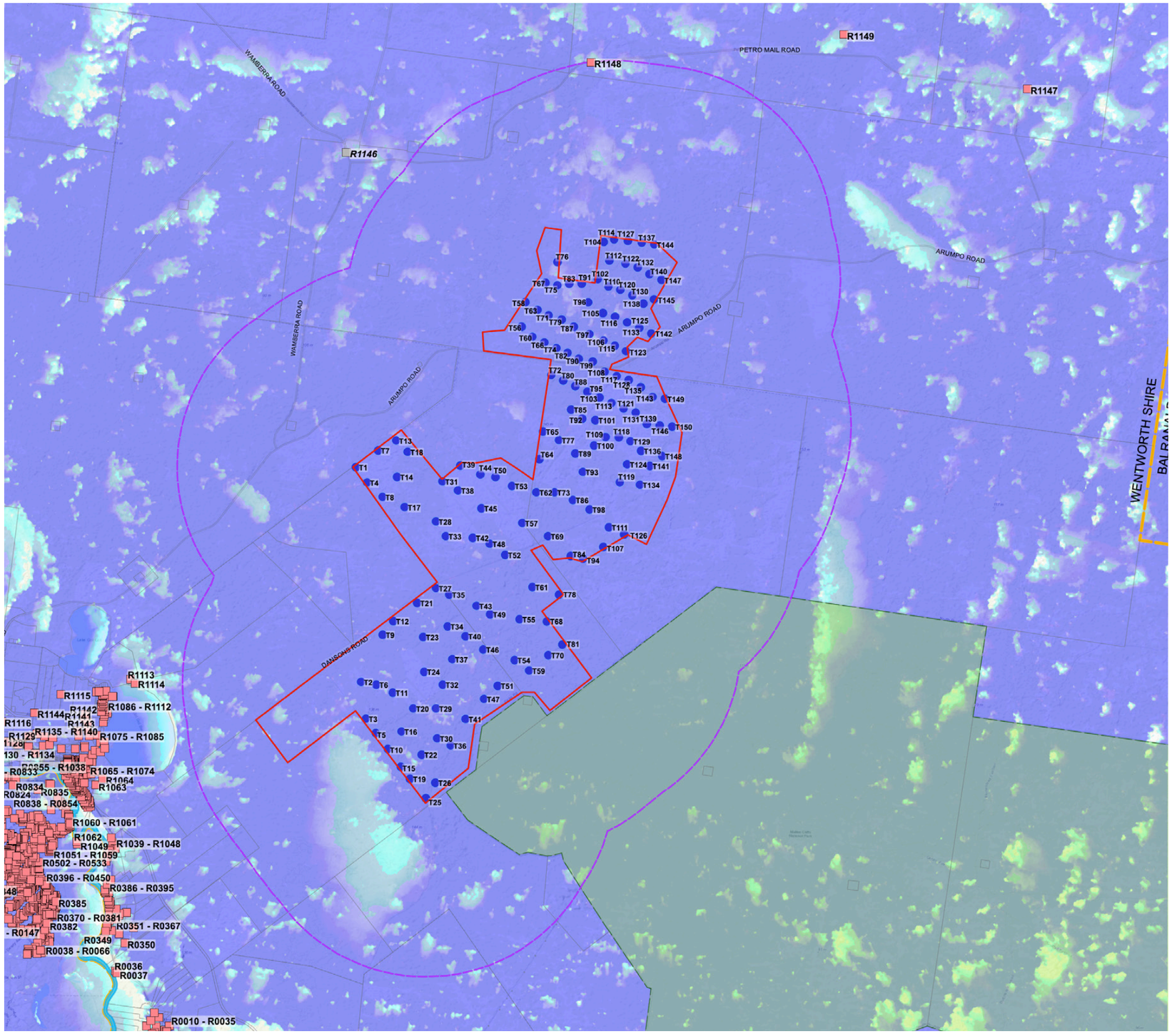


Figure 14 Zone of Visual Influence (Blade Tip 280 m)

Zone of Visual Influence Blade Tip Height 280 m

Proposed Mallee Wind Farm

LEGEND

- Project Boundary
- Proposed Turbine Locations
- Involved dwellings
- Non-involved dwellings
- 8,000 m from nearest proposed wind turbine location

Number of visible turbines (at tip height)
(Based on topography alone):

- 0
- 1-49
- 50-89
- 90 and above

Note:

The ZVI 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 ZVI is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst case scenario.

N

0 2 4 6 8 10km

8.0 Preliminary Dwelling & Viewpoint Assessment

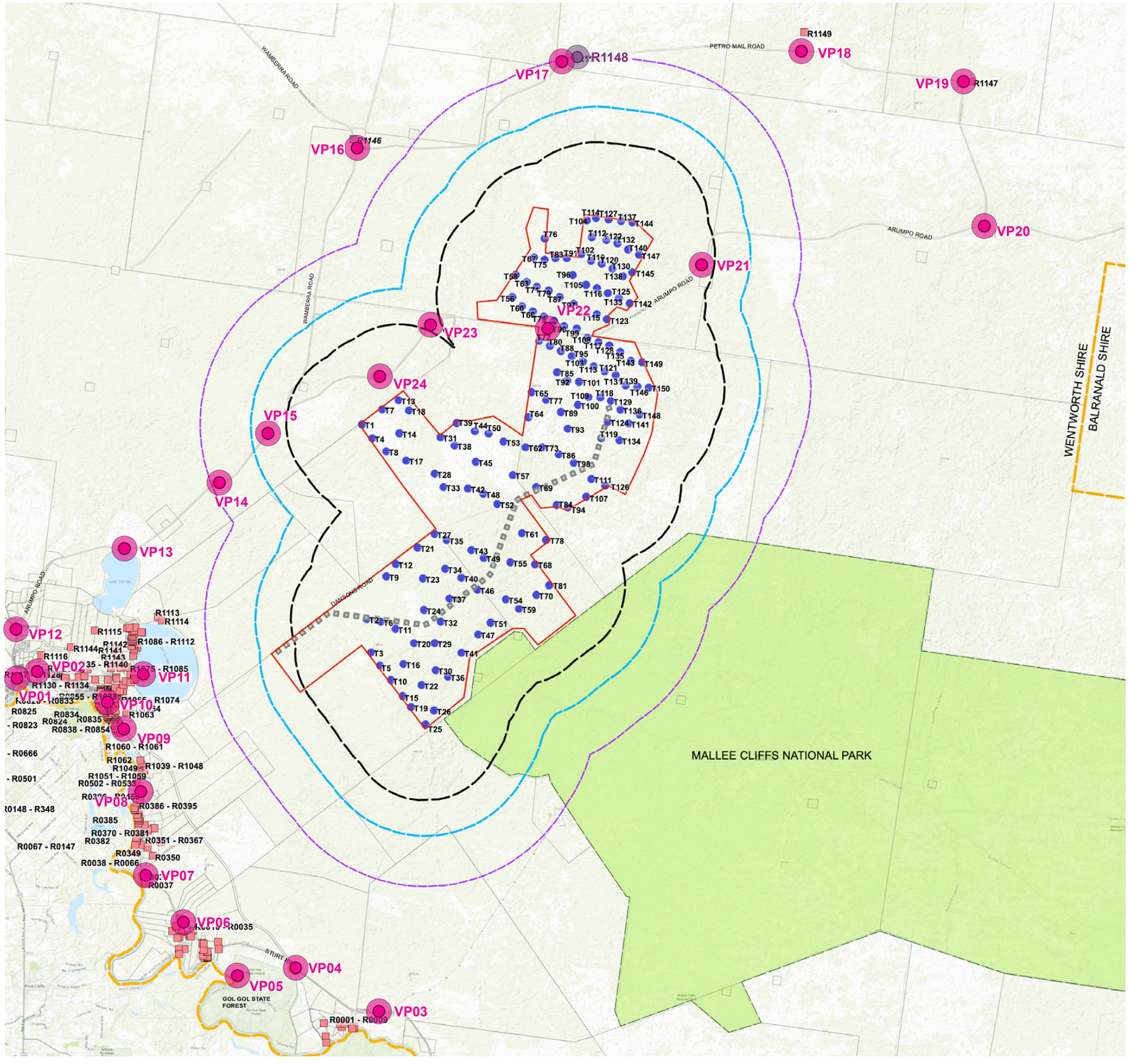
8.1 Preliminary Assessment of Dwellings

Examples of the preliminary assessment tools applied to one (1) representative non-involved dwelling (R1148) (as shown on **Figure 15**) within 8,000 m of the nearest turbine have been included in **Appendix A.**

The preliminary desktop assessment identifies existing vegetation and existing farm structures surrounding the dwellings which would reduce the potential visual impacts identified by the preliminary assessment tools and Zone of Visual Influence.

8.2 Preliminary Assessment of Public Viewpoints

Appendix B provides preliminary assessments from public viewpoints. A total of 24 preliminary viewpoints have been selected to illustrate the varying landscape character typologies throughout the Study Area and provide a preliminary assessment of the potential visibility of the Project (as shown on **Figure 15**).



Preliminary Dwelling and Viewpoint Assessment Locations

Proposed Mallee Wind Farm

LEGEND

- Project Boundary
- Proposed Turbine Locations
- Main Road
- Minor Road
- Potential Transmission Line Option
- 3,750 m from nearest proposed wind turbine locations
- 5,500 m from nearest proposed wind turbine locations
- 8,000 m from nearest proposed wind turbine locations
- National Parks / Nature Reserves
- Preliminary Dwelling Assessment locations
  Refer to Appendix A.
- Preliminary Viewpoint Assessment locations
  Refer to Appendix B.

N

0 2 4 6 8 10km

Figure 15 Preliminary Dwelling and Viewpoint Assessment Locations (Map Source: Six Maps)

9.0 Cumulative Visual Impact Assessment

9.1 Overview of Cumulative Visual Impacts

The Project is located to the western edge of the South West Renewable Energy Zone (REZ). The REZ has been identified by the NSW Electricity Strategy (refer **Figure 16**). The REZ is expected to play a vital role in delivery of affordable energy to the community across NSW (Energy NSW, 2022). The South West REZ was officially declared under the Electricity Infrastructure Investment Act 2020 by Matthew Kean MP (NSW Government – Minister for Energy) and published in the NSW Gazette on 4 November 2022.

The existing landscape character of the region allows for optimum harvest of wind energy due to the flat terrain and large expanses of uninhabited land with minimal obstructions in the landscape. These characteristics are beneficial to the output of wind energy and as such, it is highly likely that over time this will be utilised for the development of wind farm projects. **Figure 17** shows the wind farms that are currently proposed within the extents of the REZ. Majority of these projects are in the central and eastern parts of the REZ near the towns of Hay, Balranald and Coleambally.

Figure 16 South West Energy Zone (Source: Energy NSW, 2022)

9.2 Nearby Wind Farm Projects

Currently, six (6) other wind farm projects have been proposed in the REZ (refer **Figure 19**):

- Baldon Wind Farm (SEARs issued July 2022)
- Keri Keri Wind Farm (SEARs issued in April 2022)
- Yanco Delta Wind Farm (SEARs issued in May 2022)
- Burrawong Wind Farm (SEARs issued in December 2021)
- Bullawah Wind Farm (Request for Sears - October 2022)
- Dinawan Energy Hub (in scoping phase)

Other Wind Farm Projects:

Other wind farm projects in the area that are currently proposed include the Burrawong Wind Farm, Bullawah Wind Farm, Keri Keri Wind Farm, Keri Keri Solar Farm and Yanco Delta Wind Farm. Burrawong Wind Farm is located approximately 127 km away to the south east of the Project. Similarly, all other wind farm projects are located east of the Project exceeding 130 km. Therefore, there is limited potential to view these projects simultaneously.

9.3 Cumulative Impact on Broader Landscape Character

The re-occurrence of Large-scale renewable energy projects within a region 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 multiple renewable projects within the region would combine to become the dominant visual element, altering the perception of the general landscape character.

Due to the distance between the Project and other Large-scale renewable infrastructure projects, it is unlikely that there will be areas from which multiple projects will be visible simultaneously. Additionally, due to a limited number of dwellings within 8 km of the nearest proposed turbine and lack of dwellings surrounding the Project, cumulative visual impact is limited. 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.

Nearby Large Scale Renewable Energy Projects

Proposed Mallee Wind Farm

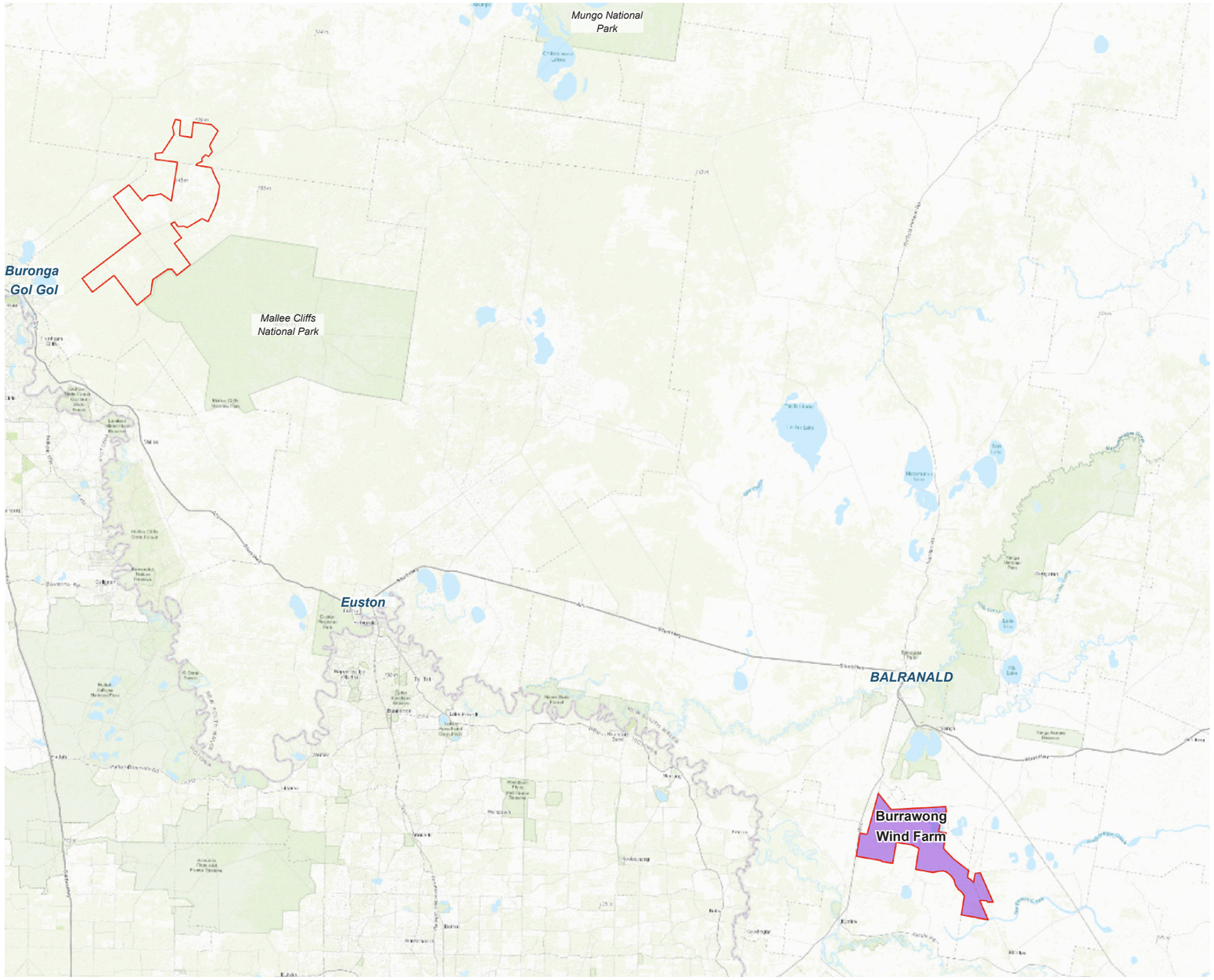


Figure 17 Nearby Large Scale Renewable Energy Projects (Map Source: ESRI)

LEGEND

- Project Boundary (Mallee Wind Farm)
- Indicative Project Boundary of Proposed Wind
- Roads
- Existing electrical transmission line
- National Parks / Nature Reserves / SCA

10.0 Summary and Next Steps

10.1 Summary of Preliminary Visual Impact Assessment

This PVIA report has been undertaken in accordance with the Visual Assessment Bulletin, and will be submitted with the Scoping Report in the request for SEARs. The following provides a brief summary of the PVIA and outlines the steps that will be undertaken in the Landscape and Visual Impact Assessment (LVIA) which will be undertaken during the EIS Phase of the Project.

10.1.1 Community Consultation

The report outlined the findings of community consultation to date which assisted in establishing the following:

- Key landscape features
- Defined areas of scenic quality and
- Identify key public viewpoints valued by that community.

Next Steps:

Community consultation will be ongoing through the Project. Ongoing input from the community will assist the preparation of the LVIA.

10.1.2 Existing Landscape Character

This PVIA provided a detailed assessment of the existing landscape character of the Study Area through the following:

- Identified land uses, key landscape features and key viewpoints,
- Categorisation of five (5) preliminary Landscape Character Units (LCUs),
- Application of preliminary scenic quality ratings to each of the LCUs ranging from Low - High,
- A brief preliminary overview of the potential visual impacts has been provided for each LCU.

Next Steps:

- Utilise the landscape character assessment to prepare a detailed Visual Baseline Study.
- Identify any additional key features, key viewpoints valued by the community through ongoing consultation.
- Refine the Landscape Character Units and allow the community to provide feedback on the relative scenic quality ratings of LCUs.
- Determine the Visual Influence Zone of key viewpoints and assess against the objectives outlined in the Visual Assessment Bulletin.

10.1.3 Application of the Preliminary Assessment Tools

The purpose of the Preliminary Assessment Tools in the PVIA is to identify ‘sensitive receptors’ for further assessment in the EIS Phase of the Project.

- The Multiple Wind Turbine Tool (MWTT) was applied to all non-involved dwellings within 8000m of the nearest proposed turbine.
- The MWTT identified one (1) non-involved dwelling (R1148) with views up to one (1) 60 degree sectors. R1148 has views towards the Project. An assessment of the potential visual impact of these viewpoints, along with key public viewpoints, are discussed in ***Appendix B***.

Next Steps:

- Ground-truthing of all identified non-involved dwellings.
- Undertake site inspection and detailed dwelling assessment at sensitive non-involved dwellings.
- The LVIA will assess each ‘sensitive receptor’ in detail to take into account topography, vegetation and other screening factors.
- Determine the potential visual impact of each sensitive receptor and provide mitigation methods to reduce potential visual impacts.

10.1.4 Zone of Visual Influence

A Zone of Visual Influence (ZVI) has been prepared to illustrate the theoretical visibility of the Project and to assist in defining the visual catchment. A Preliminary ZVI have been prepared from the blade tip height of 280 m to illustrate areas which have potential visibility of the Project.

Next Steps:

- The LVIA will require further detailed assessment from areas identified as having potential visibility in the Preliminary ZVIs.
- Graphic representations of the Project using GIS technology including wire frame diagrams and photomontages will be provided in the LVIA to be developed in the EIS phase.

10.1.5 Cumulative Visual Impacts of Surrounding Wind Farms

The Project is located within the NSW South-West REZ. It is important that the Project considers potential cumulative effects on the immediate and broader regional context that it forms a part of.

Next Steps:

Further assessment and justification for placement of turbines in multiple sectors will need to be detailed in the EIS, along with a description of the mitigation and management measures being employed to reduce impacts. Such further assessment may identify that factors such as topography, relative distance and existing vegetation may minimise the impacts of the Project.

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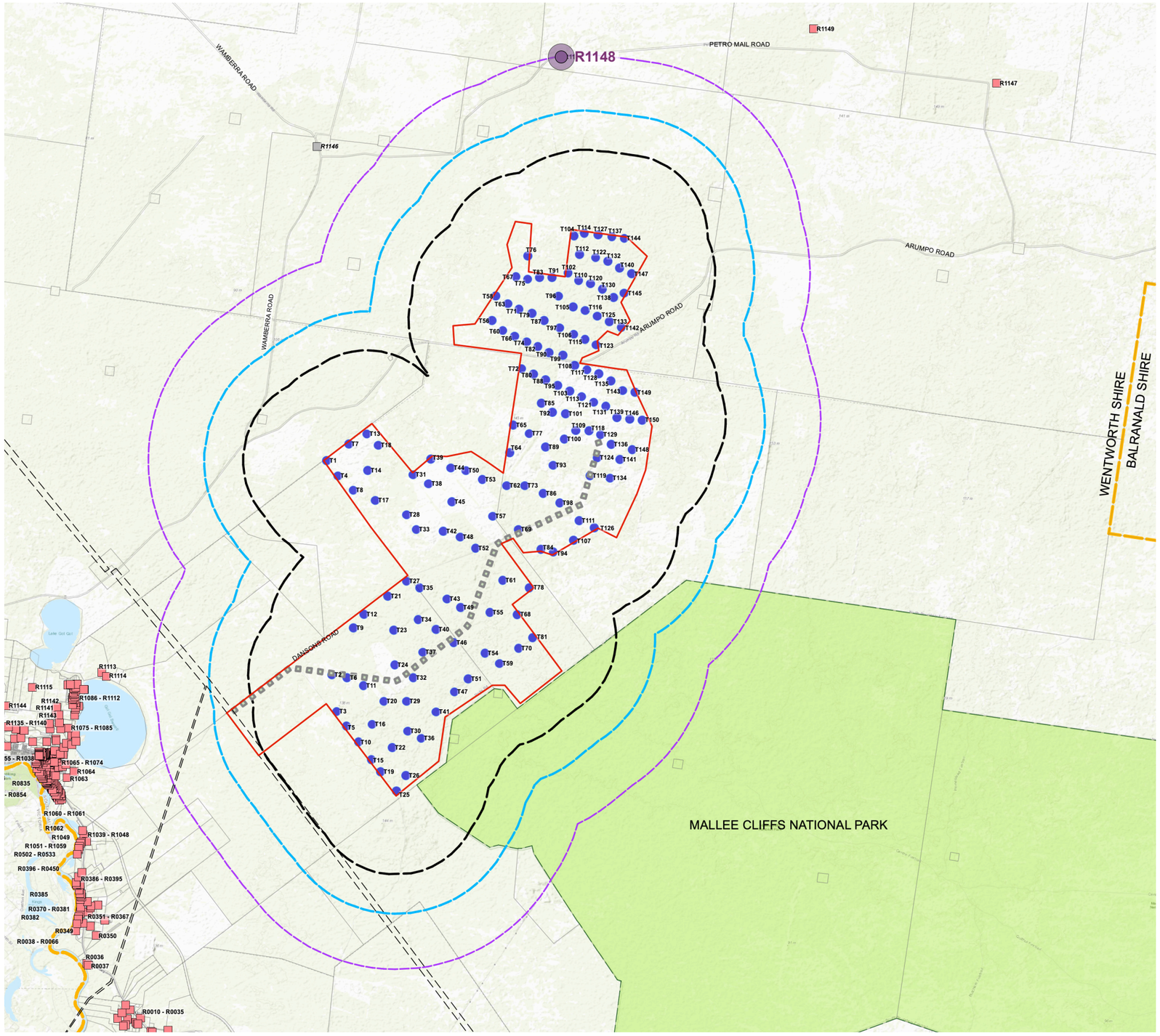
A

Preliminary Dwelling Assessments



Preliminary Dwelling Assessment Locations

Proposed Mallee Wind Farm

LEGEND

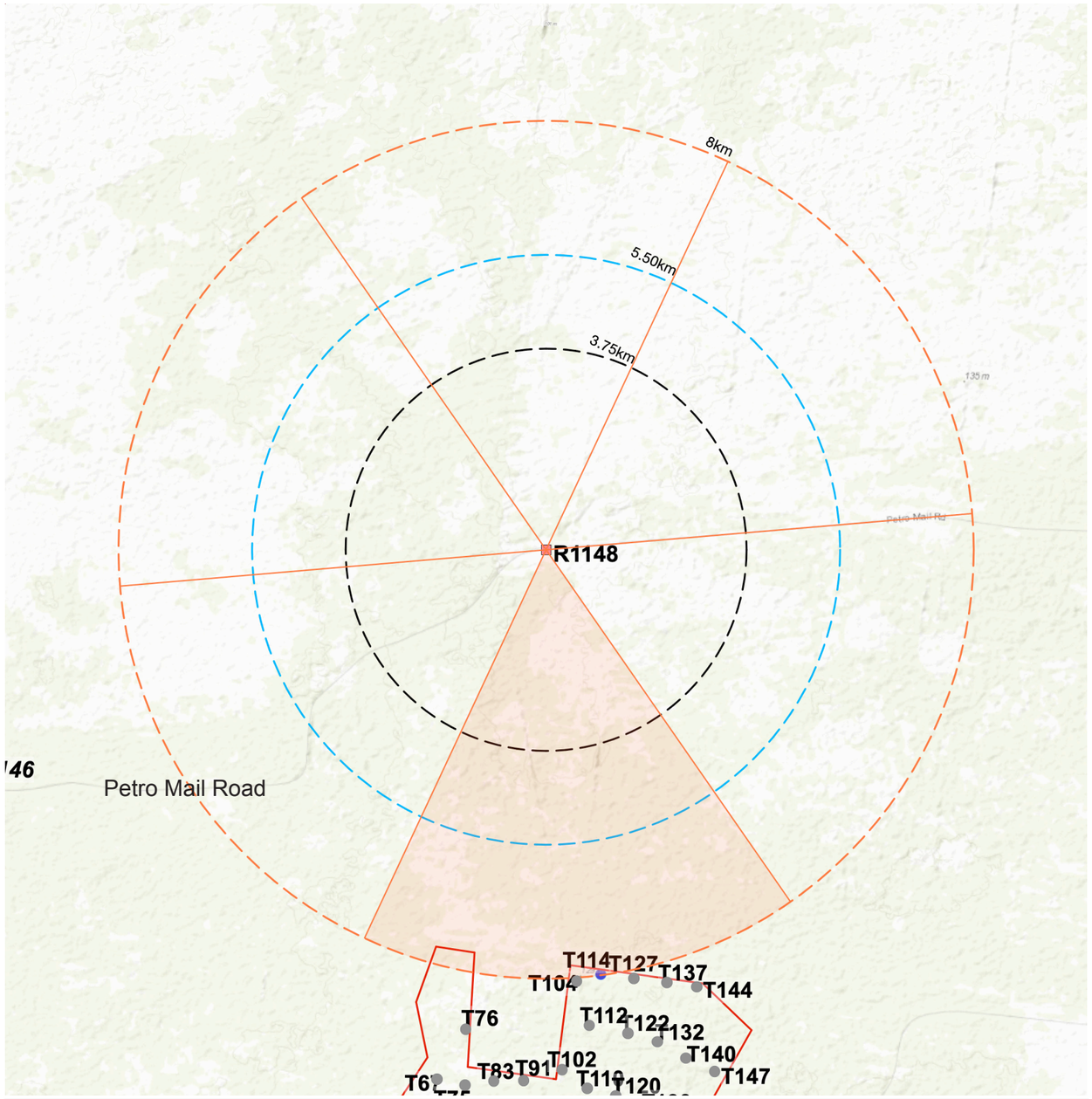
- Project Boundary
- Potential Wind Turbine Location (280 m high)
- Main Road
- Minor Road
- 3,750 m from nearest proposed wind turbine locations
- 5,500 m from nearest proposed wind turbine locations
- 8,000 m from nearest proposed wind turbine locations
- National Parks / Nature Reserves
- Preliminary Dwelling Assessment locations

N

0 2 4 6 8 10km

***Appendix A** Preliminary Dwelling Assessment Locations (Map Source: Six Maps)*

A.1 Dwelling **R1148**



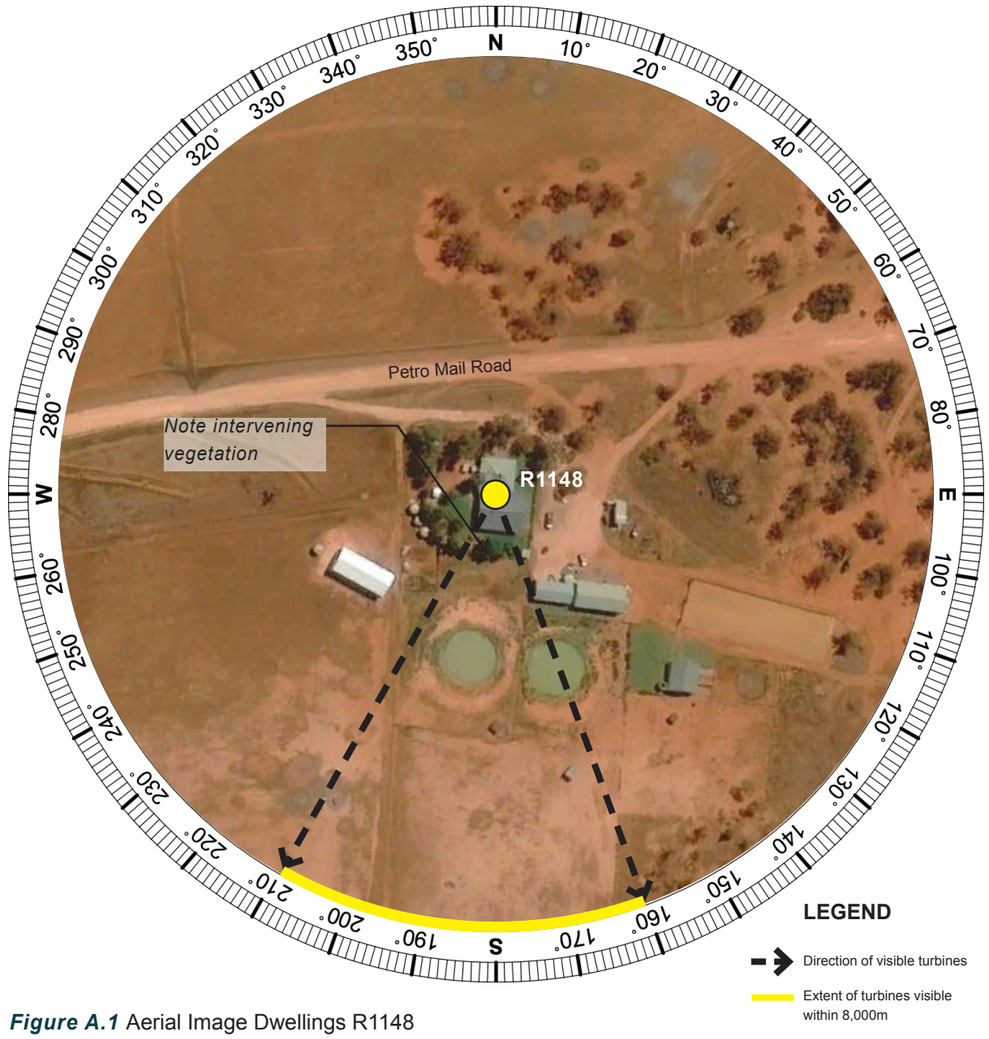


Figure A.1 Aerial Image Dwellings R1148

(Aerial Image Source: GoogleEarth 2020)

Summary of Preliminary Assessment Tools:	
Distance to Nearest Mallee Wind Farm Turbine:	**7.99 km**
Number of proposed Mallee Wind Farm turbines within the blue - purple line (5,500 m - 8,000 m) of visual magnitude:	**1 (T114)**
Number of theoretical 60º sectors (Based on 2D assessment):	**One (1) sector**
Number of potentially visible Mallee Wind Farm turbines (based on topography alone):	**89 (all at hub height)**

B

Public Viewpoint Analysis

VP01 Buronga Wetlands, Buronga

Approximate extent of potentially visible turbines

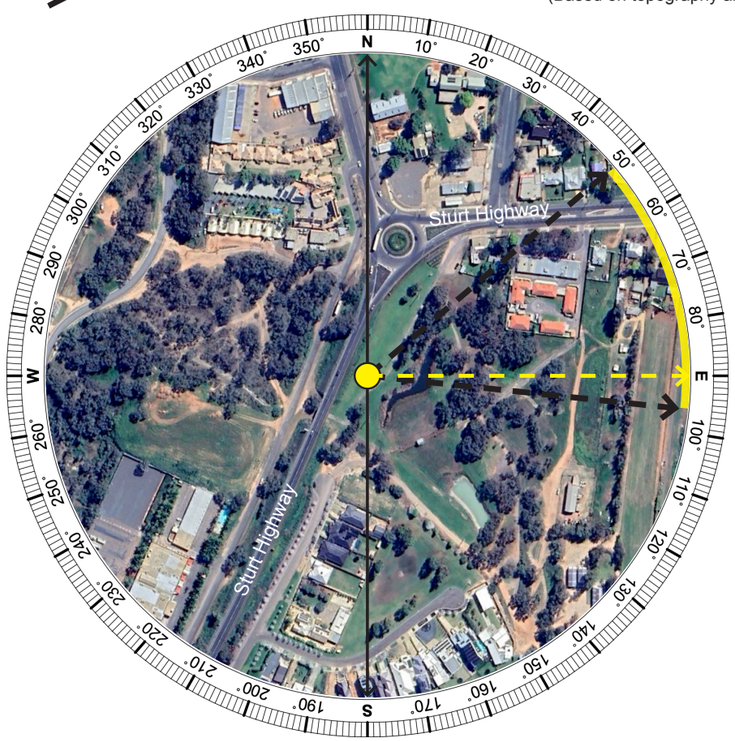
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP01

Viewpoint Summary:	
Location:	Elevation:
Buronga Wetlands, Buronga	44 m
Coordinates:	Viewing Direction:
34°10'19.80"S 142°10'50.32"E	East
Distance to nearest WTG:	Visibility Distance Zone:
17.40 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Recreation	**Moderate**
LCU:	Scenic Quality Rating:
LCU05 - Townships	

Multiple Wind Turbine Tool:

No turbines within 8000 m

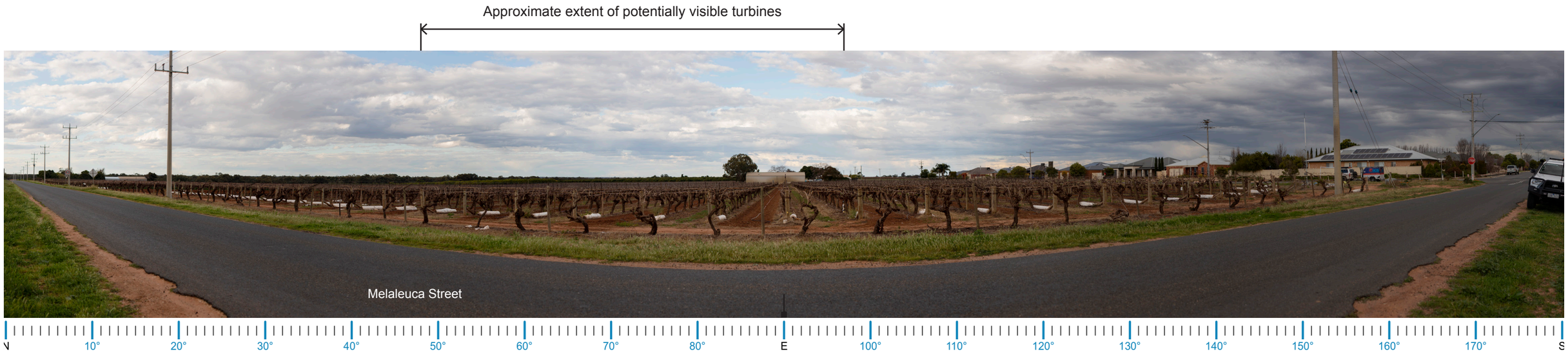
Existing Landscape Character Description:

This viewpoint was taken off the Sturt Highway at the Buronga Wetlands. The terrain is relatively flat with the surrounding land being used as a recreation area within the town of Buronga. Views are contained in this location by dense vegetation surrounding the wetlands to the east towards the Project.

Potential Visual Impact:

Due to the viewpoint distance from the project and dense vegetation to the east surrounding the wetland, it is likely that the Project will not be visible from this location.

VP02 Melaleuca Street, Buronga



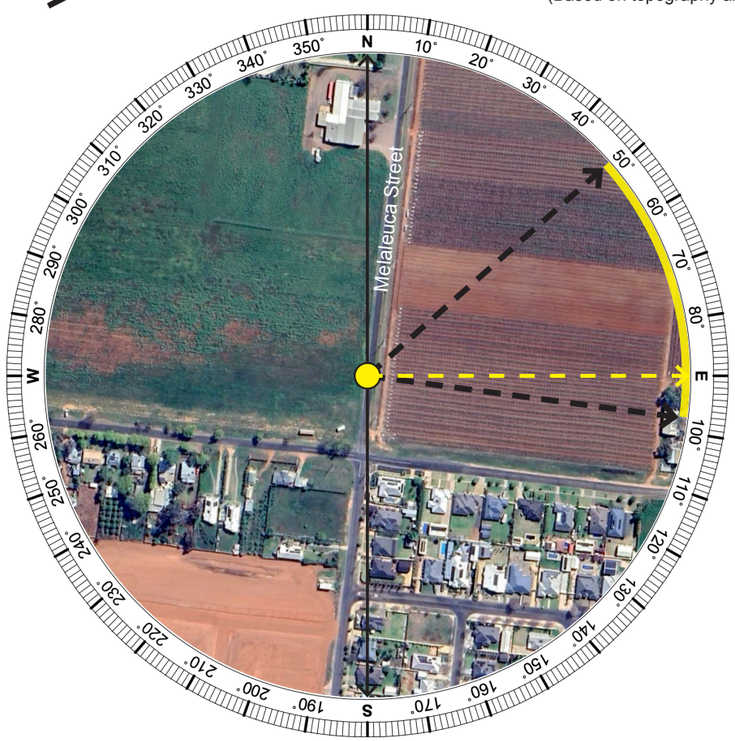
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP02

Viewpoint Summary:	
Location:	Elevation:
Melaleuca Street, Buronga	53 m
Coordinates:	Viewing Direction:
34°10'8.25"S 142°11'29.26"E	East
Distance to nearest WTG:	Visibility Distance Zone:
16.30 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Low Use Road, Agricultural	**Low**
LCU:	Scenic Quality Rating:
LCU05 - Townships	

Multiple Wind Turbine Tool:

No turbines within 8000 m

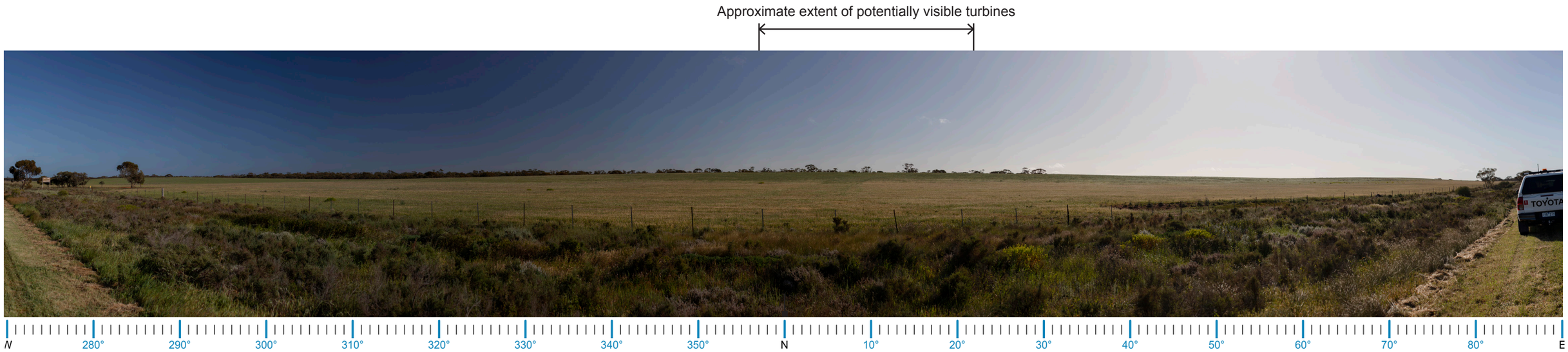
Existing Landscape Character Description:

This viewpoint was taken along Melaleuca Street within the township of Buronga. The terrain is relatively flat with the surrounding lands being used for agricultural activities in proximity to residential dwellings. Views are open and expansive from this location and minimal vegetation screening to the east. Power infrastructure is visible running along Melaleuca Street.

Potential Visual Impact:

Due to the flat terrain and expansive views, it is likely that the project will be visible from this location. The proportion of the view affected however is negligible due to the distance of the viewpoint from the Project.

VP03 Sturt Highway, Paringi



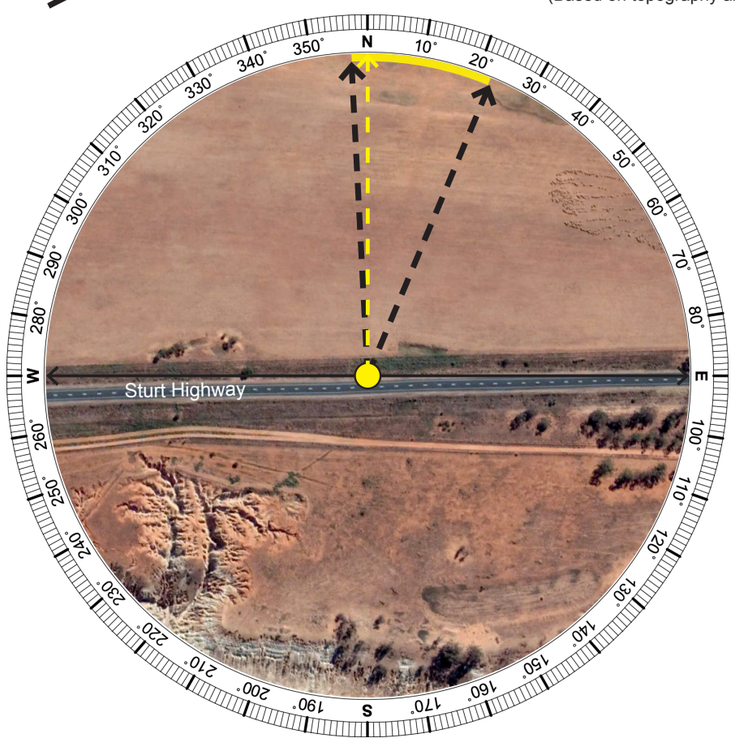
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP03

Viewpoint Summary:	
Location:	Elevation:
Sturt Highway, Paringi	57 m
Coordinates:	Viewing Direction:
34°19'6.62"S 142°22'37.13"E	North
Distance to nearest WTG:	Visibility Distance Zone:
14.20 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Major Road, Agricultural	**Low**
LCU:	Scenic Quality Rating:
LCU07 - Grazing Pastures	

Multiple Wind Turbine Tool:

No turbines within 8000 m

Existing Landscape Character Description:

This viewpoint was taken along the Sturt Highway towards Paringi. The terrain is relatively flat to gently undulating with the land being used to support agricultural activities and grazing. Views towards the Project are open yet contained by the topographic condition and the scattered vegetation along the undulation.

Potential Visual Impact:

Based on topography only, it is likely that the project will be visible from this location due to the flat terrain. The proportion of the view affected however is negligible due to the distance of the viewpoint to the Project.

VP04 Sturt Highway, Paringi

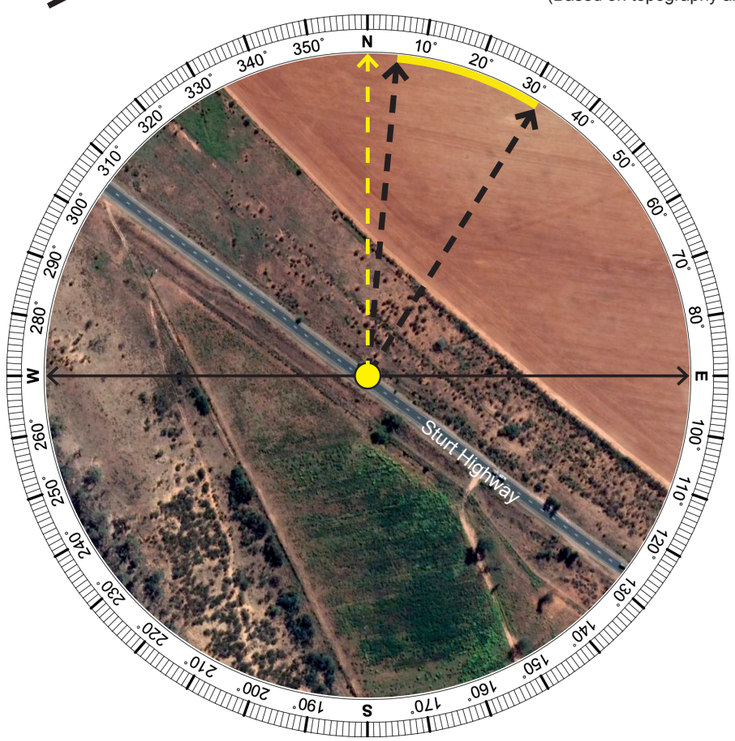
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP04

Viewpoint Summary:	
Location:	Elevation:
Sturt Highway, Paringi	51 m
Coordinates:	Viewing Direction:
34°17'58.05"S 142°19'53.96"E	North
Distance to nearest WTG:	Visibility Distance Zone:
13.40 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Major Road, Agricultural	**Low**
LCU:	Scenic Quality Rating:
LCU04 - Irrigated Pastures	

Multiple Wind Turbine Tool:

No turbines within 8000 m

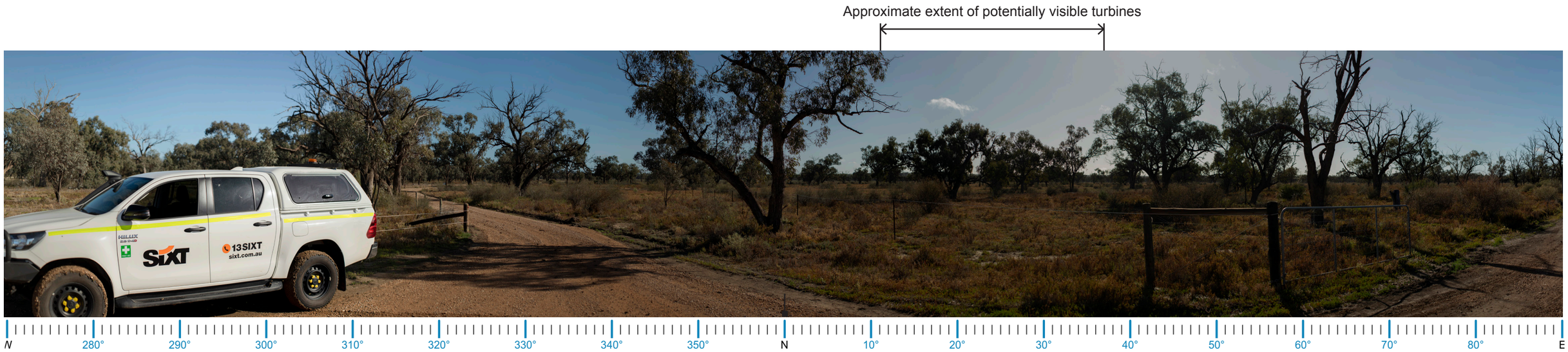
Existing Landscape Character Description:

This viewpoint was taken along Sturt Highway towards Paringi. The terrain is gently undulating with the surrounding land being used for agricultural activities. Views are open yet contained towards the Project by dense vegetation within the road corridor.

