ACEN Australia

Aquila Wind

SCOPING REPORT

FEBRUARY 2024

umwelt
Environmental & Social Consultants

AQUILA WIND

Scoping Report

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
ACEN Australia

Project Director: Nathan Baker
Project Manager: Lauren Evans
Report No. 21793/R02
Date: February 2024

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.

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
01	Lauren Evans	11 November 2022	Nathan Baker	11 November 2022
02	Lauren Evans	22 November 2022	Nathan Baker	22 November 2022
03	Lauren Evans	10 February 2023	Nathan Baker	14 February 2023
04	Lauren Evans	20 February 2023	Nathan Baker	20 February 2023
05	Lauren Evans	08 December 2023	Nathan Baker	08 December 2023
06	Lauren Evans	19 January 2024	Nathan Baker	19 January 2024
07	Lauren Evans	25 January 2024	Nathan Baker	25 January 2024
08	Lauren Evans	9 February 2024	Nathan Baker	9 February 2024

Abbreviations

Abbreviation	Description
ABS	Australian Bureau of Statistics
ACHA	Aboriginal Cultural Heritage Assessment
AEMO	Australian Energy Market Operator
AIA	Aviation Impact Assessment
BAM	Biodiversity Assessment Method
BBUS	Bird and Bat Utilisation Survey
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCS	Biodiversity, Conservation and Science
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* (NSW)
Crown Land Act	*Crown Land Management Act 2016* (NSW)
CSEP	Community and Stakeholder Engagement Plan
CWO REZ	Central-West Orana Renewable Energy Zone
CWOR Plan	Central West and Orana Regional Plan 2036
DAWE	Department of Agriculture, Water and Environment [former]
dB(A)	A-weighted noise or sound power level in decibels
DC	Direct Current
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water [current]
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	*Environmental Planning and Assessment Act 1979* (NSW)

Abbreviation	Description
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
EPL	Environment Protection Licence
GHG	Greenhouse Gas
GIS	Geographic Information System
GW	Gigawatts
Ha	Hectares
HHA	Historic 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
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* (NSW)
RAAF	Royal Australian Air Force
REZ	Renewable Energy Zone
RFS	NSW Rural Fire Service
Roads Act	*Roads Act 1993* (NSW)
SAT	Spot Assessment Technique
SEARs	Secretary's Environmental Assessment Requirements
SIA	Social Impact Assessment
SISR	Social Impact Scoping Report
SSD	State Significant Development

Abbreviation	Description
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* (NSW)
WSIA	Water and Soils Impact Assessment
WSP	Water Sharing Plan
WTG	Wind Turbine Generator

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1.0 Introduction

1.1 Project Overview

ACEN Australia (ACEN) proposes to develop Aquila Wind (the Project) to supply renewable electricity to the National Electricity Market (NEM) and reduce Australia's greenhouse gas (GHG) emissions through the generation of renewable electricity powered by the wind, as an alternative to the burning of fossil fuels.

The Project is located approximately 2.5 km southeast of Stuart Town and 2 km northeast of Euchareena, in the Central West region of NSW, within the Dubbo Regional Council Local Government Area (LGA) (refer to **Figure 1.1**) and on the lands of the Wiradjuri Nation. Dubbo is situated approximately 70 km northwest of the Project Boundary[1] (the northern most extent). The other regional centres of Mudgee, Wellington and Orange are situated approximately 40 km to the northeast, 30 km to the northwest and 35 km to the south respectively (refer to **Figure 1.1**). Lake Burrendong is located approximately 8 km north of the Project Boundary. The Project Area[2] is traversed by the Main Western Railway and is located approximately 14 km east of the Mitchell Highway.

The Project Area is located within the Central West-Orana Renewable Energy Zone (REZ) identified in the NSW Government's Electricity Strategy (refer to **Section 2.1.1**). The REZ is expected to play a vital role in the delivery of renewable energy to the National Electricity Market (NEM). The Central West-Orana region has been identified as having a high wind resource, with preliminary wind studies undertaken by ACEN guiding the development of the preliminary wind turbine layout for the Project.

The Project design includes up to 48 x 6.2 megawatt (MW) Wind Turbine Generators (WTGs) (each with a blade-tip height of up to 250 m) comprising an installed capacity of up to 300 MW, a Battery Energy Storage System (BESS) approximately 100 MW (2-hr), temporary and permanent meteorological masts, vegetation removal, earthworks, ancillary civil and electrical engineering infrastructure, temporary construction facilities and temporary concrete batching plants, and permanent worker facilities. The Project will create employment opportunities for approximately 300 temporary workers during the 2-year construction phase plus 15 permanent workers during the operational phase.

The Project will connect to the NEM via the existing 330 kV transmission line (Line 72) located within the Project Boundary. A more detailed description of the Project is provided in **Section 3.0**.

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).

[1] The Project Boundary is the maximum spatial extent of potential land access defined by the boundaries of the Host landholder properties (i.e. all agreed lots owned by Host landholders). The Project Boundary is outlined in red in the supporting figures throughout this Scoping Report.

[2] The Project Area encompasses all land within and including the Project Boundary.

The Project design includes early consideration of technical, environmental and social aspects and has been revised during the Scoping Report stage to incorporate community and stakeholder feedback towards maximising positive social, economic and environmental outcomes and minimising potential negative impacts. ACEN has established a Community and Stakeholder Engagement Plan (CSEP) for the Project and undertaken extensive engagement with local community and other stakeholders. This community and stakeholder engagement will continue throughout the Project planning and approvals process.

1.2 Project Objectives

The objectives of the Project are to:

- Develop an economically viable grid-connected wind energy facility that contributes to the supply of renewable electricity, supported by a Battery Energy Storage System (BESS).
- Enhance energy security by contributing to diversification of the State's energy mix in preparation for the retirement of large coal-fired power stations.
- Produce clean, renewable energy that contributes to meeting NSW and Commonwealth climate change mitigation and greenhouse gas (GHG) emissions reduction targets.
- Provide local and regional employment opportunities, and economic benefits to the local community.
- Avoid and/or minimise environmental impacts wherever practicable, through careful design and implementation of best practice environmental management and mitigation.

Further discussion on the Project objectives and how the broader Project would strategically contribute to NSW and Commonwealth renewable energy commitments is provided in **Section 2.1** below.

1.3 Project Background

The NSW Government's Electricity Strategy and Electricity Infrastructure Roadmap (NSW Government, 2020a) set out a plan to deliver the State's first five Renewable Energy Zones (REZs) in the Central-West Orana, New England, South-West, Hunter-Central Coast and Illawarra regions. These REZs will play a vital role in delivering affordable, reliable energy generation to help replace the State's existing power stations as they come to their scheduled end of operational life. This builds on the NSW Transmission Infrastructure Strategy and supports the implementation of the Australian Energy Market Operator's (AEMO) Integrated System Plan.

The Energy Corporation of NSW (EnergyCo NSW) is the NSW Government's statutory authority that will lead the delivery of the NSW REZs, including the REZ in the Central-West Orana region of NSW around Dubbo and Wellington, on the lands of the Wiradjuri, Wailwan and Gamilaroi people. The Central-West Orana REZ (CWO REZ) was identified due to the regional benefits from relatively low transmission build costs due to its proximity to the existing high voltage transmission network. It also has a mix of energy resources and there is significant investor interest. The CWO REZ was formally declared on 5 November 2021.