Potential Visual Impact:

Based on topography only, it is likely that the project will not be visible from this location due to terrain and distance of the viewpoint from the Project. Dense vegetation will assist screening views to the North.

VP05 Billabong Road, Gol Gol State Forest



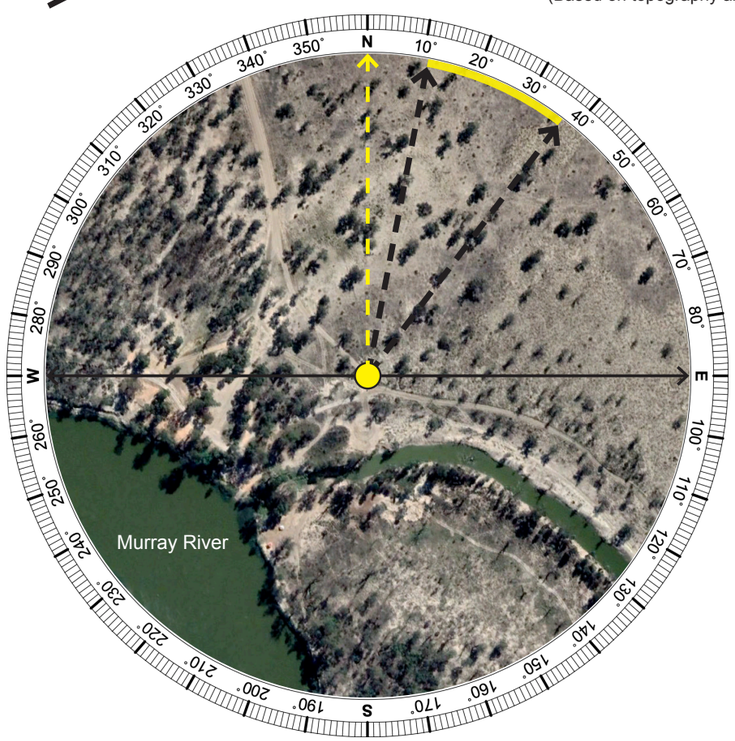
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP05

Viewpoint Summary:	
Location:	Elevation:
Billabong Road, Gol Gol State Forest	41 m
Coordinates:	Viewing Direction:
34°18'11.93"S 142°18'3.47"E	North
Distance to nearest WTG:	Visibility Distance Zone:
15.20 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
State Forest, Recreation	**Low**
LCU:	Scenic Quality Rating:
LCU02 - Waterways	

Multiple Wind Turbine Tool:

No turbines within 8000 m

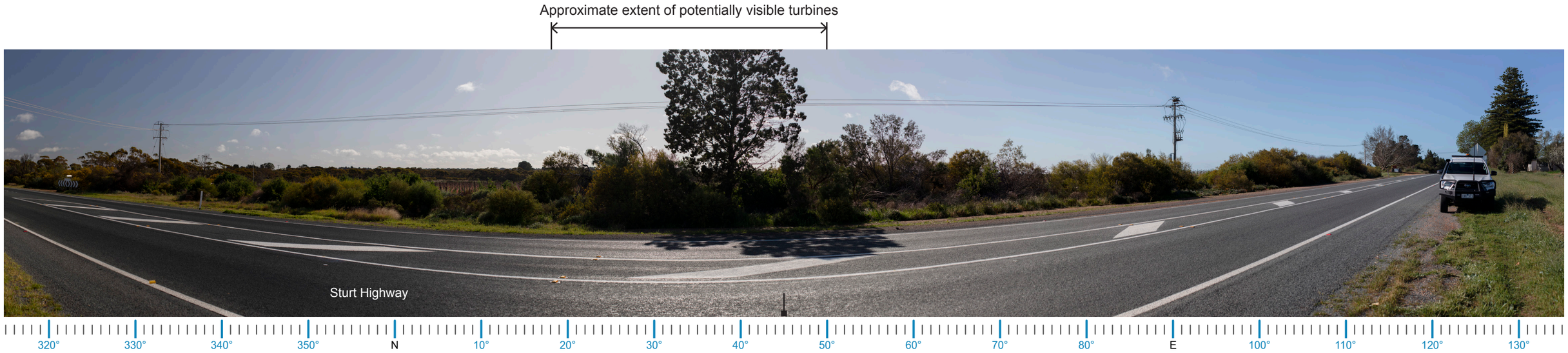
Existing Landscape Character Description:

This viewpoint was taken on Billabong Road within Gol Gol State Forest. The terrain is relatively flat in this location, sloping down towards the Murray River to the east. Views are contained by scattered vegetation within the State Forest.

Potential Visual Impact:

Based on topography only, it is likely that the Project may be visible from this location due to the flat terrain. The proportion of the view affected however is negligible due to the distance of the viewpoint from the Project and vegetation filtering select views towards the northeast.

VP06 Sturt Highway, Monak



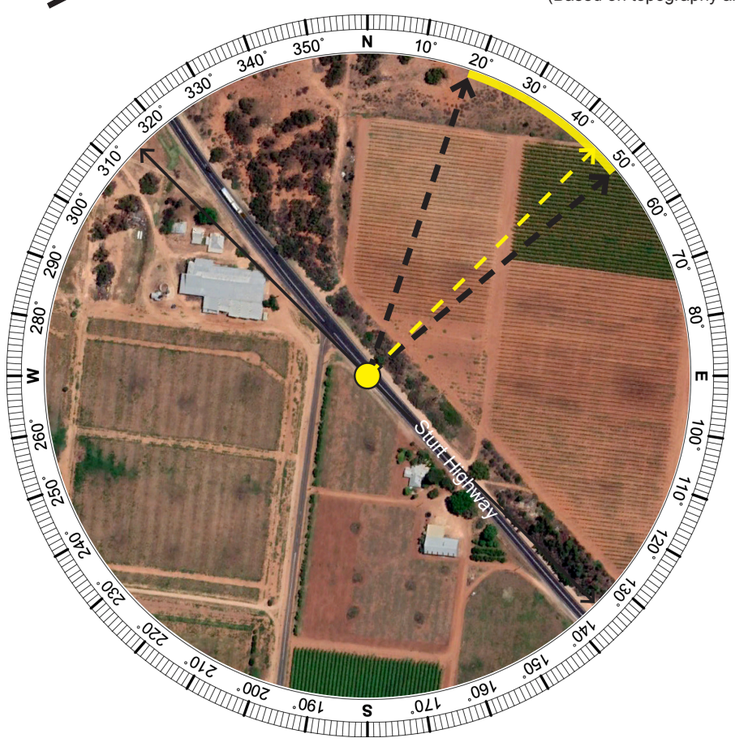
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP06

Viewpoint Summary:	
Location:	Elevation:
Sturt Highway, Monak	75 m
Coordinates:	Viewing Direction:
34°16'46.35"S 142°16'16.31"E	Northeast
Distance to nearest WTG:	Visibility Distance Zone:
15.20 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Major Road, Agricultural	**Low**
LCU:	Scenic Quality Rating:
LCU04 - Irrigated Pastures	

Multiple Wind Turbine Tool:

No turbines within 8000 m

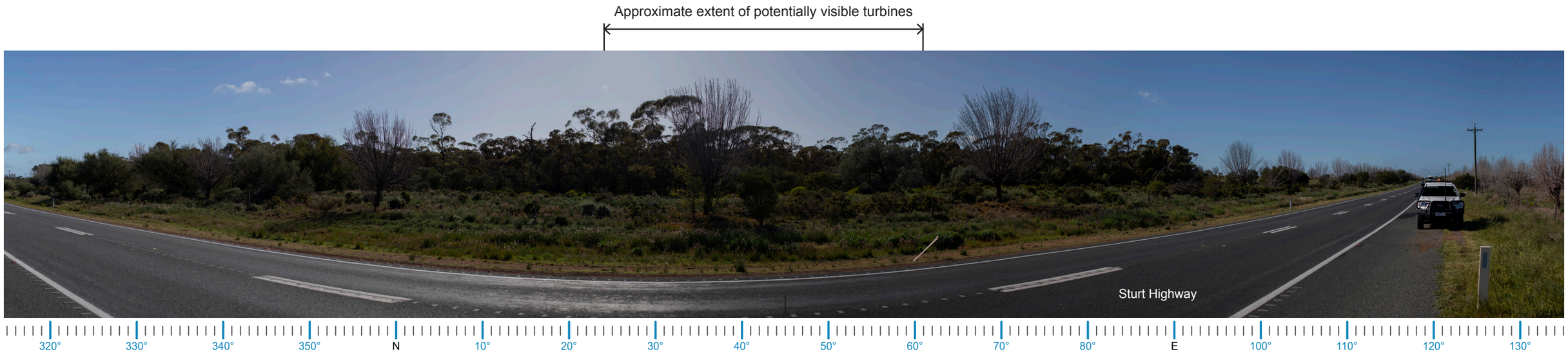
Existing Landscape Character Description:

This viewpoint was taken along the Sturt Highway towards Trentham Cliffs. The terrain is characterised as relatively flat with the surrounding land being used to support agricultural activities. Views are contained from this location by dense vegetation within the road corridor. Existing power infrastructure is visible along the edge of the Sturt Highway.

Potential Visual Impact:

Based on topography only, it is likely that the Project will be visible from this location due to the flat terrain. The proportion of the view affected however is negligible due to the distance of the viewpoint from the Project and vegetation containing views towards the northeast.

VP07 Sturt Highway, Trentham Cliffs



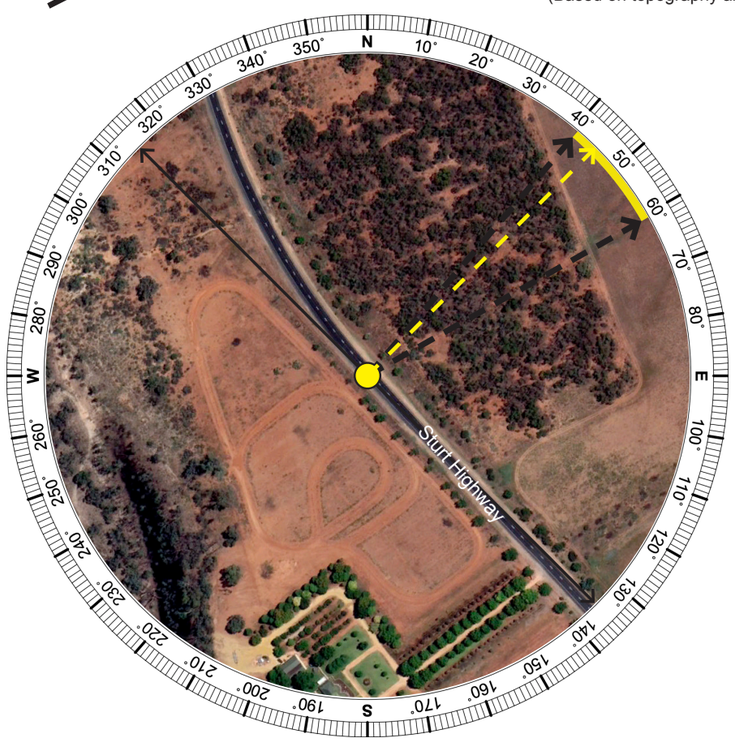
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP07

Viewpoint Summary:	
Location:	Elevation:
Sturt Highway, Trentham Cliffs	49 m
Coordinates:	Viewing Direction:
34°15'33.20"S 142°15'2.06"E	Northeast
Distance to nearest WTG:	Visibility Distance Zone:
15.30 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Major Road, Agricultural	**Low**
LCU:	Scenic Quality Rating:
LCU04 - Irrigated Pastures	

Multiple Wind Turbine Tool:

No turbines within 8000 m

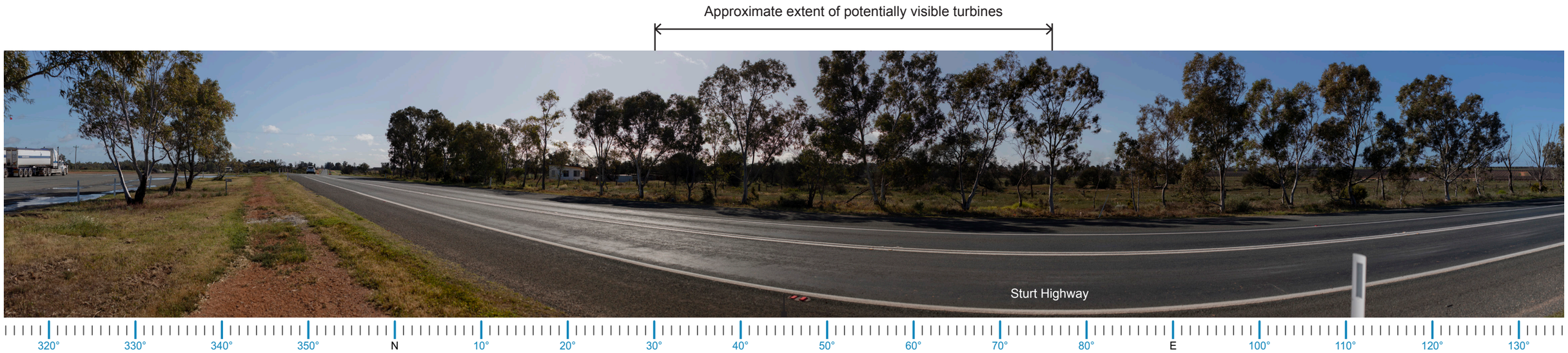
Existing Landscape Character Description:

This viewpoint was taken along the Sturt Highway towards Trentham Cliffs. The terrain is gently undulating with the land being used for agricultural activities and grazing. Views are contained by dense vegetation within the road corridor to the northeast.

Potential Visual Impact:

Based on topography only, it is likely that the project will not be visible from this location due to terrain and distance of the viewpoint from the Project. Dense vegetation will assist screening views to the northeast.

VP08 Trentham Hills Rest Area, Sturt Highway, Trentham Cliffs



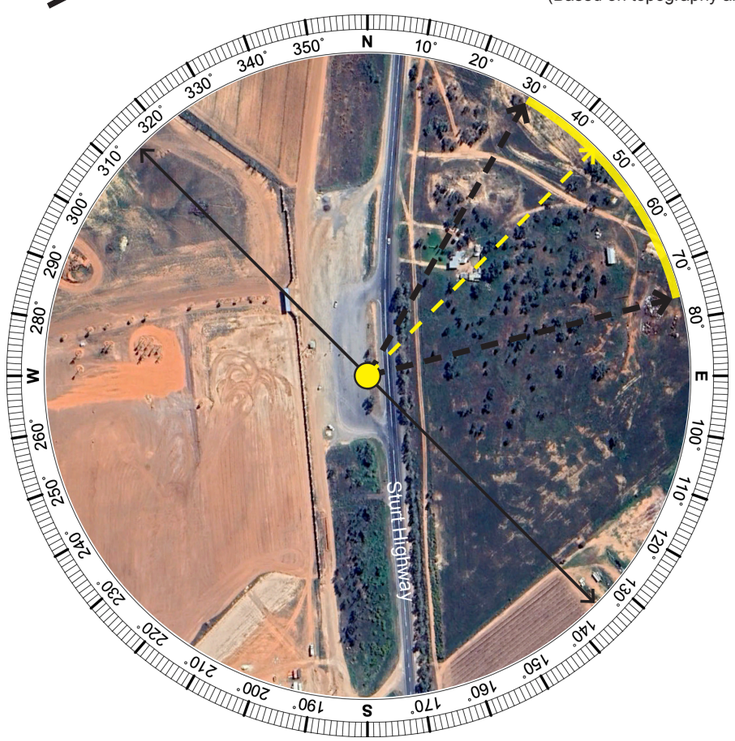
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP08

Viewpoint Summary:	
Location:	Elevation:
Trentham Hills Rest Area, Sturt Highway	57 m
Coordinates:	Viewing Direction:
34°13’18.97”S 142°14’51.77”E	Northeast
Distance to nearest WTG:	Visibility Distance Zone:
13.20 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Major Road, Rest Area	**Low**
LCU:	Scenic Quality Rating:
LCU04 - Irrigated Pastures	

Multiple Wind Turbine Tool:

No turbines within 8000 m

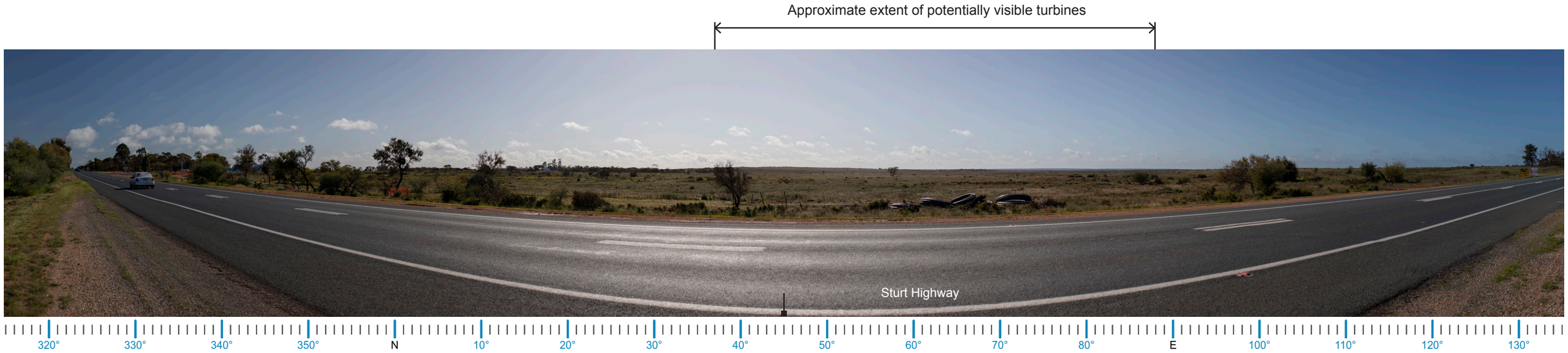
Existing Landscape Character Description:

This viewpoint was taken at the Trentham Hills Rest Area along the Sturt Highway. The terrain is relatively flat with the surrounding land being used for agricultural activities and grazing outside the rest area. Views towards the northeast are contained by screen planting within the road corridor.

Potential Visual Impact:

Based on topography only, it is likely that the Project will be visible from this location due to the flat terrain. The proportion of the view affected however is negligible due to the distance of the viewpoint from the Project and vegetation containing views towards the northeast.

VP09 Sturt Highway, Mallee



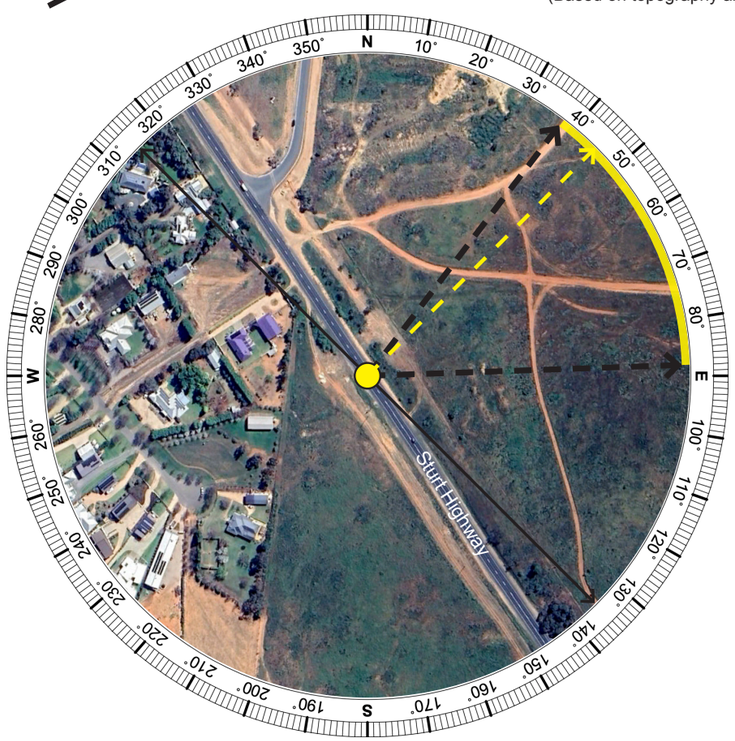
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP09

Viewpoint Summary:	
Location:	Elevation:
Sturt Highway, Mallee	48 m
Coordinates:	Viewing Direction:
34°11'39.35"S 142°14'17.12"E	Northeast
Distance to nearest WTG:	Visibility Distance Zone:
12.80 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Major Road, Agricultural	**Low**
LCU:	Scenic Quality Rating:
LCU01 - Native Vegetation	

Multiple Wind Turbine Tool:

No turbines within 8000 m

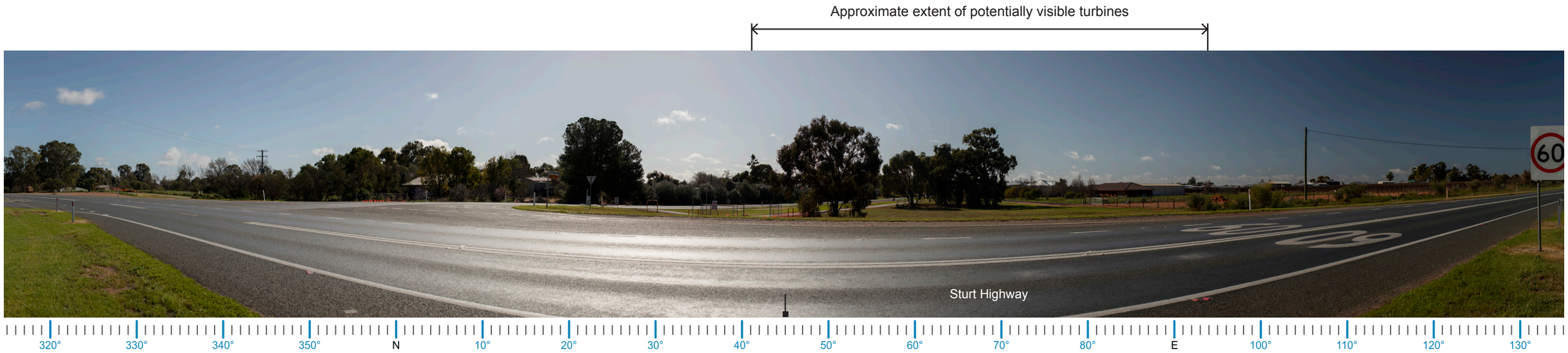
Existing Landscape Character Description:

This viewpoint was taken along Sturt Highway towards Gol Gol. The terrain is relatively flat with the surrounding land being used for grazing. Vegetation is charactered as native grasslands with scattered trees dotted throughout adjoining paddocks. Views are open and expansive from this location.

Potential Visual Impact:

Based on topography only, it is likely that there will be clear views of the project due to the flat terrain and lack of vegetation screening. The proportion of the view affected by the scale of the Project however is low due to the distance of the viewpoint from the Project.

VP10 Sturt Highway, Gol Gol



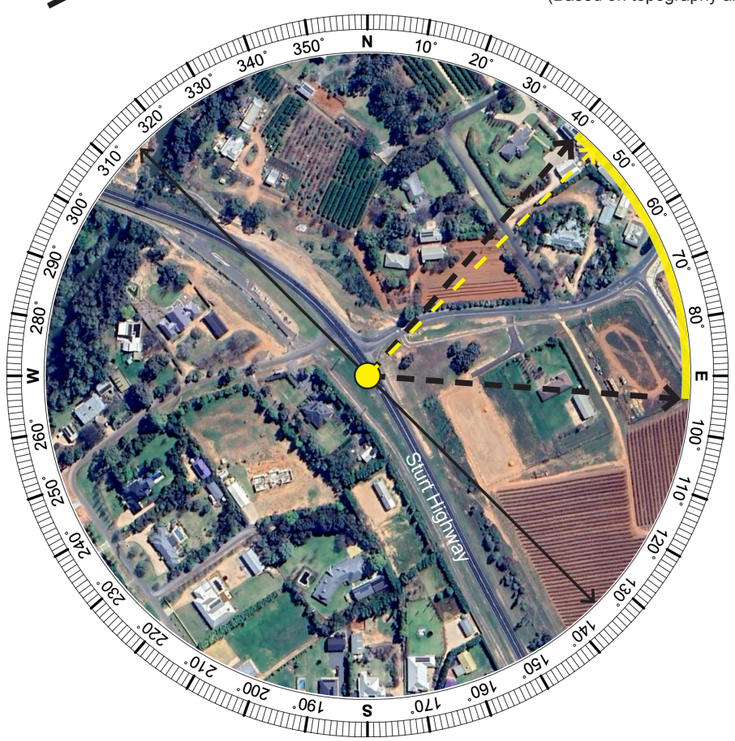
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP10

Viewpoint Summary:	
Location:	Elevation:
Sturt Highway, Gol Gol	44 m
Coordinates:	Viewing Direction:
34°10'56.77"S 142°13'44.83"E	Northeast
Distance to nearest WTG:	Visibility Distance Zone:
13.20 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Low**
LCU:	Scenic Quality Rating:
LCU05 - Townships	

Multiple Wind Turbine Tool:

No turbines within 8000 m

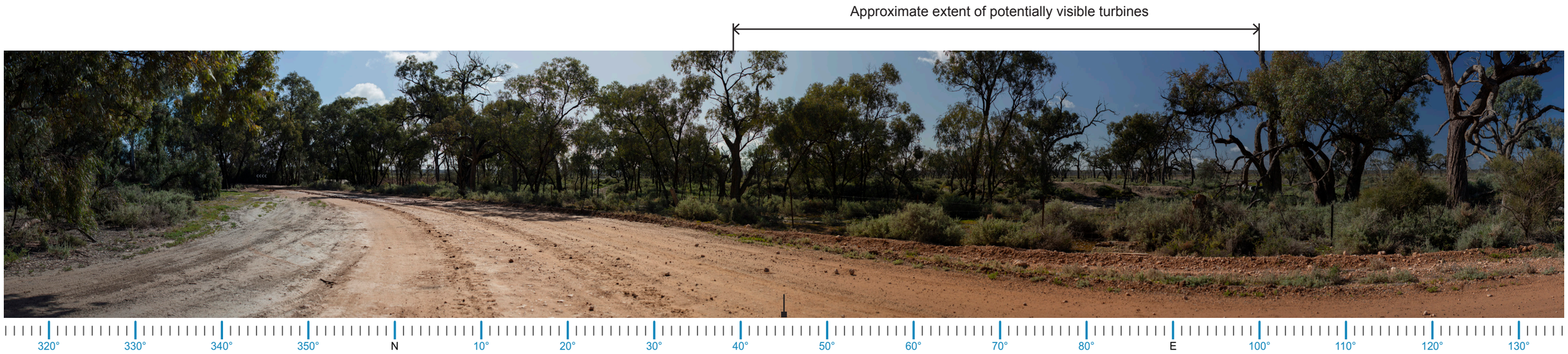
Existing Landscape Character Description:

This viewpoint was taken along the Sturt Highway outside the township of Gol Gol. The terrain is relatively flat with the surrounding land being used for residential dwellings. Views are open yet filtered toward the Project by scattered vegetation surrounding select dwellings in this location.

Potential Visual Impact:

Based on topography only, it is likely that the Project will be visible from this location due to the flat terrain. The proportion of the view affected however is negligible due to the distance of the viewpoint from the Project and vegetation filtering views towards the northeast.

VP11 Off Potters Drive, Gol Gol Creek, Mallee



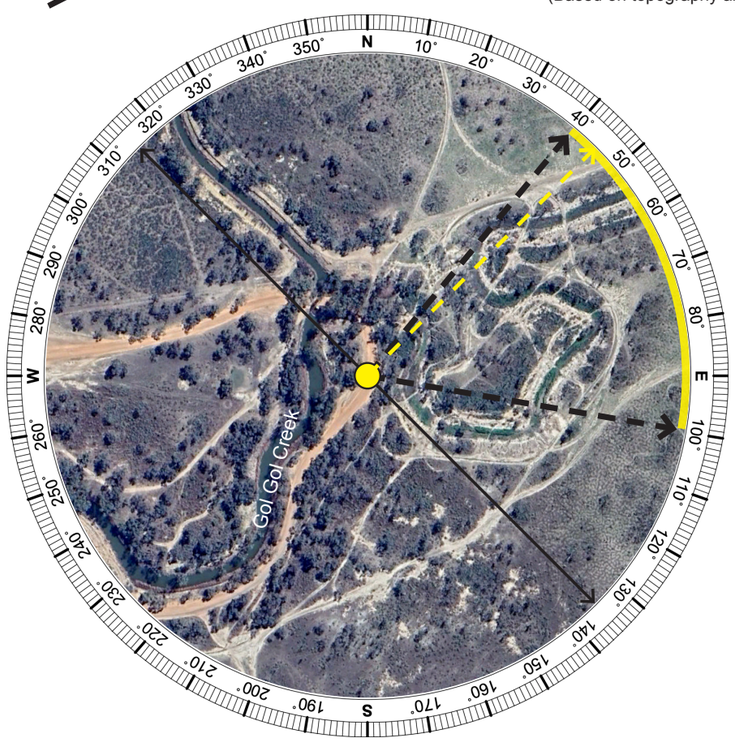
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP11

Viewpoint Summary:	
Location:	Elevation:
Off Potters Drive, Gol Gol Creek, Mallee	40 m
Coordinates:	Viewing Direction:
34°10'11.88"S 142°14'53.23"E	Northeast
Distance to nearest WTG:	Visibility Distance Zone:
11.10 km	**Near Background (NB)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Low**
LCU:	Scenic Quality Rating:
LCU02 - Waterways	

Multiple Wind Turbine Tool:

No turbines within 8000 m

Existing Landscape Character Description:

This viewpoint was taken off Potters Driver near Gol Gol Creek. The terrain is relatively flat with the vegetation character being associated with Gol Gol Creek with dense vegetation aligning the creekline that contain views towards the Project.

Potential Visual Impact:

Based on topography only, it is likely that the Project will be visible from this location due to the flat terrain. The proportion of the view affected however is low due to the distance of the viewpoint from the Project and dense vegetation filtering majority of the Project extent

VP12 Rest Area along Silver City Highway, Mourquong

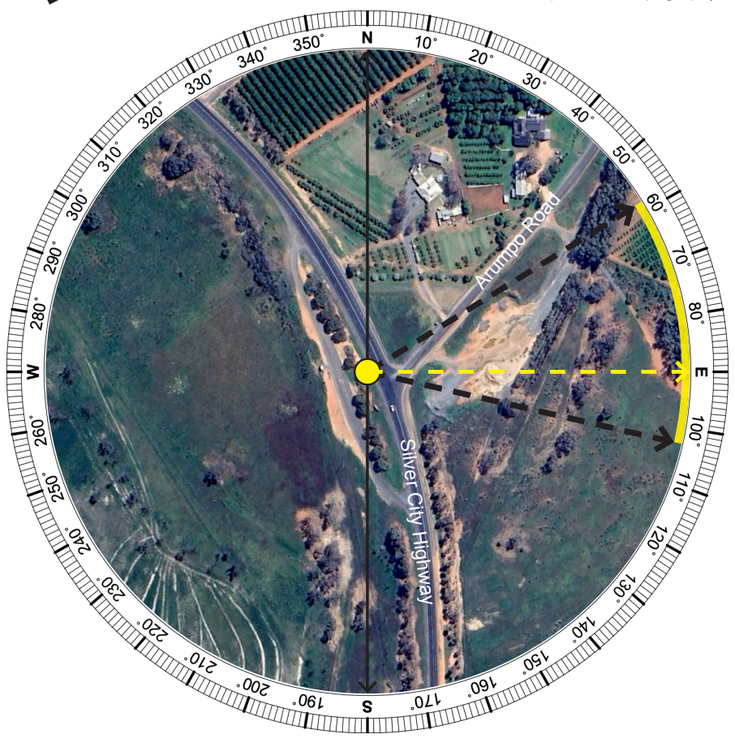
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP12

Viewpoint Summary:	
Location:	Elevation:
Rest Area, Silver City Highway, Mourquong	43 m
Coordinates:	Viewing Direction:
34° 9'0.83"S 142°10'46.85"E	East
Distance to nearest WTG:	Visibility Distance Zone:
17.30 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Major Road, Rest Area	**Low**
LCU:	Scenic Quality Rating:
LCU04 - Irrigated Pastures	

Multiple Wind Turbine Tool:

No turbines within 8000 m

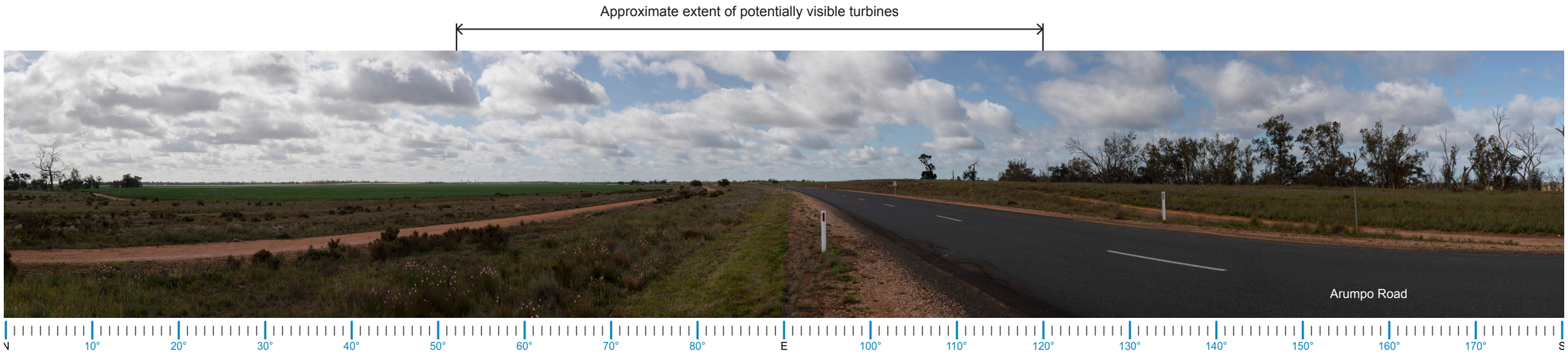
Existing Landscape Character Description:

This viewpoint was taken at the Rest Area along the Silver City Highway outside Buronga. The terrain is relatively flat with the surrounding land being used for agricultural activities. Views are contained towards the Project by dense vegetation with the road corridors.

Potential Visual Impact:

Based on topography only, it is likely that the Project will be visible from this location due to the flat terrain. The proportion of the view affected however is low due to the distance of the viewpoint from the Project and vegetation containing views.

VP13 Arumpo Road, Wentworth



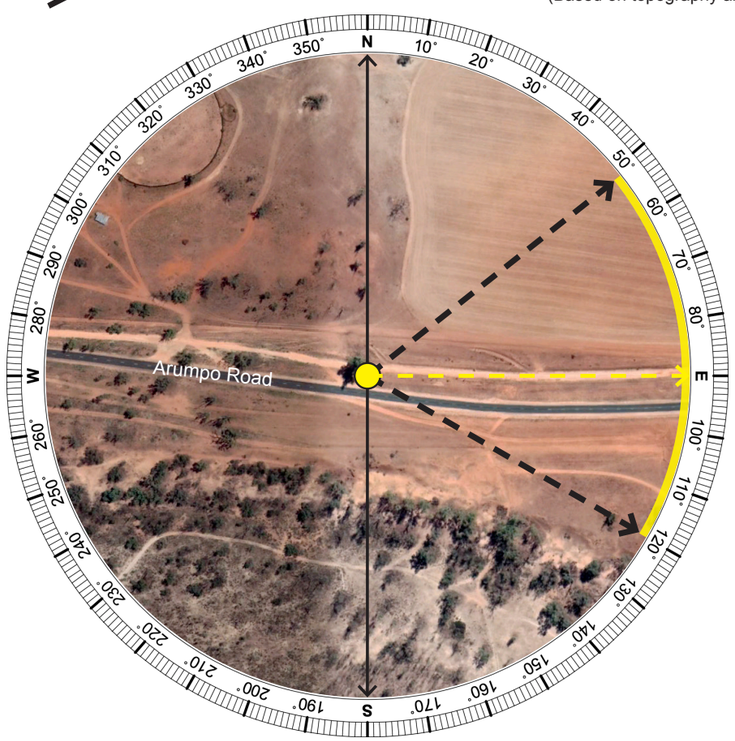
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP13

Viewpoint Summary:	
Location:	Elevation:
Arumpo Road, Wentworth	41 m
Coordinates:	Viewing Direction:
34° 6’49.16”S 142°14’14.21”E	East
Distance to nearest WTG:	Visibility Distance Zone:
12.60 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Major Road, Agricultural	**Low**
LCU:	Scenic Quality Rating:
LCU07 - Grazing Pastures	

Multiple Wind Turbine Tool:

No turbines within 8000 m

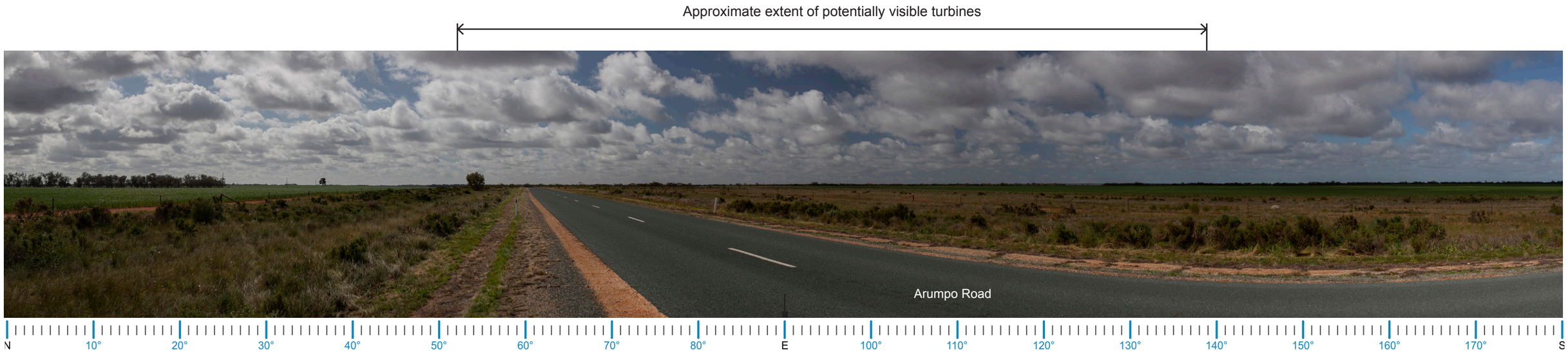
Existing Landscape Character Description:

This viewpoint was taken along Arumpo Road, near Lake Gol Gol. The terrain is relatively flat with the surrounding land being used for agricultural activities and grazing outside the extent of Lake Gol Gol. Views are open and expansive with select views filtered by scattered vegetation to the southeast.

Potential Visual Impact:

Based on topography only, it is likely that the Project will be visible from this location due to the flat terrain. The proportion of the view affected however is low as the project will be indiscernible due to the distance of the viewpoint from the Project.

VP14 Arumpo Road, Wentworth



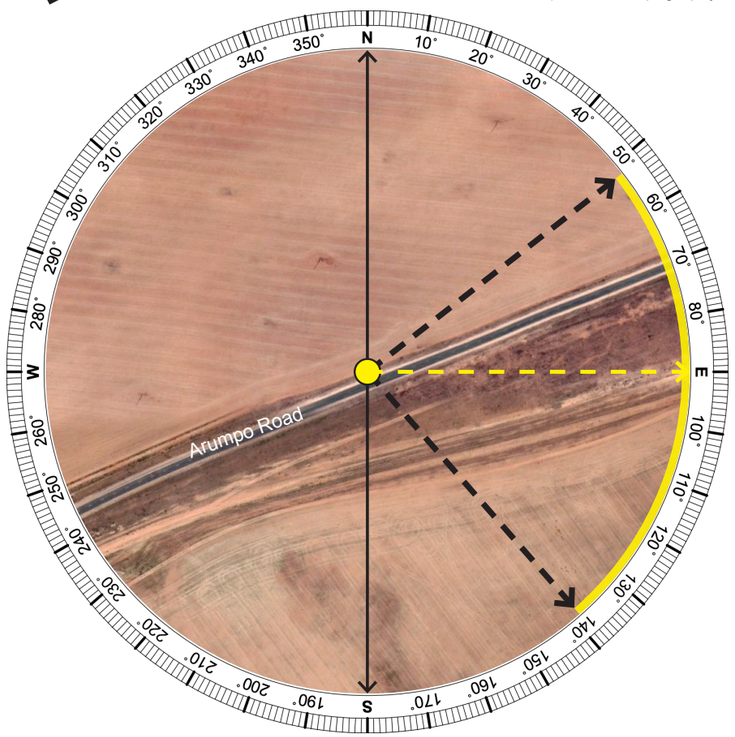
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP14

Viewpoint Summary:	
Location:	Elevation:
Arumpo Road, Wentworth	67 m
Coordinates:	Viewing Direction:
34° 5'2.03"S 142°17'15.67"E	East
Distance to nearest WTG:	Visibility Distance Zone:
7.40 km	**Far Middleground (FM)**
Land Use:	Viewer Sensitivity Level:
Major Road, Agricultural	**Low**
LCU:	Scenic Quality Rating:
LCU07 - Grazing Pastures	

Multiple Wind Turbine Tool:

One (1) 60º Sector with turbines within 8000 m

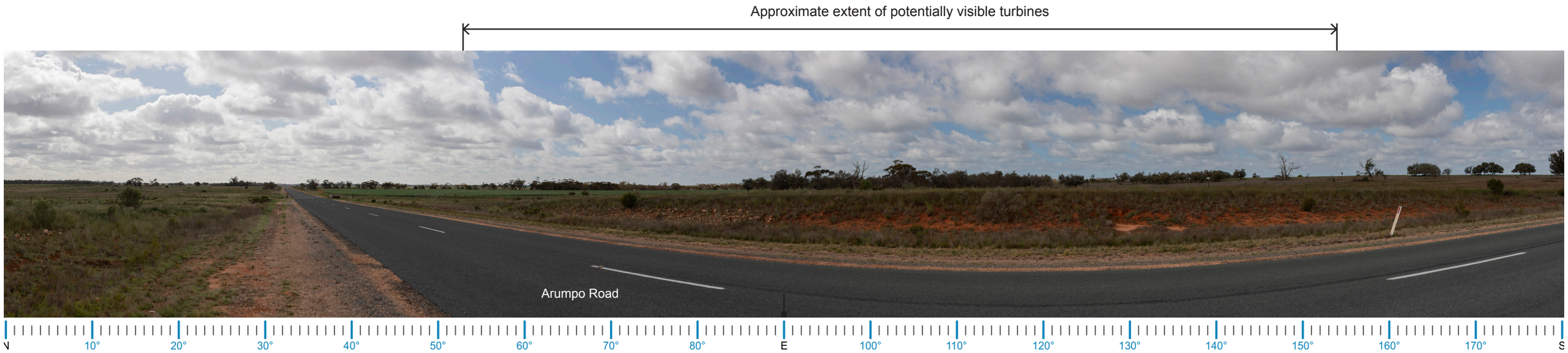
Existing Landscape Character Description:

This viewpoint was taken along Arumpo Road towards Mungo National Park. The terrain is flat being used for agricultural activities and grazing. Vegetation is characterised as native grasslands with minimal tree coverage. Views from this location are open and expansive towards the Project.

Potential Visual Impact:

Based on topography only, there will clear views of the Project due to the flat terrain. The proportion of the view will be affected because of the scale of the Project in relation to the topographic condition and lack of vegetation screening.

VP15 Arumpo Road, Wentworth



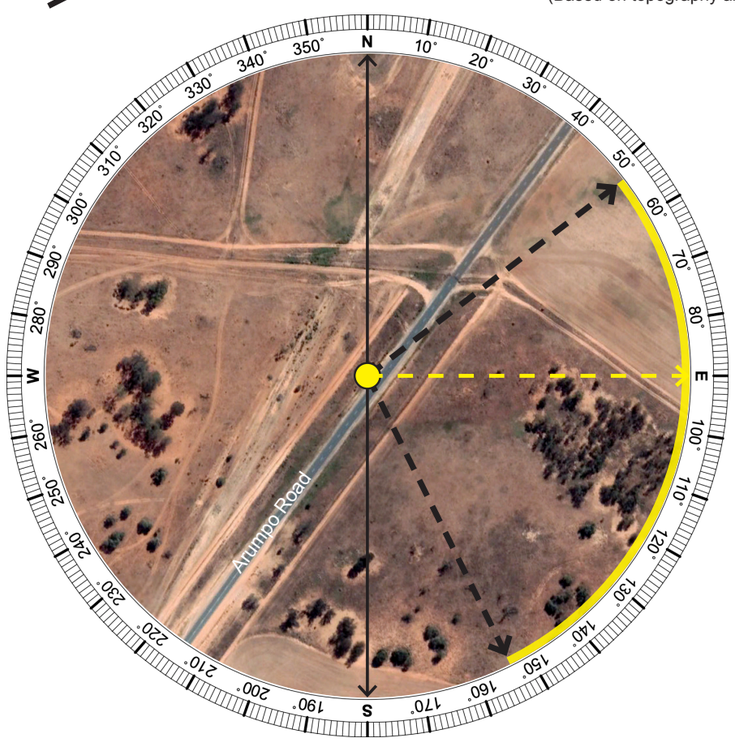
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP15

Viewpoint Summary:	
Location:	Elevation:
Arumpo Road, Wentworth	67 m
Coordinates:	Viewing Direction:
34° 3’41.99”S 142°18’47.78”E	East
Distance to nearest WTG:	Visibility Distance Zone:
4.60 km	**Far Middleground (FM)**
Land Use:	Viewer Sensitivity Level:
Major Road, Agricultural	**Low**
LCU:	Scenic Quality Rating:
LCU07 - Grazing Pastures	

Multiple Wind Turbine Tool:

One (1) 60º Sector with turbines within 8000 m

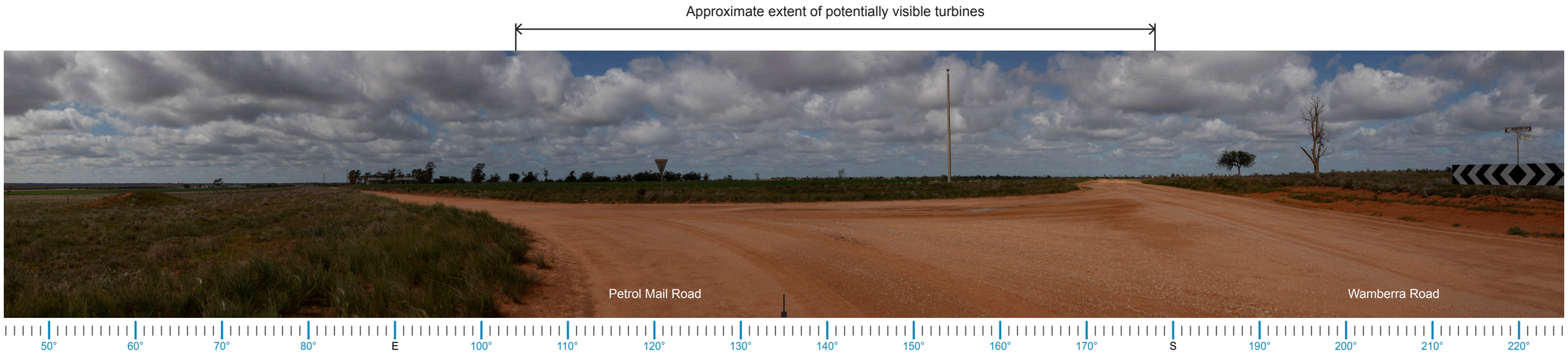
Existing Landscape Character Description:

This viewpoint was taken along Arumpo Road towards Mungo National Park. The terrain is relatively flat with the surrounding land being used for agricultural activities and grazing. Views are open and expansive with scattered vegetation dotted throughout the adjoining paddocks to the east.

Potential Visual Impact:

Based on topography only, there will clear views of the Project due to the flat terrain. The proportion of the view will be affected because of the scale of the Project in relation to the topographic condition and close proximity of the viewpoint to the Project. Select turbines in the distance may be filtered by vegetation to the east.

VP16 Corner Petro Mail Road and Wamberra Road, Arumpo



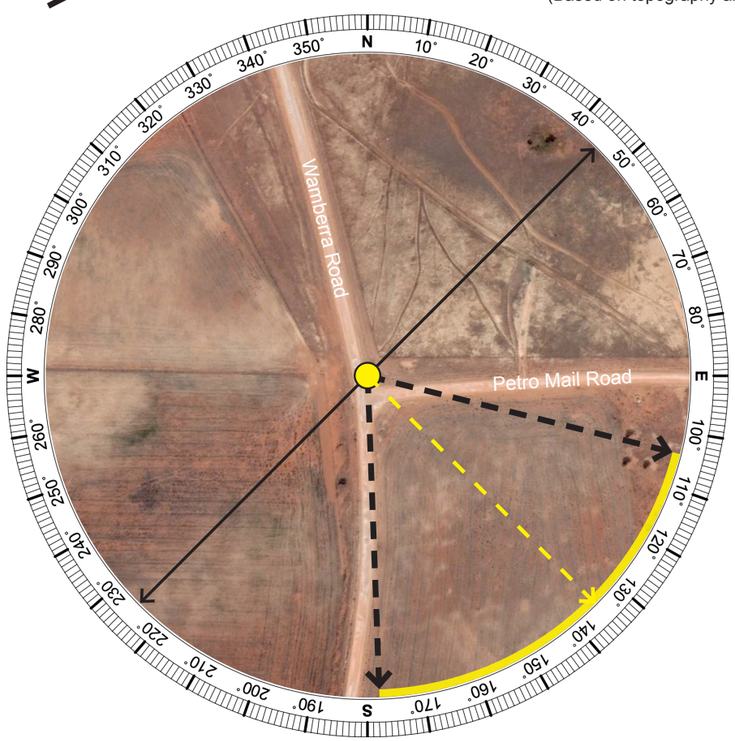
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP16

Viewpoint Summary:	
Location:	Elevation:
Corner Petro Mail Road and Wamberra Road, Arumpo	65 m
Coordinates:	Viewing Direction:
33°56'2.90"S 142°21'33.10"E	Southeast
Distance to nearest WTG:	Visibility Distance Zone:
9.90 km	**Near Background (MB)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Low**
LCU:	Scenic Quality Rating:
LCU01 - Native Vegetation	

Multiple Wind Turbine Tool:

No turbines within 8000 m

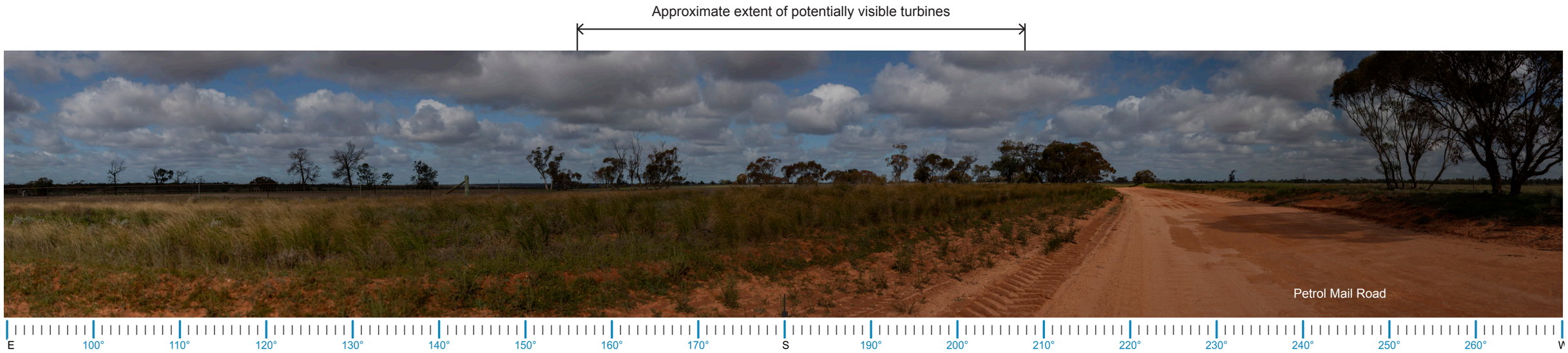
Existing Landscape Character Description:

This viewpoint was taken on the corner of Petro Mail Road and Wamberra Road. The terrain is relatively flat with the surrounding land being used for grazing. Vegetation is characterised as native grasslands with scattered vegetation visible around dwelling to the east. Views from this location are classified as open and expansive.

Potential Visual Impact:

Based on topography only, there will be views of the Project from this location due to the flat terrain. The proportion of the view affected however is low as the project will be likely indiscernible due to the distance of the viewpoint from the Project.

VP17 Petro Mail Road, Arumpo



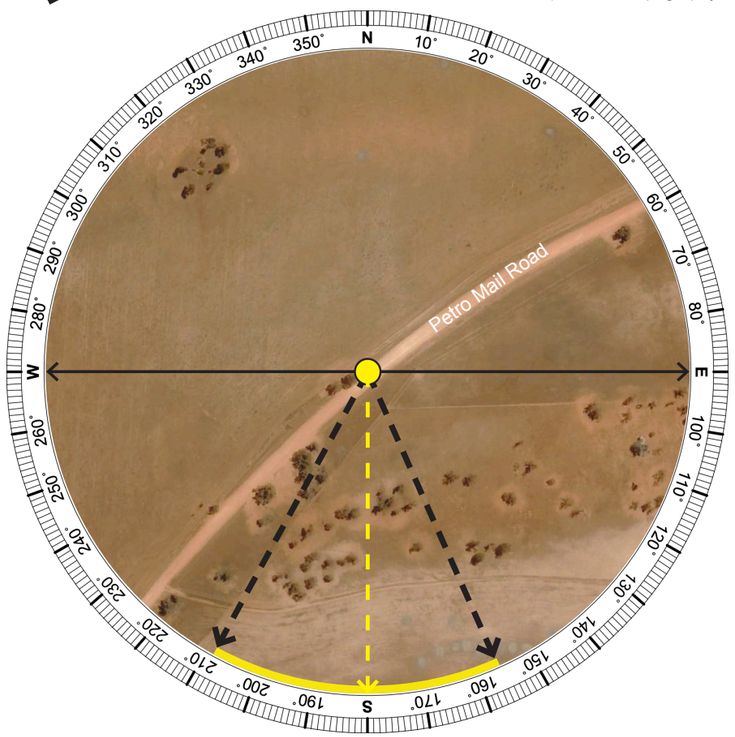
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP17

Viewpoint Summary:	
Location:	Elevation:
Petro Mail Road, Arumpo	78 m
Coordinates:	Viewing Direction:
33°53'39.98"S 142°28'4.39"E	South
Distance to nearest WTG:	Visibility Distance Zone:
7.60 km	**Far Middleground (FM)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Low**
LCU:	Scenic Quality Rating:
LCU01 - Native Vegetation	

Multiple Wind Turbine Tool:

One (1) 60° Sector with turbines within 8000 m

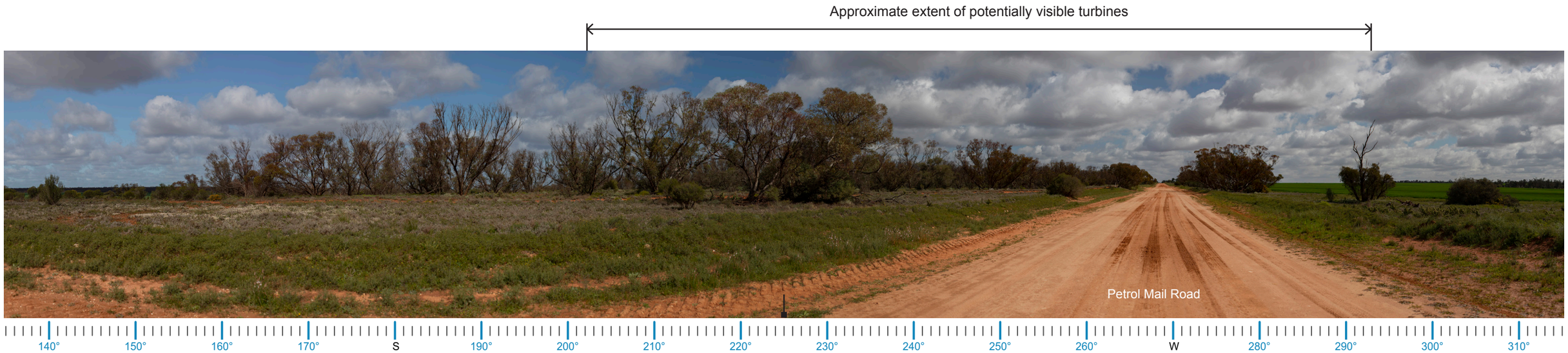
Existing Landscape Character Description:

This viewpoint was taken along Petro Mail Road off Wamberra Road. The terrain is relatively flat with the surrounding land being used for grazing. Vegetation is characterised as native grasslands with scattered vegetation dotted throughout adjoining paddocks to the road corridor. Views are open and expansive with the vegetation filtering select views to the south towards the Project.

Potential Visual Impact:

Based on topography only, there will clear views of the Project due to the topographic condition. The proportion of the view will be affected because of the scale of the Project in relation to the topographic condition and close proximity of the viewpoint to the Project. Select turbines in the distance may be filtered by vegetation to the south.

VP18 Petro Mail Road, Arumpo



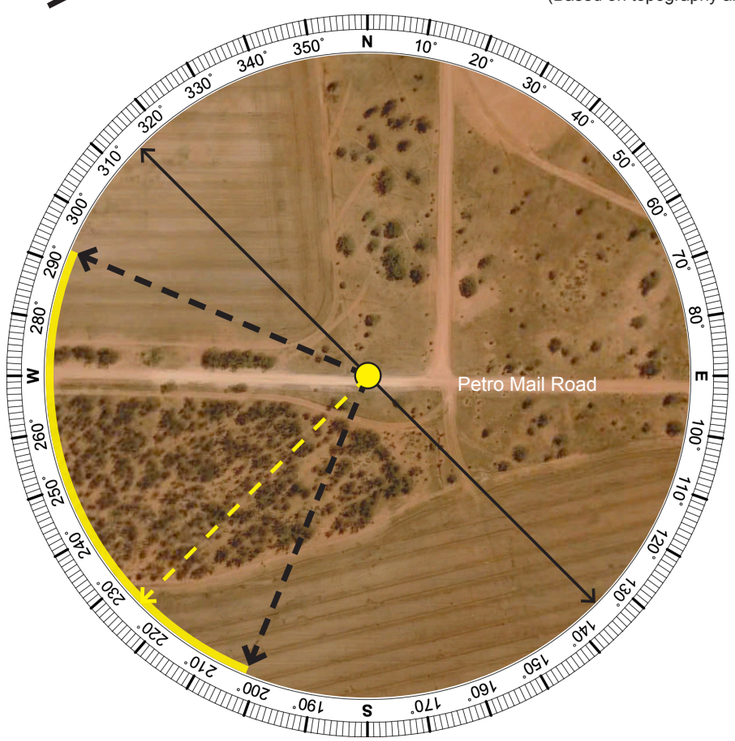
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP18

Viewpoint Summary:	
Location:	Elevation:
Petro Mail Road, Arumpo	98 m
Coordinates:	Viewing Direction:
33°53'17.30"S 142°35'44.54"E	Southwest
Distance to nearest WTG:	Visibility Distance Zone:
12.00 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Low**
LCU:	Scenic Quality Rating:
LCU01 - Native Vegetation	

Multiple Wind Turbine Tool:

No turbines within 8000 m

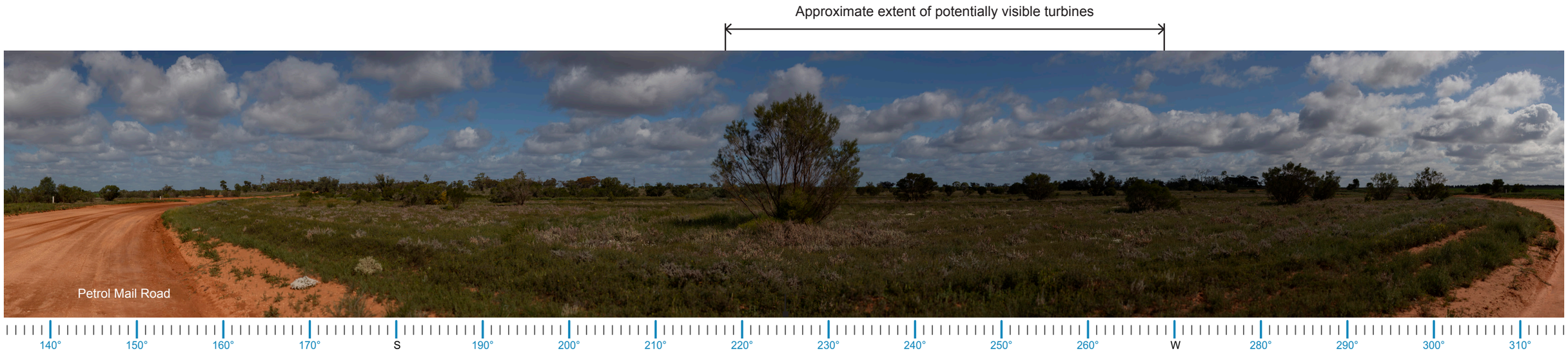
Existing Landscape Character Description:

This viewpoint was taken along Petro Mail Road off Wamberra Road. The terrain is relatively flat with the surrounding land being used for grazing. Vegetation is characterised as native grasslands with dense vegetation dotted within the road corridor and dotted throughout adjoining paddocks. Views are open and expansive with the vegetation screening views to the south towards the Project.

Potential Visual Impact:

Based on topography only, it is likely that the Project will be visible from this location due to the flat terrain. The proportion of the view affected however is low as the project will be indiscernible due to the distance of the viewpoint from the Project. Select turbines in the distance will be filtered by vegetation to the southwest.

VP19 Petro Mail Road, Arumpo



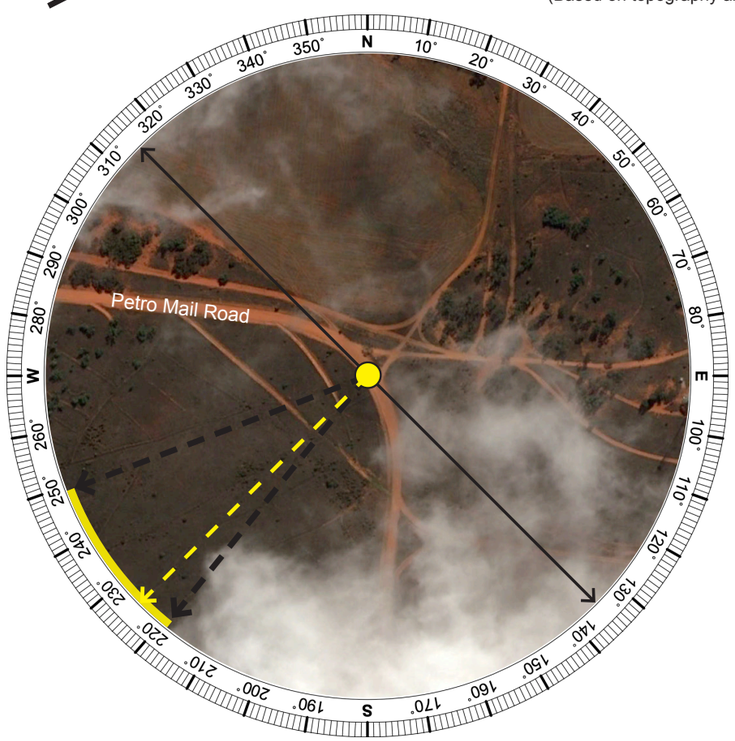
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP19

Viewpoint Summary:	
Location:	Elevation:
Petro Mail Road, Arumpo	93 m
Coordinates:	Viewing Direction:
33°54'2.44"S 142°40'56.00"E	Southwest
Distance to nearest WTG:	Visibility Distance Zone:
17.80 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Low**
LCU:	Scenic Quality Rating:
LCU01 - Native Vegetation	

Multiple Wind Turbine Tool:

No turbines within 8000 m

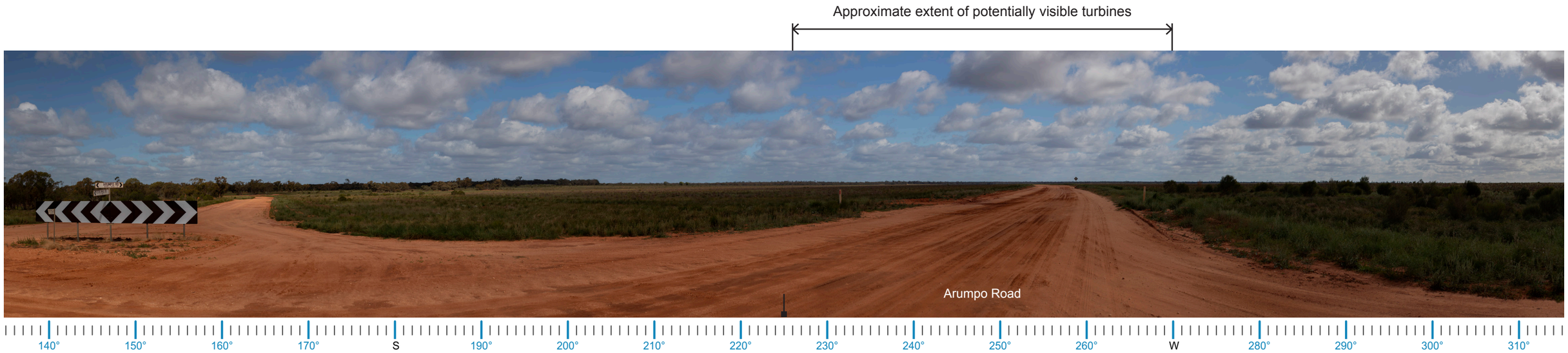
Existing Landscape Character Description:

This viewpoint was taken along Petro Mail Road. The terrain is relatively flat with the surrounding land being used for grazing. Vegetation is characterised as native grasslands with scattered vegetation dotted throughout outside the road corridor. Views are open and expansive with the vegetation containing select views to the southwest towards the Project.

Potential Visual Impact:

Based on topography only, it is likely that the project will not be visible from this location due to terrain and distance of the viewpoint from the Project. Vegetation will assist screening views to the southwest.

VP20 Corner Petro Mail Road and Arumpo Road, Arumpo Road



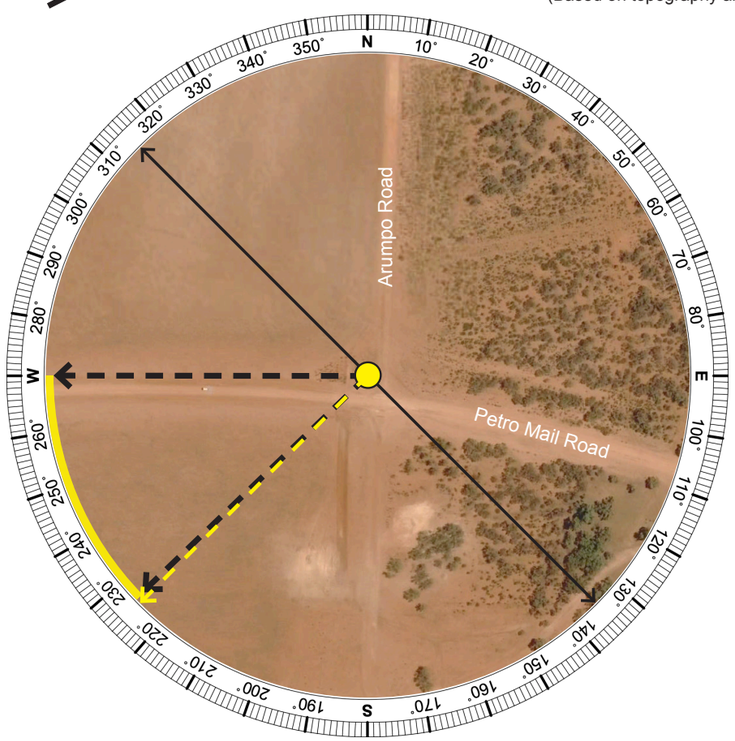
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP20

Viewpoint Summary:	
Location:	Elevation:
Corner Petro Mail Road and Arumpo Road	79 m
Coordinates:	Viewing Direction:
33°57'53.14"S 142°41'41.75"E	Southwest
Distance to nearest WTG:	Visibility Distance Zone:
17.30 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Moderate**
LCU:	Scenic Quality Rating:
LCU01 - Native Vegetation	

Multiple Wind Turbine Tool:

No turbines within 8000 m

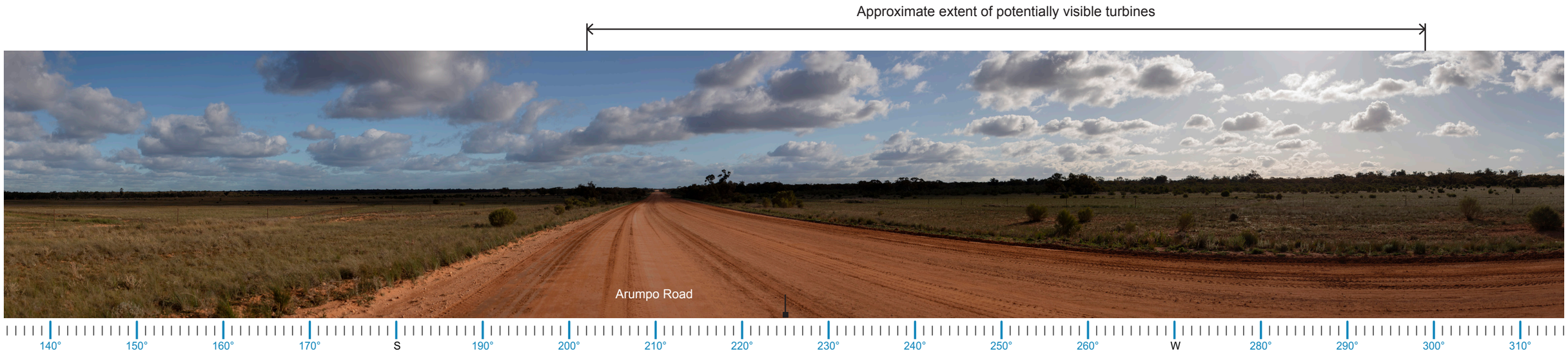
Existing Landscape Character Description:

This viewpoint was taken on the corner of Petro Mail Road and Arumpo Road. The terrain is relatively flat with the surrounding land being used for grazing. Vegetation is characterised as native grasslands with scattered vegetation dotted throughout outside the road corridor to the east. Views are open and expansive towards the Project.

Potential Visual Impact:

Based on topography only, it is likely that the Project will be visible from this location due to the flat terrain. The proportion of the view affected however is negligible as the project will be indiscernible due to the distance of the viewpoint from the Project.

VP21 Arumpo Road, Arumpo



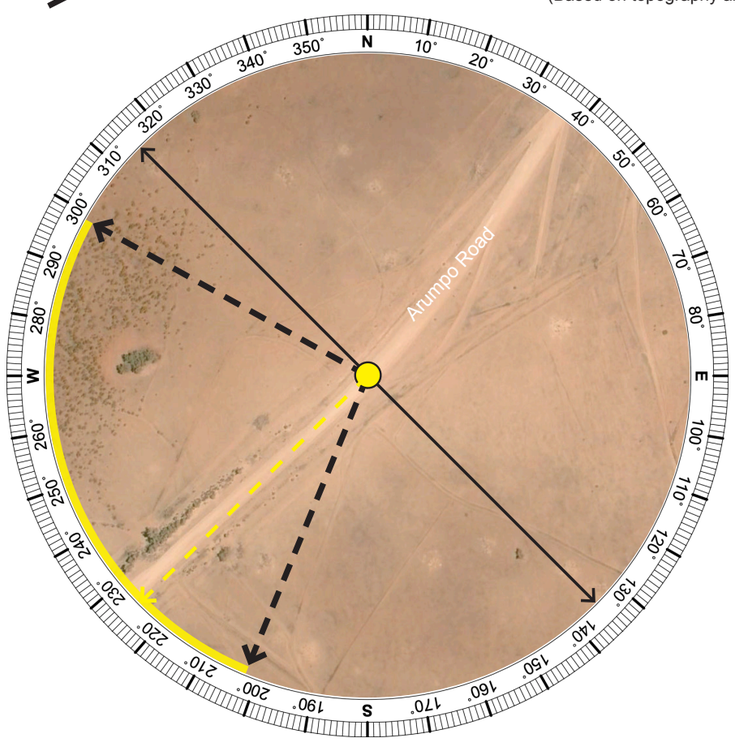
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP21

Viewpoint Summary:	
Location:	Elevation:
Arumpo Road, Arumpo	75 m
Coordinates:	Viewing Direction:
33°59'2.63"S 142°32'38.49"E	Southwest
Distance to nearest WTG:	Visibility Distance Zone:
3.10 km	**Near Middleground (NM)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Moderate**
LCU:	Scenic Quality Rating:
LCU01 - Native Vegetation	

Multiple Wind Turbine Tool:

Two (2) 60º Sectors with turbines within 8000 m

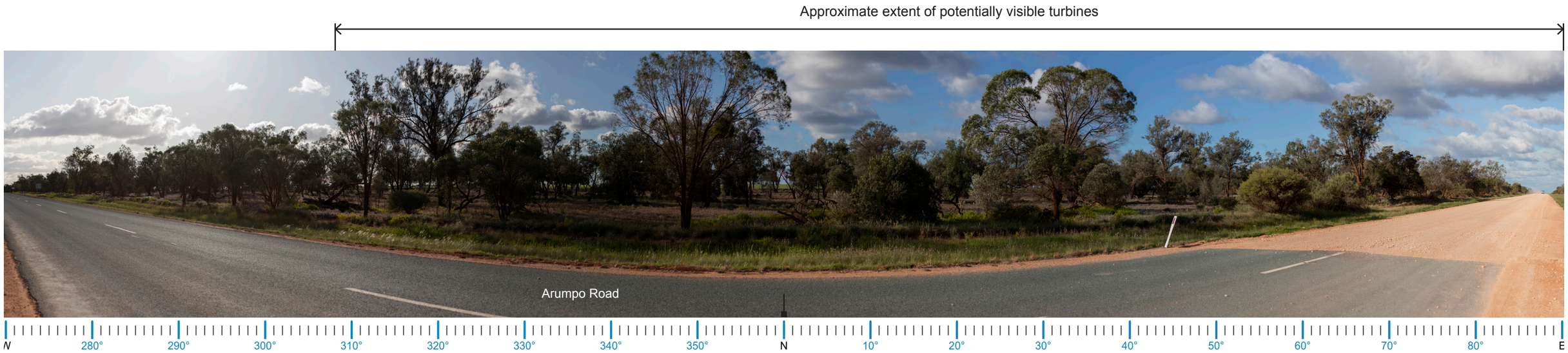
Existing Landscape Character Description:

This viewpoint was taken along Arumpo Road towards Buronga. The terrain is relatively flat with the surrounding land being used for grazing. Vegetation is characterised as native grasslands with scattered vegetation dotted throughout outside the road corridor to the west. Views are open towards the Project.

Potential Visual Impact:

Based on topography only, there will clear views of the Project due to the flat terrain. The proportion of the view will be affected because of the scale of the Project in relation to the topographic condition and close proximity of the viewpoint to the Project.

VP22a Arumpo Road, Arumpo



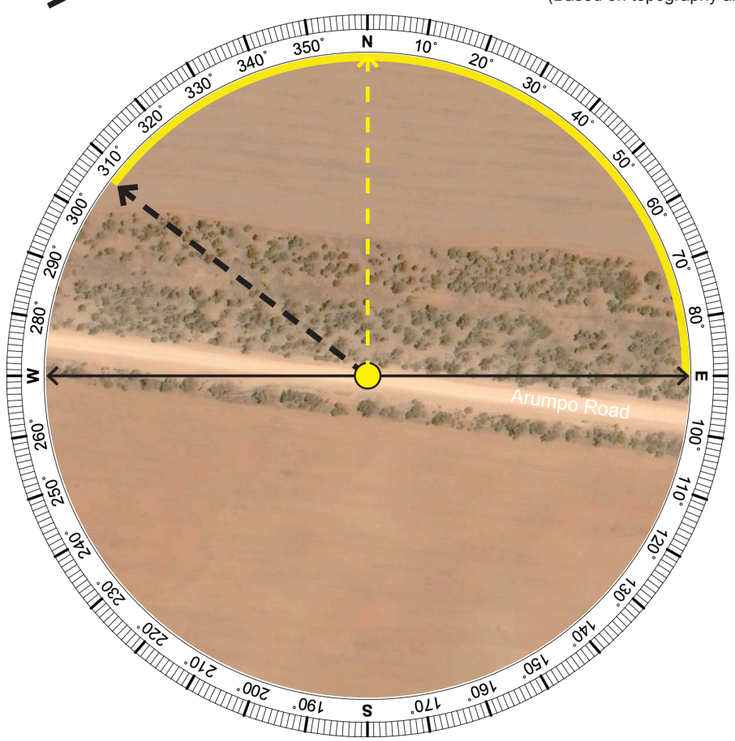
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP22a

Viewpoint Summary:	
Location:	Elevation:
Arumpo Road, Arumpo	122 m
Coordinates:	Viewing Direction:
34° 0’49.07”S 142°27’44.89”E	North
Distance to nearest WTG:	Visibility Distance Zone:
0.30 km	**Near Foreground (NF)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Moderate**
LCU:	Scenic Quality Rating:
LCU06 - Reserves	

Multiple Wind Turbine Tool:

Five (5) 60º Sectors with turbines within 8000 m

Existing Landscape Character Description:

This viewpoint was taken along Arumpo Road. The terrain is relatively flat with the surrounding land being used for grazing. Vegetation is characterised as native grasslands with dense vegetation aligning the road edge. Views are open yet filtered by vegetation towards the Project.

Potential Visual Impact:

Due to close proximity of the viewpoint to the turbines, there will be clear views of the Project from this location. The proportion of the view will be affected because of the scale of the Project.

VP22b Arumpo Road, Arumpo

Approximate extent of potentially visible turbines

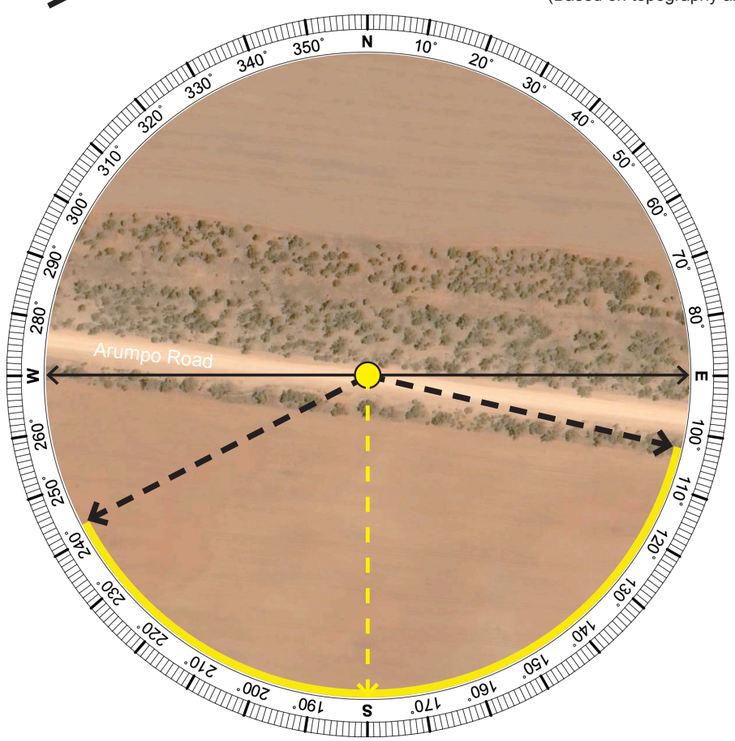
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP22b

Viewpoint Summary:	
Location:	Elevation:
Arumpo Road, Arumpo	122 m
Coordinates:	Viewing Direction:
34° 0’49.07”S 142°27’44.89”E	South
Distance to nearest WTG:	Visibility Distance Zone:
0.30 km	**Near Foreground (NF)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Moderate**
LCU:	Scenic Quality Rating:
LCU06 - Reserves	

Multiple Wind Turbine Tool:

Five (5) 60º Sectors with turbines within 8000 m

Existing Landscape Character Description:

This viewpoint was taken along Arumpo Road. The terrain is relatively flat with the surrounding land being used for agricultural activities and grazing. Views are open yet filtered by scattered vegetation within the road corridor.

Potential Visual Impact:

Due to close proximity of the viewpoint to the turbines, there will be clear views of the Project from this location. The proportion of the view will be affected because of the scale of the Project.

VP23 Arumpo Road, Wentworth

Approximate extent of potentially visible turbines

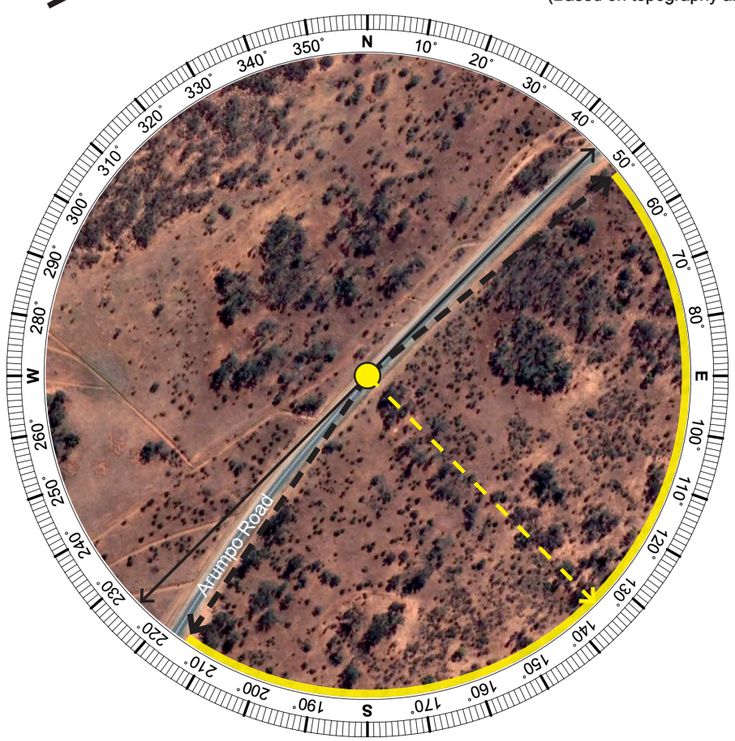
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP23

Viewpoint Summary:	
Location:	Elevation:
Arumpo Road, Wentworth	68 m
Coordinates:	Viewing Direction:
34° 0’44.98”S 142°23’58.13”E	Southeast
Distance to nearest WTG:	Visibility Distance Zone:
4.30 km	**Far Middleground (FM)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Low**
LCU:	Scenic Quality Rating:
LCU01 - Native Vegetation	

Multiple Wind Turbine Tool:

Three (3) 60º Sectors with turbines within 8000 m

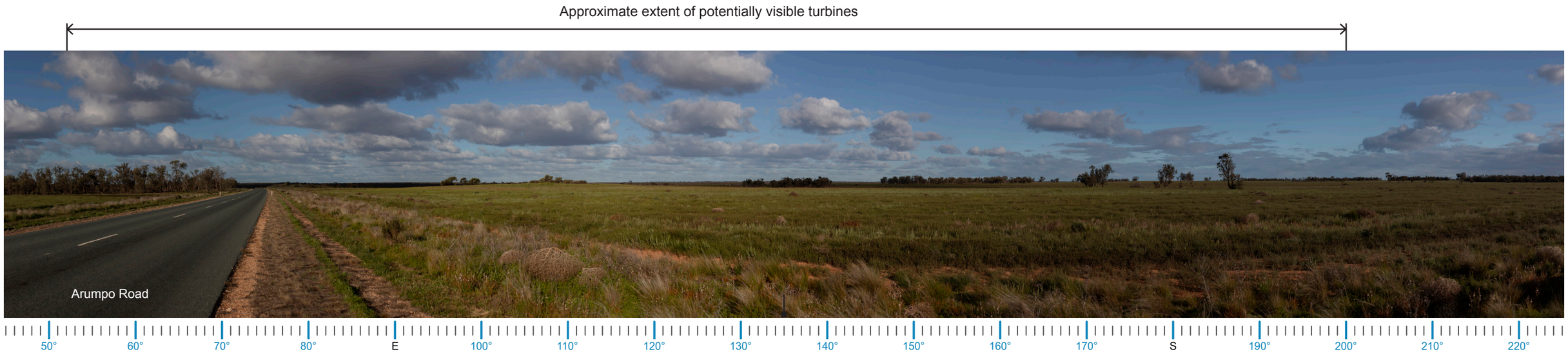
Existing Landscape Character Description:

This viewpoint was taken along Arumpo Road. The terrain is relatively flat with the surrounding land being used for grazing. Vegetation is characterised as native grasslands with open views that are contained by dense vegetation visible throughout the adjoining paddocks to the southeast.

Potential Visual Impact:

Based on topography only, there will clear views of the Project due to the topographic condition. The proportion of the view will be affected because of the scale of the Project in relation to the topographic condition and close proximity of the viewpoint to the Project. Select turbines in the distance may be filtered by vegetation to the southeast.

VP24 Arumpo Road, Wentworth



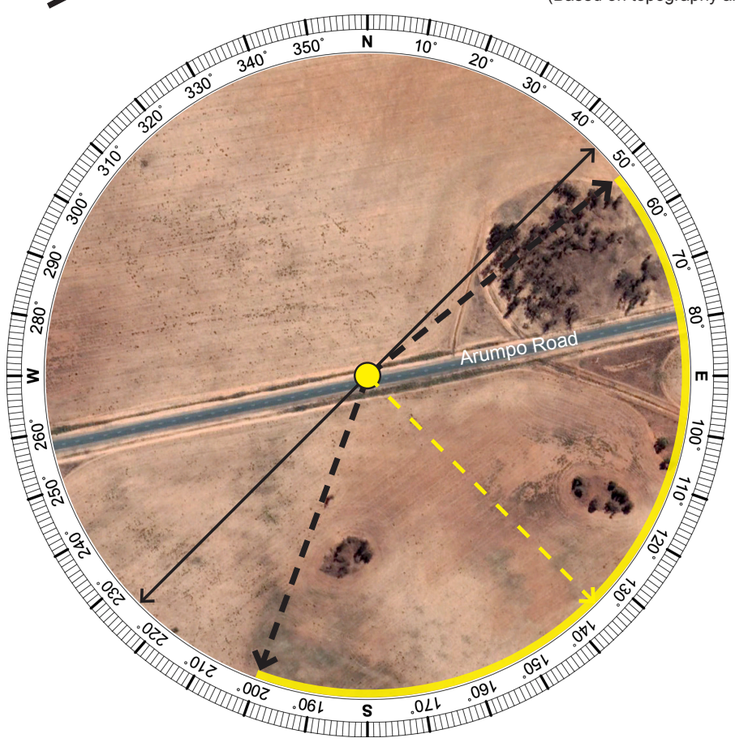
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP24

Viewpoint Summary:	
Location:	Elevation:
Arumpo Road, Wentworth	73 m
Coordinates:	Viewing Direction:
34° 2’8.25”S 142°22’21.62”E	Southeast
Distance to nearest WTG:	Visibility Distance Zone:
1.50 km	**Far Foreground (FF)**
Land Use:	Viewer Sensitivity Level:
Major Road, Agricultural	**Low**
LCU:	Scenic Quality Rating:
LCU07 - Grazing Pastures	

Multiple Wind Turbine Tool:

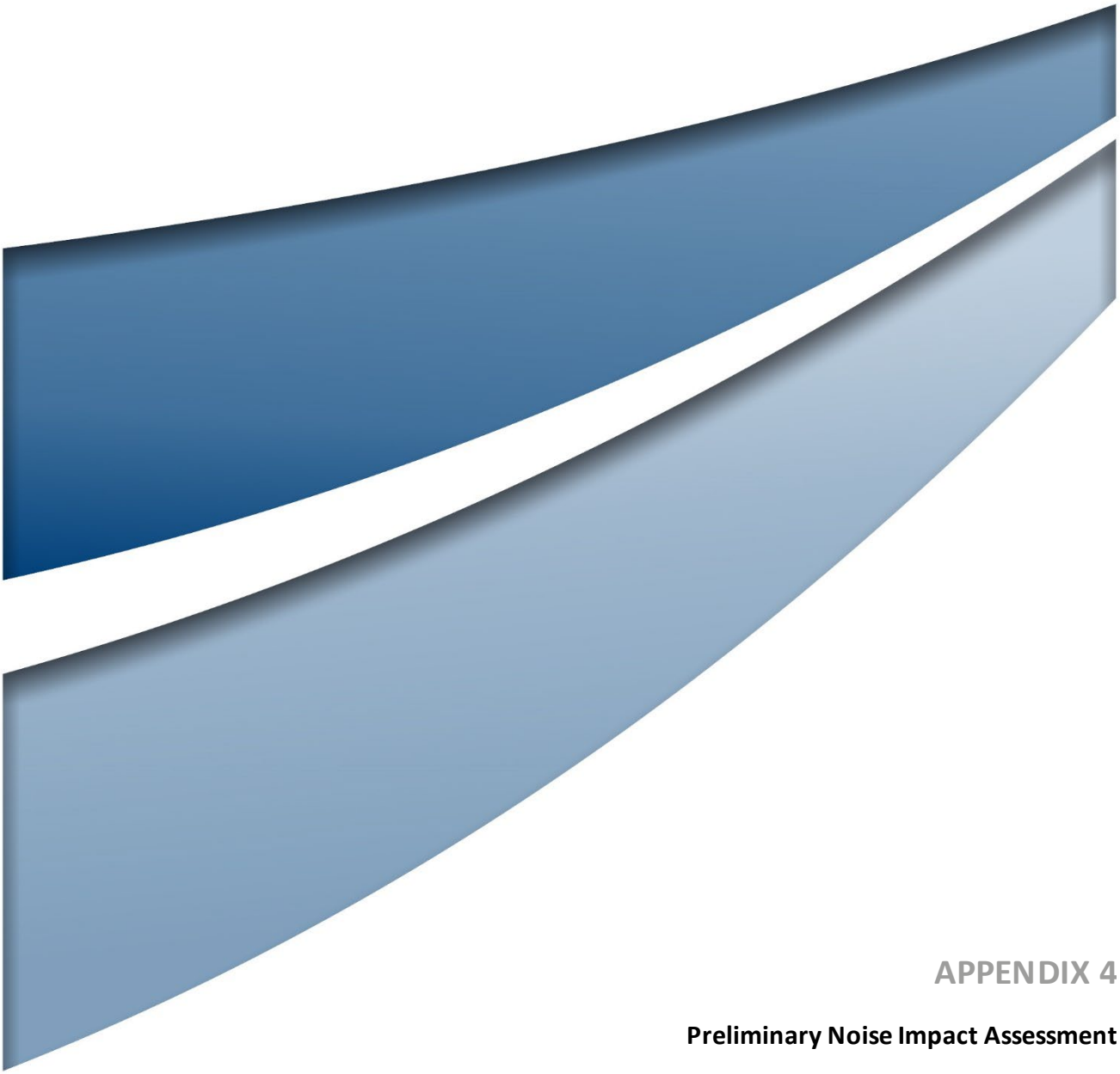
Three (3) 60º Sectors with turbines within 8000 m

Existing Landscape Character Description:

This viewpoint was taken along Arumpo Road towards Mungo National Park. The terrain is flat with the surrounding land being used for agricultural activities and grazing. Views are open and expansive with scattered vegetation dotted throughout the adjoining paddocks.

Potential Visual Impact:

Due to close proximity of the viewpoint to the turbines along with the minimal vegetation screening, there will be clear views of the Project from this location. The proportion of the view will be affected because of the scale of the Project.



APPENDIX 4

Preliminary Noise Impact Assessment

MARSHALL DAY Acoustics

MALLEE WIND FARM
PRELIMINARY NOISE ASSESSMENT

Rp 001 R01 20220306 | 10 November 2022

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Project: **MALLEE WIND FARM**

Prepared for: **Umwelt (Australia) Pty Limited**

Attention: **Bridie McWhirter**

Report No.: **Rp 001 R01 20220306**

Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Superseded	--	For issue to client	Nov. 10 2022	O. Wesley-Smith	A. Stoker
Complete	R01	Minor change to project description	Nov. 10 2022	O. Wesley-Smith	A. Stoker

EXECUTIVE SUMMARY

The proposed Mallee Wind Farm (the Project) by Spark Renewables (the Proponent) comprises the construction, operation and decommissioning of a wind farm located in the south-western region of New South Wales (NSW), approximately 16 km to the north-east of Buronga and close to the NSW-Victorian state border.

The Project will have an installed capacity of up to 1,000 MW of renewable energy and will include a large-scale battery energy storage system (BESS) which will allow for the capture and storage of dispatchable energy. The Project will comprise approximately one hundred and fifty (150) wind turbines, each with a maximum blade tip height of 280 m above ground level. Power generated by the Project will feed into the electricity grid either via the 330 / 220 kV Buronga Substation or through direct connection to the existing 220 kV transmission lines or the new 330 kV lines as part of Transgrid's Project EnergyConnect.

A preliminary assessment of operational noise for the proposed Project has been carried out in accordance with the NSW Department of Planning and Environment's *Wind Energy: Noise Assessment Bulletin - For State significant wind energy development*, dated December 2016 (the NSW Noise Assessment Bulletin).

Noise modelling was carried out based on a candidate turbine model, as nominated by the Proponent, with a generation capacity of 6.6 MW and representative of the size and type of turbine being considered for the Project. While turbine manufacturer's data has been relied on for the assessment, the turbine make and model has not been specified at this stage for commercial reasons.