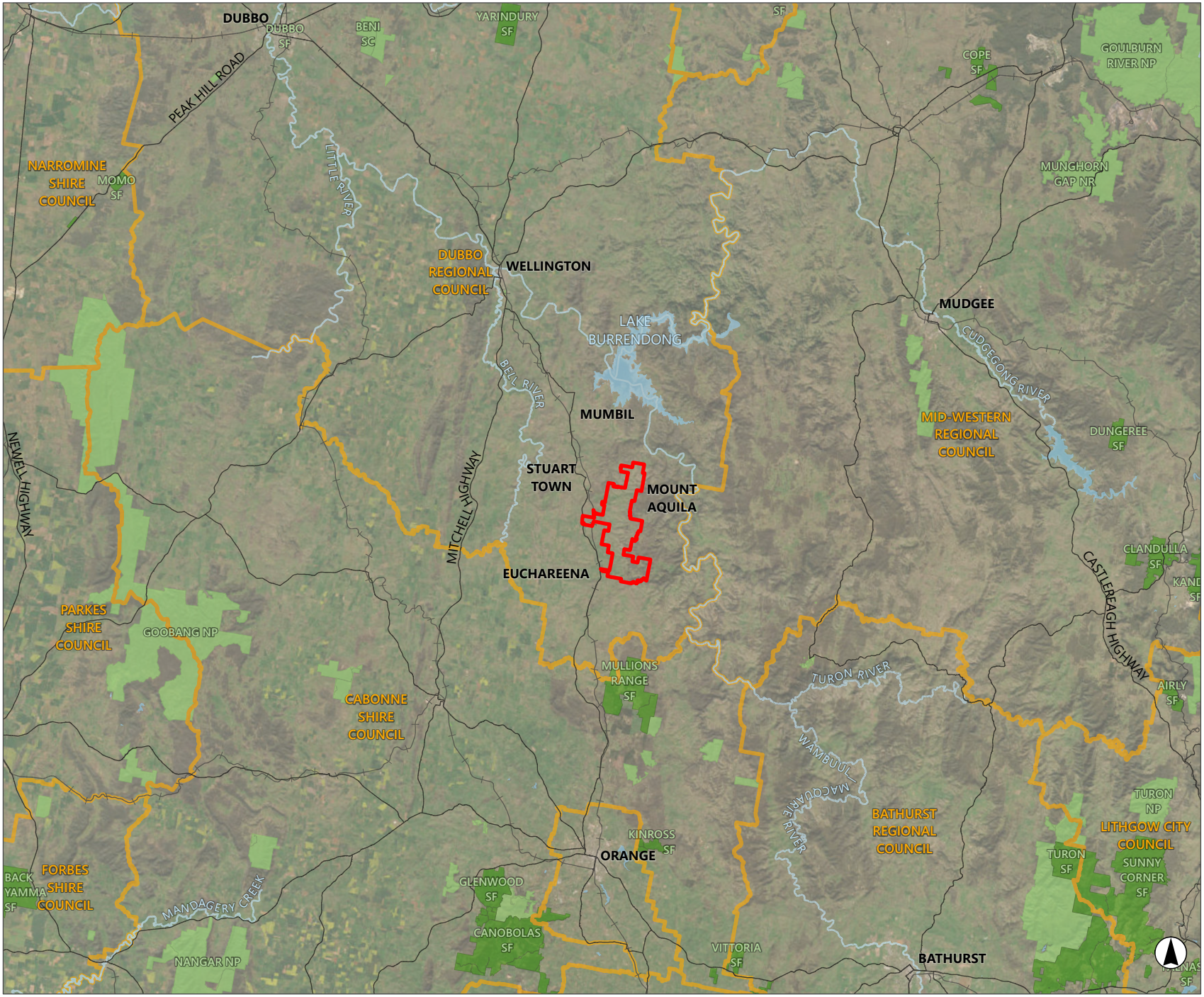
The CWO REZ Developer Registration of Interest process was held in June 2020 by EnergyCo NSW, in which 113 registrations were received, totalling over 27 GW from potential renewable generation and storage projects. The Project would make a significant contribution to achieving the 3 GW generation target for the CWO REZ.

The Project's location within the CWO REZ is expected to play a vital role in delivering renewable energy to the community across NSW. The Project is therefore strategically located in an area identified as suitable for renewable energy projects and will assist the NSW government in delivering on the objectives for the CWO REZ. The Project's regional and local context is presented in **Figure 1.1** below.

The Environmental Impact Statement (EIS) for the CWO REZ Transmission Project was placed on public exhibition in late 2023. The CWO REZ Transmission Project has been declared Critical State Significant Infrastructure and involves the construction of two new substations at Merotherie and Elong Elong and new twin circuit 500 kV transmission lines between Wollar and the new substations to connect to the CWO REZ to the NEM.

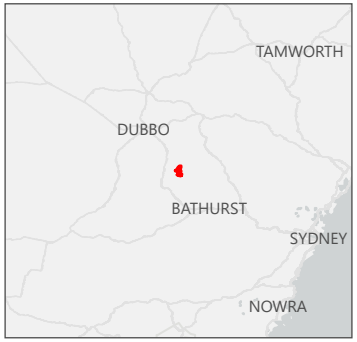
FIGURE 1.1

Regional Context



Legend

- Project Boundary
- Local Government Area Boundary
- State Forest
- NPWS Estate
- Roads
- Railway
- Major Watercourse
- Waterbodies



0 10 20
Kilometres

Scale 1:750,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

1.4 Related Development

Related development, as outlined in the NSW Government State Significant Development Guidelines (DPE, 2022), 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.

1.5 The Proponent

The proponent, ACEN Australia (ACEN), is the platform representing ACEN's renewable energy assets in Australia. It includes several solar, wind, battery, pumped hydro and energy storage projects across NSW, Tasmania, Victoria and South Australia in development and construction. ACEN is the listed energy platform of the Ayala Group, which has approximately 3,800 MW of attributable capacity in the Philippines, Vietnam, Indonesia, India, and Australia.

ACEN aims to provide low cost, clean electricity in a socially and environmentally responsible way, using innovative technology solutions, and aspires to be the largest listed renewables platform in Southeast Asia, with a goal of reaching 5,000 MW of renewables capacity by 2025.

In October 2021, ACEN announced its commitment to achieve net-zero greenhouse gas emissions by 2050. Furthermore, ACEN is a signatory to the Clean Energy Council 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 ACEN operates.

Table 1.1 presents the key details of the Proponent.

Table 1.1 Proponent Details

Requirement	Details
Full Name/s	ACEN Australia
Postal Address	Suite 2, Level 2, 15 Castray Esplanade, Battery Point, Tasmania 7004
Street Address (Project)	Off Burrendong Way, Euchareena NSW 2866
ABN	27 616 856 672
Nominated Contact	Jack Henderson

1.6 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 Secretary's Environmental Assessment Requirements (SEARs). Under the provisions of Clause 4.12(8) of the EP&A Act, an EIS is required to be prepared to accompany the SSD application for the Project. The SEARs will identify specific assessment considerations relevant to the Project that must be addressed in the EIS.

1.6.1 Wind Energy and SSD Guidelines

This Scoping Report has been prepared in consideration of the following NSW wind energy guidelines:

- NSW Government – DPE – Wind Energy Guideline (the Wind Energy Guideline), dated December 2016 (DPE, 2016a).
- 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 following SSD guidelines:

- NSW Government – Department of Planning and Environment (DPE) – State Significant Development Guidelines (SSD Guideline), dated October 2022 (DPE, 2022a).
- NSW Government – DPE – State Significant Development Guidelines – Preparing a Scoping Report – Appendix A (SSD Guideline: Appendix A), dated October 2022 (DPE, 2022b), referred to hereafter as the SSD Scoping Report Guideline.
- NSW Government – DPE – State Significant Development Guidelines – Preparing an Environmental Impact Statement – Appendix B (SSD Guideline: Appendix B), dated October 2022 (DPE, 2022c).
- NSW Government – DPE – State Significant Development Guidelines – Preparing a Submissions Report – Appendix C (SSD Guideline: Appendix C), dated October 2022 (DPE, 2022d).

- NSW Government – DPE – State Significant Development Guidelines – Preparing an Amendment Report – Appendix D (SSD Guideline: Appendix D), dated October 2022 (DPE, 2022e).
- NSW Government – DPE – Social Impact Assessment Guideline for State Significant Projects (the SIA Guideline), dated February 2023 (DPE, 2023).
- NSW Government – DPE – Undertaking Engagement Guidelines for State Significant Projects (the Engagement Guidelines), dated October 2022 (DPE, 2022f).
- NSW Government – DPE – Cumulative Impact Assessment Guidelines for State Significant Projects (the CIA Guidelines), dated October 2022 (DPE, 2022g).

1.7 Structure of this Report

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

- **Section 1.0** introduces the Project, the Proponent and provides an outline of the structure of the document.
- **Section 2.0** 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 and social context.
- **Section 3.0** contains a description of the Project, including an overview of alternatives considered.
- **Section 4.0** summarises the relevant State and Commonwealth statutory context applicable to the approval process for the Project.
- **Section 5.0** describes the stakeholder engagement program for the Project and identifies environmental and social matters identified during the scoping phase for consideration in the EIS.
- **Section 6.0** contains an analysis of the environmental and social matters relevant to the Project and the assessments proposed to be completed as part of the EIS.
- **Section 7.0** References.
- **Appendix 1** Scoping Summary Table.
- **Appendix 2** Cumulative Impact Assessment Scoping Summary Table.
- **Appendix 3** Social Impact Scoping Report.
- **Appendix 4** Proximal Landholder Consultation Update.
- **Appendix 5** Preliminary Visual Impact Assessment.
- **Appendix 6** Preliminary Noise Impact Assessment.
- **Appendix 7** Biodiversity Constraints Assessment.
- **Appendix 8** Preliminary Heritage Constraints Assessment.
- **Appendix 9** Schedule of Land.

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, 2022a). The Liddell Power Station closed in 2023, and four out of the State's five remaining coal-fired power stations are expected to close by 2035.

The proposed location of this Project is within the CWO REZ, being an area identified by the NSW government to be targeted for renewable energy development. The REZs 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 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 REZs are expected to unlock a significant pipeline of large-scale renewable energy and BESS projects, while supporting private sector investment and jobs throughout regions. The NSW Government expects the CWO REZ to bring up to $5.2 billion in private investment to the Central-West Orana region by 2030. At its peak, the CWO REZ is expected to support around 3,900 construction jobs in the region (EnergyCo NSW, 2022a).

As demonstrated in **Section 2.1.1**, 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 to capital investment, employment generation both during the construction and operational phases, provide direct and indirect benefits to local services throughout the life of the Project, deliver additional income to associated landholders, and provide benefits to surrounding landholders and the local community through the implementation of a proposed community benefit fund/planning agreement.

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 194 countries who are parties to The Paris Agreement, an international treaty on climate change adopted at the 2015 United Nations Climate Change Conference. The Paris Agreement aims to:

- Limit 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, 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 greenhouse gas 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, 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 greenhouse gas 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 resource potential under the NSW REAP. The Renewable Energy Resource Mapping (DPIE, 2019) is reproduced **Figure 2.1**, which indicates the existing wind resources applicable to the Project Area. This high wind resource makes the location suitable for a productive wind energy project.

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 will coordinate REZ transmission, generation and BESS projects to deliver efficient, timely and coordinated investment. EnergyCo NSW has been appointed as the Infrastructure Planner for the CWO REZ and will lead development of this REZ.

Draft Network Infrastructure Strategy

EnergyCo NSW is preparing the Draft Network Infrastructure Strategy (Draft NIS) (EnergyCo NSW, 2022b) as an important new element of NSW's Electricity Infrastructure Roadmap framework. The Draft NIS provides further information about the delivery and coordination of NSW REZ transmission network infrastructure, downstream network augmentations and network connections for large-scale renewable energy and storage projects.

The NIS is being developed as an important new component of the NSW-wide system planning process that in turn sits within the NEM and its processes. Going forward, the NIS is proposed to be prepared every two years to support the Infrastructure Investment Objectives Report and to ensure continuous improvement that reflects changes in the market.

The NIS is being developed to fulfill three key objectives:

1. Coordinated NSW-wide electricity infrastructure development.
2. Investor guidance.
3. Meaningful engagement.

Once finalised, the NIS will provide a clear vision of REZ development options in the wider context of a rapidly changing evolution of electricity generation and demand. Consideration of the final NIS will be undertaken during preparation of the EIS as required.

Central-West and Orana REZ (CWO REZ)

The indicative location of the CWO 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. Since then, EnergyCo NSW has continued to consult with NSW Government agencies and stakeholder groups, sourced a range of updated data and afforded further consideration to community feedback and areas of resource potential. These activities have led EnergyCo NSW to identify potential opportunities to refine the previously identified geographic extent of the CWO REZ.

Following engagement with local landholders conducted by Transgrid in 2020 and 2021, the study corridor was revised for the CWO REZ network infrastructure. Updates to the CWO REZ area include a refinement of the north-western boundary towards Gilgandra, in response to Transgrid's community engagement as well as the retraction of the eastern boundary to minimise impacts on prime agricultural land by moving the corridor away from the Merriwa Cassilis plateau and instead going through mining areas around Ulan.

Based on the current mapping, the Project is wholly located within the CWO 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.

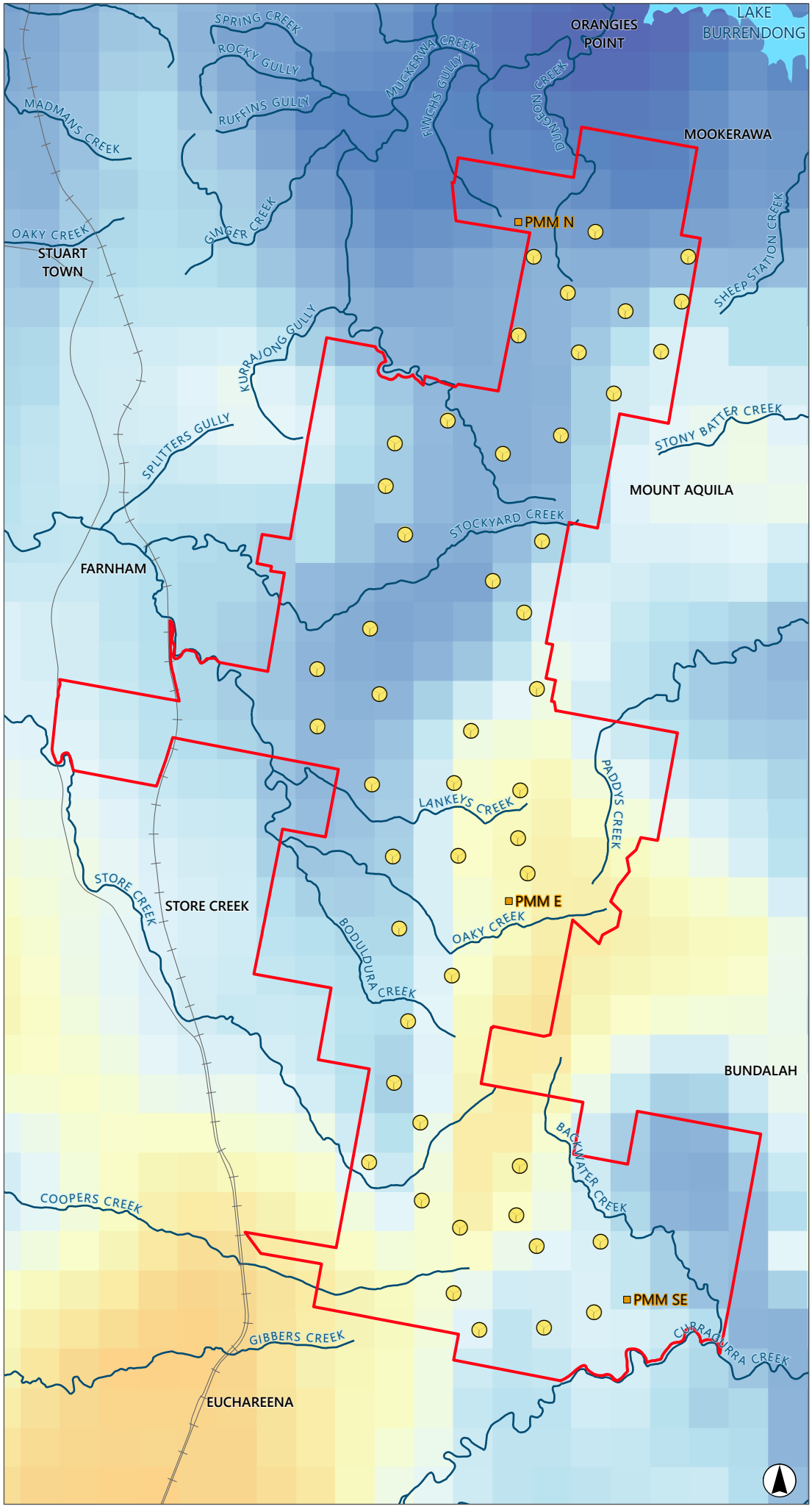


FIGURE 2.1

Wind Resource Mapping

Legend

- Project Boundary
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Waterbody
- Named Watercourse
- Road
- Railway Line

Wind Speed at 100m Above Ground Level (metres per second)