The results of the modelling demonstrate that the Project can be designed and operated to comply with the operational noise requirements of the NSW Noise Assessment Bulletin.

Once the Secretary's Environmental Assessment Requirements (SEARs) are released for this Project, further detailed assessment will be undertaken to support a subsequent State Significant Development Application (SSDA), to be lodged with the NSW Department of Planning and Environment (DPE) to demonstrate how compliance would be achieved for the specific noise matters that would be defined by the SEARs.

This would include background noise monitoring at key locations around the Project, revised operational wind turbine noise modelling assessment and other noise considerations including special noise characteristics, construction and ancillary infrastructure.

TABLE OF CONTENTS

1.0 INTRODUCTION

The proposed Mallee Wind Farm Project (the Project) comprises the construction, operation and decommissioning of a wind farm located in the south-western region of NSW, approximately 16 km to the north-east of Buronga and close to the NSW-Victorian state border.

The Project will have an installed capacity of up to 1,000 MW of renewable energy and will include a large-scale BESS which will allow for the capture and storage of dispatchable energy. The Project will comprise approximately one hundred and fifty (150) wind turbines, each with a maximum blade tip height of 280 m above ground level. Power generated by the Project will feed into the electricity grid either via the 330 / 220 kV Buronga Substation or through direct connection to the existing 220 kV transmission lines or the new 330 kV lines as part of Transgrid's Project EnergyConnect.

This report presents the result of a preliminary noise assessment prepared for submission with a Scoping Report and a SEARs request.

The preliminary noise assessment has been prepared in accordance with the NSW Noise Assessment Bulletin and is based on:

- The minimum (base) operational noise limit determined in accordance the NSW Noise Assessment Bulletin;
- Preliminary noise modelling for the Project based on the current Project design comprising one hundred and fifty (150) multi-megawatt wind turbines and a candidate turbine model representative of the size and type of turbine being considered for the Project; and
- A comparison of the predicted noise levels with the base noise limit.

Marshall Day Acoustics Pty Ltd (MDA) has been advised that at the time of this assessment, there are no operational or approved wind farms within 10 km of the proposed subject site. Therefore, within this report, potential cumulative noise considerations have not been assessed for the Project.

Other noise considerations relating to the Project would be assessed during the State Significant Development Application (SSDA) stage of the Project. This would include the noise of construction and ancillary infrastructure associated with the Project, along with any other specific noise matters defined by the SEARs for the Project, when issued.

Acoustic terminology used within this report has been defined in **Appendix A.**

2.0 PROJECT DESCRIPTION

2.1 Overview

The Project Area is located approximately 16 km north-east of Buronga, close to the NSW-Victorian state border and covers approximately 18,500 hectares. The Project Area is located on relatively flat land at an elevation of approximately 100 metres above sea level with a good available wind resource. There is one non-associated dwelling within 8 km of the proposed wind turbines at the time of this assessment.

The Project Area is located primarily on land zoned RU1 Primary Production under the Wentworth Local Environmental Plan 2011. The Project Area is currently used for cropping and grazing, with patches of remnant native vegetation present. The EnergyConnect transmission line corridor is located to the south-west of the Project Area. The Project Area is bordered by Mallee Cliffs National Park to the south-east.

The proposed development is seeking approval for up to one hundred and fifty (150) turbines, with a maximum blade-tip height of 280 m above ground level (AGL), which would generate up to 1,000 MW (1 GW) of renewable energy. A single grid-scale BESS is also proposed and would allow for the capture, storage and export of dispatchable energy to the electricity grid along with providing additional grid services. The power generated by the Project will feed into the electricity grid either

via the 330 / 220 kV Buronga Substation connecting into the new Project EnergyConnect interconnector that will link Robertstown (South Australia) with Wagga Wagga (NSW), or direct connection to 220 kV transmission line or 330 kV Project EnergyConnect.

The proposed development would comprise:

- Up to one hundred and fifty (150) wind turbines, with a maximum blade-tip height of 280 m above ground level;
- Power infrastructure providing connection to the Buronga Substation or Project EnergyConnect transmission line i.e. on-site substations/switchyards;
- Internal electrical reticulation network, access roads, and access points from public roads;
- Permanent meteorological monitoring masts;
- Temporary infrastructure including construction compound and site office buildings, storage areas and concrete batching plants;
- Hardstand and laydown area used for wind turbine installation and storage of wind turbine components;
- Operation and maintenance building; and
- A single grid-scale BESS.

Typically, MDA would assess noise to receivers within up to 5 km. This is a nominal distance commonly referenced on account of being significantly greater than the separation distance required to achieve compliance with the lowest possible noise limit prescribed in the NSW Noise Assessment Bulletin. Due to the low number of receivers within 5 km of the Project, this extent has been increased to 12 km to provide greater context to the modelling results.

The coordinates of the wind turbines are tabulated in **Appendix B**.

The coordinates of the receivers are tabulated in **Appendix C**.

A site layout plan illustrating the turbine layout and receivers is provided in **Appendix D**.

2.2 Candidate Wind Turbine Model

The wind turbine model to be assessed in detail as part of the SSDA will be determined from ongoing Project design development. Further, if the Project were ultimately approved, the final wind turbine model would only be selected after a tender process to procure the supply of turbines. The final selection would be made on account of a range of design requirements including achieving compliance with relevant noise limits at surrounding noise sensitive receivers.

Accordingly, to assess the proposed development at this stage in the Project, it is necessary to consider a representative candidate turbine model for the size and type of turbines being considered. The purpose of using a candidate turbine model in this assessment is to inform a preliminary assessment of operational noise, accounting for the base noise limit and noise emission levels that are typical of the size of turbines being considered for the development. While a specific turbine manufacturer's data has been relied on for the assessment, the turbine make and model has not been specified at this stage for commercial reasons.

The candidate turbine is a variable speed wind turbine, with the speed of rotation and the amount of power generated by the turbines being regulated by control systems which vary the pitch of the turbine blades (the angular orientation of the blade relative to its axis).

Details of the candidate wind turbine models are provided in **Table 1**.

Table 1: Candidate wind turbine model details

Item	Specification
Rated power	6.6 MW
Rotor diameter	170 m
Modelled hub height	170 m
Modelled tip height	255 m
Operating mode	Normal
Serrated trailing edge	No

A candidate wind turbine model (or models) with specifications consistent with the Project design would be used in the Environmental Impact Statement (EIS), to reflect the candidate wind turbine models under consideration at the time. Accordingly, the noise assessment undertaken for the EIS would reflect those candidate wind turbine models.

3.0 OPERATIONAL WIND FARM NOISE CRITERIA

3.1 Non-Associated Receivers

The NSW Noise Assessment Bulletin provides guidance on how noise impacts are to be assessed for large-scale wind energy development projects that are State Significant Development (SSD).

The NSW Noise Assessment Bulletin states that the South Australian EPA publication *Wind farms environmental noise guidelines* dated July 2009 (the SA EPA Guideline) is to be used as the relevant assessment standard, subject to a set of variations that apply to the assessment of NSW projects. The variations are defined for:

- noise limits;
- special noise characteristics; and
- noise monitoring.

In relation to noise limits, the variation defined in the NSW Noise Assessment Bulletin sets the base criterion at a value of 35 dB L_{Aeq} for all projects, in lieu of the 35 to 40 dB L_{Aeq} base criterion range defined in the SA EPA Guideline. The criteria in the NSW Noise Assessment Bulletin are subsequently defined as follows:

> *The predicted equivalent noise level ($L_{Aeq,10\ minute}$)*, adjusted for tonality and low frequency noise in accordance with these guidelines, should not exceed 35 dB(A) or the background noise ($L_{A90(10\ minute)}$) by more than 5 dB(A), whichever is the greater, at all relevant receivers for wind speed from cut-in to rated power of the wind turbine generator and each integer wind speed in between.*
>
> ** Determined in accordance with SA 2009, Section 4.*

Variations are also defined in the NSW Noise Assessment Bulletin for the assessment of special noise characteristics. These procedures will be referenced in subsequent detailed assessment phases for the Project.

The NSW Noise Assessment Bulletin notes the following in relation to the types of receivers where the noise limits apply:

> *The criteria in this Bulletin have been developed to address potential noise impacts on the amenity of residents and other relevant receivers in the vicinity of a proposed wind energy project. Wind energy proponents commonly negotiate agreements with private land owners where applicable noise limits may not be achievable at relevant receiver locations. A negotiated agreement will be considered as part of the assessment of a wind energy project, as will the requirements of SA 2009 and this Bulletin. The proponent's EIS should clearly identify the expected noise levels at all receiver locations including host properties to ensure that affected persons are appropriately informed regarding the development proposal.*

3.2 Associated Receivers

The assessment criteria detailed in the previous section apply to all noise sensitive receivers that are not associated with the proposed project (e.g., by way of land ownership or a negotiated agreement). However, in accordance with the requirements of the NSW Noise Assessment Bulletin, predicted noise levels are also presented for participating or associated receivers, comprising host properties and receivers where a noise agreement is in place.

Notwithstanding the above, a reference level of 45 dB L_{Aeq} is presented as a base criterion for associated receivers in order to provide context to the predicted noise levels for these locations. This is consistent with the SA EPA Guideline which recommends a level of 45 dB L_{Aeq} for *financial stakeholders*. Comparisons between the predicted noise levels and the 45 dB L_{Aeq} reference level are

provided for informative purposes only. Noise levels at these locations will ultimately need to be managed in accordance with the commercial agreements established between the Proponent and the landowners.

At the time of this assessment one (1) receiver within the vicinity of the Project is classed as being associated. This receiver is identified as R1146, situated to the northeast of the Project Area approximately 10 km from the closest wind turbine.

All other receivers considered within this assessment are non-associated.

4.0 ASSESSMENT METHOD

Operational wind farm noise levels are predicted using:

- Noise emission data for the wind turbines;
- A 3D digital model of the site and the surrounding environment; and
- International standards used for the calculation of environmental sound propagation.

At this preliminary stage of assessment, the primary consideration is potential A-weighted noise levels associated with operation of the Project.

The method selected to predict A-weighted noise levels is International Standard ISO 9613-2: 1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613-2). The prediction method is consistent with the guidance provided by the SA EPA Guideline and has been shown to provide a reliable method of predicting the typical upper A-weighted levels of the noise expected to occur in practice from wind farm developments.

The ISO 9613-2 method is used in conjunction with a set of input choices and procedural modifications that are specific to wind farm noise assessment, based on international research and guidance.

The noise prediction method is summarised in **Table 2** with further discussion of the method and the calculation choices is provided in **Appendix E**.

Table 2: Downwind prediction methodology

Detail	Description
Software	Proprietary noise modelling software SoundPLAN version 8.2
Method	International Standard ISO 9613-2:1996 *Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation* (ISO 9613-2). Adjustments to the ISO 9613-2 method are applied on the basis of the guidance contained in the UK Institute of Acoustics publication *A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise* (the UK Institute of Acoustics guidance). The adjustments are applied within the SoundPLAN noise modelling software and relate to the influence of terrain screening and ground effects on sound propagation. Specific details of adjustments are noted below and are discussed in **Appendix E.**
Source characterisation	Each wind turbine is modelled as a point source of sound. The total sound of the wind farm is then calculated based on simultaneous operation of all wind turbines and summing the contribution of each. Calculations of turbine to receiver distances and average sound propagation heights are made based on the point source being located at the position of the hub of the turbine. Calculations of terrain related screening are made based on the point source being located at the maximum tip height of each turbine. Discussion of the modelled tip height and wind turbine noise data is provided in **Section 2.2** and **Section 5.1**. Discussion of terrain screening effects is provided below.
Terrain data	Elevation contours in 5 m resolution provided by the Proponent

Detail	Description
Terrain effects	Adjustments for the effect of terrain are determined and applied based on the UK Institute of Acoustics guidance and research outlined in Appendix E. • Valley effects: +3 dB is applied to the calculated noise level of a wind turbine when a significant valley exists between the wind turbine and calculation point. A significant valley is determined to exist when the actual mean sound propagation height between the turbine and calculation point is 50 % greater than would occur if the ground were flat. • Terrain screening effects: only calculated if the terrain blocks line of sight between the maximum tip height of the turbine and the calculation point. The value of the screening effect is limited to a maximum value of 2 dB. The Project area features varied topography with wind turbines generally located in moderately upland positions. The majority of receivers are located at the lower end of the elevation range. These terrain characteristics resulted in the moderate application of adjustments to the predicted noise levels for some turbine/receiver combinations. For reference purposes, the ground elevations at the turbine and receiver locations are tabled in **Appendix B** and **Appendix C** respectively. The topography of the site is depicted in the elevation map provided in **Appendix F**
Ground conditions	Ground factor of G = 0.5 based on the UK Institute of Acoustics guidance and research outlined in **Appendix E**. The ground around the site corresponds to acoustically soft conditions (G = 1) according to ISO 9613-2. The adopted value of G = 0.5 assumes that 50 % of the ground cover is acoustically hard (G = 0) to account for variations in ground porosity and provide a cautious representation of ground effects.
Atmospheric conditions	Temperature 10 ^{o}C and relative humidity 80 % These represent conditions which result in relatively low levels of atmospheric sound absorption and are chosen based on the UK Institute of Acoustics guidance and the SA EPA Guideline. The calculations are based on sound speed profiles[1] which increase the propagation of sound from each turbine to each receiver, whether as a result of thermal inversions or wind directed toward each calculation point. The primary consideration for wind farm noise assessment is wind speed and direction. The noise level at each calculation point is assessed based on being simultaneously downwind of every wind turbine at the site. Other wind directions in which part or the entire wind farm is upwind of the receiver will result in lower noise levels. In some cases, it is not physically possible for a receiver to be simultaneously downwind of each turbine and the approach is therefore precautionary in these instances.
Receiver heights	1.5 m above ground level This is a deviation from UK Institute of Acoustics guidance. However, the modelling also does not include the 2 dB subtraction recommended by the UK Institute of Acoustics guidance. This approach has been shown to be valid for predicting noise level of wind farms expected to be measured using the L_{A90} parameter (as per the NSW Noise Assessment Bulletin).

[1] The sound speed profile defines the rate of change in the speed of sound with increasing height above ground

5.0 WIND TURBINE NOISE ASSESSMENT

5.1 Wind Turbine Noise Emissions

The noise emissions of wind turbines are described in terms of the sound power level for different wind speeds at the hub height. The sound *power* level is a measure of the total sound energy produced by each turbine and is distinct from the sound *pressure* level which depends on a range of factors such as the distance from the turbine.

Sound power level data for the candidate turbine model has been sourced from the manufacturer's specification document provided by the Proponent at the time of reporting. The sound power data provided in the manufacturer's documentation has been adjusted by the addition of +1.0 dB at each wind speed to provide a margin for typical values of test uncertainty, in line with recommendations from the UK Institute of Acoustics guidance.

The sound power levels referenced in this assessment, including the +1.0 dB adjustment, are illustrated in **Figure 1**. The overall level represents the total noise emission of the turbine, including the secondary contribution of ancillary plant associated with the turbine (e.g., cooling fans and internal transformer).

The sound power levels in **Figure 2** are considered typical of the range of noise emissions associated with comparable multi-megawatt wind turbines. The data is therefore considered appropriate to reference in this preliminary assessment as a representation of the apparent sound power levels of the turbine when tested and rated in accordance with International Electrotechnical Commission publication IEC 61400-11:2012 *Wind turbines - Part 11: Acoustic noise measurement techniques* (IEC 61400-11).

The sound frequency characteristics of the turbine has been sourced from the manufacturer's specification document provided by the Proponent at the time of reporting. The reference spectrum used as the basis for this assessment is shown in **Figure 2** and correspond with the highest overall sound power level shown in **Figure 1**, indicated to occur at 9 m/s and above.

Figure 1: Turbine assessment sound power levels (including +1 dB for test uncertainty), dB L_{WA}

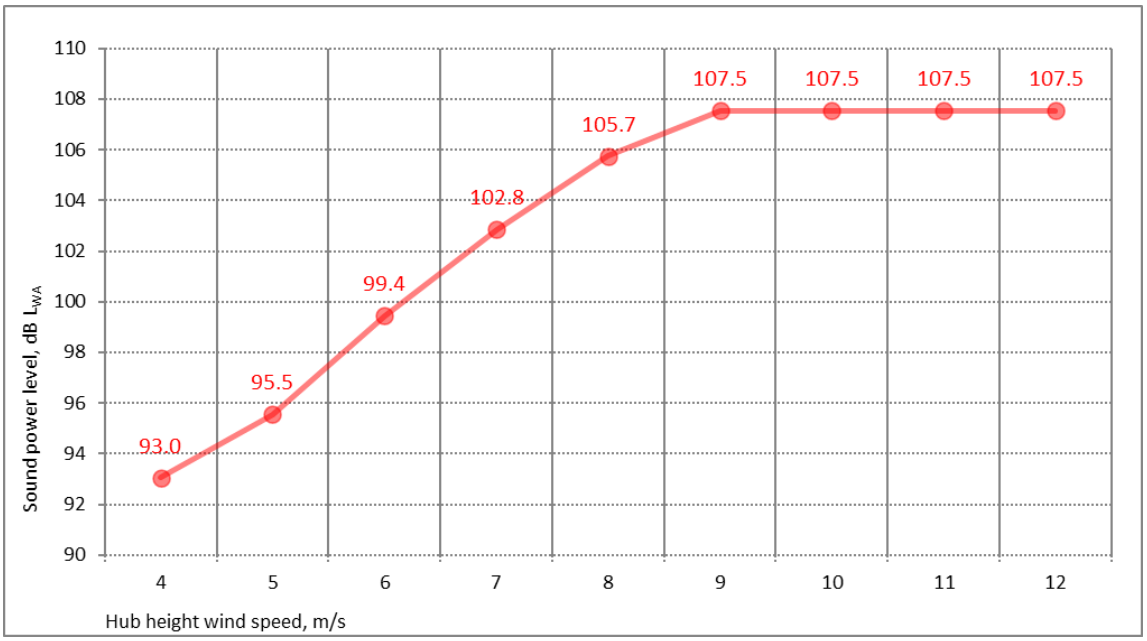
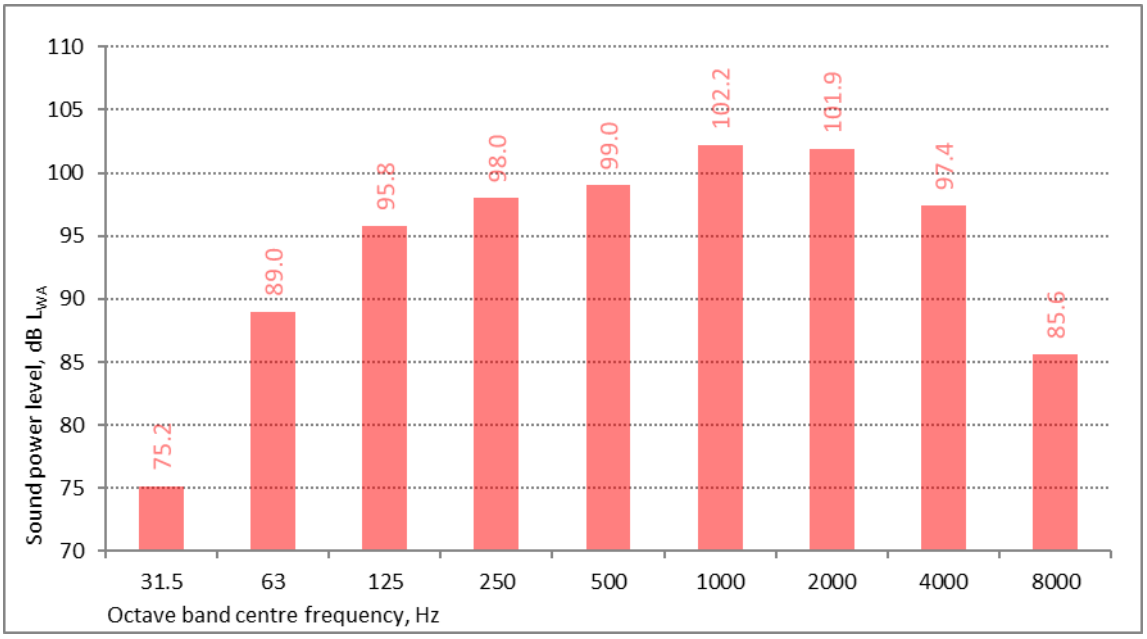


Figure 2: Turbine assessment sound power level spectrum (including +1 dB for test uncertainty), dB L_{WA}



The manufacturer specification for the candidate turbine model does not provide information about tonality.

The occurrence of tonality in the noise of contemporary multi-megawatt turbine designs is generally limited. This is supported by evidence of operational wind farms in Australia which indicates that the occurrence of tonality at receivers is atypical. On this basis, adjustments for tonality have not been applied to the predicted noise levels presented in this preliminary assessment. Notwithstanding this, the subject of tonality would be addressed in subsequent assessment stages for the Project. As part of this, further information will need to be obtained from the manufacturer concerning tonality.

The other special noise characteristic which is assessable in accordance with the NSW Noise Assessment Bulletin is low frequency noise. While there is a prescribed criterion for the application of low frequency noise penalty adjustments in the NSW Noise Assessment Bulletin (based on C-weighted noise levels), there is no established or verified engineering prediction method of C-weighted noise levels associated with the operation of wind turbines.

For the purposes of this report, a risk assessment approach has been adopted using a simplified prediction method to estimate the C-weighted noise levels. Details of the study have been provided in **Appendix H**.

5.2 Preliminary Predicted Noise Levels

This section of the report presents the preliminary predicted A-weighted noise levels of the Project at surrounding receivers, and an assessment of compliance with the base noise limit.

Sound levels in environmental assessment work are typically reported to the nearest integer to reflect the practical use of measurement and prediction data. However, in the case of wind farm layout design, significant layout modifications may only give rise to fractional changes in the predicted noise level. This is a result of the relatively large number of sources influencing the total predicted noise level, as well as the typical separating distances between the turbine locations and surrounding assessment positions. It is therefore necessary to consider the predicted noise levels at a finer resolution than can be perceived or measured in practice. It is for this reason that the levels presented in this section are reported to one decimal place.

5.2.1 Non-Associated Receivers

Predicted noise levels for all non-associated receivers within 12 km of a wind turbine are listed in Table 3. The base noise limit applicable to the wind farm at non-associated receivers is 35 dB L_{Aeq}.

The predicted noise levels are for conditions when the candidate wind turbine's noise emissions have reached their highest level (corresponding to 9 m/s or greater) and the wind is directed from the wind farm to each receiver. The predicted noise levels presented include the +1.0 dB allowance to account for turbine sound power level measurement uncertainty, as described in **Section 5.1**. Results have been sorted to provide descending predicted noise levels.

Table 3: Highest predicted noise level at non-associated receivers within 12 km of a wind turbine

Receiver	dB L_{Aeq}	Distance to the nearest turbine, m	Below the base criterion
R1148	21.8	7,988	Yes
R1114	19.8	10,112	Yes
R1113	19.7	10,314	Yes
R1111	19.1	11,118	Yes
R1112	19.1	11,144	Yes
R1088	18.8	11,444	Yes
R1107	18.9	11,436	Yes
R1090	18.8	11,552	Yes
R1080	18.5	11,766	Yes
R1106	18.9	11,502	Yes
R1091	18.8	11,562	Yes
R1103	18.9	11,514	Yes
R1089	18.7	11,588	Yes
R1079	18.5	11,757	Yes
R1087	18.7	11,608	Yes
R1101	18.8	11,534	Yes
R1100	18.8	11,559	Yes
R1098	18.8	11,571	Yes
R1086	18.7	11,681	Yes
R1094	18.8	11,601	Yes
R1095	18.8	11,604	Yes
R1104	18.8	11,568	Yes
R1105	18.8	11,568	Yes
R1102	18.8	11,609	Yes
R1092	18.7	11,651	Yes
R1099	18.8	11,625	Yes

Receiver	dB L_{Aeq}	Distance to the nearest turbine, m	Below the base criterion
R1097	18.7	11,660	Yes
R1093	18.7	11,701	Yes
R1096	18.7	11,687	Yes
R1077	18.3	11,971	Yes
R1078	18.4	11,940	Yes
R1110	18.7	11,731	Yes
R1108	18.7	11,808	Yes
R1109	18.7	11,844	Yes

It can be seen from **Table 3** that the predicted noise levels for the proposed Project are below the NSW Noise Assessment Bulletin base criterion of 35 dB L_{Aeq} at all the assessed non-associated receivers. The highest predicted noise level of 21.8 dB indicated at R1148 is 13.2 dB below the base criterion with all other non-associated receivers predicted to be below the base criterion by larger margins.

5.2.2 Associated Receivers

The predicted noise level at the single associated receiver has been listed in Table 4.

Table 4: Highest predicted noise level at non-associated receivers within 12 km of a wind turbine

Receiver	dB L_{Aeq}	Distance to the nearest turbine, m	Below the base criterion
R1146	21.2	10,437	Yes

It can be seen from Table 4 that the predicted noise level from the proposed Project is 23.8 dB L_{Aeq} below the 45 dB L_{Aeq} reference level at the associated receiver.

5.2.3 Summary

The assessment and findings detailed in **Section 5.2.1** and **Section 5.2.2** support that the project can be designed and operated to comply with the operational noise requirements of the NSW Noise Assessment Bulletin.

Predicted noise levels for each integer wind speed are tabulated in **Appendix G** for all receivers within 12 km of a wind turbine.

The location of the total predicted 30 dB, 35 dB, 40 dB, and 45 dB L_{Aeq} noise contours is illustrated in **Figure 3** with a zoomed view shown in **Figure 4**.

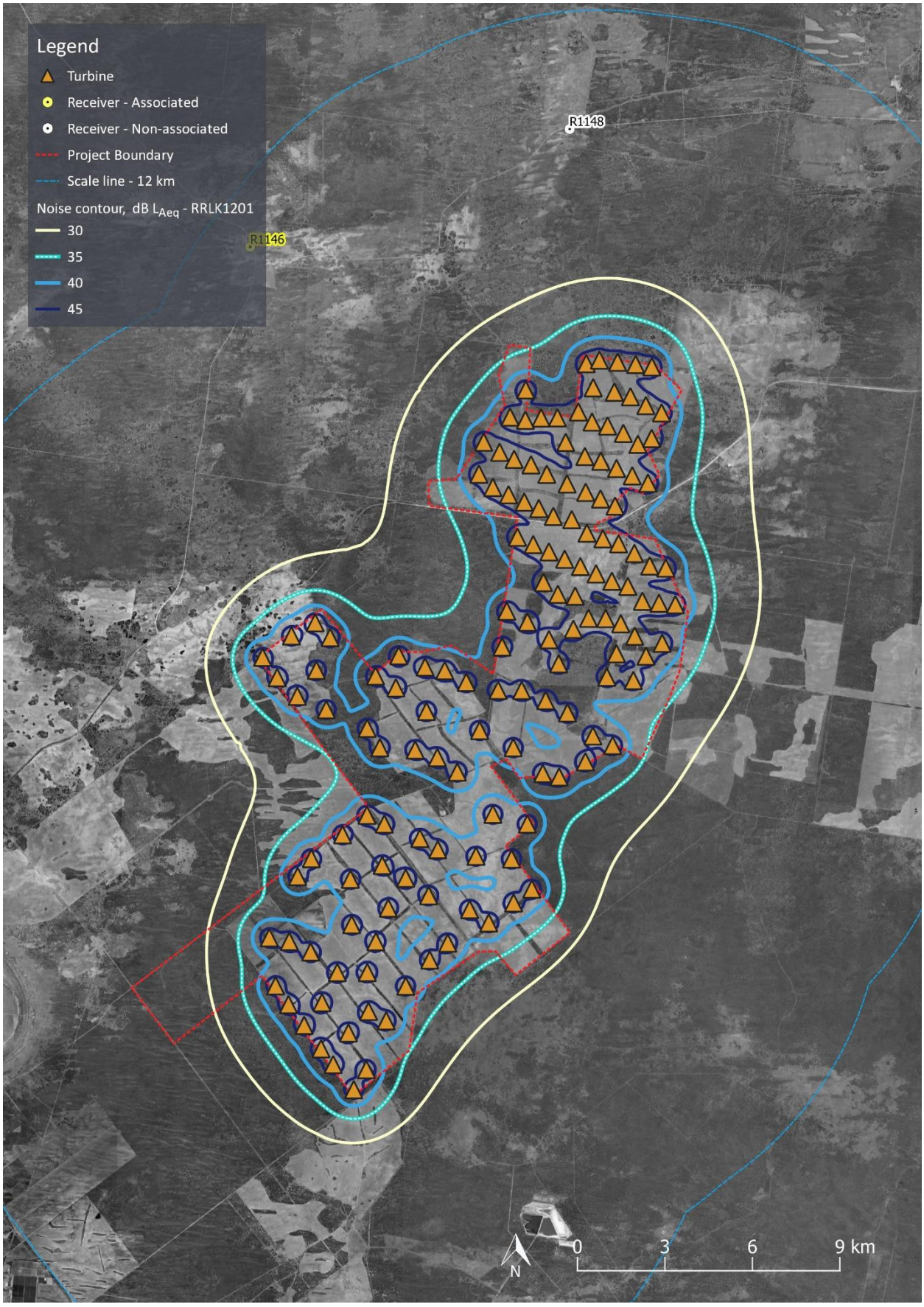
5.3 Low-Frequency Noise

The risk assessment provided in **Appendix H** indicates calculated low frequency noise levels below the applicable thresholds described in **Section H2** for both associated and non-associated receivers.

On the basis of the above, adjustments for special noise characteristics referred to in the NSW Noise Assessment Bulletin have not been applied to the predicted noise levels for non-associated receivers presented in this assessment. However, assessment of these special noise characteristics would need to be carried out as part of the post-construction compliance assessment.

Figure 3: Highest predicted noise levels (corresponding to hub height wind speeds of 9 m/s or greater)

Figure 4: Highest predicted noise levels (corresponding to hub weight wind speeds of 9 m/s or greater) – Zoomed



6.0 DETAILED ASSESSMENT PHASE

A detailed assessment of a wind farm development in NSW involves addressing several environmental noise considerations detailed in the project specific SEARs. Whilst project specific SEARs are yet to be issued, typical requirements include assessment of:

- operational wind turbine noise;
- ancillary infrastructure noise;
- construction noise;
- construction traffic noise; and
- construction vibration.

Environmental noise considerations relating to construction and ancillary infrastructure would be addressed at the EIS phase of the assessment, once the project specific SEARs have been released.

Further detailed assessment work may involve background noise monitoring at key receivers to determine the applicable criteria in accordance with the NSW Noise Assessment Bulletin. The results of any background noise monitoring would be documented in the noise assessment report prepared to accompany the SSDA for the Project.

The NSW Noise Assessment Bulletin specifies additional criteria relating to *special characteristics*, defined as tonality and low frequency. While tonality cannot be readily predicted, in relation to low frequency noise, the bulletin states that:

> *Noise assessments for proposed wind energy projects shall assess the potential for non-associated residential receiver locations to experience low frequency noise levels exceeding 60 dB(C).*

Low frequency noise characteristics are highly specific to the turbine being considered, and its assessment can involve detailed modelling using alternative procedures to those used for A-weighted noise levels. In accordance with the NSW Noise Assessment Bulletin, this modelling data is to be provided as part of an application to develop a wind farm. Accordingly, this modelling is to be undertaken and reported at the SSDA phase of the assessment.

7.0 SUMMARY

A preliminary assessment of operational noise for the proposed Project has been carried out in accordance with the NSW Noise Assessment Bulletin.

The preliminary noise assessment has been prepared based on the current Project design comprising one hundred and fifty (150) multi-megawatt turbines within the wind farm site.

Noise modelling was carried out based on a candidate turbine model, as nominated by the Proponent, with a generation capacity of 6.6 MW and representative of the size and type of turbine being considered for the Project. While turbine manufacturer's data has been relied on for the assessment, the turbine make and model has not been specified at this stage for commercial reasons.

The results of the modelling demonstrate that, despite the precautionary approach, the Project can be designed and operated to comply with the operational noise requirements of the NSW Noise Assessment Bulletin. Once the SEARs are released for this Project, further detailed assessment will be undertaken to support a subsequent SSDA, to be lodged with DPE. This would include background noise monitoring at key locations around the Project, revised operational wind turbine noise modelling assessment and other noise considerations including special noise characteristics, construction and ancillary infrastructure.

APPENDIX A GLOSSARY OF TERMINOLOGY

The basic quantities used within this document to describe noise adopt the conventions outlined in ISO 1996-1:2016 Acoustics - Description measurement and assessment of environmental noise – Basic quantities and assessment procedures.

Accordingly, all frequency weighted sound pressure levels are expressed as decibels (dB) in this report.

For example, sound pressure levels measured using an "A" frequency weighting are expressed as LA dB. Alternative ways of expressing A-weighted decibels such as dBA or dB(A) are therefore not used within this report.

Term	Definition	Abbreviation
A-weighting	A method of adjusting sound levels to reflect the human ear's varied sensitivity to different frequencies of sound.	See discussion above this table.
C- weighting	A method of adjusting sound levels to account for non-linear frequency response of the human ear at high noise levels (typically greater than 100 decibels).	-
A-weighted 90th centile	The A-weighted pressure level that is exceeded for 90 % of a defined measurement period. It is used to describe the underlying background sound level in the absence of a source of sound that is being investigated, as well as the sound level of steady, or semi steady, sound sources.	L_{A90}
A-weighted equivalent level	The A-weighted equivalent continuous pressure level.	L_{Aeq}
C-weighted equivalent level	The C-weighted equivalent continuous pressure level.	L_{Ceq}
Decibel	The unit of sound level.	dB
Hertz	The unit for describing the frequency of a sound in terms of the number of cycles per second.	Hz
Low frequency	A sound with perceptible content in the audible frequency range typically below 200 Hz	-
Octave Band	A range of frequencies. Octave bands are referred to by their logarithmic centre frequencies, these being 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, and 16 kHz for the audible range of sound.	-
Sound power level	A measure of the total sound energy emitted by a source, expressed in decibels.	L_W
Sound pressure level	A measure of the level of sound expressed in decibels.	L_p
Special characteristics	A term used by the NSW Noise Assessment Bulletin to define sound characteristics that increase the likelihood of adverse reaction to the sound. The characteristics are tonality and low frequency.	-
Tonality	A characteristic to describe sounds which are composed of distinct and narrow groups of audible sound frequencies (e.g. whistling or humming sounds).	-

APPENDIX B WIND TURBINE COORDINATES

Turbine	Easting, m	Northing, m	Terrain elevation, m
T1	625,863.76	6,230,678.40	72
T2	626,095.12	6,221,066.06	95
T3	626,308.68	6,219,419.90	105
T4	626,363.65	6,229,985.09	75
T5	626,751.48	6,218,773.87	114
T6	626,779.19	6,220,938.35	95
T7	626,855.60	6,231,416.47	70
T8	627,054.35	6,229,345.43	75
T9	627,066.10	6,223,166.93	92
T10	627,288.07	6,218,061.97	123
T11	627,512.24	6,220,578.32	107
T12	627,536.08	6,223,778.71	96
T13	627,665.90	6,231,865.87	70
T14	627,708.63	6,230,235.55	75
T15	627,867.15	6,217,259.74	119
T16	627,900.08	6,218,842.55	116
T17	628,048.68	6,228,886.09	79
T18	628,180.76	6,231,358.87	70
T19	628,284.76	6,216,718.30	113
T20	628,425.56	6,219,876.14	115
T21	628,605.35	6,224,597.94	101
T22	628,806.23	6,217,803.36	110
T23	628,873.88	6,223,070.80	106
T24	628,917.64	6,221,515.74	115
T25	628,990.06	6,215,859.33	101
T26	629,421.63	6,216,546.25	94
T27	629,444.52	6,225,266.29	109
T28	629,450.77	6,228,245.24	91
T29	629,454.28	6,219,877.42	109
T30	629,496.13	6,218,539.12	102
T31	629,738.00	6,230,037.14	87
T32	629,746.89	6,220,933.28	110

Turbine	Easting, m	Northing, m	Terrain elevation, m
T33	629,884.30	6,227,582.60	100
T34	629,967.77	6,223,545.94	115
T35	630,037.33	6,224,964.51	110
T36	630,102.33	6,218,217.16	90
T37	630,174.16	6,222,080.14	107
T38	630,434.42	6,229,632.94	98
T39	630,534.44	6,230,736.54	86
T40	630,771.55	6,223,107.51	109
T41	630,773.29	6,219,405.30	88
T42	631,096.74	6,227,502.09	109
T43	631,258.48	6,224,468.78	102
T44	631,435.06	6,230,345.43	100
T45	631,483.44	6,228,826.48	107
T46	631,558.81	6,222,509.36	98
T47	631,594.01	6,220,304.14	79
T48	631,855.09	6,227,242.93	110
T49	631,870.29	6,224,084.79	100
T50	632,109.16	6,230,223.22	100
T51	632,211.99	6,220,882.25	79
T52	632,540.34	6,226,745.77	95
T53	632,846.93	6,229,824.62	98
T54	632,963.90	6,222,033.36	74
T55	633,181.87	6,223,861.25	77
T56	633,282.02	6,236,958.73	100
T57	633,306.35	6,228,173.34	87
T58	633,444.10	6,238,056.10	95
T59	633,617.92	6,221,574.49	74
T60	633,758.53	6,236,505.15	109
T61	633,759.99	6,225,301.00	72
T62	633,941.02	6,229,550.23	87
T63	633,991.82	6,237,709.39	102
T64	634,077.07	6,231,034.07	101
T65	634,236.63	6,232,260.95	111

Turbine	Easting, m	Northing, m	Terrain elevation, m
T66	634,297.78	6,236,253.69	115
T67	634,350.32	6,238,915.38	100
T68	634,401.49	6,223,767.54	70
T69	634,459.96	6,227,584.13	70
T70	634,470.58	6,222,259.55	70
T71	634,487.86	6,237,468.32	111
T72	634,603.75	6,234,798.00	108
T73	634,747.63	6,229,545.51	77
T74	634,837.04	6,236,002.23	120
T75	634,875.71	6,238,808.09	103
T76	634,887.52	6,239,848.41	92
T77	634,943.41	6,231,886.78	104
T78	634,942.54	6,224,965.66	70
T79	635,068.51	6,237,279.52	116
T80	635,143.00	6,234,546.54	107
T81	635,095.65	6,222,732.03	74
T82	635,334.22	6,235,782.45	123
T83	635,414.51	6,238,883.79	96
T84	635,471.89	6,226,696.45	74
T85	635,493.03	6,233,246.33	95
T86	635,571.16	6,229,197.47	72
T87	635,609.58	6,236,955.01	119
T88	635,682.25	6,234,295.08	103
T89	635,684.49	6,231,287.13	86
T90	635,832.94	6,235,511.71	115
T91	635,973.91	6,238,889.71	99
T92	635,988.22	6,232,839.39	90
T93	636,016.13	6,230,459.93	80
T94	636,031.92	6,226,579.27	75
T95	636,221.51	6,234,043.63	95
T96	636,256.10	6,238,046.65	105
T97	636,304.28	6,236,626.15	111
T98	636,317.00	6,228,776.95	75

Turbine	Easting, m	Northing, m	Terrain elevation, m
T99	636,463.47	6,235,401.28	103
T100	636,519.41	6,231,642.59	90
T101	636,581.96	6,232,778.32	88
T102	636,691.66	6,239,092.65	100
T103	636,760.76	6,233,792.17	90
T104	636,963.12	6,240,747.61	109
T105	636,915.13	6,237,565.74	104
T106	636,943.23	6,236,336.52	101
T107	636,933.22	6,227,099.41	70
T108	636,987.13	6,234,938.18	90
T109	637,040.70	6,232,018.39	84
T110	637,160.59	6,238,746.03	100
T111	637,189.73	6,227,982.02	70
T112	637,200.67	6,239,921.59	101
T113	637,300.01	6,233,540.71	90
T114	637,414.41	6,240,870.05	115
T115	637,449.83	6,236,108.90	89
T116	637,460.63	6,237,404.87	102
T117	637,533.30	6,234,744.94	85
T118	637,627.80	6,232,013.29	80
T119	637,669.73	6,230,001.35	80
T120	637,693.92	6,238,609.11	99
T121	637,839.26	6,233,289.25	85
T122	637,924.54	6,239,774.09	105
T123	637,950.42	6,235,865.28	80
T124	637,998.73	6,230,802.99	80
T125	637,999.88	6,237,153.42	89
T126	637,867.83	6,227,654.83	70
T127	638,036.70	6,240,797.38	115
T128	638,070.07	6,234,571.26	80
T129	638,145.23	6,231,833.56	81
T130	638,233.17	6,238,357.65	96
T131	638,385.62	6,233,110.39	81

Turbine	Easting, m	Northing, m	Terrain elevation, m
T132	638,476.70	6,239,613.78	106
T133	638,539.13	6,236,901.96	80
T134	638,578.06	6,229,886.06	75
T135	638,611.81	6,234,242.03	81
T136	638,623.04	6,231,404.73	83
T137	638,654.55	6,240,719.86	113
T138	638,732.46	6,237,984.59	83
T139	638,886.69	6,232,601.73	79
T140	639,005.71	6,239,310.43	97
T141	639,012.47	6,230,720.13	80
T142	639,078.39	6,236,650.50	77
T143	639,138.76	6,233,812.49	82
T144	639,210.84	6,240,640.06	105
T145	639,205.30	6,238,184.63	82
T146	639,457.02	6,232,534.88	76
T147	639,544.96	6,239,058.97	85
T148	639,566.55	6,231,160.68	77
T149	639,690.31	6,233,739.11	80
T150	640,019.68	6,232,485.70	75

APPENDIX C RECEIVER LOCATIONS

Table 5 sets out the thirty five (35) noise sensitive receivers located within 12 km of a proposed wind turbine and considered in the preliminary noise assessment, together with their respective distance to the nearest turbine. Data has been provided by the Proponent.

Table 5: Receiver locations – GDA2020 MGA zone 55

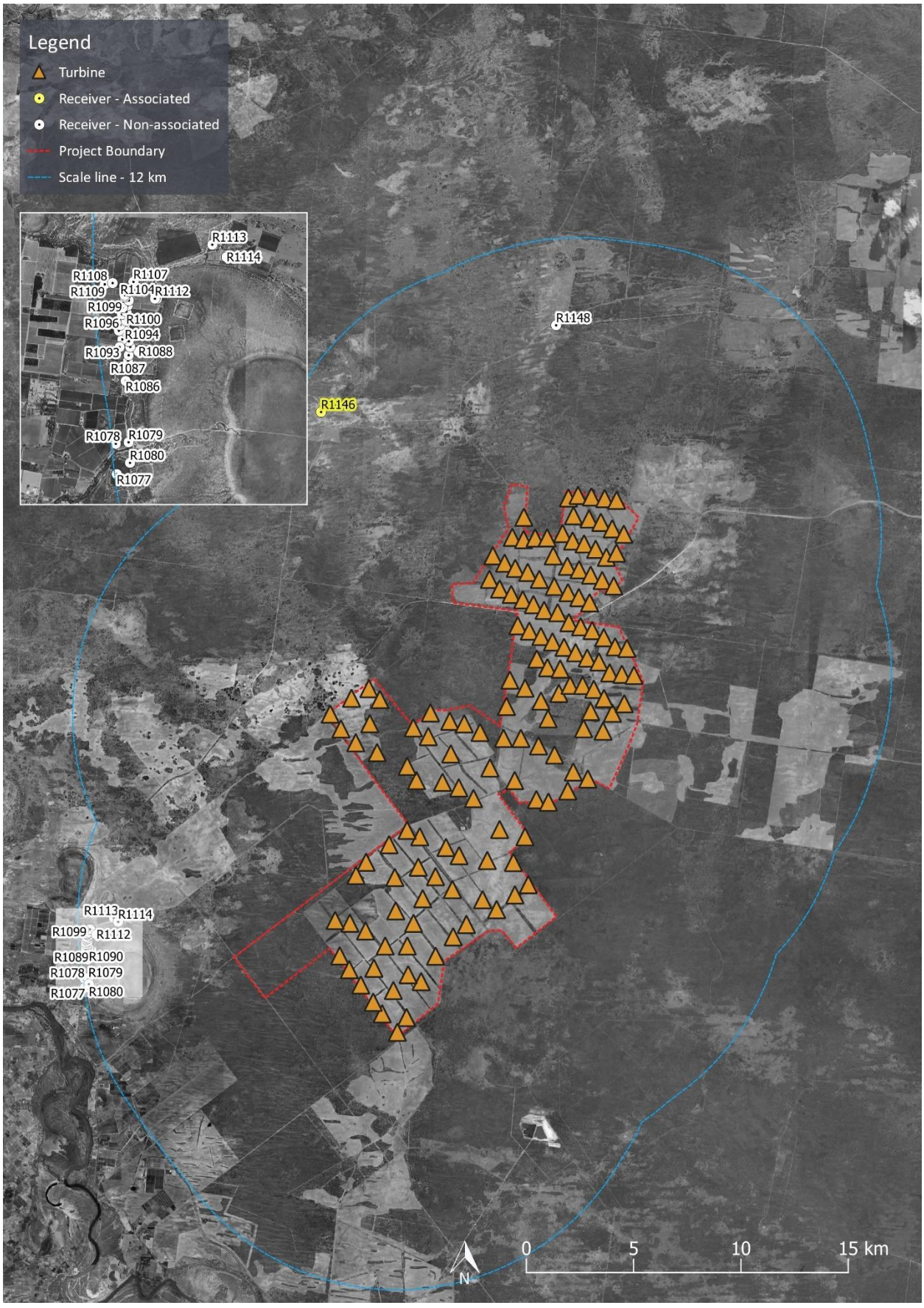
Receiver ID	Easting, m	Northing, m	Terrain elevation, m	Distance to the nearest turbine, m
R1077	614,432	6,217,930	40	11,971
R1078	614,417	6,218,360	39	11,940
R1079	614,599	6,218,381	40	11,757
R1080	614,619	6,218,091	37	11,766
R1086	614,557	6,219,248	40	11,681
R1087	614,591	6,219,530	40	11,608
R1088	614,739	6,219,664	40	11,444
R1089	614,600	6,219,612	40	11,588
R1090	614,622	6,219,730	40	11,552
R1091	614,603	6,219,809	40	11,562
R1092	614,510	6,219,836	40	11,651
R1093	614,472	6,219,728	40	11,701
R1094	614,546	6,219,985	40	11,601
R1095	614,546	6,219,953	40	11,604
R1096	614,462	6,219,960	40	11,687
R1097	614,481	6,220,039	40	11,660
R1098	614,566	6,220,098	40	11,571
R1099	614,504	6,220,191	40	11,625
R1100	614,568	6,220,224	40	11,559
R1101	614,587	6,220,316	39	11,534
R1102	614,513	6,220,283	40	11,609
R1103	614,602	6,220,386	38	11,514
R1104	614,545	6,220,436	38	11,568
R1105	614,544	6,220,462	38	11,568
R1106	614,607	6,220,512	37	11,502
R1107	614,668	6,220,650	36	11,436
R1108	614,297	6,220,628	40	11,808
R1109	614,261	6,220,615	40	11,844
R1110	614,373	6,220,633	40	11,731

Receiver ID	Easting, m	Northing, m	Terrain elevation, m	Distance to the nearest turbine, m
R1111	614,998	6,220,408	35	11,118
R1112	614,971	6,220,411	35	11,144
R1113	615,783	6,221,176	40	10,314
R1114	615,984	6,221,000	44	10,112
R1146*	625,439	6,244,751	55	10,437
R1148	636,393	6,248,790	66	7,988

* Associated receiver

APPENDIX D SITE LAYOUT PLAN

Figure 5: Proposed turbine locations and noise sensitive receivers



APPENDIX E NOISE PREDICTION MODEL

Environmental noise levels associated with wind farms are predicted using engineering methods.