High : 10.2

Low : 2.4

0 1 2

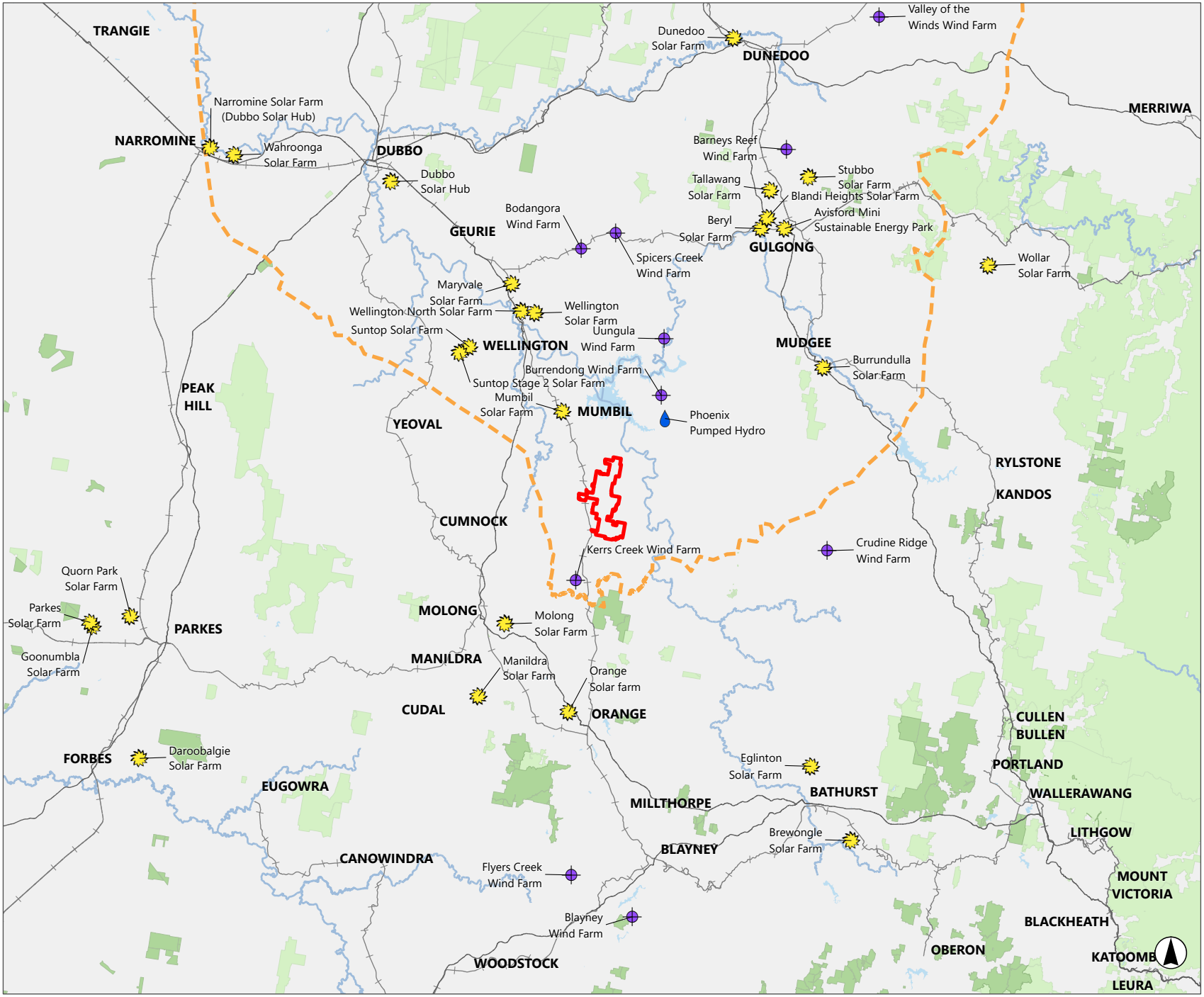
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

FIGURE 2.2

Central- West Orana Renewable Energy Zone



Legend

- Indicative Central West Orana Renewable Energy Zone Boundary

Other Renewable Projects

- Solar
- Wind
- Pumped Hydro

- Project Boundary
- State Forest
- NPWS Estate
- Roads
- Railway
- Major Watercourse
- Waterbodies

0 20 40
Kilometres

Scale 1:1,100,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

2.1.2 Regional and Local Plans

2.1.2.1 Central West and Orana Regional Plan 2036

The Central West and Orana Regional Plan 2036 (CWO Regional Plan 2036) is the NSW Government's strategy for guiding land use planning decisions for the Central West and Orana Region over the next 14 years. The vision of the CWO Regional Plan 2036 is to 'create a leading and diverse regional economy in NSW, with a vibrant network of centres building on the opportunities of being at the heart of NSW' (DPE, 2017).

The supporting goals of the CWO Regional Plan 2036 are to create:

- The most stunning environment in NSW.
- A thriving, interconnected economy.
- Vibrant and engaged communities.
- Great housing choice and lifestyle options.

The CWO Regional Plan 2036 promotes further development of renewable energy across the Central West and Orana, through Direction 9 being 'Increase renewable energy generation'. The region is seen as having significant potential for renewable energy industries with vast open spaces and higher altitude tablelands with potential for wind power generation, large-scale solar energy and bioenergy generation. The CWO Regional Plan 2036 indicates that renewable energy generation will also create a more sustainable energy future for the region. The Project is considered to be consistent with the vision of the CWO Regional Plan 2036, particularly in light of the proposed development of renewable energy generation.

2.1.2.2 Draft Central West and Orana Regional Plan 2041

The CWO Regional Plan 2036 (discussed above) is undergoing its first five-year review to reset its priorities and extend its reach to 2041, in the form of a revised regional plan for the CWO region. The Draft Central West and Orana Regional Plan 2041 (Draft CWO Regional Plan 2041) (DPIE, 2021i) is the revised regional plan which will supersede the existing CWO Regional Plan 2036, once finalised.

The vision of the Draft CWO Regional Plan 2041 is 'A healthy, connected and resilient region, with a prosperous economy' which is underpinned by four key parts, each containing specific strategies and goals to achieve the overarching vision of the plan. The four key parts are summarised below:

1. A sustainable and resilient place.
2. People, housing and communities.
3. Prosperity, productivity and innovation.
4. Location specific responses.

Development and investment in renewable energy generation is incorporated throughout all four parts of the Draft CWO Regional Plan 2041. However, Part 4, Objective 20 specifically relates to renewable energy development and investment within the CWO REZ, stating 'Leverage the Central–West Orana Renewable Energy Zone to provide economic benefit to communities'.

Key objectives for the Project, including the generation of renewable energy to assist in achieving NSW renewable energy targets whilst promoting economic growth for the region, coupled with the Projects strategic location within the CWO REZ assists in demonstrating the Projects alignment with the objectives of the Draft CWO Regional Plan 2041.

2.1.2.3 Dubbo Local Strategic Planning Statement

Adopted on 22 June 2020, the Dubbo Local Strategic Planning Statement (Dubbo Regional Council, 2020) (Dubbo LSPS) is a 20-year vision for land use planning for Dubbo and Wellington and provides an overarching strategic direction for future land use planning in the Dubbo Regional Council LGA.

Planning themes and priorities of the Dubbo LSPS are around infrastructure, economy, housing, liveability and sustainability. Specifically, Dubbo Regional Council aims to increase renewable energy generation in order to diversify the regional economy and promote a sustainable future. The Project is considered to be consistent with the vision and intent of the Dubbo LSPS, specifically in relation to the proposed development of renewable energy generation.

2.1.2.4 Dubbo Regional Council 2040 Community Strategic Plan

The Dubbo Regional Council 2040 Community Strategic Plan (Dubbo Regional Council, 2022) (Dubbo CSP) is the highest-level strategy that will guide and influence the actions and initiatives of Dubbo Regional Council, the community, all tiers of government and community stakeholders through to 2040. Feedback was provided to Dubbo Regional Council by the local community, which has been used to develop a number of visions for the future across a variety of important themes, as provided below:

- Provide for housing choice and housing affordability to meet the needs of our community.
- Achieve ongoing economic prosperity through a diverse employment base and a visitor economy that makes use of our tourism assets.
- Key infrastructure and services are provided to further enhance the quality of life of our community and to maintain economic growth.
- A united and cohesive Council that provides leadership to our community.
- Continued access to a range of community, cultural and open space facilities and areas.
- Continuing to value Dubbo's unique environment and ensure it's protected for future generations.

The Dubbo CSP includes strategic actions against each of the key themes presented in the Dubbo CSP. Of relevance to the Project is Theme 2: 'Infrastructure', which includes action 2.1 'Opportunities for use of renewable energy are increased' and action 2.1.1 'Investment in renewable energy opportunities are encouraged and supported'.