The international standard ISO 9613-2 *Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation* (ISO 9613-2) has been chosen as the most appropriate method to calculate the level of broadband A-weighted wind farm noise expected to occur at surrounding receiver locations. This method is the most robust and widely used international method for the prediction of wind farm noise.

The use of this standard is supported by international research publications, measurement studies conducted by Marshall Day Acoustics and direct reference to the standard in the South Australian EPA publication *Wind farms environmental noise guidelines*, NZS 6808:2010 *Acoustics – Wind farm noise* and AS 4959:2010 *Acoustics – Measurement, prediction and assessment of noise from wind turbine generators.*

The standard specifies an engineering method for calculating noise at a known distance from a variety of sources under meteorological conditions favourable to sound propagation. The standard defines favourable conditions as downwind propagation where the source blows from the source to the receiver within an angle of ±45 degrees from a line connecting the source to the receiver, at wind speeds between approximately 1 m/s and 5 m/s, measured at a height of 3 m to 11 m above the ground. Equivalently, the method accounts for average propagation under a well-developed moderate ground based thermal inversion. In this respect, it is noted that at the wind speeds relevant to noise emissions from wind turbines, atmospheric conditions do not favour the development of thermal inversions throughout the propagation path from the source to the receiver.

To calculate far-field noise levels according to the ISO 9613-2, the noise emissions of each turbine are firstly characterised in the form of octave band frequency levels. A series of octave band attenuation factors are then calculated for a range of effects including:

- Geometric divergence;
- Air absorption;
- Reflecting obstacles;
- Screening;
- Vegetation; and
- Ground reflections.

The octave band attenuation factors are then applied to the noise emission data to determine the corresponding octave band and total calculated noise level at receivers.

Calculating the attenuation factors for each effect requires a relevant description of the environment into which the sound propagation such as the physical dimensions of the environment, atmospheric conditions and the characteristics of the ground between the source and the receiver.

Wind farm noise propagation has been the subject of considerable research in recent years. These studies have provided support for the reliability of engineering methods such as ISO 9613-2 when a certain set of input parameters are chosen in combination. Specifically, the studies to date tend to support that the assignment of a ground absorption factor of G = 0.5 for the source, middle and receiver ground regions between a wind farm and a calculation point tends to provide a reliable representation of the upper noise levels expected in practice, when modelled in combination with other key assumptions; specifically all turbines operating at identical wind speeds, emitting sound levels equal to the test measured levels plus a margin for uncertainty (or guaranteed values), at a temperature of 10 °C and relative humidity of 70 % to 80 %, with specific adjustments for screening and ground effects as a result of the ground terrain profile.

In support of the use of ISO 9613-2 and the choice of G = 0.5 as an appropriate ground characterisation, the following references are noted:

- A factor of G = 0.5 is frequently applied in Australia for general environmental noise modelling purposes as a way of accounting for the potential mix of ground porosity which may occur in regions of dry/compacted soils or in regions where persistent damp conditions may be relevant
- In 1998, a comprehensive study (commonly cited as the Joule Report), part funded by the European Commission found that the ISO 9613-2 model provided a robust representation of upper noise levels which may occur in practice, and provided a closer agreement between predicted and measured noise levels than alternative standards such as CONCAWE and ENM. Specifically, the report indicated the ISO 9613 method generally tends to marginally over predict noise levels expected in practice.
- The UK Institute of Acoustics journal dated March/April 2009 published a joint agreement between practitioners in the field of wind farm noise assessment (the UK IOA 2009 joint agreement), including consultants routinely employed on behalf of both developers and community opposition groups, and indicated the ISO 9613-2 method as the appropriate standard and specifically designated G = 0.5 as the appropriate ground characterisation. This agreement was subsequently reflected in the recommendations detailed in the UK Institute of Acoustics publication *A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise* (UK Institute of Acoustics guidance). It is noted that these publications refer to predictions made at receiver heights of 4 m. Predictions in Australia are generally based on a lower prediction height of 1.5 m which tends to result in higher ground attenuation for a given ground factor, however conversely, predictions in Australia do not generally incorporate a -2 dB factor (as applied in the UK) to represent the relationship between L_{Aeq} and L_{A90} noise levels. The result is that these differences tend to balance out to a comparable approach and thus supports the use of G = 0.5 in the context of Australian prediction methodologies.

A range of measurement and prediction studies[2, 3, 4] for wind farms in which Marshall Day Acoustics' staff have been involved in have provided further support for the use of ISO 9613-2 and G = 0.5 as an appropriate representation of typical upper noise levels expected to occur in practice.

The findings of these studies demonstrate the suitability of the ISO 9613 method to predict the propagation of wind turbine noise for:

- the types of noise source heights associated with a modern wind farm, extending the scope of application of the method beyond the 30 m maximum source heights considered in the original ISO 9613-2;
- the types of environments in which wind farms are typically developed, and the range of atmospheric conditions and wind speeds typically observed around wind farm sites. Importantly, this supports the extended scope of application to wind speeds in excess of 5 m/s.

---

[2] Bullmore, Adcock, Jiggins & Cand – *Wind Farm Noise Predictions: The Risks of Conservatism*; Presented at the Second International Meeting on Wind Turbine Noise in Lyon, France September 2007.

[3] Bullmore, Adcock, Jiggins & Cand – *Wind Farm Noise Predictions and Comparisons with Measurements*; Presented at the Third International Meeting on Wind Turbine Noise in Aalborg, Denmark June 2009.

[4] Delaire, Griffin, & Walsh – *Comparison of predicted wind farm noise emission and measured post-construction noise levels at the Portland Wind Energy Project in Victoria, Australia*; Presented at the Fourth International Meeting on Wind Turbine Noise in Rome, April 2011.

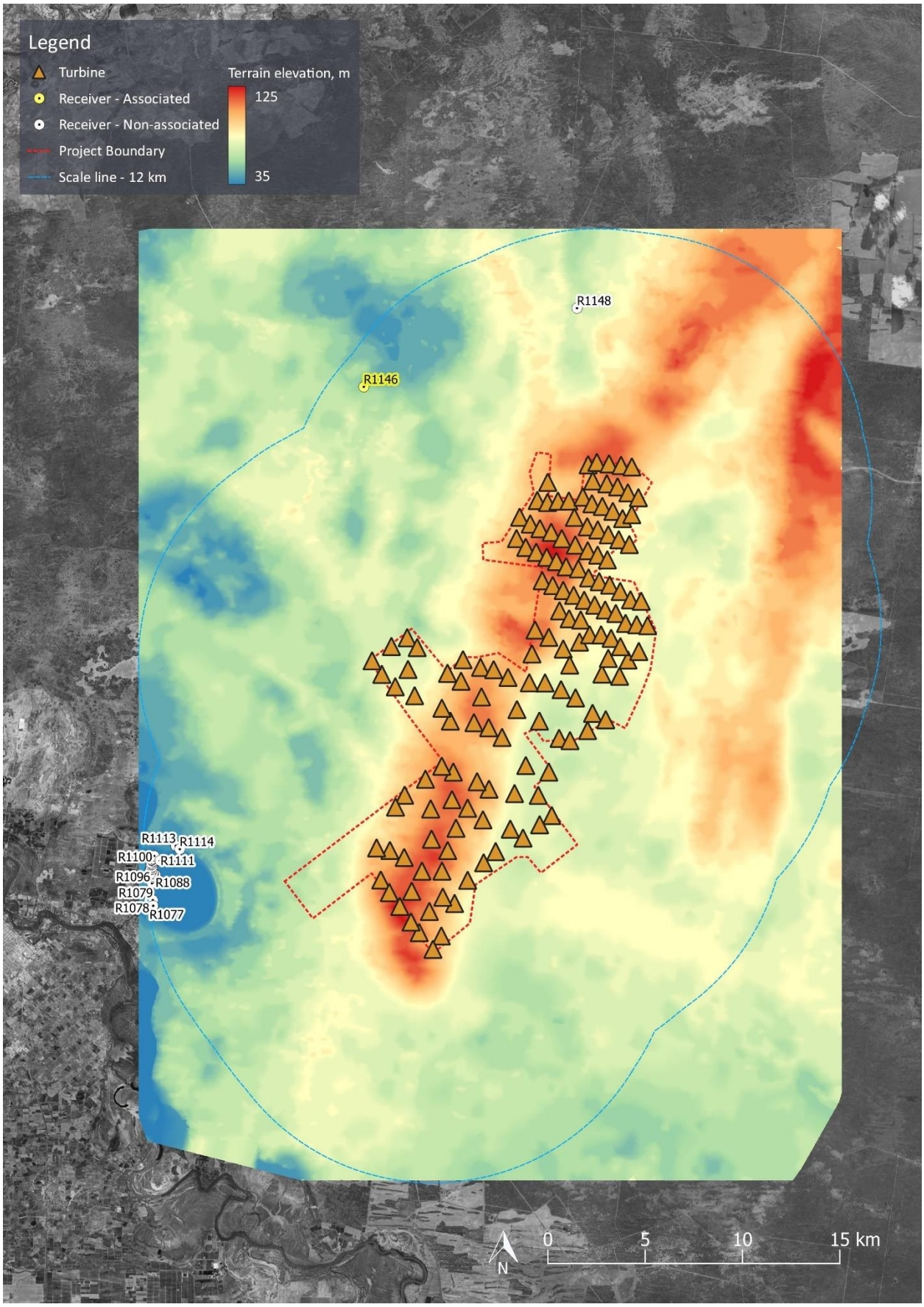
In addition to the choice of ground factor referred to above, adjustments to the ISO 9613-2 standard for screening and valleys effects are applied based on recommendations of the Joule Report, UK IOA 2009 joint agreement and the UK IOA Good Practice Guide. The following adjustments are applied to the calculations:

- screening effects as a result of terrain are limited to 2 dB
- screening effects are assessed based on each turbine being represented by a single noise source located at the maximum tip height of the turbine rotor
- an adjustment of 3 dB is added to the predicted noise contribution of a turbine if the terrain between the turbine and receiver in question is characterised by a significant valley. A significant valley is defined as a situation where the mean sound propagation height is at least 50 % greater than it would be otherwise over flat ground.

The adjustments detailed above are implemented in the wind turbine calculation procedure of the SoundPLAN 8.2 software used to conduct the noise modelling. The software uses these definitions in conjunction with the digital terrain model of the site to evaluate the path between each turbine and receiver pairing and then subsequently applies the adjustments to each turbine's predicted noise contribution where appropriate.

APPENDIX F SITE TOPOGRAPHY

Figure 6: Terrain elevation map for the Project and surrounding area



APPENDIX G TABULATED PREDICTED NOISE LEVEL DATA

Table 6: Predicted noise levels. dB L_{Aeq} (includes +1 dB allowance for measurement uncertainty) for receivers within 12 km of a wind turbine

Receiver	Hub-height wind speed (m/s)					
	4	5	6	7	8	≥9
R1077	3.8	6.3	10.2	13.6	16.5	18.3
R1078	3.9	6.4	10.3	13.7	16.6	18.4
R1079	4.0	6.5	10.4	13.8	16.7	18.5
R1080	4.0	6.5	10.4	13.8	16.7	18.5
R1086	4.2	6.7	10.6	14.0	16.9	18.7
R1087	4.2	6.7	10.6	14.0	16.9	18.7
R1088	4.3	6.8	10.7	14.1	17.0	18.8
R1089	4.2	6.7	10.6	14.0	16.9	18.7
R1090	4.3	6.8	10.7	14.1	17.0	18.8
R1091	4.3	6.8	10.7	14.1	17.0	18.8
R1092	4.2	6.7	10.6	14.0	16.9	18.7
R1093	4.2	6.7	10.6	14.0	16.9	18.7
R1094	4.3	6.8	10.7	14.1	17.0	18.8
R1095	4.3	6.8	10.7	14.1	17.0	18.8
R1096	4.2	6.7	10.6	14.0	16.9	18.7
R1097	4.2	6.7	10.6	14.0	16.9	18.7
R1098	4.3	6.8	10.7	14.1	17.0	18.8
R1099	4.3	6.8	10.7	14.1	17.0	18.8
R1100	4.3	6.8	10.7	14.1	17.0	18.8
R1101	4.3	6.8	10.7	14.1	17.0	18.8
R1102	4.3	6.8	10.7	14.1	17.0	18.8
R1103	4.4	6.9	10.8	14.2	17.1	18.9
R1104	4.3	6.8	10.7	14.1	17.0	18.8
R1105	4.3	6.8	10.7	14.1	17.0	18.8
R1106	4.4	6.9	10.8	14.2	17.1	18.9
R1107	4.4	6.9	10.8	14.2	17.1	18.9
R1108	4.2	6.7	10.6	14.0	16.9	18.7
R1109	4.2	6.7	10.6	14.0	16.9	18.7
R1110	4.2	6.7	10.6	14.0	16.9	18.7
R1111	4.6	7.1	11.0	14.4	17.3	19.1

Receiver	Hub-height wind speed (m/s)					
	4	5	6	7	8	≥9
R1112	4.6	7.1	11.0	14.4	17.3	19.1
R1113	5.2	7.7	11.6	15.0	17.9	19.7
R1114	5.3	7.8	11.7	15.1	18.0	19.8
R1146*	6.7	9.2	13.1	16.5	19.4	21.2
R1148	7.3	9.8	13.7	17.1	20.0	21.8

* Associated receiver

APPENDIX H C-WEIGHTING ASSESSMENT RESULTS

H1 Introduction

Presented below are details of the risk assessment carried out for the purpose of gauging whether penalties for low frequency, as detailed in the NSW Noise Assessment Bulletin, are applicable.

H2 Assessment Requirement

The following excerpt concerning C-weighted wind turbine noise have been reproduced from NSW Noise Assessment Bulletin.

> ***Low Frequency Noise***
>
> *The presence of excessive low frequency noise (a special noise characteristic) [ie noise from the wind farm that is repeatedly greater than 65 dBC during day time or 60 dBC during the night-time at any relevant receiver] will incur a 5 dB(A) penalty, to be added to the measured noise level for the wind farm, unless a detailed internal low frequency noise assessment demonstrates compliance with the proposed criteria for the assessment of low frequency noise disturbance (UK Department for Environment, Food and Rural Affairs (DEFRA, 2005) for a steady noise source.*

H3 Prediction Method

As stated in **Section 2.4**, there are no commonly used, practical methods to accurately predict the wind turbine low frequency noise levels at receiver locations.

In this case, the C-weighted noise levels at receiver locations have been estimated using a simplified approach which constitutes the same noise modelling methods as described above for A-weighted levels, but with the following modifications:

- The range of band frequencies has been expanded to include bands down to the 12.5 Hz frequency band
- The ground absorption parameter has been set to G = 0 (hard ground) to account for the increased influence of ground reflections at low frequencies.

C-weighted noise levels have been predicted for the worst-case wind speed in terms of C-weighted levels being 9 m/s.

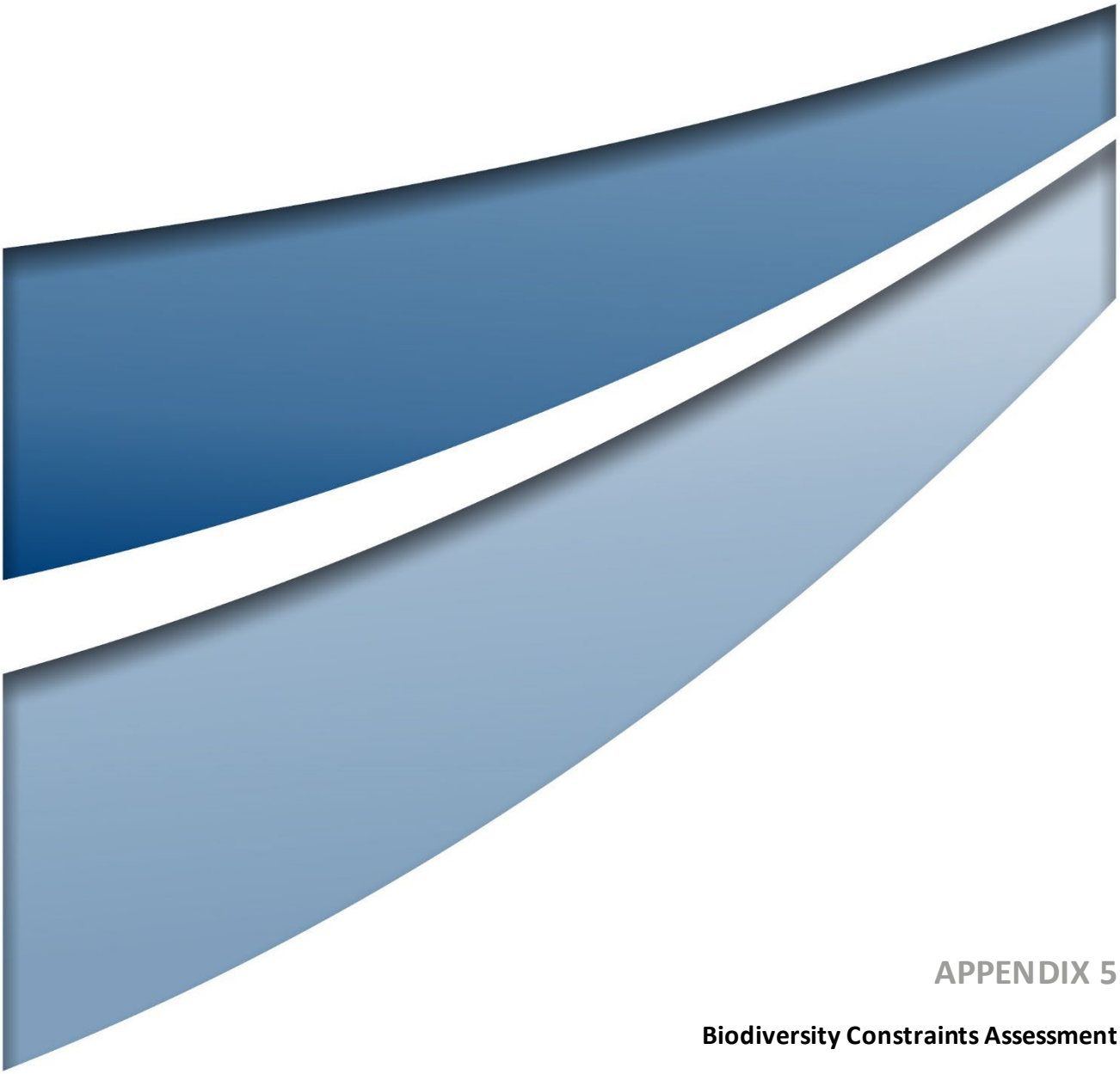
H4 Results

Table 7 presents the results of the preliminary C-weighted noise predictions for identified receivers within 12 km of a wind turbine.

Table 7: Predicted C-weighted noise levels

Receiver ID	dB L_{Ceq}
R1077	46.4
R1078	46.5
R1079	46.6
R1080	46.5
R1086	46.7
R1087	46.7
R1088	46.8
R1089	46.7
R1090	46.8
R1091	46.8
R1092	46.7
R1093	46.7
R1094	46.8
R1095	46.8
R1096	46.7
R1097	46.7
R1098	46.8
R1099	46.8
R1100	46.8
R1101	46.8
R1102	46.8
R1103	46.8
R1104	46.8
R1105	46.8
R1106	46.9
R1107	46.9
R1108	46.7
R1109	46.7
R1110	46.8
R1111	47.0

Receiver ID	dB L_{Ceq}
R1112	47.0
R1113	47.4
R1114	47.5
R1146	48.7
R1148	48.7



APPENDIX 5

Biodiversity Constraints Assessment

umwelt
Environmental & Social Consultants

MALLEE WIND FARM

Biodiversity Constraints Assessment

FINAL

November 2022

MALLEE WIND FARM

Biodiversity Constraints Assessment

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Spark Renewables

Project Director: Nathan Baker
Project Manager: Bridie McWhirter
Technical Director: Ryan Parsons
Technical Manager: Belinda Howe
Report No. R06
Date: November 2022

umwelt
Environmental & Social Consultants

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
V1	Ryan Parsons	8 November 2022	Nathan Baker	8 November 2022
Final	Ryan Parsons	11 November 2022	Ryan Parsons	11 November 2022

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1.0 Introduction

The proposed Mallee Wind Farm (the Project) comprises the construction, operation and decommissioning of a wind farm located in the south-western region of NSW, approximately 16 km to the north-east of Buronga and close to the NSW-Victorian state border.

The Project will have an installed capacity of up to 1,000 MW of renewable energy and will include a large-scale BESS which will allow for the capture and storage of dispatchable energy. The power generated from indicatively one hundred and fifty (150) wind turbines, each with a maximum blade tip height of 280 m above ground level, or release from battery storage, will feed into the electricity grid either via the 330/220 kV Buronga Substation or through direct connection to 220 kV transmission lines or the 330 kV Project EnergyConnect.

Umwelt (Australia) Pty Limited (Umwelt) was engaged by Spark to prepare a Scoping Report for planning and environmental aspects of the Project, and in support of the proponent's request for the Secretary's Environmental Assessment Requirements (SEARs).

1.1 Purpose and Objectives

This biodiversity constraints assessment report has been prepared to document the outcomes of preliminary desk and field-based investigations conducted for the Project. It aims to support the Scoping Report prepared by Umwelt, and more broadly the proponent's request for SEARs. It has been prepared to identify key ecological constraints and risks associated with the proposed Project and document the suitability of the Project Area to accommodate the proposed wind farm development. Specifically, the key outputs of this document include:

- Constraints mapping showing known ecological constraints, including known areas with threatened flora or fauna species.
- Review of threatened flora and fauna species that have a reasonable likelihood of being present on the Project Area including those listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Discussion around the suitability of the Project Area for development when taking regard of the identified or potential ecological constraints within the Project Area.
- Advice on priorities and focus on the next phase of surveys required to support development, including any specific requirements that will need to be met in order to achieve stated ecological requirements within the Wind Energy Framework - Standard Secretary's Environmental Assessment Requirements, the EPBC Act and other relevant legislation.
- Advice on ways Spark can avoid, minimise, or mitigate potential adverse effects arising from the proposed development.

Third party data, results or interpretations have been independently verified by Umwelt to the extent possible within the current scope and our analysis has been informed by eighteen (18) days (FTE) of preliminary site survey effort i.e. site visit conducted by two Umwelt ecologists over nine (9) days between 7 and 15 September 2022.

This report presents recommended next steps formed on the basis of anticipated requirements for a Project of this type and scale, and the investigations conducted to date. The assessment of constraints documented herein is preliminary only and any guidance is limited to potential impacts, any anticipated biodiversity assessment requirements and compliance obligations.

This report is not designed to achieve the legislative and statutory requirements of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), Environmental Planning and Assessment Act 1979 (EP&A Act), Biodiversity Conservation Act 2016 (BC Act) and other relevant legislation (refer **Section 1.3** of this report), however these requirements would be achieved in the future with the implementation of recommendations documented herein, and confirmation of these requirements following receipt of the SEARs.

1.1.1 Contributing Authors

This report was prepared by the following contributing authors:

- Belinda Howe – Senior Ecologist.
- Ryan Parsons – Principal Ecologist.
- Birdie McWhirter – Senior Environmental Consultant.
- Nathan Baker – Principal Environmental Consultant.

1.2 Project Overview

1.2.1 Location

The Project Area is located approximately 16 km north-east of Buronga, close to the NSW-Victorian state border and covers approximately 18,500 hectares. The Project Area is located on relatively flat land at an elevation of approximately 100 metres above sea level with a good available wind resource. There is one residential dwelling within 8 km of the proposed wind turbines.

The Project Area is located primarily on land zoned RU1 Primary Production under the Wentworth Local Environmental Plan 2011 (Wentworth LEP). The Project Area is currently used for cropping and grazing, with patches of remnant native vegetation present. The Project EnergyConnect transmission line corridor is located to the south-west of the Project Area. The Project Area is bordered by Mallee Cliffs National Park to the south-east.

1.2.2 Indicative Design

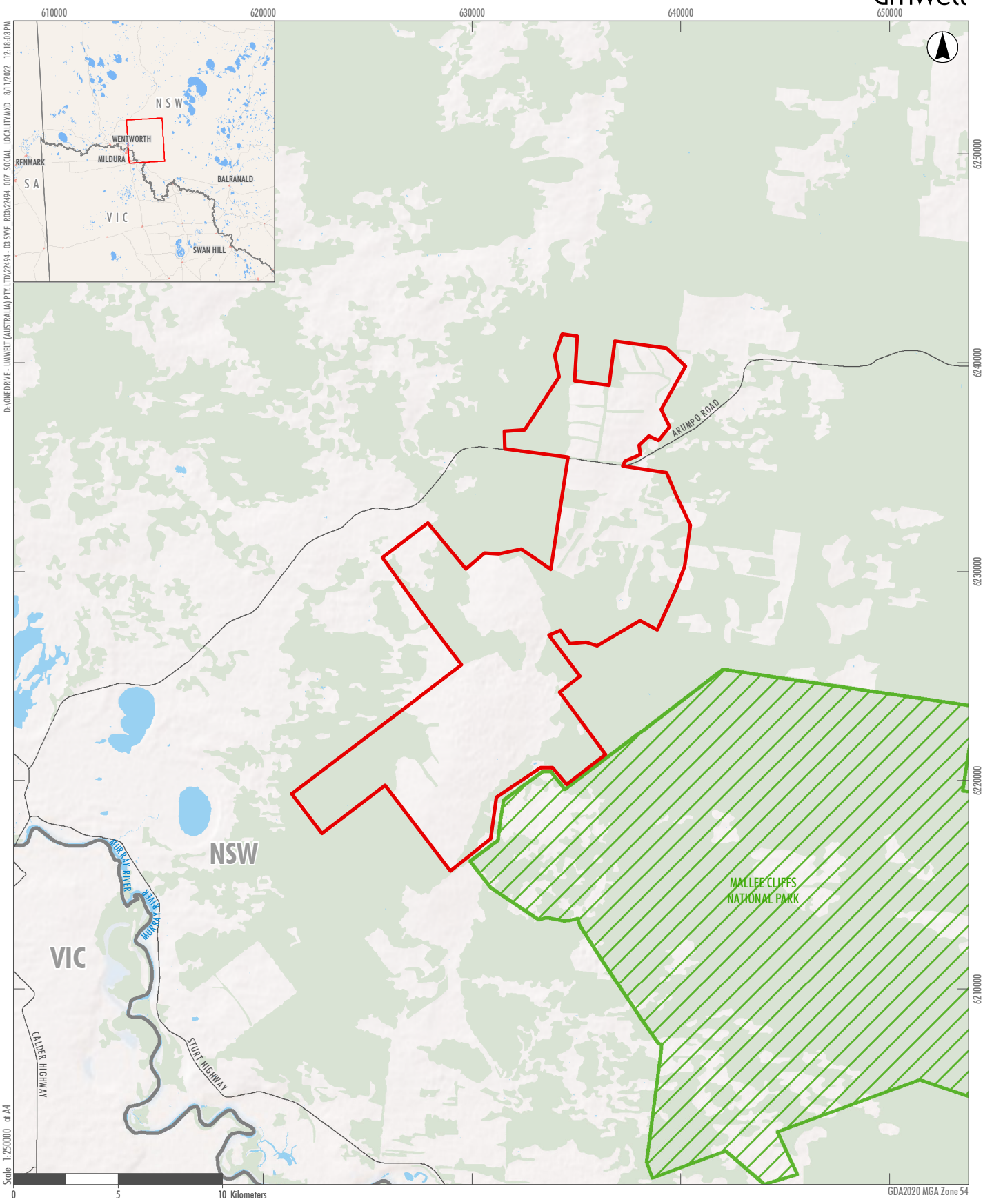
The proposed development is seeking approval for up to 150 wind turbines which would generate up to 1000 MW (1GW) of renewable energy , with a maximum blade-tip height of 280 m above ground level (AGL). A single grid-scale BESS is also proposed and would allow for the capture and storage of dispatchable to the electricity grid along with providing additional grid services. The power generated by the Project would feed into the electricity grid (National Energy Market, NEM) either via the 330/220 kV Buronga Substation connecting into the new Project EnergyConnect interconnector that would link Robertstown (South Australia) with Wagga Wagga (NSW), or direct connection to 220kV transmission line or 330 kV Project EnergyConnect.

It is noted that this development was in the early stages of stakeholder engagement and overall wind farm design at the time this FFA report was prepared. During the Scoping Report and EIS planning approval phases, several technical studies (relating to aspects including noise, visual, biodiversity, heritage, traffic, social, aviation safety, electromagnetic interference (EMI) and electromagnetic field (EMF) and blade throw) would be undertaken and their outcomes, as well as feedback from community engagement, would inform the wind farm design.

The proposed development would comprise:

- Up to 150 wind turbines, with a maximum blade-tip height of 280m AGL.
- Power infrastructure providing connection to the transmission network i.e. on-site substations/switchyards.
- Internal electrical reticulation network, access roads, and access points from public roads.
- Permanent meteorological monitoring masts.
- Temporary infrastructure including construction compound and site office buildings, storage areas and concrete batching plants.
- Hardstand and laydown area used for wind turbine installation and storage of wind turbine components.
- Operation and maintenance building.
- A single grid-scale BESS.

The location of the Project Area in the broader regional context as well as the specific features of the Project Area are provided in **Figure 1.1** below. The Development Corridor has applied appropriate buffers to the indicative design to capture works associated with the Project.



Legend

- Project Boundary
- NPWS Estate Boundary
- Native Vegetation Areas
- Hydro Areas
- Major Roads
- Watercourses

FIGURE 1.1

Locality

Image Source: ESRI Basemap (2022) Data source: NSW LPI (2021), NSW DFSI (2021), NPWS Estate (2019), VIC DVC (2021), Forestry Corporation of VIC (2019)

1.3 Statutory Considerations

Commonwealth and State Legislation relevant to this biodiversity constraints assessment report is described in **Table 1.1**.

Table 1.1 Legislation Relevant to the Project

Relevant Legislation	Governing Agency	Summary
Commonwealth legislation		
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Department of Climate Change, Energy, the Environment and Water (DCCEEW)	The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Commonwealth Government's primary piece of environmental legislation and is administered by the Australian Government – DCCEEW. It is designed to protect national environmental assets, known as matters of national environmental significance (MNES), which include threatened species of flora and fauna, endangered ecological communities, and migratory species, as well as other protected matters. It defines the categories of threat for threatened flora and fauna, identifies key threatening processes and provides for the preparation of recovery plans for threatened flora, fauna, and communities. Actions that may adversely affect MNES may be deemed to be a controlled action under the EPBC Act. The significance of the proposed action on MNES can be determined through self-assessment using *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (Department of the Environment, Water, Heritage and the Arts, 2013). A referral is required for proposed actions that may affect nationally listed threatened species, threatened ecological communities, and migratory species. In accordance with the Bilateral Agreement reached between the NSW and Commonwealth Governments, an Environmental Impact Statement (EIS) under the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act, see below) for State Significant Development (SSD) can also be used for an EIS under the EPBC Act. This is possible for a "controlled action" and if directed by the Commonwealth Minister.
State legislation		
Environmental Planning and Assessment Act 1979 (EP&A Act)	Department of Planning and Environment (DPE)	The *Environmental Planning & Assessment Act 1979* (EP&A Act) is the overarching planning legislation in NSW that provides for the creation of planning instruments that guide land use. The EP&A Act also provides for the protection of the environment, including the protection and conservation of native animals and plants. This includes threatened species, populations and ecological communities, and their habitats of biodiversity values as listed in the *Biodiversity Conservation Act 2016* (BC Act) and NSW *Fisheries Management Act 1994* (FM Act). The EIS anticipated to be prepared for the Project will meet the necessary environmental assessment requirements under the relevant provisions of the EP&A Act.

Relevant Legislation	Governing Agency	Summary
Biodiversity Conservation Act 2016 (BC Act)	DPE – Biodiversity and Conservation Division (BCD)	The BC Act and its supporting regulations commenced on 25 August 2017. The BC Act repealed the *Threatened Species Conservation Act 1995* (TSC Act) along with other natural resource management legislation, while retaining the TSC Act species list. The BC Act sets out the environmental impact assessment framework for threatened species, threatened ecological communities and Areas of Outstanding Biodiversity Value (formerly critical habitat) for Major Projects, Part 5 activities, and local development. Sections 7.9 of the BC Act requires that an application of development under Part 4 of the EP&A Act for SSD must be accompanied by a Biodiversity Development Assessment Report (BDAR) prepared by an accredited assessor in accordance with the Biodiversity Assessment Method (BAM) (DPIE, 2020).
National Parks and Wildlife Act 1974 (NPW Act)	DPE	The *National Parks and Wildlife Act 1974* (NPW Act) provides for the protection of Aboriginal sites and designated conservation areas as well as the flora and fauna within conservation areas. There are no conservation areas declared under the NPW Act that are within the Project Area, however the Mallee Cliffs National Park is adjacent to the eastern section of the Project. The objective of the NPW Act is to consolidate and amend the law relating to the establishment, preservation and management of national parks, historic sites, certain other areas, and the protection of certain fauna, native plants and Aboriginal objects.
Fisheries Management Act 1994 (FM Act)	Department of Primary Industries (DPI)	The objectives of the *Fisheries Management Act 1994* (FM Act) are to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations. More detailed objectives relevant to the Project include: • to conserve fish stocks and key fish habitats • to conserve threatened species, populations and ecological communities of fish and marine vegetation • to promote ecologically sustainable development, including the conservation of biological diversity.

Relevant Legislation	Governing Agency	Summary
Local Land Services Act 2013 (LLS Act)	Local Land Services (LLS)	The *Local Land Services Act 2013* (LLS Act), supported by the Local Land Services Regulation 2014 (LLS Regulation), established 11 regional Local Land Services organisations to provide biosecurity, natural resources management and agricultural advisory services. Under Part 5A of the LLS Act and the supporting regulation, a Native Vegetation Regulatory (NVR) map showing the extent of categorised land in NSW is to be published by the Environment Agency Head (EAH). The NVR map underpins the legislative framework for native vegetation clearing in rural areas by categorising land in NSW. However, the map applies only to the following zones (if they are not in an excluded LGA): Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone RU5 Primary Production Small Lots and Zone RU6 Transition.
Biosecurity Act 2015	DPI	The *Biosecurity Act 2015* replaced the *Noxious Weeds Act 1993* on 1 July 2017. The Biosecurity Act is a wide-ranging legislation that outlines the requirements of government, councils, private landholders, and public authorities in the management of biosecurity matters. Priority weeds are regulated under the Biosecurity Act with a general biosecurity duty to prevent, eliminate or minimize any biosecurity risk they may pose. Some priority weeds have additional management obligations which may apply generally, or under specific circumstances. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised as is reasonably practicable.
State Environmental Planning Policy (Koala Habitat Protection) 2021 (Koala SEPP 2021)	DPE	The Koala SEPP 2021 was created under the EP&A Act and commenced on 17 March 2021. The Koala SEPP 2021 reinstates the policy framework of SEPP Koala Habitat Protection 2019 for most land zone types. For all RU1 (Primary Production), RU2 (Rural Landscape) or RU3 (Forestry) zoned land outside of the Sydney Metropolitan Area and Central Coast, SEPP Koala Habitat Protection 2020 continues to apply, though it does not establish any specific obligations or considerations for SSD. The Koala SEPP 2021 aims to: • Help reverse the decline of koala populations by ensuring koala habitat is properly considered during the development assessment process. • Provide a process for councils to strategically manage koala habitat through the development of koala plans of management.

2.0 Methodology

The following sections explain the methods undertaken for the purpose of this biodiversity constraints assessment.

2.1 Desktop Searches and Literature Review

The following information database tools were utilised for this constraints analysis. The likelihood of occurrence of threatened species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and / or the *Biodiversity Conservation* Act 2016 (BC Act) in the Project Area was assessed through use of the following search tools (using a 10 km buffer around the Project Area):

- Mallee Wind Farm Preliminary Ecological Assessment (GHD 2022).
- Biodiversity Values Map Viewer (DPE 2022a).
- Department of Climate Change Energy Environment and Water (DCCEEW) EPBC Act Protected Matters Search Tool (PMST) (DCCEEW 2022).
- DPE BioNet Atlas Search Tool (DPE 2022b).
- Important Habitat Mapping via BAM Calculator (DPE 2022c).
- Groundwater Dependant Ecosystems Atlas. (Bureau of Meteorology (BOM) 2017).
- The threatened species database search results are provided in **Appendix A**. In addition to the databases mentioned above, regional vegetation community mapping and the Biodiversity Assessment Method Calculator (BAM-C) were also used to gain an understanding of the potential ecological values of the Project Area.

2.2 Preliminary Category 1 – Exempt Land Mapping

Section 6.8(3) of the BC Act states that:

"the biodiversity assessment method is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on category 1-exempt land (within the meaning of Part 5A of the Local Land Services Act 2013)".

This exclusion means the Biodiversity Offsets Scheme (BOS) under the BC Act does not apply to areas identified as Category 1 – exempt land and therefore formal biodiversity surveys are not required.

Areas of Category 1 – exempt land include those where vegetation was cleared as at 1 January 1990 or there has been a lawful removal of all native vegetation (all strata) prior to the commencement of Part 5A of the Local Land Services (LLS) Act, being 25 August 2017. 'Cleared as at 1990' has been interpreted as areas where there is clear evidence of the complete removal of all vegetation or evidence of compositional change in the grassland prior to 1990 and in which shrubs or trees had not regrown prior to 1990.

Potential *Category 1 – exempt land* areas were identified using available online data sets, including:

- Transitional Native Vegetation Regulatory (DPE 2022d).
- Land Use Mapping for NSW 2017 V1.2 (DPE 2022e).
- NSW Native Vegetation Extent 5m Raster V1.2 (DPE 2022f).
- NSW Government Historical Imagery Viewer (DSS 2022).

Refer to **Figure 2.1** for an overview of the methodology used. These data sources were used to create a preliminary Land Categorisation map for the Project Area. From this, further ground truthing was completed for land within the Development Corridor. Areas identified as either Category 2 Regulated Land, Vulnerable Regulated Land and Sensitive Regulated Land (rural land where clearing requires approval / biodiversity offsets) or Excluded Land were identified and mapped accordingly.

It is noted that historical aerial imagery available for the Project Area did not cover the entire area cohesively, and sections were assessed individually to ensure the entire area was covered.

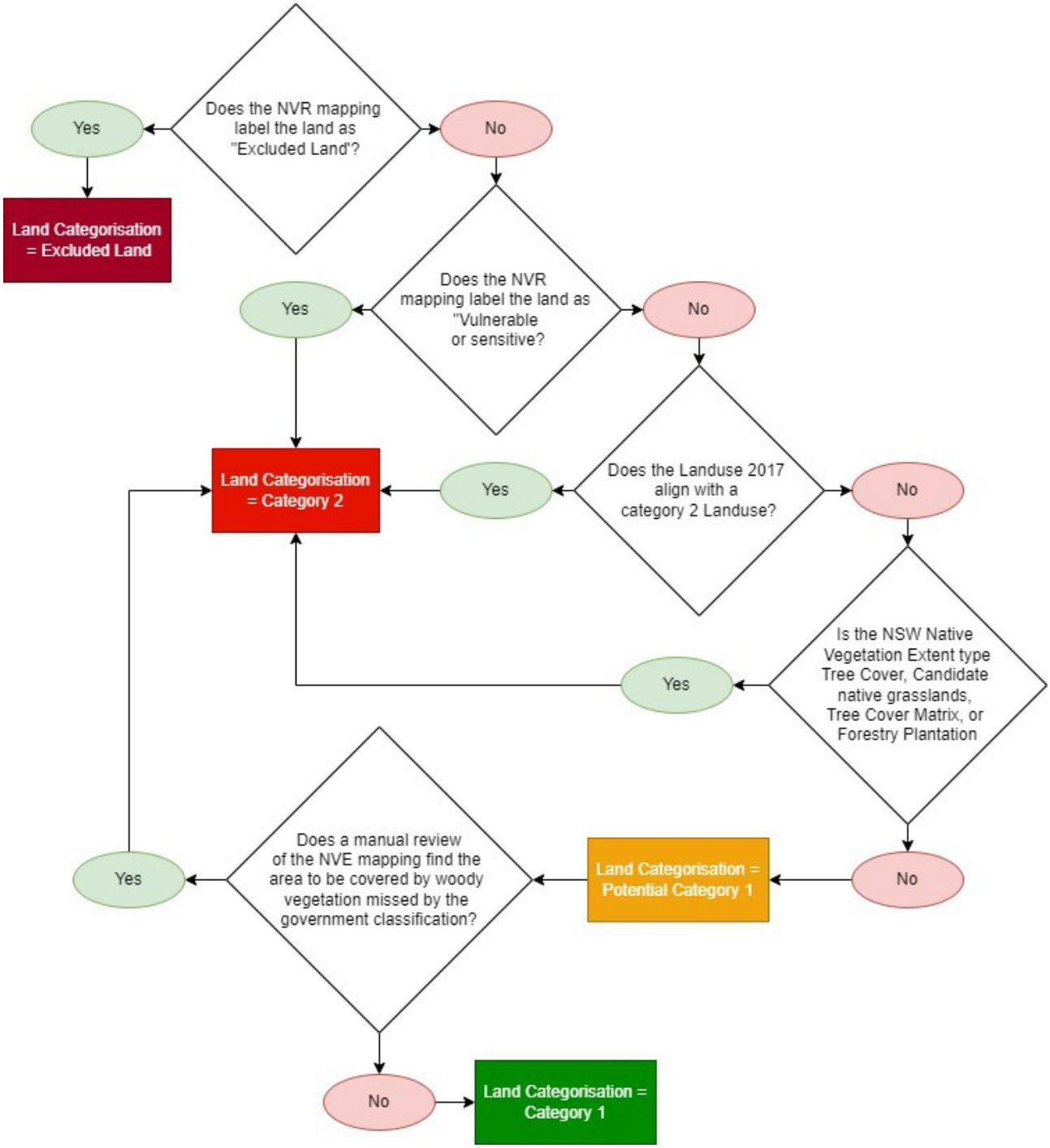


Figure 2.1 Land Category Mapping Process

2.3 Field Surveys

Umwelt has conducted one nine-day site visit where the survey team collected Vegetation Integrity Plot data and mapped the vegetation communities occurring within the Project Area. While conducting these surveys, the two Umwelt Ecologists performed opportunistic surveys for owl/cockatoo hollow bearing trees, large stick nests, and threatened flora and fauna. Additionally, the following data was collected:

- 28 General habitat assessments
- 59 Rapid Vegetation Assessment Points
- 32 BAM vegetation and vegetation integrity plots.

2.4 Vegetation Mapping

Vegetation mapping within the Project Area was completed using data collected during Umwelt's field survey. Additional resources such as regional mapping and GHD's preliminary ecological assessment (GHD 2022) were utilised during the survey.

2.5 Ecological Constraints Mapping

The data obtained through the above-described methods was collectively used to produce an ecological constraints map. The Project Area was mapped with three levels of constraint: high, moderate, and low. **Table 2.1** describes these constraint levels in detail. This ecological constraints map will be used to inform on project design and to assist Spark in its avoidance and minimisation of ecological impacts.

Table 2.1 Ecological Constraints Framework

Constraint Risk Categories	Description	Potential Risk
High	Highly constrained areas include remnant vegetation, areas of known Biodiversity Values, land where threatened species have been recorded, and potential threatened ecological community (TECs)	Project activities within high constraint areas may result in adverse impacts on a threatened species and ecological communities. Impacts to high constraint areas would likely require offsets under NSW and/or Commonwealth legislation. It is possible that offset liabilities could be substantial. Within the Project Area, PCTs 170 and 171 are considered a high constraint due to the potential presence of the Mallee Bird Community of the Murray Darling Depression Bioregion Threatened Ecological Community (EEC) (Mallee Bird Community).
Moderate	Moderately constrained areas include land identified as remnant vegetation that is unlikely to support a threatened ecological community	Project activities within moderate constraint areas may adversely impact foraging or dispersal habitat for threatened species (secondary habitat). Important populations may be impacted however impacts are likely to be more localised. Impacts to moderate value areas will require offsets. Within the Project Area PCTs 11, 57, 58, and 254 are considered a moderate constraint.

Constraint Risk Categories	Description	Potential Risk
Low	Areas of low ecological constraint are those areas mapped as Category 1 – exempt land.	Project activities within low constraint areas are restricted to generalist species and are unlikely to result in significant impacts on flora and fauna. May result in indirect impacts on adjacent habitats (dust, light, noise etc.).

3.0 Results

The following sections provide the results of each of the components of this biodiversity constraints assessment.

3.1 Biodiversity Values Map (Desktop Assessment)

The Biodiversity Values (BV) map (DPE 2022a) identifies land with high biodiversity value that is especially sensitive to impacts from development and clearing. Land types included on the BV include:

- coastal wetlands and littoral rainforest mapped under the State Environmental Planning Policy (Coastal Management) 2018 (Coastal Management SEPP)
- core koala habitat identified in a plan of management under State Environmental Planning Policy No 44 – Koala Habitat Protection (SEPP 44)
- declared Ramsar wetlands defined by the EPBC Act
- land containing threatened species or threatened ecological communities identified as potential serious and irreversible impacts (SAII) under section 6.5 of the BC Act
- biodiverse riparian land
- high conservation value grasslands or groundcover
- old growth forest identified in mapping developed under the National Forests Policy Statement but excluding areas not meeting the criteria published jointly by the Minister of the Environment and the Minister for Primary Industries
- rainforest identified in mapping developed under the National Forests Policy Statement but excluding areas not meeting the criteria published jointly by the Minister for Energy and Environment and the Minister for Primary Industries
- declared areas of outstanding biodiversity value
- council nominated areas with connectivity or threatened species habitat that the Minister for Energy and Environment considers will conserve biodiversity at bioregional or state scale
- any other land that in the opinion of the Environment Agency Head is of sufficient biodiversity value to be included.

No mapped areas of Biodiversity Values are mapped within the Project Area.

3.2 Important Habitat Mapping (Desktop Assessment)

For a small number of threatened species as detailed within the Threatened Biodiversity Data Collection (TBDC), Section 5.1.3 of the Biodiversity Assessment Method (BAM) allows for important habitat maps. Important habitat maps identify areas that are considered essential to support critical life stages of the species, for example breeding areas or locations important for foraging or over-wintering for migratory species. Currently, important habitat maps are provided for the following species:

- Swift Parrot (Lathamus discolor).
- Plains-wanderer (*Pedionomus torquatus*).
- Regent Honeyeater (*Anthochaera phrygia*).
- Migratory Shorebirds.

The Project Area does not contain any areas of Important Habitat Mapping for the above listed species or entities.

3.3 Groundwater Dependent Ecosystems (Desktop Assessment)

Groundwater dependent ecosystems (GDEs) rely on the presence of groundwater to function and sustain the resident assemblage of species, populations, and ecological communities. The level of groundwater dependence of vegetation communities in the Project Area has been identified using the GDE Atlas (BoM 2017).

The GDE Atlas delineates and provides information about the following three types of GDEs (BoM 2022):

- Aquatic ecosystems that rely on the surface expression of groundwater – this includes surface water ecosystems which may have a groundwater component, such as rivers, wetlands, and springs. Marine and estuarine ecosystems can also be groundwater dependent, but they are not mapped in the GDEs Atlas.
- Terrestrial ecosystems that rely on the subsurface presence of groundwater – this includes all vegetation ecosystems.
- Subterranean ecosystems – this includes cave and aquifer ecosystems.

Within the aquatic and terrestrial ecosystem type, an area of vegetation can be classified as either a high potential, moderate potential or low potential GDE. According to the GDEs Atlas, the Project Area has no mapped aquatic GDEs and not been analysed in a regional or national study for the presence of terrestrial GDEs.

3.4 BAM Calculator Candidate Species (Desktop Assessment)

Table 3.1 identifies the predicted species (species credit species) predicted to potentially occur in the Project Area. These are the species that will require targeted surveys during the biodiversity assessment.

Table 3.1 Bam Calculator Predicted Species

Scientific Name	Common Name	Jan	Feb	Mar	Apr	May	June	July	August	September	October	November	December
Acacia acanthoclada	Harrow Wattle								x	x	x	x	
Acacia carneorum	Purple-wood Wattle	x	x	x	x	x	x	x	x	x	x	x	x
Amytornis striatus	Striated Grasswren	x	x	x	x	x	x	x	x	x	x	x	x
Ardeotis australis	Australian Bustard	x	x	x	x	x	x	x	x	x	x	x	x
Atriplex infrequens	A saltbush	x	x									x	x
Austrostipa metatoris	A spear-grass										x	x	
Burhinus grallarius	Bush Stone-curlew	x	x	x	x	x	x	x	x	x	x	x	x
Calotis moorei	A burr-daisy									x	x	x	
Cratystylis conocephala	Bluebush Daisy	x	x	x	x	x	x	x	x	x	x	x	x
Dodonaea stenozyga	Desert Hopbush	x	x	x	x	x	x	x	x	x	x	x	x
Haliaeetus leucogaster	White-bellied Sea-Eagle							x	x	x	x	x	x
Hamirostra melanosternon	Black-breasted Buzzard									x	x	x	
Hieraaetus morphnoides	Little Eagle								x	x	x		
Lasiopetalum behrii	Pink Velvet Bush	x	x	x	x	x	x	x	x	x	x	x	x
Lasiorhinus latifrons	Southern Hairy-nosed Wombat	x	x	x	x	x	x	x	x	x	x	x	x
Lepidium monoplocoides	Winged Peppercress									x	x	x	x
Leptorhynchos waitzia	Button Immortelle									x	x	x	

Scientific Name	Common Name	Jan	Feb	Mar	Apr	May	June	July	August	September	October	November	December
Lophochroa leadbeateri	Major Mitchell's Cockatoo									x	x	x	x
Lophoictinia isura	Square-tailed Kite	x								x	x	x	x
Lucasium stenodactylum	Crowned Gecko	x	x	x							x	x	x
Neobatrachus pictus	Painted Burrowing Frog	x	x	x	x	x	x	x	x	x	x	x	x
Pimelea serpyllifolia subsp. serpyllifolia	Thyme Rice-Flower							x	x	x	x	x	
Polytelis anthopeplus monarchoides	Regent Parrot (eastern subspecies)							x	x	x	x	x	
Pseudomys desertor	Desert Mouse			x	x	x	x		x	x	x	x	x
Pterostylis cobarensis	Greenhood Orchid										x		
Santalum murrayanum	Bitter Quandong	x	x	x	x	x	x	x	x	x	x	x	x
Swainsona colutoides	Bladder Senna	x	x	x	x	x	x	x	x	x	x	x	x
Swainsona pyrophila	Yellow Swainson-pea									x	x	x	
Manorina melanotis	Blacked-eared Miner	x							x	x	x	x	x
Pachycephala rufogularis	Red-lored Whistler	x	x	x	x	x	x	x	x	x	x	x	x

Note: x denotes the species survey period, and grey shading represents Umwelt's proposed survey timing.

3.5 Threatened Species (Desktop and Field Assessment)

A summary of the results of the database searches are provided in **Appendix A**. The following table (**Table 3.2**) documents the threatened species known or likely to occur within the Project Area and includes results from the ecological surveys completed as well as any species identified during the database searches. Refer to **Figure 3.1** for threatened species recorded within a 10 km area of the Project Area. No species identified has a high likelihood of presence or are known to occur within the Project Area are listed as a Serious and Irreversible Impact (SAII) species. Additionally, none of these species are species credit species (not including species credit species for breeding habitat).

Table 3.2 Known or Likely to Occur in the Project Area Threatened Species

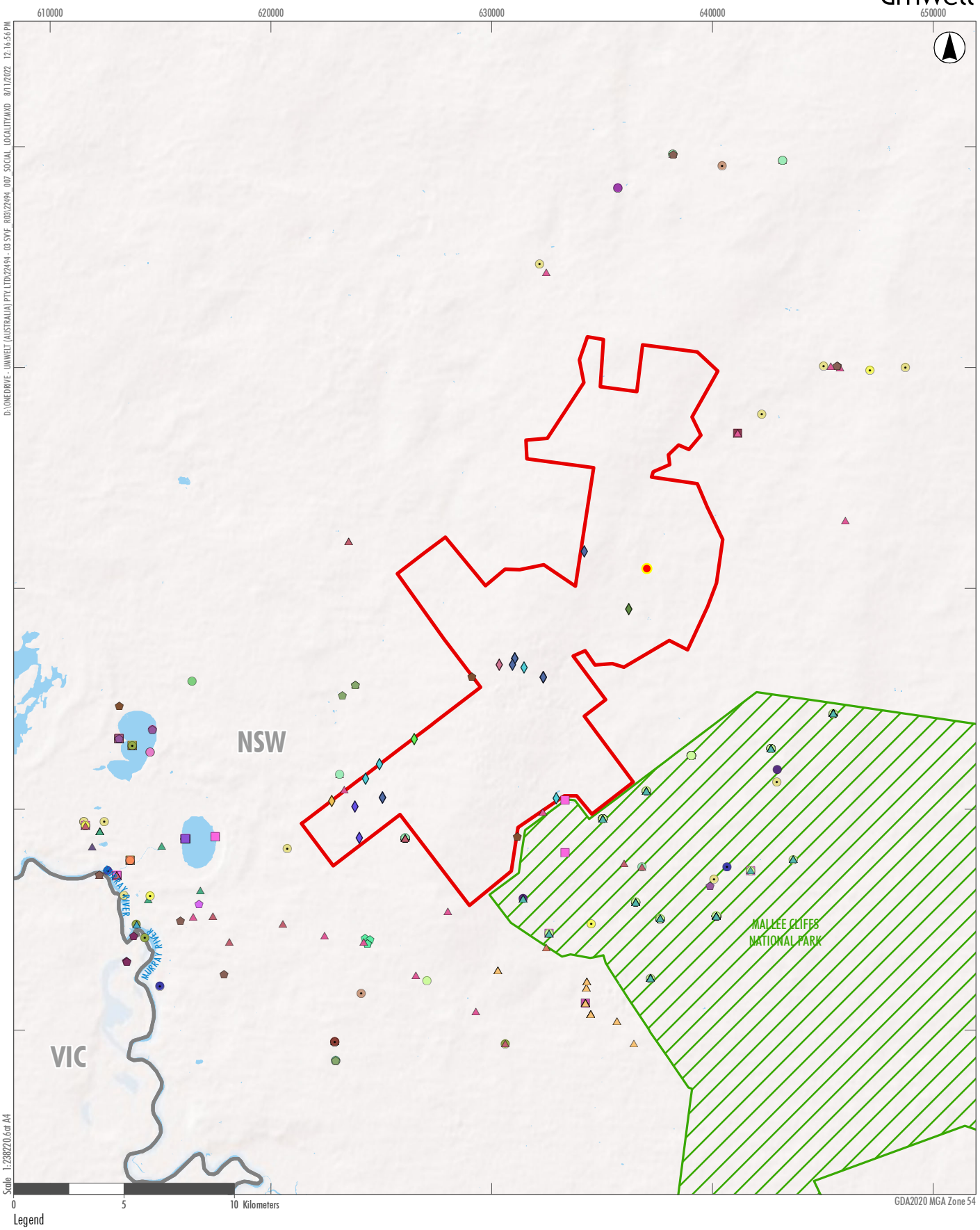
Scientific Name	Common Name	NSW BC ACT*	EPBC Act*	SAII?	Likelihood of Occurrence
Circus assimilis	Spotted Harrier	V		No	Known
Hieraaetus morphnoides	Little Eagle	V		No	Known
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		No	Known
Lophochroa leadbeateri	Major Mitchell's Cockatoo	V		No	Known
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V		No	High
Hydroprogne caspia	Caspian Tern		J	No	High
Leipoa ocellata	Malleefowl	E	V	No	Known
Certhionyx variegatus	Pied Honeyeater	V		No	High
Epthianura albifrons	White-fronted Chat	V		No	Known
Daphoenositta chrysoptera	Varied Sittella	V		No	Known
Pachycephala inornata	Gilbert's Whistler	V		No	Known
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V		No	Known
Cinclosoma castanotum	Chestnut Quail-thrush	V		No	Known
Calidris ruficollis	Red-necked Stint		C,J,K	No	High
Cercartetus concinnus	Western Pygmy Possum	E		No	Known

Scientific Name	Common Name	NSW BC ACT*	EPBC Act*	SAII?	Likelihood of Occurrence
Chalinolobus picatus	Little Pied Bat	V		No	High
Vespadelus baverstocki	Inland Forest Bat	V		No	High
Aprasia inaurita	Mallee Worm-lizard	E		No	High
Swainsona pyrophila	Yellow Swainson-pea	V	V	No	High
Acacia acanthoclada	Harrow Wattle	E		No	High
Santalum murrayanum	Bitter Quandong	E		No	High

* *where V = vulnerable, E = Endangered, J = JAMBA**, K = ROKAMBA**, C = CAMBA**.*

** *International Migratory Bird Agreements.*

It is important to note that this list is preliminary and additional species, identified during future survey work, are likely to require further consideration during the EIS assessment phase. If new species are identified, they will be subject to assessment under BAM (2020) and the EBPC Act.



Legend

- Project Boundary
- NPWS Estate Boundary
- Hydro Areas
- Waterourses
- Active Wedge-tailed Eagle Nest

Bionet records inside project area

- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow)
- *Cercartetus concinnus* (Western Pygmy Possum)
- *Cinclosoma castanotum* (Chestnut Quail-thrush)
- *Daphoenositta chrysoptera* (Varied Sittella)
- *Leipoa ocellata* (Malleefowl)
- *Melanodryas cucullata cucullata* (Hooded Robin (south-eastern form))
- *Pachycephala inornata* (Gilbert's Whistler)

Bionet records outside project area

- *Aancia acanthoclada* (Hannow Wattle)
- *Antechinomys laniger* (Kultarr)
- *Aprasia inaurita* (Mallee Worm-lizard)
- *Arenaria interpres* (Ruddy Turnstone)
- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow)
- *Bettongia lesueur graii* (Boodie, Burrowing Bettong (mainland))
- *Botaurus poiciloptilus* (Australasian Bittern)
- *Burhinus grallarius* (Bush Stone-curlew)
- *Calidris acuminata* (Sharp-tailed Sandpiper)
- *Calidris ferruginea* (Curlew Sandpiper)
- *Calidris melanotos* (Pectoral Sandpiper)
- *Calidris ruficollis* (Red-necked Stint)
- *Cercartetus concinnus* (Western Pygmy Possum)
- *Certhionyx variegatus* (Pied Honeyeater)
- *Chaeropus ecaudatus* (Pig-footed Bandicoot)
- *Chalinolobus picatus* (Little Pied Bat)
- *Chlidonias leucopterus* (White-winged Black Tern)
- *Cinclosoma castanotum* (Chestnut Quail-thrush)
- *Circus assimilis* (Spotted Harrier)
- *Climacteris picumnus victoriae* (Brown Treecreeper (eastern subspecies))
- *Daphoenositta chrysoptera* (Varied Sittella)
- *Epthianura albifrons* (White-fronted Chat)
- *Falco subniger* (Black Falcon)
- *Gallinago hardwickii* (Latham's Snipe)
- *Gelochelidon nilotica* (Gull-billed Tern)
- *Gras rubicunda* (Brolga)
- *Haliaeetus leucogaster* (White-bellied Sea-Eagle)
- *Hieraaetus morphnoides* (Little Eagle)
- *Hydroprogne caspia* (Caspian Tern)
- *Leipoa ocellata* (Malleefowl)
- *Leporillus conditor* (Greater Stick-nest Rat)
- *Limosa lapponica* (Bar-tailed Godwit)
- *Limosa limosa* (Black-tailed Godwit)
- *Litoria raniformis* (Southern Bell Frog)
- *Lophochroa leadbeateri* (Major Mitchell's Cockatoo)
- *Lophoictinia isura* (Square-tailed Kite)
- *Macrotis lagotis* (Bilby)
- *Melanodryas cucullata cucullata* (Hooded Robin (south-eastern form))
- *Ningaui yvonneae* (Southern Ningaui)
- *Oxyura australis* (Blue-billed Duck)
- *Pachycephala inornata* (Gilbert's Whistler)
- *Petroica phoenicea* (Flame Robin)
- *Phascogale calura* (Red-tailed Phascogale)
- *Pluvialis fulva* (Pacific Golden Plover)
- *Polytelis anthopeplus monarchoides* (Regent Parrot (eastern subspecies))
- *Pseudomys desertor* (Desert Mouse)
- *Rostratula australis* (Australian Painted Snipe)
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
- *Santalum murrayanum* (Bitter Quandong)
- *Solanum karsense* (Menindee Nightshade)
- *Stictonetta naevosa* (Freckled Duck)
- *Strophurus elderi* (Jewelled Gecko)
- *Swainsona pyrophila* (Yellow Swainson-pea)
- *Tiliqua occipitalis* (Western Blue-tongued Lizard)
- *Tringa glareola* (Wood Sandpiper)
- *Tringa nebularia* (Common Greenshank)
- *Tringa stagnatilis* (Marsh Sandpiper)
- *Vespadelus baverstocki* (Inland Forest Bat)

FIGURE 3.1

Mallee Wind Farm Threatened Species Records 10 km Buffer

Image Source: ESRI Basemap (2022) Data source: NSW LPI (2021), NSW DFSI (2021), NPWS Estate (2019), VIC DVC (2021), Forestry Corporation of VIC (2019)

3.5.1 Wedge-Tail Eagle Nest

While not a threatened species, the wedge-tailed eagle is a species of concern when assessing windfarm development impacts. During surveys conducted by Umwelt in September 2022, an active wedge-tailed eagle nest was observed approximately 600 m outside of the current Development Corridor (refer to **Figure 3.1**).

Wedge-tailed eagles, while not listed as threated under state or federal legislation, have been recognised as a species of concern due to interactions with wind turbines. Currently there is no state or federal advice on buffer areas of active stick nests for wind farms. This ecological feature will need to be discussed with BCD further.

3.6 Migratory Species (Desktop Assessment)

The Commonwealth PMST search and BioNET Atlas identified records for 19 migratory species within a 10 km radius of the Project Area. These species are identified in **Table 3.3**.

Table 3.3 Migratory Species with Potential to Occur or Utilise the Airspace Above the Project Area

Scientific Name	Common Name	BC Act	EPBC Act
Apus pacificus	Fork-tailed Swift	-	Migratory
Pluvialis fulva	Pacific Golden Plover	-	Migratory
Chlidonias leucopterus	White-winged Black Tern	-	Migratory
Gelochelidon nilotica	Gull-billed Tern	-	Migratory
Hydroprogne caspia	Caspian Tern	-	Migratory
Motacilla flava	Yellow Wagtail	-	Migratory
Actitis hypoleucos	Common Sandpiper	-	Migratory
Arenaria interpres	Ruddy Turnstone	-	Migratory
Calidris acuminata	Sharp-tailed Sandpiper	-	Migratory
Calidris ferruginea	Curlew Sandpiper	Endangered	Critically Endangered, Migratory
Calidris melanotos	Pectoral Sandpiper	-	Migratory
Calidris ruficollis	Red-necked Stint	-	Migratory
Gallinago hardwickii	Latham's Snipe	-	Migratory
Limosa lapponica	Bar-tailed Godwit	-	Migratory
Limosa limosa	Black-tailed Godwit	Vulnerable	Migratory
Numenius madagascariensis	Eastern Curlew	-	Critically Endangered, Migratory
Tringa glareola	Wood Sandpiper	-	Migratory
Tringa nebularia	Common Greenshank	-	Migratory
Tringa stagnatilis	Marsh Sandpiper	-	Migratory

3.7 Category 1 – Exempt Land Mapping (Desktop and Field Assessment)

Section 6.8(3) of the BC Act states that:

> *"the biodiversity assessment method is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on category 1-exempt land (within the meaning of Part 5A of the Local Land Services Act 2013)".*

This exclusion means the Biodiversity Offsets Scheme (BOS) under the BC Act does not apply to areas identified as Category 1 – exempt land and therefore formal biodiversity surveys are not required.

Areas of Category 1 – exempt land include those where vegetation was cleared as at 1 January 1990 or there has been a lawful removal of all native vegetation (all strata) prior to the commencement of Part 5A of the Local Land Services (LLS) Act, being 25 August 2017. 'Cleared as at 1990' has been interpreted as areas where there is clear evidence of the complete removal of all vegetation or evidence of compositional change in the grassland prior to 1990 and in which shrubs or trees had not regrown prior to 1990.

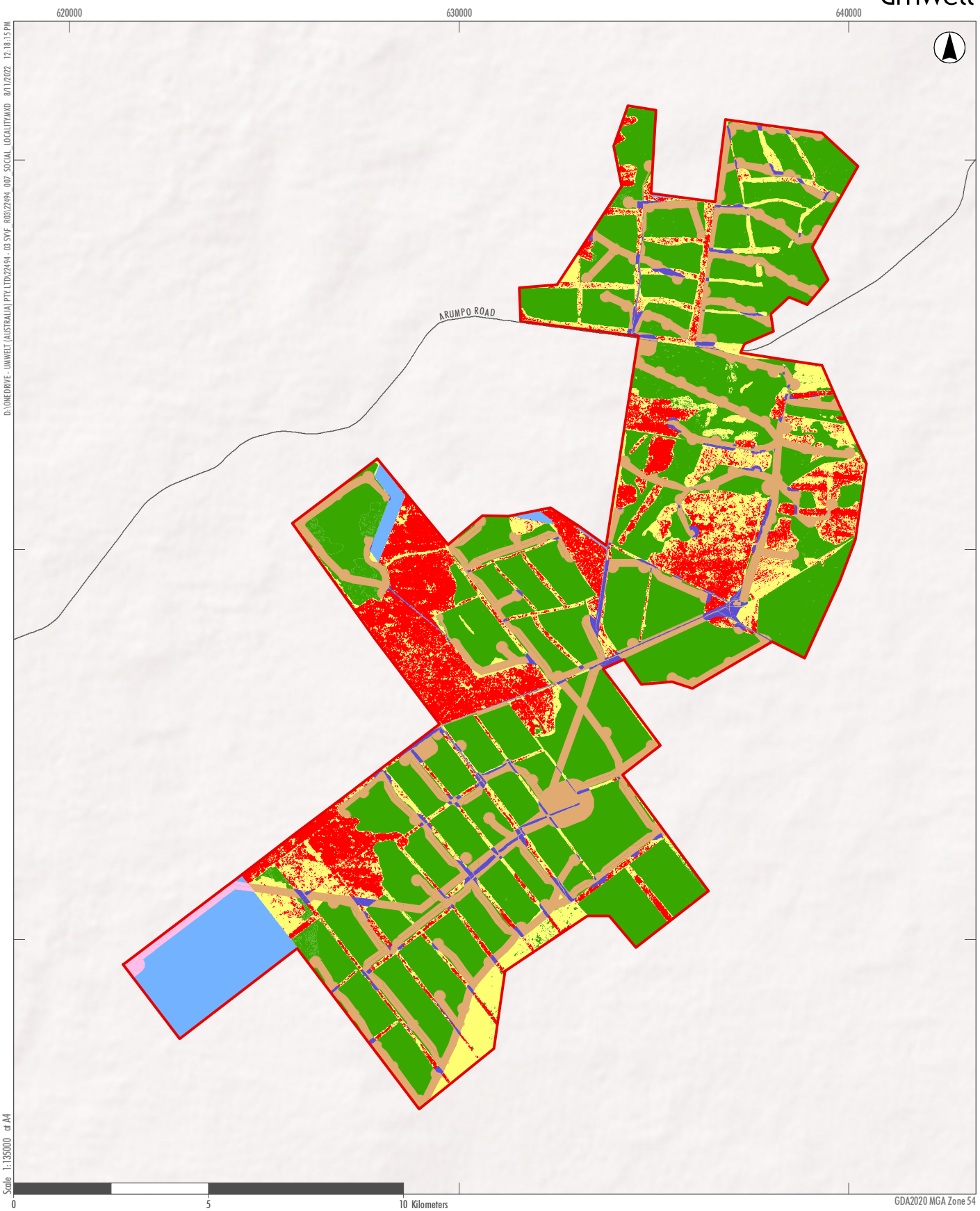
Potential *Category 1 – exempt land* areas were identified using available online data sets, including:

- Transitional Native Vegetation Regulatory (DPE 2022d).
- Land Use Mapping for NSW 2017 V1.2 (DPE 2022e).
- NSW Native Vegetation Extent 5m Raster V1.2 (DPE 2022f).
- NSW Government Historical Imagery Viewer (DSS 2022).

Refer to **Figure 2.1** for an overview of the methodology used. These data sources were used to create a preliminary Land Categorisation map for the Project Area. From this, further ground truthing was completed for land within the Development Corridor. Areas identified as either Category 2 Regulated Land, Vulnerable Regulated Land and Sensitive Regulated Land (rural land where clearing requires approval / biodiversity offsets) or Excluded Land were identified and mapped accordingly.

It is noted that historical aerial imagery available for the Project Area did not cover the entire area cohesively, and sections were assessed individually to ensure the entire area was covered.

A large proportion of Category 1 land has been mapped with high confidence across the Project Area (refer to **Figure 3.2**), comprising over 60% of the land within the areas considered in this constraints analysis. Within the Development Corridor 3,080 ha of Category 1 – Exempt Land, representing 86% of the Development Corridor. It should be noted that land mapped as Category 1 – Exempt Land outside of the Development Corridor has not gone through any secondary ground truthing. If the Development Corridor were to change, any additional areas would be ground-truthed. Consultation with BCD will occur to confirm areas mapped as Category 1 land.



Legend

- Project Boundary
- Major Roads

Development Corridor Verified Land Category

- Category 1 - Exempt Land
- Category 2 Land
- Excluded Land

Project Area Desktop Land Category

- Category 1 - Exempt Land
- Category 2 Land
- Unconfirmed Land Category
- Confirmed Excluded Land

FIGURE 3.2

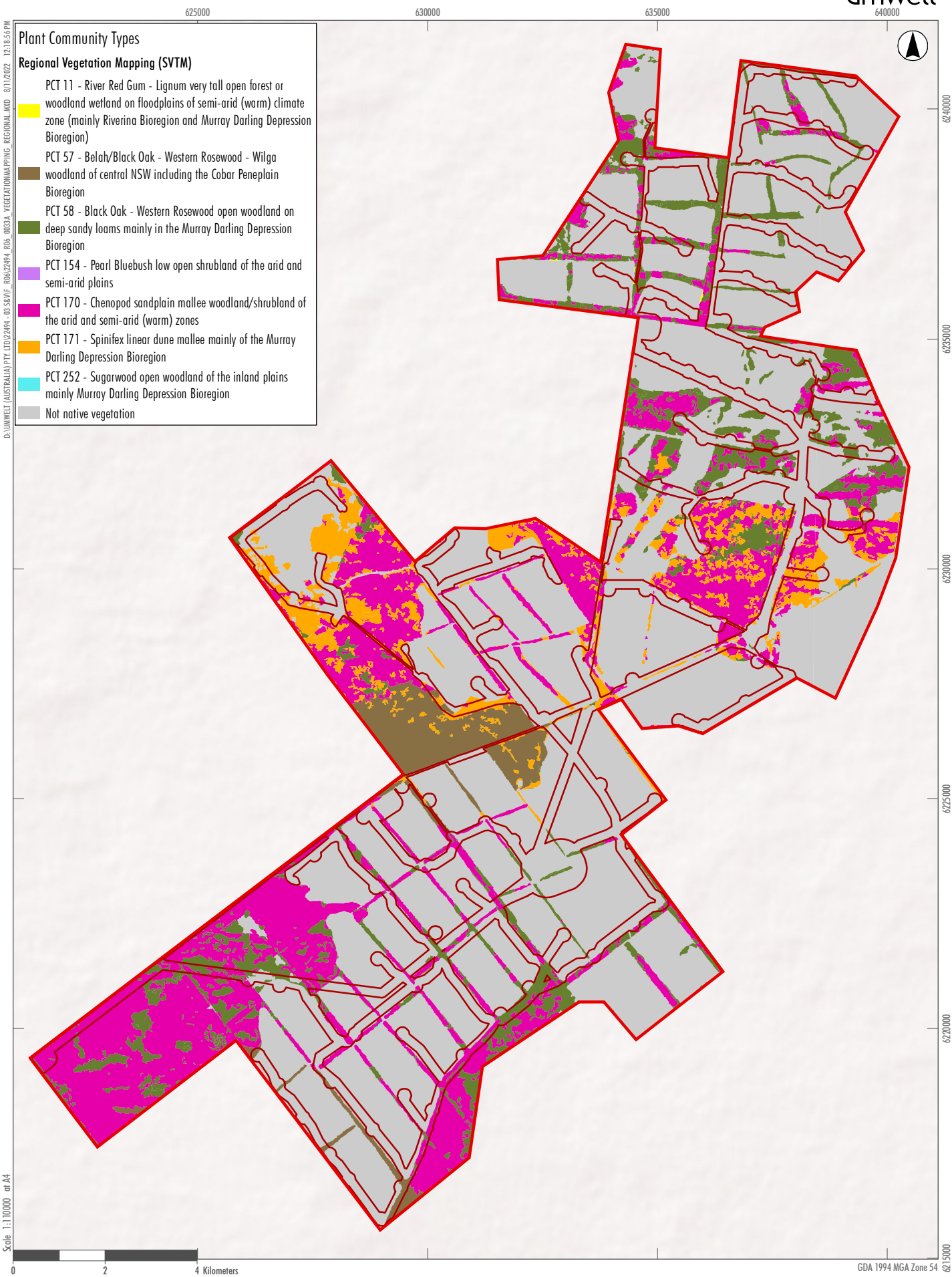
Land Categorisation Mapping

Image Source: ESRI Basemap (2022) Data source: NSW LPI (2021), NSW DFSI (2021), NPWS Estate (2019), VIC DVC (2021), Forestry Corporation of VIC (2019)

3.8 Vegetation Mapping

A preliminary vegetation map of the Project Area has been prepared which utilises the available regional vegetation mapping (Western SVTM) (refer to **Figure 3.3a** and **Table 3.4**). Regional vegetation mapping provides valuable information at the landscape scale of the vegetation in the area.

Detailed vegetation mapping surveys have been conducted focussing on the current Development Corridor (a portion of the Project Area). Results from these floristic surveys completed in September 2022 are restricted to the Development Corridor and present a more detailed, field verified vegetation map (refer to **Figure 3.3b** and **Table 3.5**). Through this process, a total of three PCTs, in various condition types, have been mapped across the Development Corridor, with one TEC (Mallee Bird Community) likely present on site (PCTs 170 and 171 – see **Table 3.4** and **Table 3.5** below)).



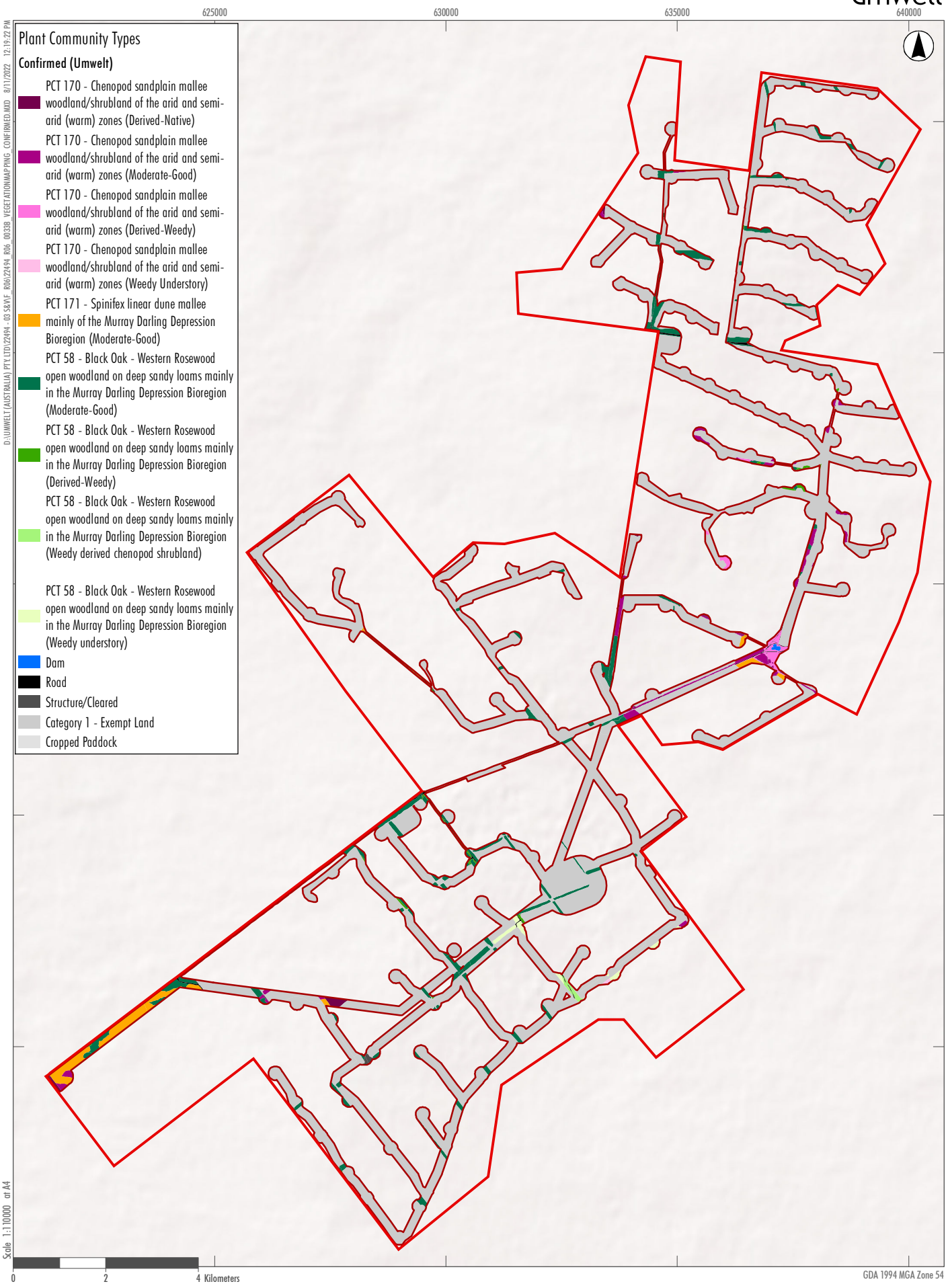
Legend

- Project Boundary
- Development Corridor (See figure 3.3B for confirmed PCT mapping within Development Corridor)

FIGURE 3.3A

Regional Vegetation Mapping within the Project Boundary

Image Source: ESRI (2022) Data source: DSFI (2020)



Legend

- Project Boundary
- Development Corridor

FIGURE 3.3B

Confirmed Vegetation Mapping within the Development Site

Image Source: ESRI (2022) Data source: DSFI (2020)

A formal process of detailed floristic survey and data analysis will be required to make a final determination as to whether or not vegetation within the Project Area conforms with BC Act and/or EPBC Act listed TECs.

Table 3.4 Plant Community Types in the Project Area

PCT ID	PCT Name	Potential BC Act Status	Potential EPBC Act Status	Preliminary Area (ha)
0	Not native vegetation	-	-	11,787.8
11	River Red Gum - Lignum very tall open forest or woodland wetland on floodplains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	-	-	1.6
57	Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion	Listed as in part conforming to *Acacia loderi* shrublands EEC according to the VIS database	-	598.9
58	Black Oak - Western Rosewood open woodland on deep sandy loams mainly in the Murray Darling Depression Bioregion	Listed as in part conforming to *Acacia loderi* shrublands EEC according to the VIS database Listed as in part conforming to *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions according to the VIS database	-	1,749
154	Pearl Bluebush low open shrubland of the arid and semi-arid plains	Listed as in part conforming to *Acacia loderi* shrublands EEC according to the VIS database	-	0.6
170	Chenopod sandplain mallee woodland/shrubland of the arid and semi-arid (warm) zones	Listed as in part conforming to *Acacia loderi* shrublands EEC according to the VIS database Listed as in part conforming to *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions according to the VIS database	Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions CEEC Mallee Bird Community of the Murray Darling Depression Bioregion EEC	3,522

PCT ID	PCT Name	Potential BC Act Status	Potential EPBC Act Status	Preliminary Area (ha)
171	Spinifex linear dune mallee mainly of the Murray Darling Depression Bioregion	-	Mallee Bird Community of the Murray Darling Depression Bioregion EEC	905.5
252	Sugarwood open woodland of the inland plains mainly Murray Darling Depression Bioregion	-	-	0.7
Total				**18,566.2**

EEC – Endangered Ecological Community; CEEC – Critically Endangered Ecological Community.

Table 3.5 Plant Community Types in the Development Corridor

PCT ID	PCT Name	Potential BC Act Status	Potential EPBC Act Status	Preliminary Area (ha)
0	Not native vegetation	-	-	3,085.6
58	Black Oak - Western Rosewood open woodland on deep sandy loams mainly in the Murray Darling Depression Bioregion	Listed as in part conforming to *Acacia loderi* shrublands EEC according to the VIS database. Ruled out due to absence of *A. loderi* Listed as in part conforming to *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions according to the VIS database Ruled out due to absence of *A. melvillei*	-	301.5
170	Chenopod sandplain mallee woodland/shrubland of the arid and semi-arid (warm) zones	Listed as in part conforming to *Acacia loderi* shrublands EEC according to the VIS database. Ruled out due to absence of *A. loderi* Listed as in part conforming to *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions according to the VIS database. Ruled out due to absence of *A. melvillei*	Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions CEEC. Ruled out given *Eucalyptus dumosa* was not dominant within the vegetation community and therefore did not meet the key diagnostic requirements of the conservation advice. Mallee Bird Community of the Murray Darling Depression Bioregion EEC	112.5

PCT ID	PCT Name	Potential BC Act Status	Potential EPBC Act Status	Preliminary Area (ha)
171	Spinifex linear dune mallee mainly of the Murray Darling Depression Bioregion	-	Mallee Bird Community of the Murray Darling Depression Bioregion EEC	75.9
Total				**3,575.5**

EEC – Endangered Ecological Community; CEEC – Critically Endangered Ecological Community.

3.8.1 Threatened Ecological Communities

The preliminary vegetation mapping has identified multiple TECs with potential to be present within the Project Area, refer to **Figure 3.4** for the potential State listed TECs and **Figure 3.5** for the potential Federal TECs. In September 2022, PCT mapping surveys were completed within the Development Corridor to investigate the presence of native vegetation and the potential for TECs. The TECs *Acacia loderi* shrublands EEC and *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions are only 'in-part' associated with the PCTs identified in **Table 3.2**.

There is potential that these TECs occur within the Project Area however based on the vegetation within the Development Corridor, it is considered unlikely that these TECs would be present within the Project Area. If the Development Corridor were to be changed, PCT mapping surveys would be conducted within these areas to assess presence. For this reason, the occurrence of these TEC is considered a potential constraint.

It was determined that the *Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions CEEC* was not present within the Development Corridor due to low abundance of diagnostic canopy species. A single diagnostic canopy species (DAWE 2021) was recorded in low abundance, comprising *Eucalyptus dumosa* (i.e., the species was not dominant within the vegetation community). The conservation advice requires *Eucalyptus porosa*, *Eucalyptus behriana* or *Eucalyptus dumosa* to be a dominant canopy to conform to the CEEC. The vegetation within the Development Corridor is dominated by mallee species which are not characteristic of the CEEC. Additionally, according to the regional occurrence mapping provided in the conservation advice, the Project Area is further north of the area mapped where the CEEC may occur.

It is likely that the mallee bird community EEC is present on site. This is due to:

- The occurrence of mallee vegetation
- The presence of mallee specialist bird species.

Further data collection and subsequent analysis will be required to determine presence and condition and will be undertaken as part of the biodiversity assessment.

3.9 Avifauna Impacts (Desktop Assessment)

The Project has been designed to minimise and avoid impacts to remnant native vegetation and biodiversity values by siting infrastructure within areas of disturbed cropping land. Being a proposed wind farm site, habitat features outside of the Development Corridor, and Project Area, also need to be considered from impacts to avifauna (birds and bats).

The following landscape features have been identified as notable features for birds and bats in the area:

- Mallee Cliffs National Park (approximately 200 m east of the Project Area).
- Mungo National Park (approximately 47 km north-east of Project Area).
- conservation mapped land – located immediately along the north, west, south and eastern edges of the Project Area.
- Willandra Lakes Region World Heritage Area (approximately 25 km northeast of Project Area).
- Mourguong Saltwater Disposal Basin (approximately 13 km west of Project Area).
- The Murray and Darling Rivers (approximately 9 km south and 37 km west of Project Area, respectively).
- Lake Gol Gol and Gol Gol Swamp (located approximately 8 km west and 4 km south-west of the Project Area, respectively).
- Large areas of remnant native vegetation surrounding the Project Area (surrounding Project Area).

These listed areas represent potentially important foraging and roosting habitat for migratory and non-migratory birds and bats. Additionally, the site is a potential fly way for migratory species. This represents a potentially high ecological constraint in regard to the prescribed impact assessment for turbine strike. **Figure 3.6** displays the abovementioned landscape features to provide a spatial context for the constraint, however, illustrating this constraint can be challenging. Further surveys will be required to further understand the bird and bat utilisation of the site. These surveys include bird and bat utilisation surveys (BBUS) occurring across summer, autumn, winter and spring.

3.10 Ecological Constraints Mapping

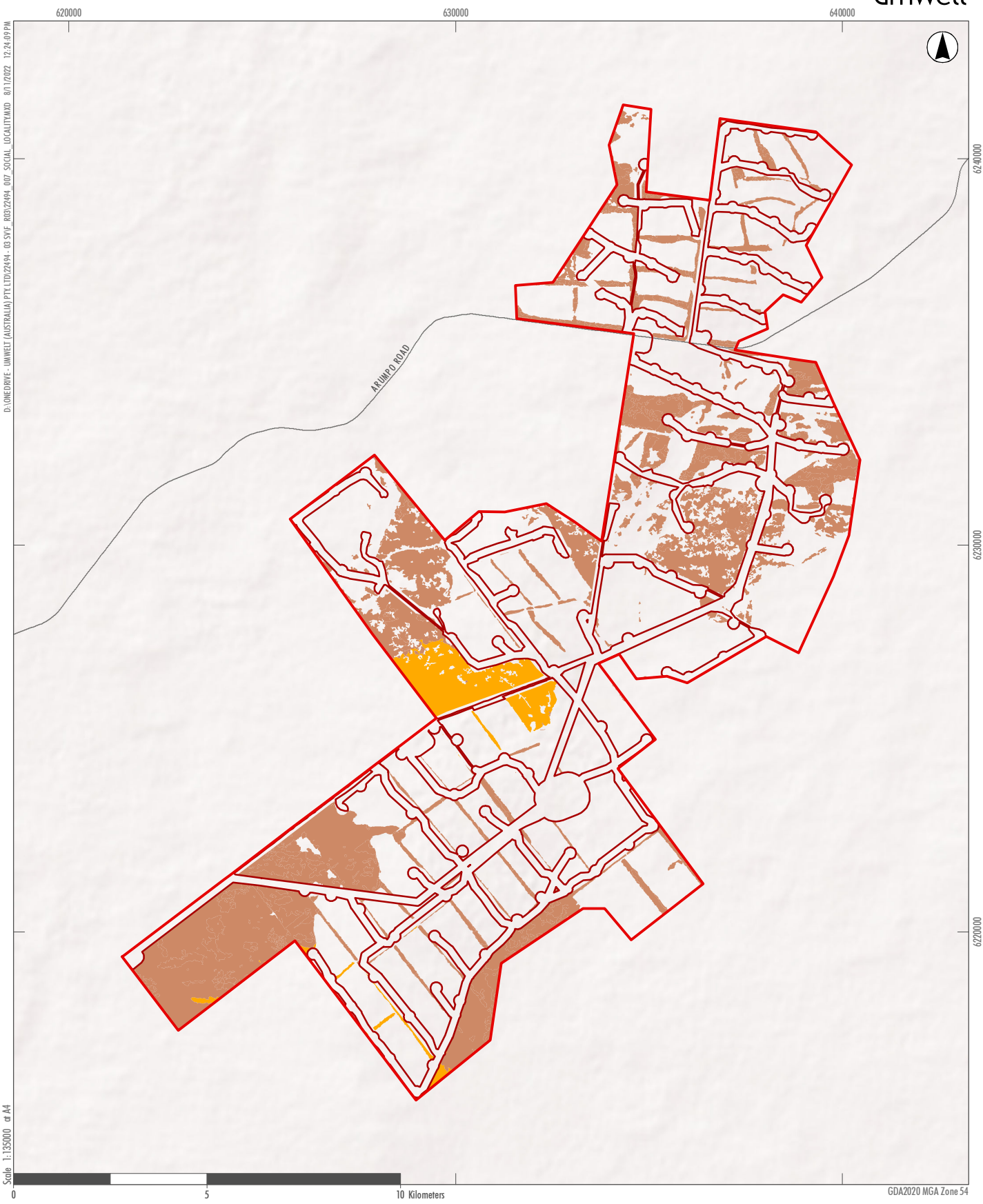
Figure 3.7 displays the high, moderate, and low constraints for the Project Area and the Development Corridor. This ecological constraints map will be used to inform on project design and to assist Spark in its avoidance and minimisation of ecological impacts. The constraint assessment was determined as follows:

- Land potentially supporting (that are likely to occur within the Project Area) TECs is considered a high constraint
- Land supporting remnant vegetation, that does not support a TEC (or due to onsite surveys is considered unlikely the TEC will occur) is mapped as a moderate constraint
- The wedge-tailed eagle nest (with 200 m buffer applied) is mapped as a moderate constraint

- Land considered to be Category-1 – Exempt Land is considered a low constraint.
- **Table 3.6** provides a summary of the constraints within the Project Area and the areas associated with them.