The development of the Project is consistent with the themes, actions and overarching vision of the Dubbo CSP, as it promotes the investment in renewable energy generation and economic prosperity and seeks to protect the environment whilst maintaining economic growth for the Dubbo region.

2.2 Project Location

2.2.1 Site Details and Project Context

The Project Area is situated wholly within the Dubbo Regional Council LGA, with the town of Dubbo itself situated approximately 70 km northwest of the indicative Project Boundary. A list of all land parcels within the Project Area is provided in **Appendix 9**.

The nearest population centre to the Project is the rural community of Stuart Town located approximately 3.3 km northwest of the Project Boundary, with a population of 241 according to the 2021 Australian Bureau of Statistics (ABS) Census (ABS, 2021). The township of Euchareena is situated adjacent to the Project Boundary, approximately 200 m south, with a population of 170. Other nearby population centres in the vicinity of the Project Area include:

- Mudgee (population of 11,457), approximately 40 km northeast.
- Wellington (population of 4,096), approximately 30 km northwest.
- Orange (population of 61,266), approximately 35 km south.

Additionally, existing 132 kilovolt (kV) and 330 kV transmission lines traverse the Project Area in a north to south direction, with the connection to the NEM occurring at a position within the Project Boundary and near the 330 kV line (Line 72) (refer to **Figure 3.1** in **Section 3.0**).

The Project is located in an area east of Burrendong Way and Stuart Town, south of Lake Burrendong and the Mookerawa State Recreation Area, and northeast of Euchareena. The Macquarie River runs generally parallel to the eastern portion of the Project Boundary, approximately two km from the north/northeastern boundary and five km from the eastern boundary, before the Macquarie River diverts further southeast towards Bathurst.

Existing local roads provide access to and throughout the proposed Project Area, including Mount Aquila Road which travels east from Farnham, Medlands Road, Bundalah Road and Mount Top Road which travel through the southern portions of the Project Area. The 'Main Western Railway' extends north to south and passes through the westernmost portion of the Project Area for approximately 500 m, between Store Creek and Farnham.

The Project Area is zoned RU1 Primary Production under the Dubbo Regional Local Environmental Plan 2022 (Dubbo Regional LEP 2022) as is most of the land use surrounding the Project Boundary. Beyond the northwestern extents of the Project Boundary there is a large area of land zoned as E3 Environmental Management. Other land use zoning in the vicinity of the Project includes R5 Large Lot Residential, RE1 Public Recreation, RE2 Private Recreation RU1 Primary Production, RU5 Village, SP2 Infrastructure and W1 Natural Waterways. Zoning and permissibility are discussed in **Section 4.1.2**.

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

- **Crown Lands:** Crown reserves are present within and surrounding the Project Area. Works which may intersect these lands will likely require approval under the *Crowns Land Management Act 2016*, which will be investigated further during preparation of the EIS.

- **Community**: Several SSD projects at various stages of development are present within the region and the CWO REZ more broadly (as outlined in **Section 2.1.1** above), which are of relevance to local communities. Further discussion regarding local community and other stakeholders is provided in **Section 5.0** and the Social Impacts Scoping Report (SISR) provided as **Appendix 3.**

- **Land Use**: Agricultural land uses are prevalent within and surrounding the Project Area, and there is a small area (approximately 0.6 ha) of mapped Biophysical Strategic Agricultural Land (BSAL) located within the north-eastern corner of the Project Area (refer to **Section 6.2.8.2**). There are two current mining and/or exploration licence applications within the Project Area, including exploration licences EL8491 and EL8901. EL8704 is present immediately north and east of the northern-most portion of the Project Area. Further consideration of consultation with exploration licence holders will be undertaken during preparation of the EIS.

- **Biodiversity**: There are areas within the Project Boundary identified on the NSW Government Biodiversity Values (BV) Map which correspond to protected riparian land. Further discussion around biodiversity values within the Project Area is provided in **Section 6.2.3** and the Biodiversity Constraints Assessment provided as **Appendix 7**.

- **Traffic and Access**: Burrendong Way is located adjacent to the western side of the Project Area and provides the primary connection between Orange and Wellington, which connects to the Mitchell Highway and continues further northwest towards Dubbo. Further discussion around traffic, transport and access is provided in **Section 6.2.5**.

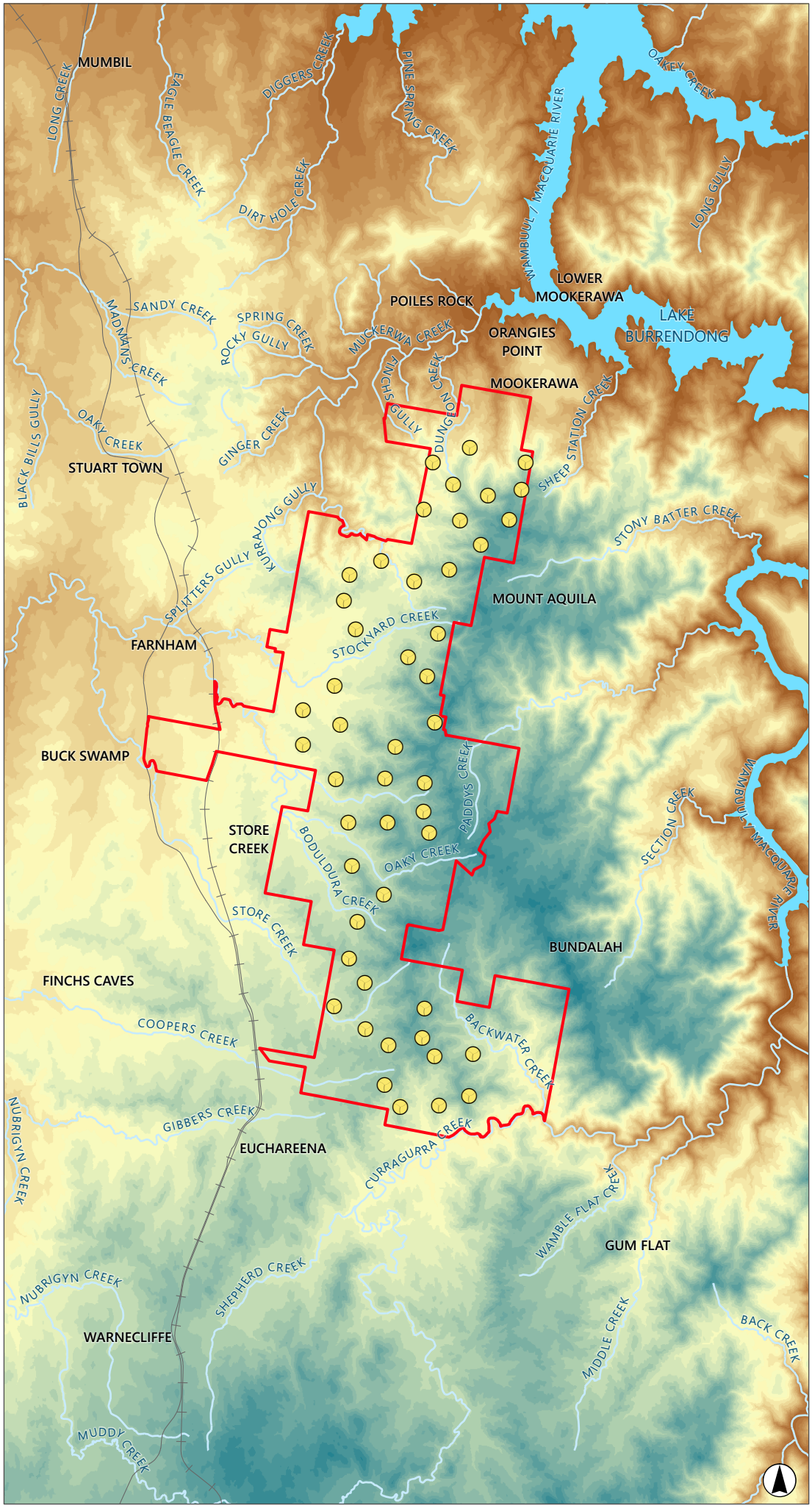
- **Topography**: The Project Area is at an elevation of ~600 to 800 m above sea level and comprises a complex terrain, with steep arid hills on the eastern boundary flattening out to rolling ridge lines to the west that are dominated by improved pasture used for grazing (refer to **Figure 2.3**). 'Mount Aquila' the Projects namesake is situated directly east of the Project, amongst the steep arid hills on the eastern boundary.

- **Hydrology**: The Project Area is dissected by a number of larger waterways namely Muckerwa Creek in the north, Stockyard Creek in the central portion, and Boduldura, Lankeys, Store and Backwater Creeks in the south (refer to **Section 6.2.8**). The landscape within the Project Area includes numerous small creek lines that feed into the nearby Macquarie River and Cudgegong River. No flood prone land or flood management areas are identified within 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**.

FIGURE 2.3

Elevations



Legend

- Project Boundary
- Waterbody
- Road
- Railway Line
- Named Watercourse
- Indicative Turbine Locations

Elevation (m)

- 320 - 340
- 340 - 360
- 360 - 380
- 380 - 400
- 400 - 420
- 420 - 440
- 440 - 460
- 460 - 480
- 480 - 500
- 500 - 520
- 520 - 540
- 540 - 560
- 560 - 580
- 580 - 600
- 600 - 620
- 620 - 640
- 640 - 660
- 660 - 680
- 680 - 700
- 700 - 720
- 720 - 740
- 740 - 760
- 760 - 780
- 780 - 800
- 800 - 820
- 820 - 840

0 2 4
Kilometres

Scale 1:125,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

2.2.2 Identification of Dwellings

During the early stages of Project design, ACEN recognised the importance of comprehensively identifying dwellings situated near the Project or within its potential area of influence. Accordingly, the following tasks occurred to establish the dwellings list that has been adopted for this Scoping Report:

- Establishing an ArcGIS workspace with the Project Boundary and an 8 km buffer around that boundary (dwellings study area).
- Importing lot/DP boundaries (cadastre) and property information from the NSW address database for all land within the dwellings study area.
- Overlaying minimum lot size data across all lot/DP boundaries and identifying (via an ArcGIS query) all lot/DP where a dwelling entitlement exists i.e. the lot size is large enough that a dwelling entitlement can be assumed.
- Establishing a 100 m x 100 m grid within the GIS workspace.
- Gaining the most recent publicly available aerial photography for the dwellings study area.
- Based on progressive (grid-based) review of aerial photography and a precautionary approach:
    - Moving address icons (from lot centre) to the centre of identifiable structures, where a dwelling was observed.
    - Providing multiple address icons at the centre of each identifiable structure, if more than one exists within a lot.
    - Removing the address icons where no structure is identifiable, and there is no known dwelling entitlement.
- Searching Council's website and identifying any current DA for dwellings within the dwellings study area, and adding any potential future dwellings identified via ACEN's stakeholder engagement.
- Establishing a unique ID for all structures.
- Labelling all structures identified as dwellings, except in circumstances where ACEN's ongoing ground truthing data confirms otherwise.

By implementing the above methodology, a "desk-based" dwellings list was established. During the preparation of the Scoping Report, ACEN visited the Project Area and surrounding locality on multiple occasions and progressively ground truthed identified dwelling locations. This ground truthing information was fed back to Umwelt and the dwellings list updated to that which has been utilised within this report.

The quantity and status of dwellings in proximity of the Project are accurate as of October 2023 and may change as further ground truthing occurs during the EIS phase of the Project, as community and stakeholder engagement continues, and access to private lands is progressively agreed between ACEN and neighbours of the Project.

2.3 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 CIA Guidelines (DPE, 2022h), 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 CWO REZ, at different stages of the approval process (refer to **Figure 2.2** and **Table 2.1**). Approved and proposed renewable energy projects (based on current publicly available information) within 100 km of the Project are shown in **Table 2.1** below. However, it is 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 (November 2023) the closest renewable energy development to the Project were:

- Yarrabin (Phoenix) Pumped Hydro, located ~9 km north-northwest of the Project.
- Mumbil Solar Farm, located ~12 km northwest of the Project.
- Burrendong Wind Farm, located ~7.5 km northeast of the Project.
- Kerrs Creek Wind Farm, located directly south of the Project.

Given the strategic importance of the CWO 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, having regarded to the CIA Guidelines.

Table 2.1 Renewable Energy Projects Surrounding the Project

Project	Status	Generation Capacity (MW)	Potential Construction Start Date
Kerrs Creek Wind Farm	Proposed	441	2026
Yarrabin (Phoenix) Pumped Hydro[1]	Proposed	810	2025
Beryl Solar Farm	Approved	87	Operating
Apsley Battery Energy Storage System	Approved	200/400 MWh	Unknown
Orana Battery Energy Storage System	Proposed	200/400 MWh	2023
Bodangora Wind Farm	Approved	113.2	Operating
Maryvale Solar Farm	Approved	125	2023
Dunedoo Solar Farm	Approved	55	2022–2023
Suntop Solar Farm	Approved	170	Complete, commissioning underway
Uungula Wind Farm	Approved	400	2022–2023
Spicers Creek Wind Farm	Proposed	730	2023–2024

Project	Status	Generation Capacity (MW)	Potential Construction Start Date
Wellington Solar Farm[2]	Approved	174	2019
Wellington North Solar Farm[2]	Approved	300	Unknown
Wellington Battery Energy Storage System	Proposed	500/1000 MWh	2023
Wellington Town BESS	Proposed	180 / 720 MWh	Q2 2024
Wellington South Battery Energy Storage System	Proposed	500 / 1000 MWh	Unknown
Crudine Ridge Wind Farm	Approved	135	Operating
Birriwa Solar Farm[1]	Proposed	600	Unknown
Central West Orana REZ – Transmission Line and associated Elong Elong Energy Hub	Proposed	N/A	2023
Central West Orana REZ – Wollar Substation	Proposed	N/A	2023
Cobbora Solar Farm	Proposed	700	2023
Mumbil Solar Farm	Proposed	120	Unknown
Sandy Creek Solar Farm	Proposed	750	2023
Tallawang Solar Farm	Proposed	500	2023
Stubbo Solar Farm[1]	Approved	400	Early 2023
Liverpool Range Wind Farm	Approved	1000	2024
Burrendong Wind Farm	Proposed	400 (possibility to expand to 650)	Unknown
Forrest Glen Solar Farm	Proposed	110	Unknown
Wollar Solar Farm	Approved	290	2022
Barneys Reef Wind Farm	Proposed	350–441	Unknown
Goulburn River Solar Farm	Proposed	520	Late 2023
Valley of the Winds Wind Farm[1]	Proposed	800	Quarter 1 of 2023 (dependent on project approval)
Burrundulla Solar Farm/Mini Sustainable Energy Park	Proposed	10	Unknown
Molong Solar Farm	Approved	25–30	Operational
Wahroonga Solar Farm	Approved	5	Unknown
Dubbo Solar Hub (Narromine and South Keswick [Dubbo])	Approved	25	Operational
Gilgandra Solar Farm	Approved	40–50	Unknown

Note [1]: ACEN owned.
Note [2]: a modification for a BESS is currently proposed for this project.

2.4 Planning and Other Agreements

Should the Project be approved, ACEN will enter into a Planning Agreement (PA) with Dubbo Regional Council in accordance with the requirements of the EP&A Act and guidelines. The PA will relate to the funding of infrastructure, road upgrades or other items to support local communities.

ACEN has entered into agreements with the vast majority of landholders within the Project Area and is currently exploring opportunities for an agreement in respect of one additional landholding. Where appropriate, ACEN will also seek to enter into negotiated agreements with neighbouring landholders (for example, having regard to impact thresholds under the Visual and Noise Bulletins) during the preparation of the EIS.

2.5 Project Benefits

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

- A renewable energy development that would align with NSW and Federal strategic direction on emissions reduction including emissions reduction targets.
- A renewable energy development within the CWO REZ, supplying approximately 300 MW to the NEM and contributing to the 3 GW renewable energy generation target for the CWO REZ.
- Contributing to the security and reliability of the NEM following the progressive closure of all remaining coal-fired electricity generators operating in NSW commencing from 2022–2023.
- Direct and indirect economic benefits to local communities in regional NSW, through employment opportunities, increased spending in local communities because of the project workers during construction and operation. Specifically, it is estimated that the Project will generate over 300 jobs during the construction phase and approximately 15 jobs during the operational phase.
- Direct and indirect economic benefits to the local community through a Community Benefit Fund, neighbouring property benefits scheme, lease payments to landholders and a PA with Dubbo Regional Council.
- Broader community benefits as a result of the project making funding available during its operational life, such as supporting local education and training programs and public infrastructure upgrades.