Table 3.6 Summary of Ecological Constraints Mapping

Ecological Constraints Category	Project Area (ha)	Development Corridor (ha)
High	4,162	188
Moderate	2,352	302
Low	12,053	3,086



Legend

- Project Boundary
- Development Corridor (no TECs Confirmed within Development Corridor)
- Major Roads

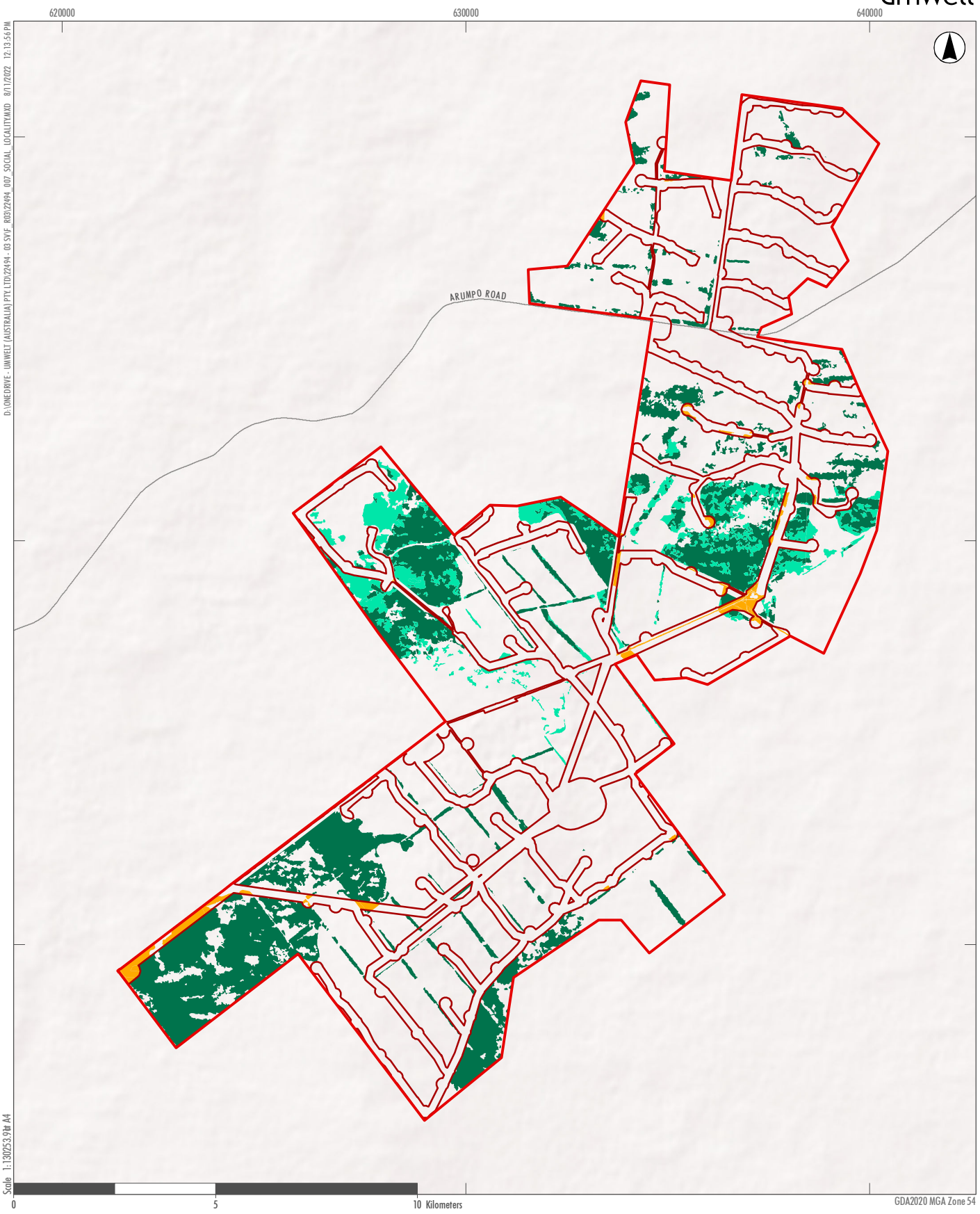
Regional Vegetation Mapping - Potential TEC under BC Act

- In part *Acacia loderi* shrublands EEC
- In part *Acacia loderi* shrublands EEC / In part *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions EEC
- In part *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions EEC

FIGURE 3.4

Potential TECs within Project Boundary under BC Act

Image Source: ESRI Basemap (2022) Data source: NSW LPI (2021), NSW DFSI (2021)



Legend

- Project Boundary
- Development Corridor
- Major Roads

Umwelt Vegetation Mapping Potential TEC under EPBC Act (Confirmed - within Development Corridor)

- Mallee Bird Community of the Murray Darling Depression Bioregion EEC

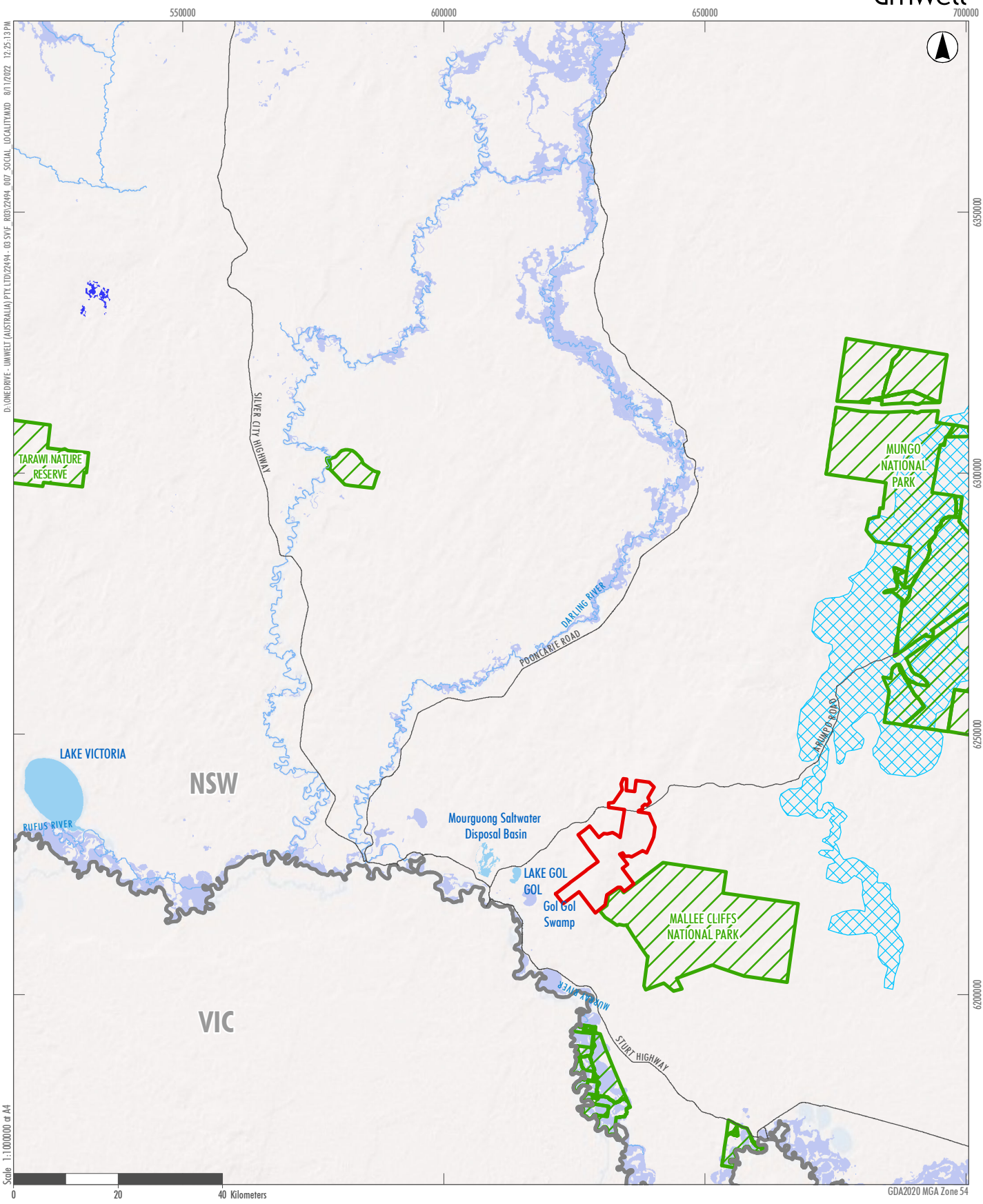
Regional Vegetation mapping Potential TEC under EPBC Act (Not confirmed - outside Development Corridor)

- Mallee Bird Community of the Murray Darling Depression Bioregion EEC
- Mallee Bird Community of the Murray Darling Depression Bioregion EEC / Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions CEEC

Image Source: ESRI Basemap (2022) Data source: NSW LPI (2021), NSW DFSI (2021)

FIGURE 3.5

'Potential TECs within Project Boundary under EPBC Act



Legend

- Project Boundary
- Major Roads
- NPWS Estate Boundary
- Willandra Lakes Region World Heritage Area

Wetlands

- Floodplain Wetland
- Saline Wetland

FIGURE 3.6

Wider Landscape Features

Image Source: ESRI Basemap (2022) Data source: NSW LPI (2021), NSW DFSI (2021), NPWS Estate (2019), VIC DVC (2021), Forestry Corporation of VIC (2019)

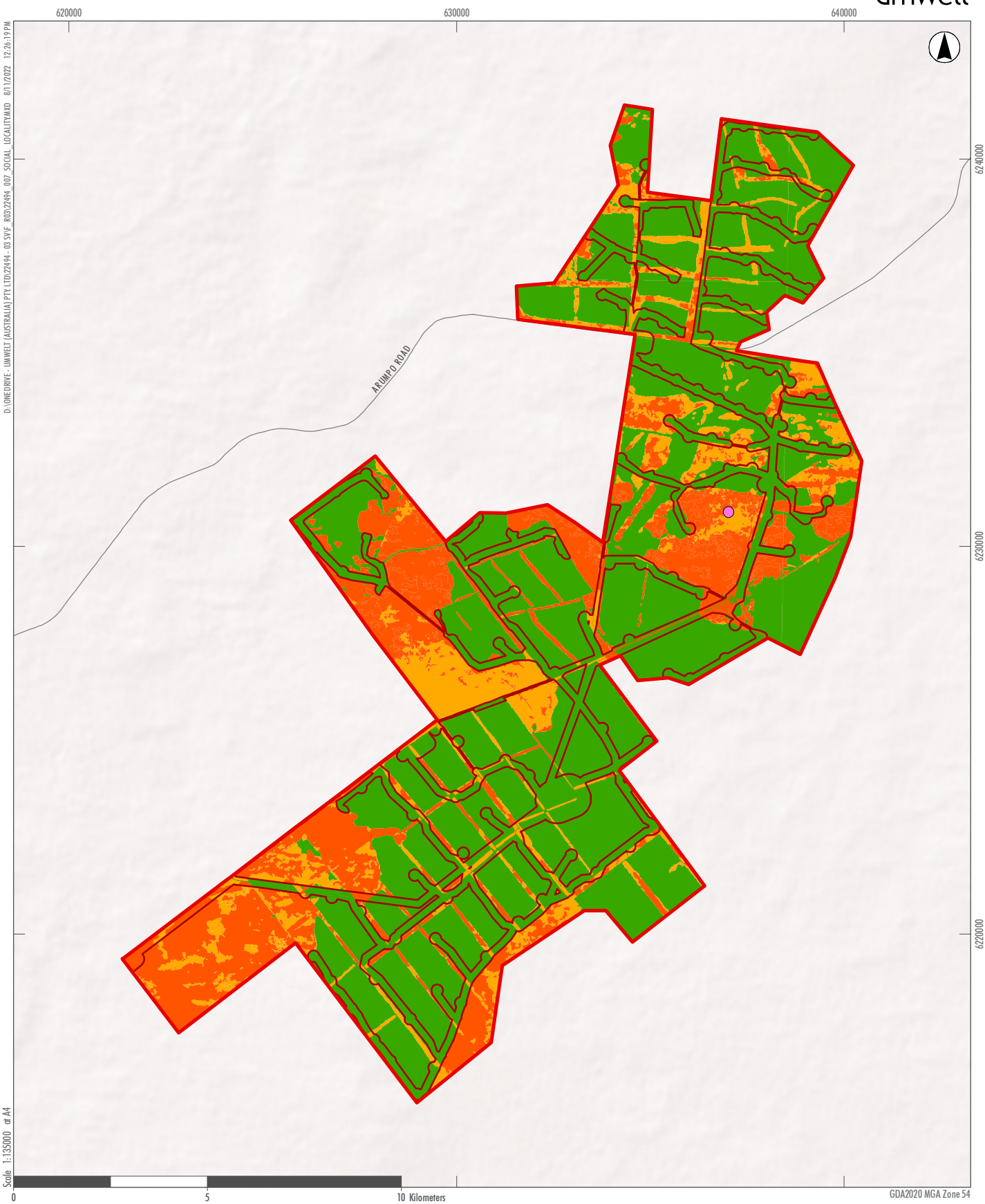


FIGURE 3.7

Ecological Constraints Mallee Wind Farm

Image Source: ESRI Basemap (2022) Data source: NSW LPI (2021), NSW DFSI (2021), NPWS Estate (2019), VIC DVC (2021), Forestry Corporation of VIC (2019)

3.11 Potential Impacts

Irrespective of the preliminary constraints described above, the BAM requires the assessment of discrete types of impacts on biodiversity values resulting from proposed development during both construction and operational phases. The types of impacts requiring assessment are as follows:

- **Direct impacts:** impacts on biodiversity values and threatened species habitat that relate to clearing native vegetation and impacts on biodiversity values prescribed by the BC Regulation.
- **Indirect impacts**: impacts that occur when the proposal affects native vegetation and threatened species habitat beyond the development footprint or within retained areas (e.g. biosecurity or noise and vibration impacts that affect adjacent areas).
- **Prescribed impacts:** means the prescribed impacts identified in clause 6.1 of the BC Regulation. Prescribed impacts can be direct or indirect impacts.
- **Serious and irreversible impacts (SAII):** impacts likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct in accordance with the principles set out in clause 6.7(2) of the BC Regulation.

Based on the findings of the desktop assessment and site inspection, the potential impacts to biodiversity from the Project are detailed in **Table 3.7** below.

Table 3.7 Potential impacts associated with the Project

Impact Type	Potential Impact	Details
Direct impact	Removal of native vegetation	• The Project may result in the removal of native vegetation, including TEC listed under both the BC Act and EPBC Act. Vegetation removal that may be required for the proposed works would likely contribute to further fragmentation of native vegetation communities within the locality. • Hollow-bearing trees provide habitat for threatened species such as forest owls, woodland and forest birds and microbats, which may occur within the Project Area. As such, the proposal has the potential to remove these tree hollows impacting on threatened species that may utilise them as habitat. • Construction of wind turbines and other infrastructure may clear logs and debris used by threatened flora and fauna species predicted to occur within the Project Area.
	Removal of threatened species and their habitat	
	Fauna mortality	
Indirect impact	Inadvertent impacts on adjacent habitat or vegetation	• Inadvertent disturbance to native vegetation and threatened species habitat may occur during construction and operational phases of the Project. • Priority weeds are likely to occur in parts of the Project Area. Continued weed invasion and encroachment could have potentially severe consequences for the habitat of flora and fauna occurring in the area. • Potential sediment, nutrient and pollutant run-off into adjacent vegetation and fauna habitat.
	Reduced viability of adjacent habitat due to edge effects	
	Reduced viability of adjacent habitat due to noise, dust, or light spill	

Impact Type	Potential Impact	Details
	Transport of weeds and pathogens from the site to adjacent vegetation	• Noise and vibration disturbances to fauna. • Fire mitigation strategies may result in changes to fire regime across the Project Area.
	Changed fire regimes	
Prescribed impacts	Impacts from wind turbine strike	• The operation of wind turbines has the potential to directly impact upon threatened birds and bats. Direct impact would take the form of birds and bats being struck by the turbine blades when moving within or through the wind farm. • The Project may create a barrier to movement across the landscape. • The Project may create a barrier to movement longitudinally for some threatened bird species. • Increased vehicle movement during construction may increase risk of vehicle strike on ground-dwelling species Construction of the wind farm may require the removal of natural or made-made waterbodies, or could alter subterranean or overland waterflows across the Project Area.
	Impacts to water bodies, water quality and hydrological processes	
	Impacts to habitat connectivity	
	Impacts from vehicle strike	
Serious and Irreversible Impacts (SAII)	As per examples listed above	• There are no entities with the potential for SAII that could be present within the Project Area, refer **Table 3.2**. • However, the BAM assessment will likely require an assessment of SAII if these entities are identified at a later time.

4.0 Discussion

This constraints assessment has characterised the ecological values within the Project Area based on a combination of field and desktop assessment results. It is intended that this constraints assessment be used to inform the future planning and design of the Project to avoid disturbance to high value ecological areas. The next steps of this biodiversity assessment will be to receive SEARs and continue to conduct field surveys consistent with the BAM. At the conclusion of the study a Biodiversity Assessment Report (BDAR) will be produced and submitted to agency as part of the EIS.

The project has been sited to maximise the use of historically cleared areas to avoid and minimise impacts to biodiversity. Over 60% of the Project Area (86% of the Development Corridor) can be classified as Category 1 – Exempt Land which means that biodiversity assessment of these areas, under the BAM, is not required except for prescribed impacts. The Category 1 land represents the least constrained areas from a biodiversity perspective and in relation to reducing biodiversity impacts and managing overall offsetting requirements, these areas will be prioritised for development during refinement of the project design during the future stages of the project.

The key ecological constraints at this stage of the project are:

- The substantial bird (migratory and non-migratory) habitat in the surrounding landscape.
- Potential presence of approximately 4,428 hectares (Project Area – based on regional mapping) and 188 ha (Development Corridor) of land conforming to the Mallee Bird Community, listed under the EPBC Act. It is noted, however, that any impacts on EPBC Act listed TECs could be considered potentially significant and require referral to DCCEEW.
- Prescribed impacts for turbine strike for birds and bats.

Potential impacts identified in this assessment can be avoided or minimised by:

- Completing pre-lodgement meetings with Commonwealth and State regulatory bodies to inform the assessment process and ecological data requirements.
- Avoiding or minimising (as much as practical) the infrastructure footprint within identified high and moderate constraint areas.

From this constraints assessment it is considered that the ecological constraints identified should not prevent the Project from continuing to the next stage of the development process. However, it is recommended that further ecological surveys are completed within the Project Area to better characterise and map ecological values present. These surveys should include:

- Consider the need to refer the project to the Commonwealth Environment Minister. Impacts on EPBC Act listed communities are likely to be unavoidable and could be considered to have the potential to be significant.
- Bird and bat utilisation surveys (BBUS) to assess the movement patterns, frequency and behaviour of bird and bat species using the Project Area to better understand the potential risk that the development of the Project poses to these species (see **Section 4.1** below).
- Complete seasonal threatened species surveys in Spring 2022, Summer 2022, and Autumn 2023. Additional seasonal threatened flora and fauna searches for candidate species.

4.1 Biodiversity Development Assessment

Further detailed biodiversity surveys will be undertaken within the Development Corridor to support the EIS phase for the Project. Following the completion of the surveys, a Biodiversity Development Assessment Report (BDAR) will be prepared. The BDAR will include:

- Field surveys and GIS mapping.
- Three rounds of seasonal surveys flora and fauna surveys:
    - Spring threatened species surveys
    - Summer threatened species surveys
    - Autumn threatened species surveys.
- Bird and Bus Utilisation Surveys (BBUS) will be completed to aid the Prescribed Impact Assessment (Turbine Strike). These surveys will be conducted in each season and will survey a mixture of vantage point and woodland areas.
- Preparation the BDAR including:
    - methods and results of vegetation surveys including a vegetation community map (based on PCTs and including TECs)
    - methods and results of surveys targeting species-credit species
    - assessment of prescribed impacts
    - outcomes of the calculator assessment identifying the credits generated by the PCTs (and ecosystem-credit species) and species-credit species
    - relevant data and mapping for agency submission including field data, figures and associated GIS files.

The BDAR will include an assessment of potential biodiversity impacts within the Development Corridor and surrounds including the values of the adjacent Mallee Cliffs National Park and land zoned 'E2 Conservation'. This will include consideration of potential impacts to biodiversity conservation activities such as species reintroductions and rewilding in the Mallee Cliffs National Park. Further, the BDAR will assess the Project's potential direct and indirect impacts to species and communities, including consideration of any edge effects or habitat connectivity impacts.

5.0 References

Bureau of Meteorology (BOM) 2022 Groundwater Dependant Ecosystems Atlas.

Department of Agriculture, Water, and the Environment (DAWE) 2021. Conservation Advice1 for the Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions.

Department of Climate Change Energy Environment and Water (DCCEEW) 2022, 'Species Profile and Threats Database', accessed September 2022, from <http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=206>.

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Department of Environment (DPE), 2022a Biodiversity Values Map (Biodiversity Values Map | NSW Environment and Heritage).

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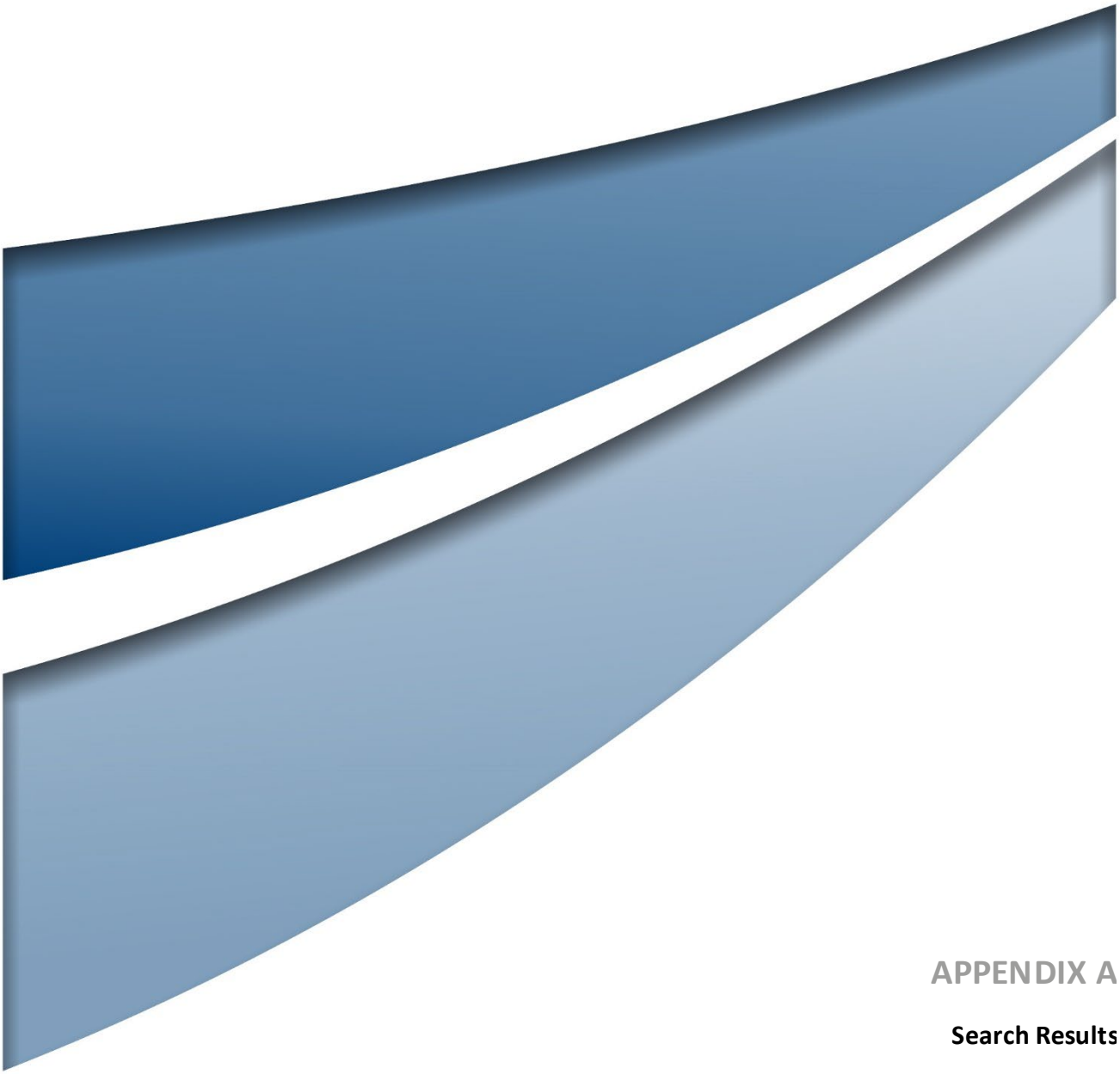

APPENDIX A

Search Results

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 19-Oct-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	27
Listed Migratory Species:	9

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	5
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	4
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	7
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	150 - 200km upstream from Ramsar site	In feature area
Riverland	100 - 150km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	200 - 300km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area	In feature area
Mallee Bird Community of the Murray Darling Depression Bioregion	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Botaurus poiciloptilus			
Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Falco hypoleucos](#) Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Grantiella picta](#) Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In feature area
[Leipoa ocellata](#) Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Manorina melanotis](#) Black-eared Miner [449]	Endangered	Species or species habitat may occur within area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Pedionomus torquatus](#) Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Pezoporus occidentalis](#) Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
[Polytelis anthopeplus monarchoides](#) Regent Parrot (eastern) [59612]	Vulnerable	Breeding likely to occur within area	In feature area
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
FISH			
[Bidyanus bidyanus](#) Silver Perch, Bidyan [76155]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
[Craterocephalus fluviatilis](#) Murray Hardyhead [56791]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area	In buffer area only
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In buffer area only
FROG			
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In feature area
MAMMAL			
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat may occur within area	In buffer area only
PLANT			
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
Pterostylis xerophila Desert Greenhood [7997]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Solanum karsense Menindee Nightshade [7776]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Swainsona murrayana			
Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Swainsona pyrophila			
Yellow Swainson-pea [56344]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
Aprasia parapulchella			
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Hemiaspis damelii			
Grey Snake [1179]	Endangered	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area	In feature area
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Commonwealth Trading Bank of Australia		
Commonwealth Land - Commonwealth Trading Bank of Australia [16416]	NSW	In buffer area only
Commonwealth Land - Commonwealth Trading Bank of Australia [16417]	NSW	In buffer area only
Commonwealth Land - Commonwealth Trading Bank of Australia & Moya Grace Murphy [16418]	NSW	In buffer area only
Commonwealth Land - Commonwealth Trading Bank of Australia & Moya Grace Murphy [16415]	NSW	In buffer area only
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Corporation [16073]	NSW	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysostoma			
Blue-winged Parrot [726]		Species or species habitat known to occur within area overfly marine area	In feature area
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Kings Billabong Park	Conservation Park	VIC	In buffer area only
Mallee Cliffs	National Park	NSW	In feature area
River Murray Reserve	Natural Features Reserve	VIC	In buffer area only
Southern Mallee	NRS Addition - Gazettal in Progress	NSW	In feature area

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Kings Billabong Wetlands	VIC	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
EnergyConnect NSW - Eastern Section	2020/8766		Approval	In feature area
Controlled action				
Electricity Transmission Line	2001/380	Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
EnergyConnect NSW - Western Section	2020/8673	Controlled Action	Post-Approval	In buffer area only
Great Darling Anabranch - pipeline construction and environmental water flow ma	2004/1319	Controlled Action	Post-Approval	In feature area
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Table 1 Threatened Species recorded within 10 km of the Project Area

Kingdom	Class	Family	Scientific Name	Common Name	NSW BC ACT	EPBC Act	Likelihood of Occurrence
Fauna	*Amphibia*	*Hylidae*	*Litoria raniformis*	Southern Bell Frog	E	V	Low
Fauna	*Aves*	*Accipitridae*	*Circus assimilis*	Spotted Harrier	V		Known
Fauna	*Aves*	*Accipitridae*	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V		Moderate
Fauna	*Aves*	*Accipitridae*	*Hieraaetus morphnoides*	Little Eagle	V		Known
Fauna	*Aves*	*Accipitridae*	*Lophoictinia isura*	Square-tailed Kite	V		Moderate
Fauna	*Aves*	*Anatidae*	*Oxyura australis*	Blue-billed Duck	V		Moderate
Fauna	*Aves*	*Anatidae*	*Stictonetta naevosa*	Freckled Duck	V		Moderate
Fauna	*Aves*	*Ardeidae*	*Botaurus poiciloptilus*	Australasian Bittern	E	E	Moderate
Fauna	*Aves*	*Artamidae*	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V		Known
Fauna	*Aves*	*Burhinidae*	*Burhinus grallarius*	Bush Stone-curlew	E		Moderate
Fauna	*Aves*	*Cacatuidae*	*Lophochroa leadbeateri*	Major Mitchell's Cockatoo	V		Known
Fauna	*Aves*	*Charadriidae*	*Pluvialis fulva*	Pacific Golden Plover		C,J,K	Moderate

Kingdom	Class	Family	Scientific Name	Common Name	NSW BC ACT	EPBC Act	Likelihood of Occurrence
Fauna	*Aves*	*Climacteridae*	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V		High
Fauna	*Aves*	*Falconidae*	*Falco subniger*	Black Falcon	V		Moderate
Fauna	*Aves*	*Gruidae*	*Grus rubicunda*	Brolga	V		Moderate
Fauna	*Aves*	*Laridae*	*Chlidonias leucopterus*	White-winged Black Tern		C,J,K	Moderate
Fauna	*Aves*	*Laridae*	*Gelochelidon nilotica*	Gull-billed Tern		C	Moderate
Fauna	*Aves*	*Laridae*	*Hydroprogne caspia*	Caspian Tern		J	High
Fauna	*Aves*	*Megapodiidae*	*Leipoa ocellata*	Malleefowl	E	V	Known
Fauna	*Aves*	*Meliphagidae*	*Certhionyx variegatus*	Pied Honeyeater	V		High
Fauna	*Aves*	*Meliphagidae*	*Epthianura albifrons*	White-fronted Chat	V		Known
Fauna	*Aves*	*Neosittidae*	*Daphoenositta chrysoptera*	Varied Sittella	V		Known
Fauna	*Aves*	*Pachycephalidae*	*Pachycephala inornata*	Gilbert's Whistler	V		Known
Fauna	*Aves*	*Petroicidae*	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V		Known
Fauna	*Aves*	*Petroicidae*	*Petroica phoenicea*	Flame Robin	V		Low

Kingdom	Class	Family	Scientific Name	Common Name	NSW BC ACT	EPBC Act	Likelihood of Occurrence
Fauna	*Aves*	*Psittacidae*	*Polytelis anthopeplus monarchoides*	Regent Parrot (eastern subspecies)	E	V	Moderate
Fauna	*Aves*	*Psophodidae*	*Cinclosoma castanotum*	Chestnut Quail-thrush	V		Known
Fauna	*Aves*	*Rostratulidae*	*Rostratula australis*	Australian Painted Snipe	E	E	Moderate
Fauna	*Aves*	*Scolopacidae*	*Arenaria interpres*	Ruddy Turnstone		C,J,K	Moderate
Fauna	*Aves*	*Scolopacidae*	*Calidris acuminata*	Sharp-tailed Sandpiper		C,J,K	Moderate
Fauna	*Aves*	*Scolopacidae*	*Calidris ferruginea*	Curlew Sandpiper	E	CE,C,J,K	Moderate
Fauna	*Aves*	*Scolopacidae*	*Calidris melanotos*	Pectoral Sandpiper		J,K	Moderate
Fauna	*Aves*	*Scolopacidae*	*Calidris ruficollis*	Red-necked Stint		C,J,K	High
Fauna	*Aves*	*Scolopacidae*	*Gallinago hardwickii*	Latham's Snipe		J,K	Moderate
Fauna	*Aves*	*Scolopacidae*	*Limosa lapponica*	Bar-tailed Godwit		C,J,K	Moderate
Fauna	*Aves*	*Scolopacidae*	*Limosa limosa*	Black-tailed Godwit	V	C,J,K	Moderate
Fauna	*Aves*	*Scolopacidae*	*Tringa glareola*	Wood Sandpiper		C,J,K	Moderate
Fauna	*Aves*	*Scolopacidae*	*Tringa nebularia*	Common Greenshank		C,J,K	Moderate

Kingdom	Class	Family	Scientific Name	Common Name	NSW BC ACT	EPBC Act	Likelihood of Occurrence
Fauna	*Aves*	*Scolopacidae*	*Tringa stagnatilis*	Marsh Sandpiper		C,J,K	Moderate
Fauna	*Mammalia*	*Burramyidae*	*Cercartetus concinnus*	Western Pygmy Possum	E		Known
Fauna	*Mammalia*	*Chaeropodidae*	*Chaeropus ecaudatus*	Pig-footed Bandicoot	Extinct	X	Low
Fauna	*Mammalia*	*Dasyuridae*	*Antechinomys laniger*	Kultarr	E		Low
Fauna	*Mammalia*	*Dasyuridae*	*Ningaui yvonneae*	Southern Ningaui	V		Moderate
Fauna	*Mammalia*	*Dasyuridae*	*Phascogale calura*	Red-tailed Phascogale	Extinct	V	Low
Fauna	*Mammalia*	*Emballonuridae*	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V		Moderate
Fauna	*Mammalia*	*Muridae*	*Leporillus conditor*	Greater Stick-nest Rat	Extinct	V	Low
Fauna	*Mammalia*	*Muridae*	*Pseudomys desertor*	Desert Mouse	CE		Low
Fauna	*Mammalia*	*Potoroidae*	*Bettongia lesueur graii*	Boodie, Burrowing Bettong (mainland)	Extinct	X	Low
Fauna	*Mammalia*	*Thylacomyidae*	*Macrotis lagotis*	Bilby	Extinct	V	Low
Fauna	*Mammalia*	*Vespertilionidae*	*Chalinolobus picatus*	Little Pied Bat	V		High
Fauna	*Mammalia*	*Vespertilionidae*	*Vespadelus baverstocki*	Inland Forest Bat	V		High
Fauna	*Reptilia*	*Diplodactylidae*	*Strophurus elderi*	Jewelled Gecko	V		Moderate

Kingdom	Class	Family	Scientific Name	Common Name	NSW BC ACT	EPBC Act	Likelihood of Occurrence
Fauna	*Reptilia*	*Pygopodidae*	*Aprasia inaurita*	Mallee Worm-lizard	E		High
Fauna	*Reptilia*	*Scincidae*	*Tiliqua occipitalis*	Western Blue-tongued Lizard	V		Moderate
Flora	*Flora*	*Fabaceae (Faboideae)*	*Swainsona pyrophila*	Yellow Swainson-pea	V	V	High
Flora	*Flora*	*Fabaceae (Mimosoideae)*	*Acacia acanthoclada*	Harrow Wattle	E		High
Flora	*Flora*	*Santalaceae*	*Santalum murrayanum*	Bitter Quandong	E		High
Flora	*Flora*	*Solanaceae*	*Solanum karsense*	Menindee Nightshade	V	V	Low

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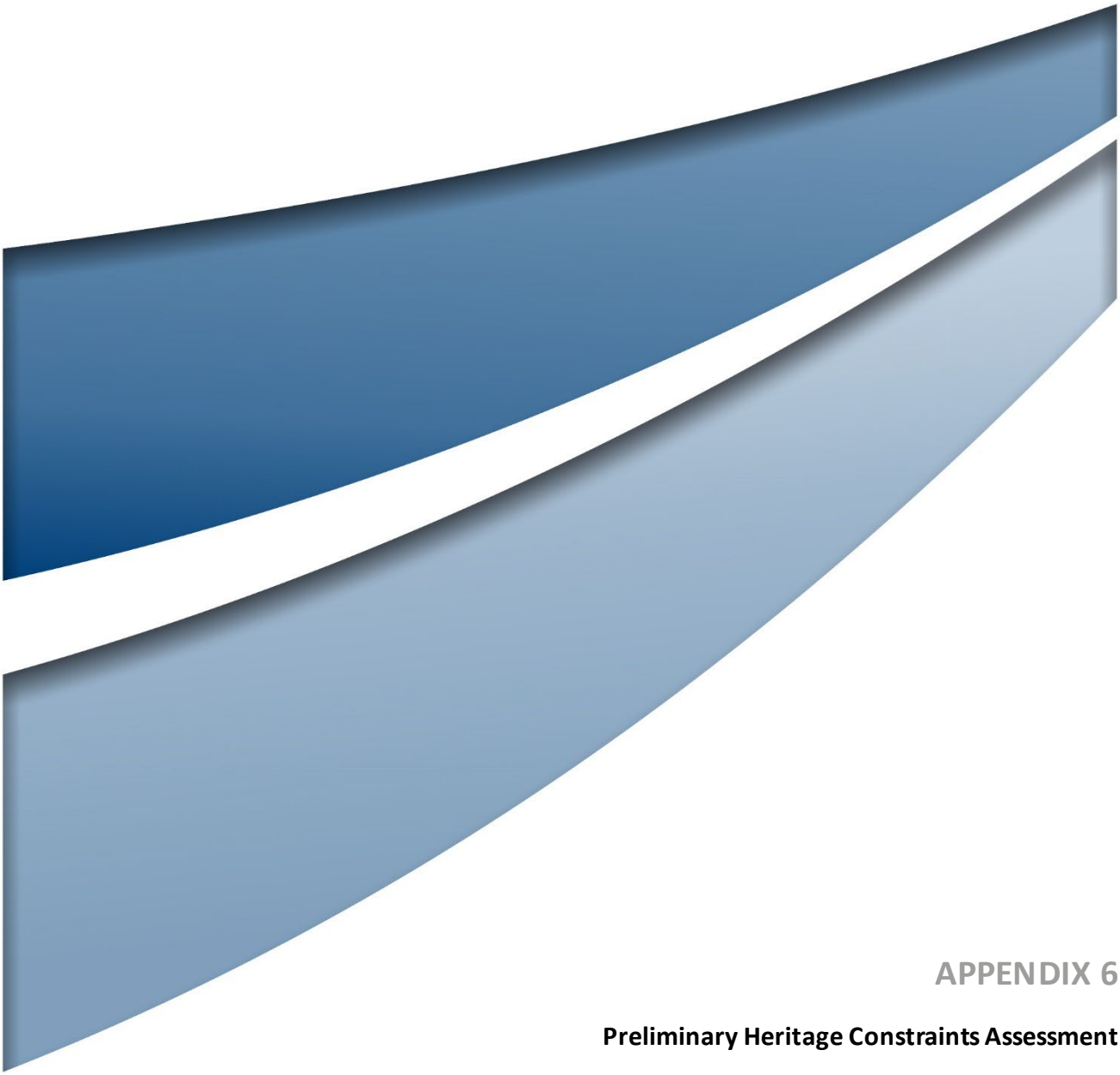

APPENDIX 6

Preliminary Heritage Constraints Assessment

Reference: 22078

14 November 2022

Bridie McWhirter
Umwelt Pty Ltd
Senior Environmental Consultant
By email: bmcwhirter@umwelt.com.au

Dear Bridie,

RE: CULTURAL HERITAGE DUE DILIGENCE ASSESSMENT FOR 22494 - MALLEE WIND FARM - SCOPING REPORT

Austral Archaeology Pty Ltd (Austral) has been engaged by Umwelt Pty Ltd to provide desktop Aboriginal and non-Aboriginal cultural heritage advice for a scoping report for the proposed Mallee Windfarm project. The project is being developed by Spark Renewables (Spark) within the South-West Renewable Energy Zone (South West REZ), New South Wales (NSW) [the project area]. This advice is intended to assist Umwelt and Spark in determining their obligations regarding the Aboriginal and non-Aboriginal heritage items, objects and places under the following legislation:

- *National Parks and Wildlife Act 1974* (NPW Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment 2016 - EPBC Act)
- *NSW Heritage Act 1977* (Heritage Act)
- *Wentworth Local Environmental Plan 2011* (Wentworth LEP)
- *Wentworth Shire Development Control Plan 2011* (Wentworth DCP).

1. Development Overview

Location

The Project Area is located approximately 16 km north-east of Buronga, close to the NSW-Victorian state border and covers approximately 17,300 hectares. The Project Area is located on relatively flat land at an elevation of approximately 100 metres above sea level with a good available wind resource. There is one non-involved dwelling within 8 km of the proposed wind turbines.

The Project Area is located primarily on land zoned RU1 Primary Production under the Wentworth LEP. The Project Area is currently used for cropping and grazing, with patches of remnant native vegetation present. The Project EnergyConnect transmission line corridor is located to the south-west of the Project Area. The Project Area is bordered by Mallee Cliffs National Park to the south-east.

Indicative Design

The proposed development is seeking approval for up to 150 wind turbines which would generate up to 1000 MW (1GW) of renewable energy, with a maximum blade-tip height of 280 m above ground level (AGL). A single grid-scale BESS is also proposed and would allow for the capture and storage of dispatchable to the electricity grid along with providing additional grid services. The power generated by the Project will feed into the electricity grid (National Energy Market, NEM) either via the 330/220kV Buronga Substation connecting into the new Project EnergyConnect interconnector that will link Robertstown (South Australia) with Wagga Wagga (NSW), or direct connection to 220kV transmission line or 330kV Project EnergyConnect.

It is noted that this development was in the early stages of landowner consultation, stakeholder engagement and overall wind farm design at the time this FFA report was prepared. During the Scoping Report and EIS planning approval phases, several technical studies (relating to aspects

including noise, visual, biodiversity, heritage, traffic, social, aviation safety, electromagnetic interference (EMI) and electromagnetic field (EMF) and blade throw) will be undertaken and their outcomes, as well as feedback from community engagement, will inform the wind farm design.

The proposed development would comprise:

- Up to 150 wind turbines, with a maximum blade-tip height of 280m AGL
- Power infrastructure providing connection to the transmission network i.e. on-site substations/switchyards
- Internal electrical reticulation network, access roads, and access points from public roads
- Permanent meteorological monitoring masts
- Temporary infrastructure including construction compound and site office buildings, storage areas and concrete batching plants
- Hardstand and laydown area used for wind turbine installation and storage of wind turbine components
- Operation and maintenance building
- A single grid-scale BESS.

2. ASSESSMENT OBJECTIVES

The purpose of this desktop heritage assessment is to evaluate the potential impact from the proposed development on the significance of any Aboriginal and historic heritage values that may be present within or in the vicinity of the Project Area.

The client has advised a preliminary Project Area based on host landholder lots plus a 1 kilometre (km) buffer around any broader ancillary infrastructure e.g. transmission line and local transport routes.

The preliminary Project Area consists of the following lots:

- Lot 1 DP756995
- Lot 3805 DP763156
- Lot 1 DP756991
- Lot 2 DP756991
- Lot 121 DP760678
- Lot 6 DP1256363
- Lot 3 DP756993
- Lot 1726 DP763664
- Lot 1727 DP763667
- Lot 7 DP1256363
- Lot DP 1035269
- Lot 2 DP756993

The Project Area is located approximately 47 km east of the Wentworth Town Centre, 16 km northeast of the township of Buronga, and is situated within the Wentworth Local Government Area (LGA). The location of the Project Area in a regional context is shown in Figure 1 and Figure 2 show the Project Area in local context.

The proposed development comprises the construction of up to 150 wind turbines, power infrastructure providing connection to the transmission network i.e., on-site substations and switchyards, internal electrical reticulation network, access roads and permanent meteorological monitoring masts, temporary infrastructures including a construction compound and site offices, hardstands and laydown areas used for wind turbine installation and storage of wind turbines, operation and maintenance buildings and a single grid-scale BESS.

3. LIMITATIONS OF THE REPORT

This report comprises a desktop-only assessment of Aboriginal and non-Aboriginal archaeological values in the Project Area. The assessment aims to provide Aboriginal and non-Aboriginal heritage inputs to inform a scoping report being made in advance of an Environmental Impact Statement (EIS) required for a State Significant Infrastructure (SSI) development under Part 5 of the EP&A Act. The report does not include any physical (field) assessments of Aboriginal and historic heritage that may be present within the Project Area.

The results, assessments and judgements contained in this report are constrained by the standard limitations of desktop research and by the unpredictability inherent in archaeological zoning from the desktop. Whilst every effort has been made to gain insight to the heritage values of the Project Area, Austral cannot be held accountable for errors or omissions arising from such constraining factors.

4. ABBREVIATIONS

The following are common abbreviations that are used within this report:

Burra Charter	*Burra Charter: Australia ICOMOS Charter for Places of Cultural Significance 2013*
CBD	Central Business District
CHL	Commonwealth Heritage List
DCP	Development Control Plan
DPC	Department of Premier and Cabinet
EPA Act	*Environmental Planning and Assessment Act 1979 No 203 - NSW Legislation* n.d.
EPBC Act	*Commonwealth Environment Protection and Biodiversity Conservation Act* 1999
EPI	Environmental Planning Instrument
Heritage Act	*Heritage Act 1977 No 136 - NSW Legislation* n.d.
ICOMOS	International Council on Monuments and Sites
LEP	Local Environmental Plan
LGA	Local Government Area
NHL	National Heritage List
NPW Act	Minister of Energy and Environment 1974-*National Parks and Wildlife Act 1974*
The Proponent	Spark Renewables
RNE	Register of the National Estate
SHI	State Heritage Inventory
SHR	State Heritage Register
Project Area	Lot 1 DP756995, Lot 3805 DP763156, Lot 1 DP756991, Lot 2 DP756991, Lot 121 DP760678, Lot 6 DP1256363, Lot 3 DP756993, Lot 1726 DP763664, Lot 1727 DP763667, Lot 7 DP1256363, Lot DP 1035269, and Lot 2 DP756993.
Wentworth DCP	*Wentworth Shire Development Control Plan 2011*
Wentworth LEP	*Wentworth Local Environmental Plan 2011*

Refer also to the document Heritage Terms and Abbreviations, published by the Heritage Office and available on the website: http://www.environment.nsw.gov.au/heritage/index.htm

5. STATUTORY CONTEXT

NSW NATIONAL PARKS AND WILDLIFE ACT 1974

Section 87 of the NPW Act makes it a strict liability offence to knowingly or unknowingly harm Aboriginal objects or declared Aboriginal places. Harm is defined under the NPW Act as "*any act*

or omission that destroys, defaces or damages the object or place or in relation to an object, moves the object from the land on which it had been situated". The NPW Act allows for a person or organisation to exercise due diligence in determining whether their actions will or are likely to impact upon Aboriginal objects or places. Any person or organisation who can demonstrate that they have exercised due diligence has a defence against prosecution under the strict liability provisions of the NPW Act. Where an activity is likely to harm Aboriginal objects or places, consent in the form of an Aboriginal Heritage Impact Permit (AHIP) is required.

The *National Parks and Wildlife Regulation 2009* (NPW Regulation) adopted the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010a) (the Code). The Code sets out the reasonable and practicable steps which individuals and organisations need to take in order to:

- Identify whether Aboriginal objects are, or are likely to be, present within the Project Area.
- If Aboriginal objects are, or are likely to be present, determine whether their activities are likely to cause harm.
- Determine whether further assessment or an AHIP application is required for the activity to proceed.

This advice has been formulated to provide a robust assessment that will identify whether Aboriginal objects or places are present or are likely to be present within the Project Area. This has been achieved through the completion of a desktop review and archaeological survey of the Project Area. The Code provides a series of questions that clarify whether it is applicable to a proposed project.

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 27 July 2022 (Client service ID: 703652 & 703644). The search identified 64 Aboriginal archaeological sites within a 25-kilometre search area centred on the proposed Project Area. One of these registered sites is located within the Project Area, C1 River Margin, (AHIMS # 46-1-0105). Two sites, Buronga Landfill Artefact 3 (AHIMS # 46-3-0205), and PEC-W-135 (AHIMS # 46-3-0206) [an artefact], are located within 1 kilometre of the proposed Project Area. The results of the AHIMS search are described in Table 1 below and shown in Figure 3.1 and Figure 3.2

Spatial information for this report is displayed using the GDA94 Datum. Where AHIMS site records were provided on a different datum, they were converted using standard functions in QGIS software.

Table 1 AHIMS sites identified within 25 kilometres of the Project Area.

Site type	Occurrence	Frequency
Modified Tree (Carved or Scarred)	42	65.63%
Artefact	16	25.00%
Shell	3	4.69%
Artefact, Hearth, Shell	1	1.56%
Burial	1	1.56%
Hearth	1	1.56%
Grand Total	64	100%

Modified trees are the most prominent feature located within the vicinity of the Project Area. They comprise 42 (65%) of the 64 sites and are not recorded with any other site features. Sites that only contain artefacts form a quarter (n=16, 25%) of recorded sites within the area. This site is the only site that contains multiple features. Sites consisting of shell only (n=3) comprise 4.69% of the sites in the area. One site (1.56%) contains three archaeological features, artefact, hearth, and shell.

One burial and one hearth, comprising 1.56% of sites respectively, have also been recorded in the search area.

ENVIRONMENTAL PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) established the Australian Heritage Council (formerly the Australian Heritage Commission) and provides for the protection of cultural heritage at a national level and items owned or managed by the Commonwealth. The EPBC Act has established two heritage registers:

- Commonwealth Heritage List (CHL): for significant items owned or managed by Commonwealth Government agencies;
- National Heritage List (NHL): for items assessed as being of national cultural significance.

A referral under the EPBC Act that is approved by the Australian Heritage Council is required for works to an item registered on either of these lists to ensure that the item's significance is not impacted upon. No part of the Project Area appears on either the CHL or the NHL.

The Australian Heritage Council is also responsible for keeping the Register of the National Estate (RNE). In 2007 the RNE was frozen and no further sites were added to it. For Commonwealth properties, the RNE was superseded by the CHL and NHL lists. The RNE is now retained as an archive of information about more than 13,000 places throughout Australia.

No part of the Project Area appears on the RNE.

However, the nearby Mallee Cliffs National Park is listed on the RNE as Place ID 960, and Place File Number 1/05/360/0003. The park was registered on 25 September 1981 for its natural values and forms part of a broader registration of national parks and reserves within the Murray-Mallee region.

NSW HERITAGE ACT 1977

The Heritage Council is the approval authority under the Heritage Act for works to an item on the State Heritage Register (SHR). Section 57(1) of the Heritage Act identifies the need for Heritage Council approval if the work involves the following tasks:

- Demolishing the building or work;
- Damaging or despoiling the place, precinct or land, or any part of the place, precinct or land;
- Moving, damaging or destroying the relic or moveable object;
- Excavating any land for the purpose of exposing or moving the relic;
- Carrying out any development in relation to the land on which the building, work or relic is situated, the land that comprises the place, or land within the precinct;
- Altering the building, work, relic or moveable object;
- Displaying any notice or advertisement on the place, building, work, relic, moveable object or land, or in the precinct; and
- Damaging or destroy any tree or other vegetation on or remove any tree or other vegetation from the place, precinct or land.

Demolition of an SHR item (in whole) is prohibited under the Heritage Act, unless the item constitutes a danger to its occupants or the public. A component of an SHR item may only be demolished if it does not contribute to the significance of the item.

Section 57(1) of the Heritage Act also applies to archaeological remains (such as relics) within an SHR site, and excavation can only proceed subject to approval of a Section 60 application by the Heritage Division of OEH.

No part of the Project Area appears on the SHR.

HERITAGE AND CONSERVATION REGISTER (SECTION 170 REGISTER)

Under Section 170 of the Heritage Act, government instrumentalities must keep a Heritage and Conservation Register (a Section 170 Register) which contains items under the control or ownership of the agency, and which are, or could, be listed as heritage items (of State or local significance). Road reserves within the Project Area are owned by the Department of Roads and Maritime Services.

No part of the Project Area appears on any Section 170 Heritage and Conservation registers.

ENVIRONMENTAL PLANNING INSTRUMENTS

An Environmental Planning Instrument (EPI) is made under the EPA Act. An EPI can be a Development Control Plan (DCP), Local Environmental Plan (LEP) or a State Environmental Planning Policy.

Wentworth Local Environmental Plan 2011

The current LEP for the Project Area is the Wentworth LEP. Part 5.10 of the Wentworth LEP deals with heritage conservation, and subsections (2) and (3) determine whether development consent needs to be granted by Wentworth Shire Council before any activities occurring which may impact cultural heritage. Heritage items are listed under Schedule 5, Part 1 of the Wentworth LEP.

No part of the Project Area is listed on Schedule 5 of the Wentworth LEP.

Wentworth Shire Development Control Plan 2011

The applicable DCP for the Project Area is the Wentworth Shire DCP. Section 1.2 of the Wentworth Shire DCP outlines design controls to be implemented when dealing with Aboriginal heritage in the LGA. Section 1.2 (p.18) also details requirements for the managing post-European archaeological sites. Section 1.2 includes the following development controls:

- Section 1.2 (p.17) states that where indicated, an independent Aboriginal Heritage Assessment should be undertaken in accordance with the requirements of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b-Department of Environment Climate Change and Water NSW 2010)
- Section 1.2 (p.18) states that a Heritage Impact Assessment undertaken by a qualified heritage practitioner is required where works are proposed in the vicinity of a heritage item.

As discussed in the AHIMS section above, one registered Aboriginal heritage site, C1 River Margin (AHIMS # 46-1-0105), comprising a shell midden and an artefact, is located within the proposed Project Area. Two sites, Buronga Landfill Artefact 3 (AHIMS # 46-3-0205), and PEC-W-135 (AHIMS # 46-3-0206) [an artefact], are located within 1 kilometre of the proposed Project Area. Consequently, further assessment in the form of an Aboriginal Cultural Heritage Assessment (ACHA) is required.

SUMMARY OF HERITAGE LISTINGS

Table 2.1 lists the relevant statutory and non-statutory registers, listings and orders, and identifies those in which any part of the site is listed. The location of heritage items in relation to the Project Area are outlined in Figure 3 and Figure 3.2.

Table 2.2 Summary of heritage register listings for the subject Project Area

Register/Listing	Inclusion	Statutory implications
NHL	Nil	N/A
CHL	Nil	N/A
RNE	Nil	N/A
SHR	Nil	N/A
Wentworth Shire LEP	Nil	N/A

Wentworth DCP	Yes	Works will require an ACHA, as AHIMS sites are present within the proposed Project Area.

6. PREVIOUS ARCHAEOLOGICAL STUDIES

A review of the reports held on the AHIMS database identified several archaeological studies which have been undertaken in the locality of the Project Area. These are summarised in Table 3. Austral has also undertaken a review of information to identify whether the activity is located within landscape features likely to contain Aboriginal objects. This includes an assessment of ethnographic information, soils, geology, landform, disturbance and resource information pertinent to the Project Area. The outcome of this review is outlined in Table 4.

Table 3 Archaeological studies undertaken in the vicinity of the Project Area.

Author	Year	Details
Bonhomme	1990	This report looks at the burial practices that can be found along the Murray River between Albury and Mildura, following the Lachlan River north to Condobolin. The closest field site to the Project Area that was investigated by Bonhomme was at Gol Gol Swamp where sand had been removed from the lunette, which had no disturbed burials, but a survey of the western side of the dune identified some artefacts. There are also a number of sites within 30 km to the west to north-west of the site which are mainly located on source bordering dunes, including lunates. Site types are predominantly burials. From this study Bonhomme concludes that the type of disturbance that often disturbs burials is erosion through grazing and cropping, with sand mining, though not as common, being a much more destructive form of disturbance. They also identify that possible cemeteries are more likely to occur in the western areas, with development in areas of dunes requiring thorough archaeological investigation before any work.
Time Capsule Earth	2007	An archaeological assessment was conducted for a residential development in Gol Gol 5 km southwest of the Project Area. The area being developed was a vineyard that was bordered by the Murray River, which was the site's most distinguishing landform. There is some undulation in the topography of the site. As a part of the assessment, a survey was conducted throughout the vineyard and along the river. The visibility of the survey varied from <10% to 85% depending on the area of the vineyard. A previously identified shell midden (AHIMS # 46-3-0030) was located along the river, in the south-western corner of the development area and the current status of the site was recorded. The assessment also looks at the historical sites within the development area.
Navin Officer Heritage Consultant	2008	This report was conducted north of Buronga, 25 km west of the Project Area. The assessment was for the construction of the proposed Peaking Power Plant and includes both indigenous and non-indigenous sites. A survey was made of the 10 ha proposed development area consisting of low and high dunes, flats and Swales/depressions. This survey did not find any identifiable Aboriginal artefacts or Potential Artefact Deposit.
(Landskape 2009a)	2009	This cultural heritage assessment was conducted to determine the impact of the installation of observation bores around Gol Gol Lake, 10 km west from the Project Area. Cupper recognises that there are 3 sites registered on AHIMS that would be affected by the bores. This assessment involved a survey of the bore sites with a pedestrian survey along the lake margins. No new sites were recorded during the survey, but the three sites that had already been identified were relocated. Cupper recorded their then-current condition and any new feature that was identified.

Author	Year	Details
(Landskape 2009b)	2009	This report was conducted to assess the impact of the groundwater pumping scheme and disposal pipeline to Mourquong Swamp which is proposed to re-introduce flooding to Lake Gol Gol, approximately 9 km southwest of the Project Area. Two recorded AHIMS sites (#46-3-0006 and #46-3-0114) are identified as being potentially impacted by the works involved in this development. A survey was conducted, focusing on the corridor where the infrastructure would be installed. These corridors crossed a variety of landscape settings including Gol Gol Lake, Mourquong Swamp, Dunefield and Sand Plain Hinterland. As part of the survey, many of the AHIMS sites that were identified to be close to or within the area of impact were relocated and their condition recorded. These sites consisted of the features shell midden, modified tree, burial, stone artefact, and hearths located mostly on the lunette (n=14) and the rest were on the lakeshore (n=7). Three new sites were identified, all being Middens, with two located on the sandplains and one on the sand ridge of Lake Gol Gol. The first site covered an area of 25 by 25 m, with the disturbance from rabbits exposing a 50mm thick lens. The second location is a 30 m wide band 240m and the last site was 380 by 100 m and included a hearth.
Onsite Cultural Heritage Management	2017	Onsite Cultural Heritage Management (Onsite) completed an Aboriginal due diligence report in advance of fencing and associated infrastructure within the Murray-Mallee Cliffs National Park. The investigation comprised 41.9 kilometres of survey and did not locate any Aboriginal objects or sites within the Project Area. No specific areas of Potential Archaeological Deposit (PAD) were identified or discernible. Onsite (p.37) noted that there was a scarcity of stone across the entire survey area. As the survey area adjoins the current Project Area to the southeast and is located wholly within the Mallee Cliffs Linear Dunes and Mallee Cliffs Sandplains soil landscapes, it is particularly relevant to the current scoping report(OnSite Cultural Heritage Management 2017).
Biosis	2017	A report was prepared for Wentworth Shire Council for the development of two boat ramps at two locations, James King Park (5 km from the Project Area) and Dareton (15 km from the Project Area). Both these sites are on the banks of the Murray River, and a number of registered sites are recorded on AHMIS within close proximity to the sites. The survey conducted as a part of the report recorded a new site within each of the development areas. At James King Park an earth mound was located on the foreshore of the river and the midden located at the Dareton site was also located on the foreshore. Test excavations were conducted at both sites with the Dareton midden recorded to be only surface deposits. The earth mound located at James King Park, however, was recorded to be a substantial midden, with layered shell beads, covering the length of the Murray Riverbank.
JACOBS	2019	An assessment that was a part of an Environmental Scoping Report for the TransGrid project, a transmission line that connects Wagga Wagga (NSW) to Robertson (SA) and Red Cliffs (Vic), passing 10 km north of the Project Area. The assessment only contains a desktop analysis of the aboriginal heritage that has been identified in the region of the western portion of the TransGrid network and provides a predictive model from this assessment. The predictive statements developed in the assessment identify River and creek margins, source bordering dunes, lunettes, and sand dunes near water sources as highly sensitive. The assessment identifies slightly elevated box plains as moderate sensitivity and low lying floodplain/wetlands as low sensitivity with the possibility of there being scar trees in the landform.
Navin Officer Heritage Consultant	2020	This study contains the survey involved with the Aboriginal Cultural Heritage Assessment for the NSW section of the western portion of Project EnergyConnect. The assessment identified multiple sites that had been recorded within the area surrounding the transmission line with 6 occurring in the survey area and the survey identified 131 new sites. The newly recorded sites predominantly were made up of sites containing artefacts scatters followed by scarred trees, isolated fines, hearths and middens. Most of these new sites followed the trend of the density of sites rising closer to water sources with most of the sites located in the undulating sandplains north of Lake Victoria, followed by floodplains.

7. LANDSCAPE ASSESSMENT

Table 4 Assessment of landscape features

Information	Details
Ethnographic	The Barkandji No.8 Native Title determination (2015) and the Mallee Cliffs Draft POM (2017) recognise the Barkandji (Paakantji) People as the traditional owners of the country with encompasses the neighbouring Mallee Cliffs National Park and the surrounding areas. The Australian Heritage Database / Register of the National Estate (RNE) listing for Mallee Cliffs listed the traditional owners of the Mallee Cliffs area (or Mallee country) as the Paakantji, Latji Latji, Muthi Muthi, and Yitha Yitha people. Pardoe (2014, p.114) notes the importance of the Murray River to Barkandji and other Aboriginal peoples in the local area, stating that people would use the river for approximately 8 months of the year and then move between the rivers and plains depending on the season and seasonal events, such as floods or droughts (Benchmark Heritage Management 2018, p.20, Allen 1980, pp.51–54). Aboriginal people utilised a wide range of animal, fish, shellfish and plant species present in the area. Macropods, emus, eggs, fish, reptiles, birds, possums, yams and shellfish were all cooked in oven mounds, with some ovens being reused in locations where fuel was scarce (Stanbridge 1861, p.295, Beveridge & Royal Society of N.S.W. 1883, p.18, Beveridge 1889, pp.18–21). Ovens were situated near creeks, rivers, lakes, lagoons and other waterways, on both high and low ground (Coutts et al. 1979, pp.3–4). Other material culture that was used in the area included scrapers and stone tools, often made from quartz or shells, which were used for activities like cutting the skin of animals, cutting hair and sharpening materials such as wood for boomerangs and spears (Kirby 1896, p.46, Coutts 1977, p.10). Aboriginal people in the Murray and Mallee regions also had a diet rich in fruit, vegetables, and herbs. Seeds, such as nardoo, were a stable food source with grinding stones used for their production (Beveridge 1889, pp.139–165). The highly varied diet for people on the Murray River and Mallee Plains allowed for larger populations than what would have been possible away from the river corridor (Beveridge 1889, pp.9–35, 71). As well as for food, flora and fauna were used for creating clothing and ornamental accessories. Examples include ‘bone points’, which would have functioned as awls or piercers, as well as tail sinews, which were used to make fastening cords. Animals such as brush-tailed possums were highly prized for their fur, with possum-skin cloaks (Beveridge 1889, pp.19–21). Kangaroo teeth were also used for hair decoration and often bone or reeds were pierced through the middle cartilage of the nose (Beveridge 1889, p.29). Cumbungi root was multi-functional and twine from its fibre was used for armbands and waist-belts as well as bags to carry items from one camp to another. The fibre rush from cumbungi was also harvested for flax which could be used for making nets (Beveridge 1889, pp.68–73).
Soils	The Project Area is located within two soil landscapes identified in Mitchell (2002): the Mallee Cliffs Linear Dunes soil landscape and the Mallee Cliffs Sandplains soil landscape (Figure 6). The Mallee Cliffs Linear Dunes soil landscape comprises extensive Quaternary dunefields and sandplains, relief to 7 metres, and is characterised by deep brownish sands and calcareous red loamy earths. The Mallee Cliffs Sandplains soil landscape is characterised by slightly undulating sandplain of Quaternary aeolian sands with east-west trending dunes, often with blowouts, partly scalded broad swales and small depressions, and a relief from 6 to 10 metres. Solonized brown soils, calcareous loamy sand, texture-contrast soils on the plain, red and brown sands on dunes, and non-cracking grey or brown clays in depressions.
Hydrology	The Project Area is located within the Murray River catchment area, with the Murray River located approximately 14 kilometres to the southwest (Figure 5). An unnamed dry lake and lunette are located 8 kilometres west of the Project Area. Lake Gol Gol, another dry/ephemeral salt lake is situated 11.8 kilometres to the west. No major waterways are present within the Project Area. However, a number of minor,

Information	Details
	sporadic drainage lines and manmade dams are present. It is likely that dune swales also act as watercourses or ephemeral ponds during times of heavy rainfall.
Geology	The Project Area is underlain by the Woorinen Formation (Figure 4). The main landform in the Woorinen Formation comprises closely spaced, east-west longitudinal dunes containing high proportions of clay and calcium carbonate. These dunes range from 0.5 to 3 kilometres in length and are typically 2.6 metres high. Soils in the Woorinen Formation are commonly unconsolidated red-brown medium to fine silty sand, red calcareous silty clay, sandy clay, and clay pellet aggregates; forms extensive dune fields with subdued crests and flakes separated by swales and sand plains ((Bowler & J. W. Magee 1978).
Landforms	Linear dunes, dune swales and sandplains are the predominant landforms in the Project Area, with some minor drainage lines and claypans also present. Previous archaeological studies in the local area suggest that all undisturbed landforms have the potential to contain low numbers of isolated artefacts. Landforms in the Project Area such as dunes, claypans, minor watercourses and those which support mature tree species such as Black Box (*E.largiflorens*) have been previously found to have the potential to contain higher numbers of Aboriginal cultural heritage items. Of particular note is the unnamed dry salt lake, source bordering dune and lunette adjacent to the southwestern extent of the Project Area. These landforms have a high potential for archaeological materials, including burials, to be present. Although the unnamed salt lake outside the preliminary Project Area, a portion of it is located within the 1 km buffer zone requested for analysis by the proponent.
Disturbances	Historically the Project Area was used for grazing and other relatively low-impact agricultural activity, with little development beyond station access tracks, bores, dams and roads. From the 1990s onwards significant disturbances across the Project Area occur, with extensive land clearing and agricultural cropping taking place. Current aerial imagery shows the continued agricultural disturbance in the form of cropping and vegetation clearance. These activities have the potential to destroy, move or alter Aboriginal cultural heritage items in the Project Area.

Previous archaeological investigations surrounding the Project Area and the search of the AHIMS database have helped to predict what certain site types can be expected within the Project Area. Based upon the results of these background studies, Austral has developed a series of predictive statements relating to the type and character of Aboriginal cultural heritage sites that are likely to exist in the Project Area and where they are more likely to be located. These predictive statements indicate that:

- Most Aboriginal heritage sites are likely to occur within 200 metres of past or current water sources.
- Modified trees are the most common site type in the Project Area. They occur most often within 250 metres of water, in the flood plain, or adjacent to the Murray River corridor on mature tree species such as River Red Gum (*E.camaldulensis*) and Black Box (*E.largiflorens*).
- Extensive clearing of vegetation (mainly mallee species) has taken place across a large portion of the Project Area. However, there remains potential for isolated stands of Black Box (*E.largiflorens*) to occur around claypans and other ephemeral watercourses.
- Artefact scatters are a common site type in the area and are most likely to occur on raised, level ground, near sources of freshwater or wetlands, or along spur crests or ridgelines.
- Hearths most frequently occur on the Murray River soil landscapes and within 250 metres of water on well-drained and raised, level ground, near sources of freshwater, or in wetlands, or along spur crests or ridgelines.
- Dry/salt lakes with source bordering dunes and lunettes have a high potential for archaeological material and burials to be present.

- Archaeological material is also present beyond the immediate river surroundings in decreasing artefact densities.
- Isolated artefacts may occur at any place in the landscape.

8. ACTIVITIES IN AREAS WHERE LANDSCAPE FEATURES INDICATE THE PRESENCE OF ABORIGINAL OBJECTS

Table 5 Applicability landscape features from the Code likely to have Aboriginal objects to the Project Area.

Question	Response
Is the activity within 200m of 'waters'?	No
Is the activity within a sand dune system?	Yes
Is the activity located on a ridge top, ridge line or headland?	No
Is the activity located within 200m below or above a cliff face?	No
Is the activity within 20m of or in a cave, rock shelter or cave mouth?	No
Is the activity (or any part of it) on land that is disturbed?	Yes
Do the predictive statements of Section 6 indicate Aboriginal Objects or places are likely to occur on any of the topographic elements of the activity area?	Yes

9. RECOMMENDATIONS AND IMPACT ASSESSMENT

Based upon the nature of the proposed works, the project's proposed consideration as an SSD under Part 4 of the EP&A Act, the discussions in sections 4 to 8 above, and the provisions of the Code, further archaeological assessment of the Project Area is recommended.

In accordance with the Code of Practice, the presence of a previously recorded AHIMS site within the Project Area indicates that further archaeological investigation should be undertaken if the proposed works cannot avoid the site.

Although the Project Area is highly disturbed by land clearing, grazing and cropping, it contains one previously recorded Aboriginal heritage site, C1 River Margin, (AHIMS # 46-1-0105). Two further AHIMS sites, Buronga Landfill Artefact 3 (AHIMS # 46-3-0205), and PEC-W-135 (AHIMS # 46-3-0206) [an artefact], located within 1 kilometre of the proposed Project Area. A review of relevant heritage databases, outlined in Section 4, returned no records of any non-Aboriginal (historic) heritage sites within the Project Area.

A review of previous archaeological studies in the Murray-Mallee local area and an assessment of the Project Area's landscape suggested the potential for Aboriginal archaeological sites to be present, albeit in low numbers. In particular, there is potential for isolated artefacts and low density artefact scatters to be present across the Project Area, especially in undisturbed areas adjacent to ephemeral water sources. Of note is the unnamed dry salt lake, source bordering dune and lunette are located outside the Project Area at the southwestern end. These landforms have a high potential for archaeological materials, including burials, to be present. Additionally, remnant stands of mature Black Box (*E.largiflorens*) have the potential to contain trees with scarring or modification by Aboriginal people. Due to the limitations of satellite imagery, a desktop survey was unable to establish whether remnant Black Box stands exist within the Project Area.

Given the presence of previously recorded AHIMS sites and considering the proposed NSW planning approval pathway (SSD), we advise that further archaeological investigation in the form of ACHA be undertaken. We further advise that it is likely that the SEARs for the project will request that a Historic Heritage Assessment (HHA) and Statement of Heritage Impact (SoHI) also be prepared for the project.

If you have any questions regarding the advice within this letter, please do not hesitate to contact me on the details below.

Yours sincerely,

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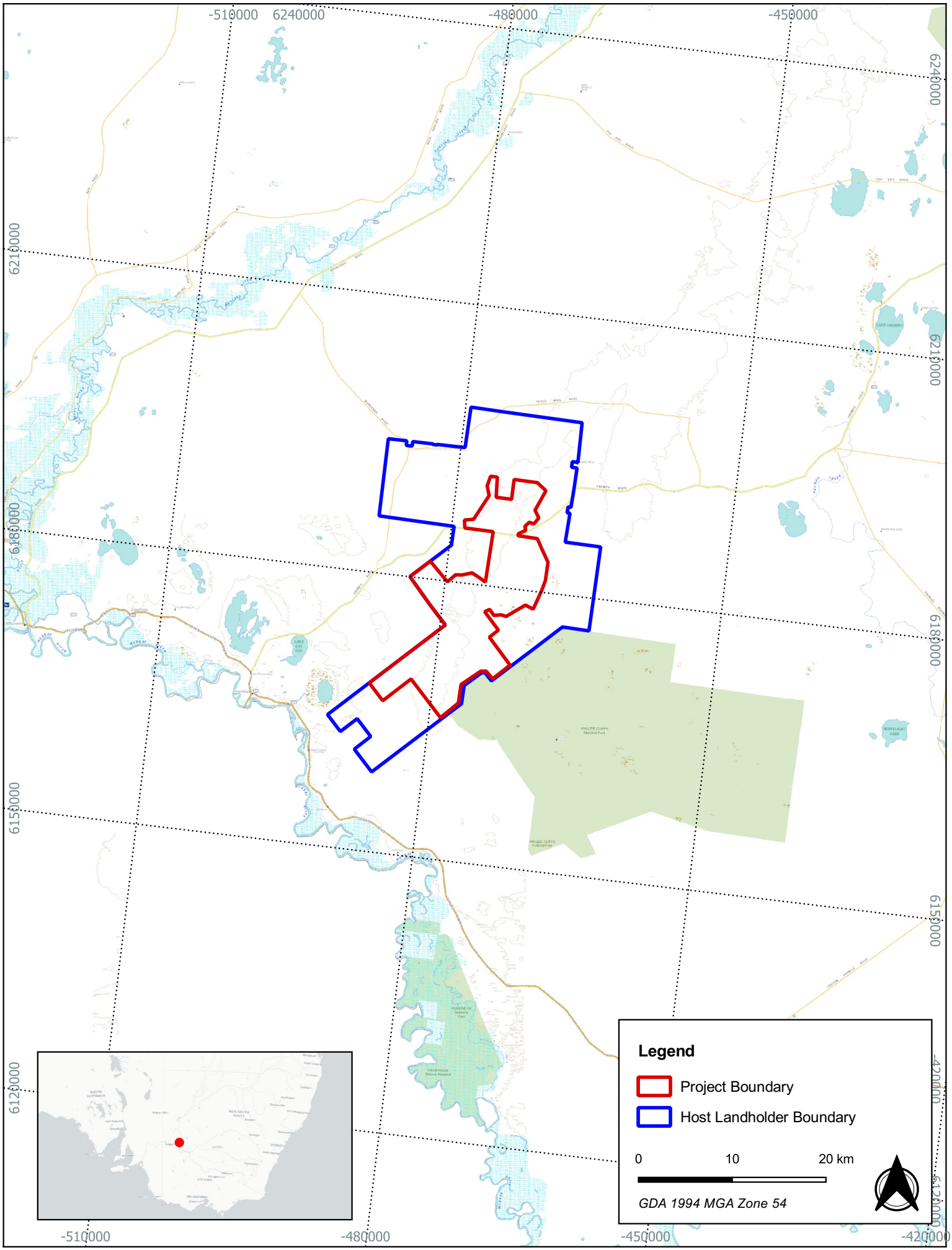

Figure 1.1 - Location of the project area

22078 - Alfred Elms Road Trentham Cliffs - ACHDDA

Source: NSW LPI Basemap, CartoDB Positron

Drawn by: AMM Date: 2022-11-14

AUSTRAL ARCHAEOLOGY

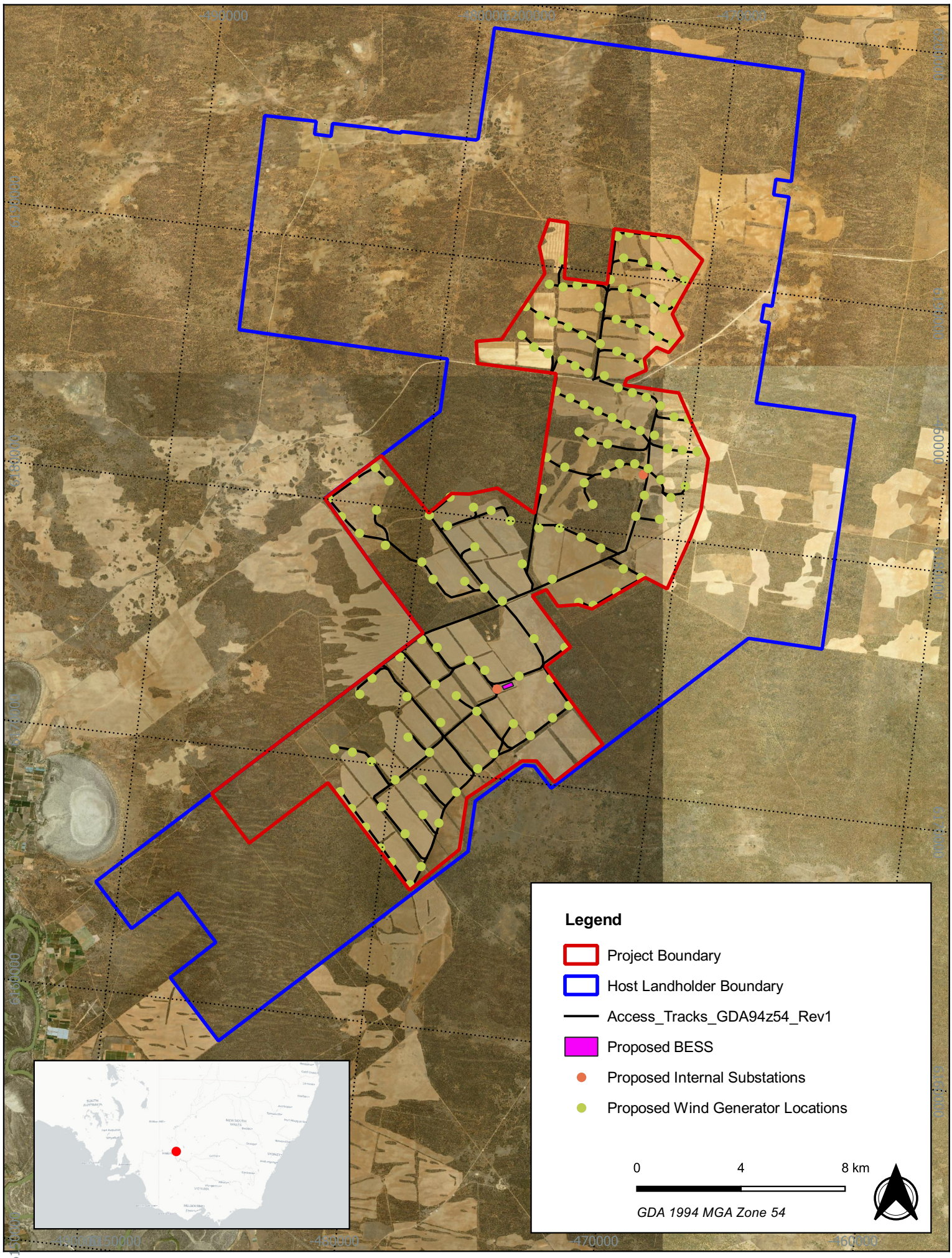

Figure 2 - Detailed aerial of the project area

22078 - Alfred Elms Road Trentham Cliffs - ACHDDA

Source: NSW LPI Aerial, CartoDB Positron

Drawn by: AMM Date: 2022-11-14

AUSTRAL ARCHAEOLOGY

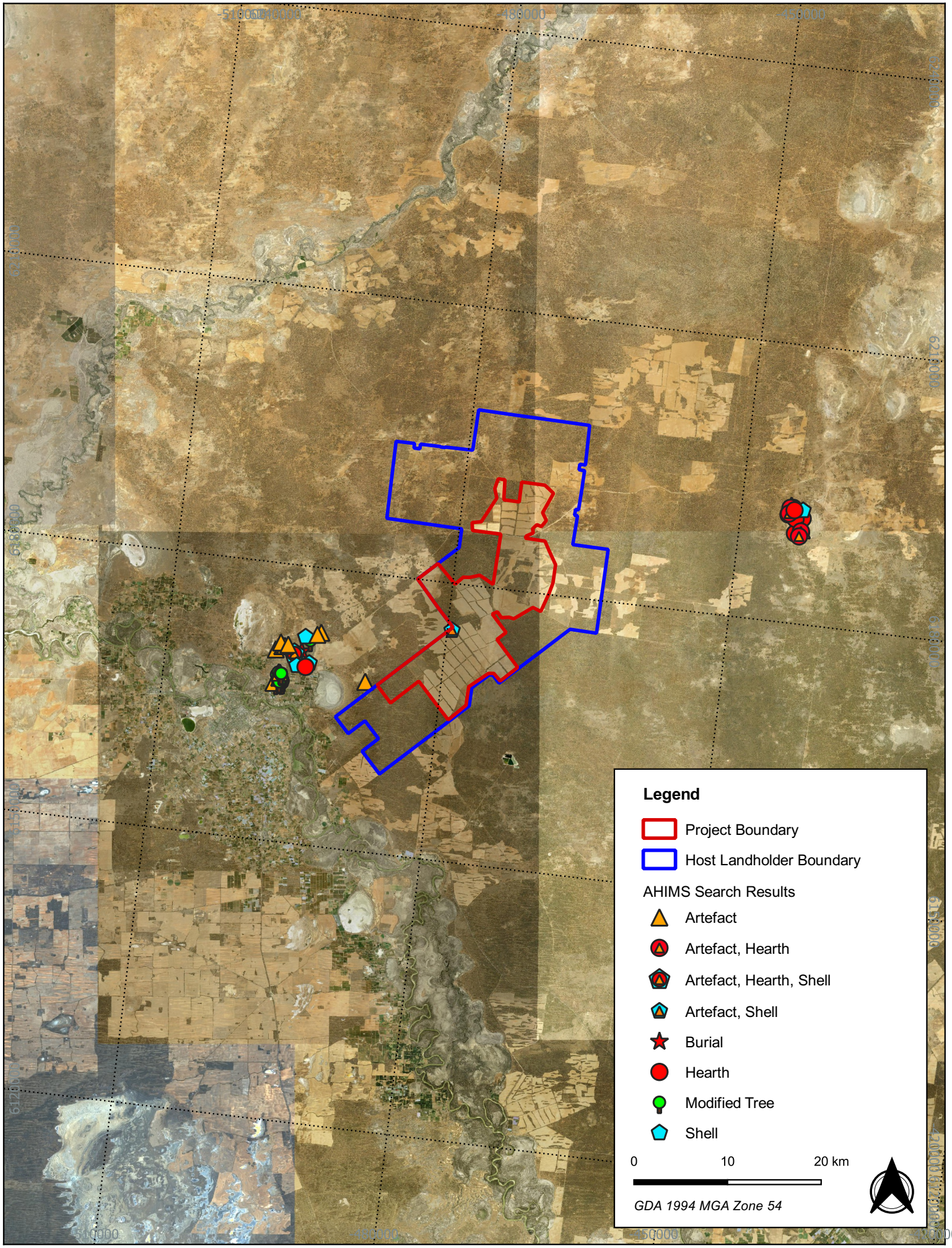

Figure 3.1 - AHIMS sites within 25 km of the project area

22078 - Alfred Elms Road Trentham Cliffs - ACHDDA

Source: NSW LPI Aerial

Drawn by: AMM Date: 2022-11-14

AUSTRAL ARCHAEOLOGY

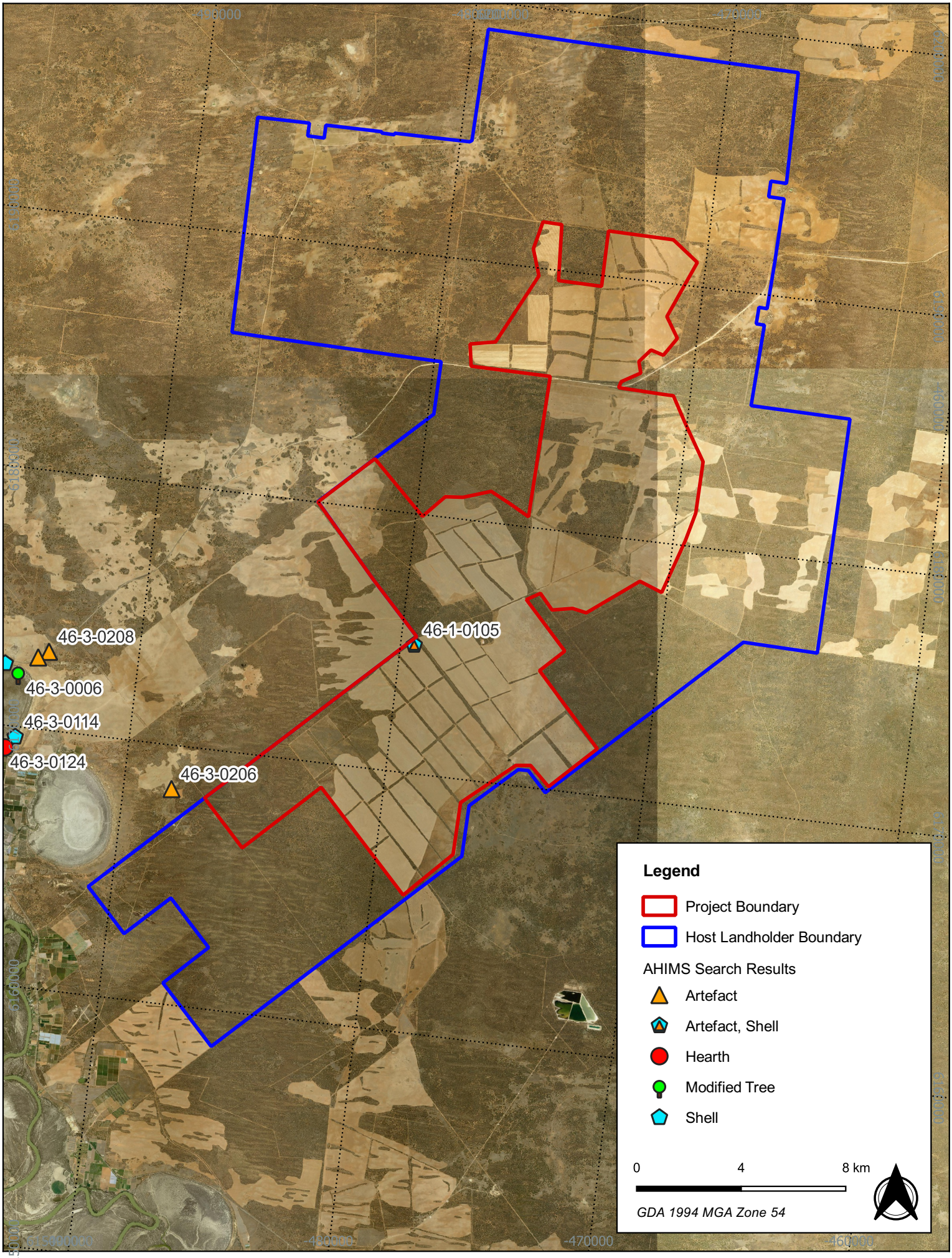

Figure 3.2 - AHIMS Sites in close proximity to the project area

22078 - Alfred Elms Road Trentham Cliffs - ACHDDA

Source: NSW LPI Aerial

Drawn by: AMM Date: 2022-11-14

AUSTRAL ARCHAEOLOGY

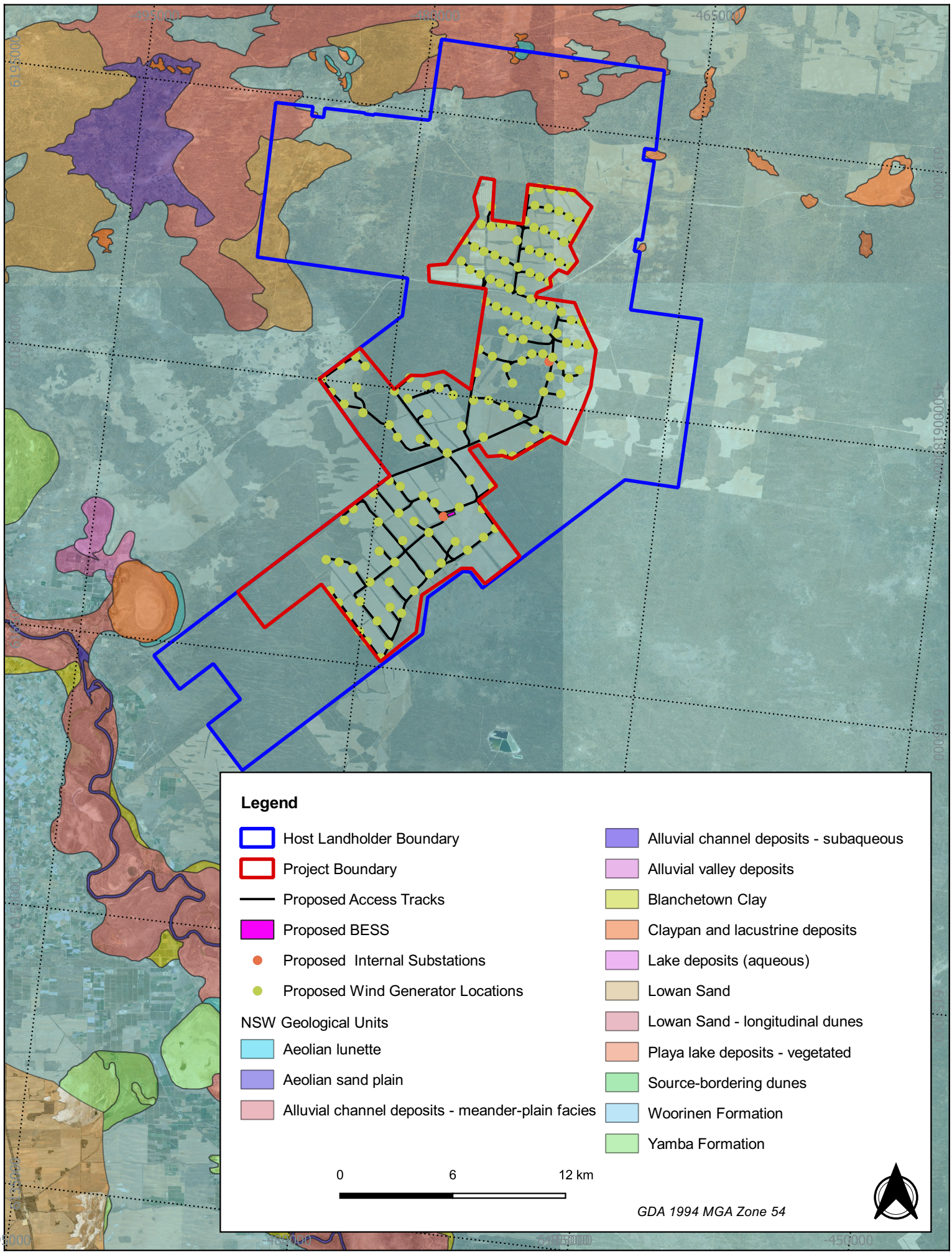

Figure 4 - Geology of the project area

22078 - Alfred Elms Road Trentham Cliffs - ACHDDA

Source: NSW LPI Aerial

Drawn by: AMM Date: 2022-11-14

AUSTRAL ARCHAEOLOGY

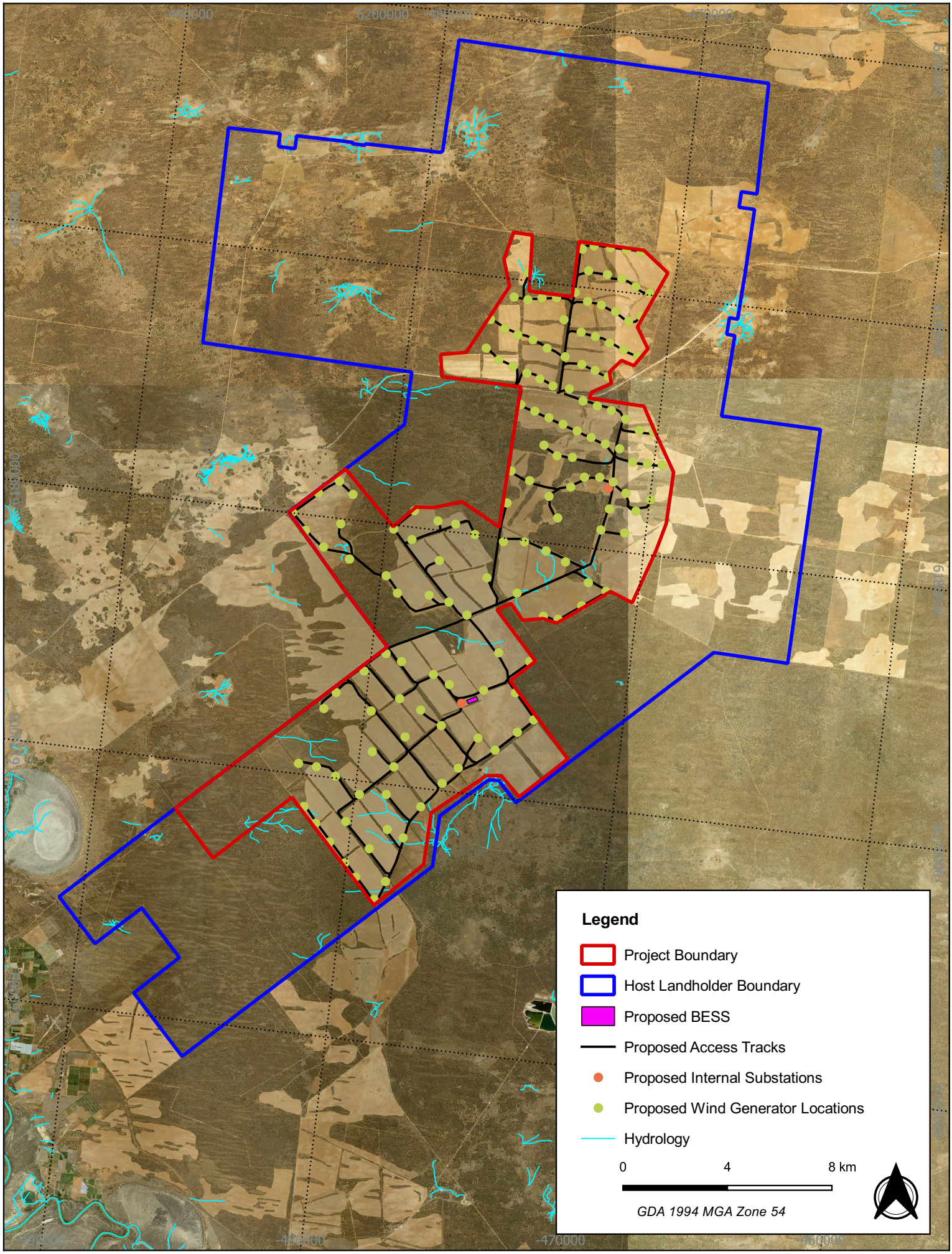

Figure 5 - Hydrology of the project area

22078 - Alfred Elms Road Trentham Cliffs - ACHDDA

Source: NSW LPI Aerial

Drawn by: AMM Date: 2022-11-14

AUSTRAL ARCHAEOLOGY

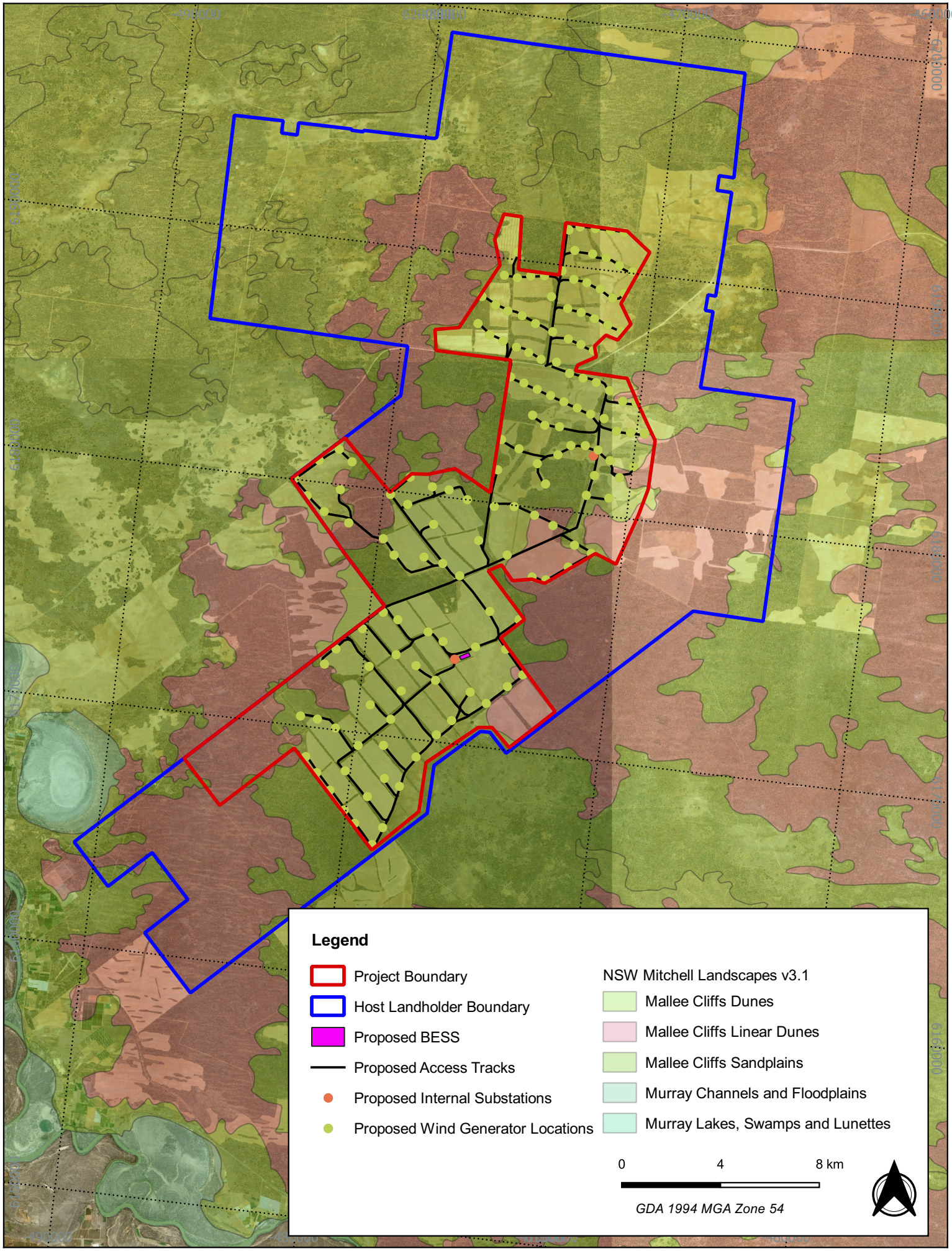

Figure 6 - Mitchell Soil Landscapes within the project area

22078 - Alfred Elms Road Trentham Cliffs - ACHDDA

Source: NSW LPI Aerial

Drawn by: AMM Date: 2022-11-14

AUSTRAL ARCHAEOLOGY