3.0 The Project

3.1 Project Summary

The Project includes the installation, operation, maintenance and decommissioning of up to 48 WTGs, a BESS, ancillary civil and electrical engineering infrastructure, temporary construction facilities and permanent worker facilities. The key components of the Project include:

- Up to 48 (three blade) WTGs, with a maximum blade-tip height of 250 m above ground level.
- Power infrastructure providing connection to the existing 330 kV transmission line i.e. on-site substations/switchyards.
- Internal electrical reticulation network i.e. electrical connections between the proposed wind turbines and substation consisting of a combination of underground cables and overhead powerlines.
- Construction of a new/upgraded site access roads, intersection upgrades, and level rail crossing over the Main Western Railway Line.
- Other associated permanent infrastructure including hardstands, new/upgraded farm access tracks, secondary access point/s from public roads, operation and maintenance buildings.
- A BESS (100 MW/200 MWh).
- Permanent meteorological monitoring masts.
- Temporary construction facilities including:
    - Construction compounds, site office buildings and storage areas.
    - On-site concrete batching plants for use during the construction phase.
    - Laydown areas used for wind turbine installation and storage of WTG components.
- Targeted road network upgrades to facilitate delivery of oversize and overmass (OSOM) WTG components to the Project Area as required.
- A permanent operations and maintenance facility for the Project.

The conceptual 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 design and refinement as part of the ongoing design and EIS process.

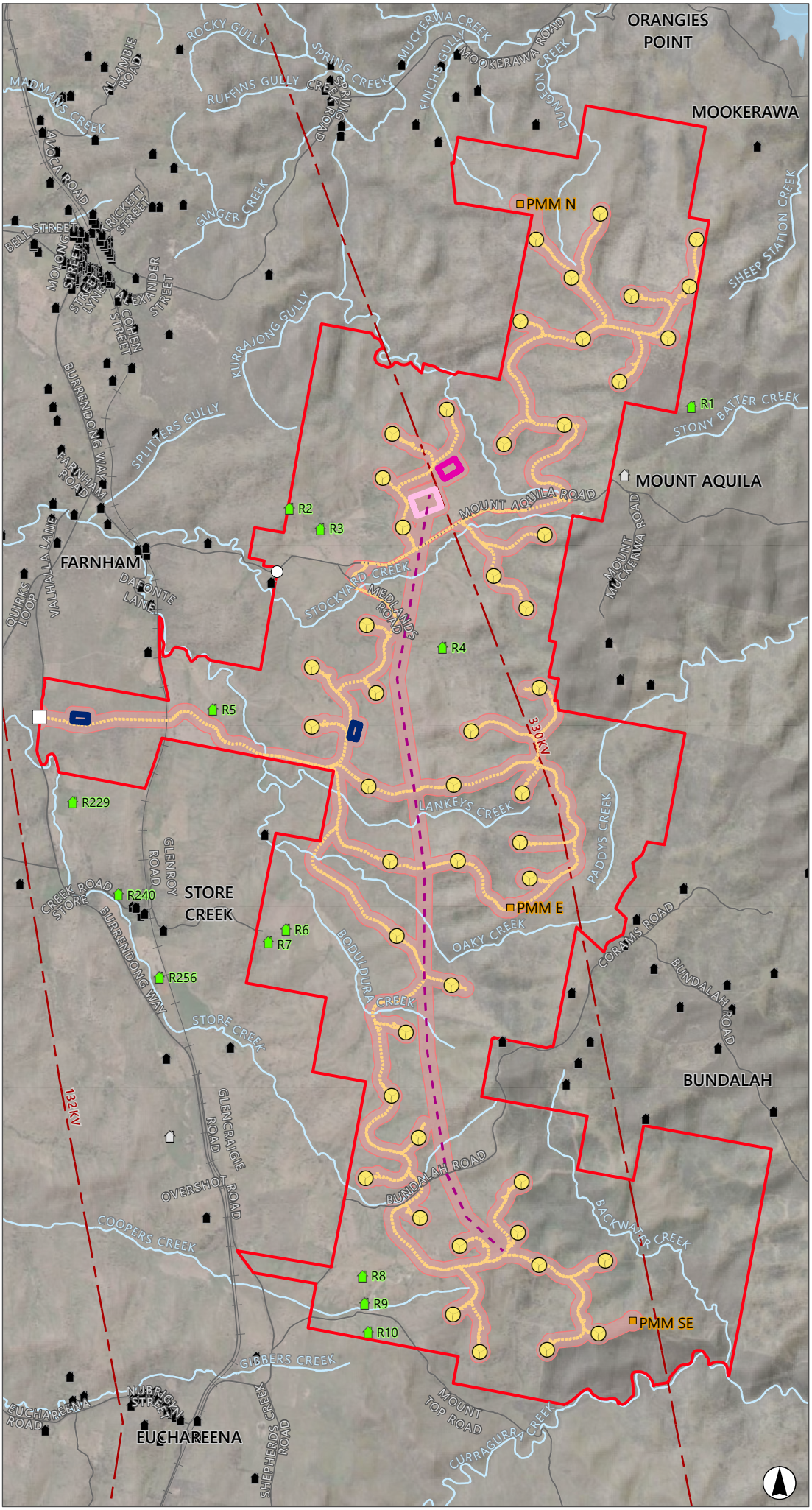
Table 3.1 Indicative Project Components and Approximate Dimensions

Project Component(s)/Infrastructure	Approximate Dimensions	Quantity
WTGs		
WTG height	Up to 250 m	Up to 48 WTGs
Rotor diameter	Approx. 172 m	
Blade length	Approx. 90 m	
Uppermost blade tip	Up to 250 m	
Tower (hub) height	Approx. 165 m	
WTG foundations (excavation size)	Approx. 30 m x 30 m	
Installed Capacity	Indicatively 6.2 MW WTGs	
BESS Facility		
Compound	Approx 9 ha	1
Ancillary Infrastructure		
Hardstands for turbine construction	Approx. 40 x 90 m	Up to 48
Internal Roads and drainage	Approx. 69 km (subject to final WTG layout)	N/A
Substation	Approx. 5 ha	1
Overhead transmission lines (high voltage)	Less than 1 km required for cut in (existing Transgrid 330 kV Overhead line within site boundary)	N/A
Overhead transmission lines (medium to low voltage)	Approx. 8 km	N/A
Underground transmission cables (medium to low voltage)	Approx. 58 km (subject to final WTG layout)	N/A
Permanent Meteorological Masts	At hub height	Up to 3
Temporary Meteorological Masts	Up to hub height	Up to 6
Temporary Construction Facilities		
Temporary construction compounds, including concrete batching plants, rock crushing facilities, site compound and office, stockpiles and materials storage and temporary laydown areas	Approx. 3 ha	2

The proposed infrastructure would be contained within the Project Boundary including turbine blades. The proposed layout will allow for micro-siting and will be subject to further detailed design as the environmental and social impact assessments progress. The conceptual design for the EIS will include a Proposed Development Corridor (refer to **Figure 3.1**) 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.

FIGURE 3.1

Aquila Wind Project Preliminary Layout



Legend

- Project Boundary
- Development Corridor
- Proposed BESS
- Proposed Compounds
- Proposed Substation
- Proposed Transmission Lines
- Proposed Access Tracks
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Primary Access Point
- Secondary Access Point
- Existing Electricity Transmission Line
- Railway Line
- Waterbody
- Named Watercourse

Existing Dwellings

- Host Dwelling (labelled with R#)
- Non-associated Dwelling

Proposed Dwelling

- Potential Future Dwelling

0 1 2
Kilometres

Scale 1:72,500 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

3.1.1 Anticipated Timeframes

It is anticipated that construction works will commence within one year of Project approval i.e., construction commencing in mid-to-late 2026. 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 24 months. The Project has an estimated operational life of 30 years after which it would be decommissioned. In summary the anticipated timeframes for the Project are:

- **Planning and approvals (prior to commencement of construction):** in progress and aiming to be completed in 2026.
- **Construction and Commissioning:** planned to commence in 2026, for approximately 24 months.
- **Operation:** planned to commence in 2027 with full scale operations planned for 2028, with an estimated operational life of 30 years.

3.2 Wind Turbine Generators

The Project is designed to accommodate WTGs of up to 250 m in height. This allows for a conservative worst-case assessment allowing for WTG advances between the time of assessment for the Project and the commencement of construction. The WTGs will be three-bladed with the rotor and nacelle mounted on a tower with an internal ladder or lift. The current conceptual WTG locations are shown on **Figure 3.1**.

3.3 Battery Energy Storage System

A BESS 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 100 MW/200 MWh, but this is not intended as an upper limit and will be subject to further design work.

A range of technologies are being considered, including lithium-ion, lead acid, sodium sulphur, sodium or nickel hydride, electrochemical technology (i.e., flow batteries), cryogenic storage and compressed air. The final design of the battery storage will depend on the technology selected. The 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 shown on **Figure 3.1**.

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 and collector substations and switchyards.
- Underground and overhead transmission lines at varying voltages (i.e. high, medium and low).
- Temporary and permanent offices and site compounds.

- An operations and maintenance facility (to be co-located within the substation or BESS footprint as shown in **Figure 3.1**).
- Permanent meteorological masts.
- Communication cables (includes control cables and earthing).
- Water storage tanks.
- Hardstands.
- Internal access tracks and primary and secondary 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 and temporary meteorological masts. All temporary facility sites will be rehabilitated once they are no longer required.

3.5 Access

Access to the Project Area is proposed via the existing road network, and new access roads with associated intersection upgrade works as a component of the Project. Primary access will likely be via a new access point proposed off Burrendong Way in the western most portion of the Project Area. The position of the primary access point off Burrendong Way will allow the transport of Project-related materials to the Project Area from the north via Wellington utilising the Mitchell Highway/Golden Highway from the Port of Newcastle, or from the south via Orange utilising Lachlan Valley Way/Hume Highway towards Port Botany/Port Kembla.

Potential secondary Project access is proposed along Mount Aquila Road, which would be accessed via Burrendong Way approximately 3.5 km northeast of the primary access point. This access point will likely service the transport of materials from the north via Wellington.

Project access and transport routes will continue to be investigated by the Proponent throughout future stages of project development and design. The local access road connections and approach routes to the Project will be developed in combination with site planning and wind turbine location selection. Given the large 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 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, where necessary.
- Undertake dust suppression.
- Utilise the secondary intersections and crossovers identified above to facilitate construction and operational vehicles.
- Procure resources from licensed operators which are located along these roads.

3.5.1 Over-Size, Over-Mass Vehicle Transport Routes

Over-size, over-mass (OSOM) vehicles will be required to transport WTGs and ancillary infrastructure to the Project Area. A preferred transport route has not yet been established but several options are under consideration as indicated in **Figure 3.2**. The preferred transport route of WTG components and other Project-related materials will be confirmed via a transport route assessment, to be prepared as part of the EIS.

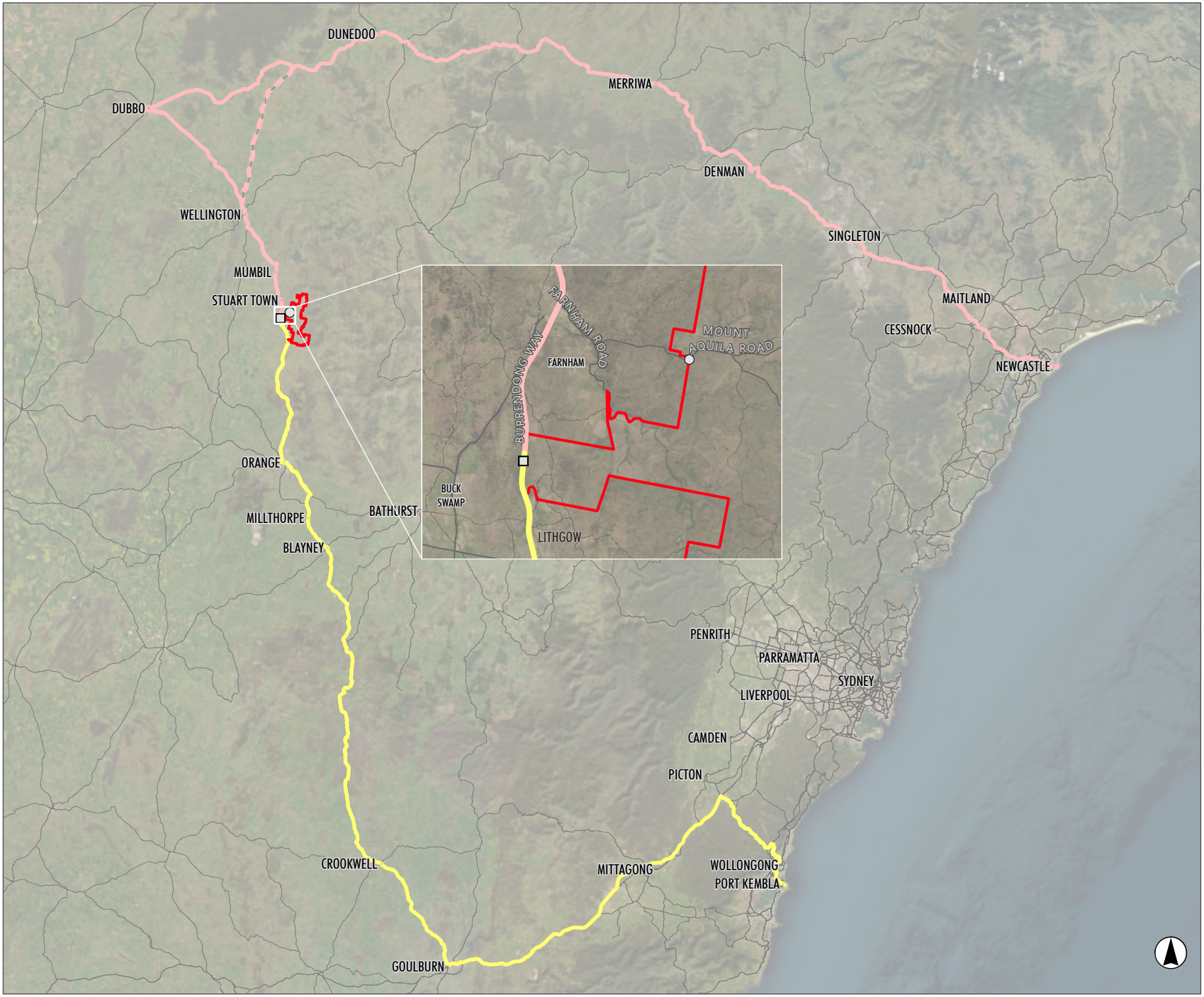


FIGURE 3.2

Site Access and Transport Routes

Legend

- Project Boundary
- Primary Access Point
- Secondary Access Points

Indicative Transport Routes

- From Newcastle
- From Newcastle – Alternative Route Via Saxa Road
- From Port Kembla

0 25 50
Kilometres

Scale 1:1,750,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

3.6 Development Corridor

The Project Boundary comprises an area of approximately 6,806 ha. ACEN has identified an indicative Development Corridor within which all Project infrastructure will be placed (refer to **Figure 3.1**). The purpose of the Development Corridor is to provide 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 buffer (minimum 135 m radius) around proposed WTGs.
- A 100 m buffer measured from the edge of all other infrastructure.

The proposed Development Corridor associated with the Project is approximately 1,497 ha based on the current indicative Project layout, which will be subject to further design refinement and revision as the Project progresses. Within this indicative Development Corridor, it is estimated that the actual land disturbance area (based on the current Project layout) would be in the order of 388 ha, or approximately 5–6% 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.

3.7 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 proximity to existing electricity transmission infrastructure.
- Alignment with strategic plans for the wider region (as discussed in **Section 2.1.2** above).
- Much of the Project Area being historically cleared for agricultural use, resulting in generally homogenous agricultural land within and surrounding the Project Area.
- The Project being compatible with existing pastoral land uses, with minimal impact to current agricultural activities being anticipated during both construction and operation of the Project.
- Proximity to the existing public road network and access to several existing internal roads.
- 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 and neighbours, has been subject to several design iterations to incorporate feedback received during this stage of the Project. Where landholders did not wish to be involved in the Project, these areas have been removed from the Project Area and a buffer distance applied.

Three key alternative Project options have been considered to date by ACEN with the first being a 'do nothing' approach. This option does not meet ACEN 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 80 WTGs a) within other areas of the Project Boundary, and b) within the Development Corridor identified in **Figure 3.1** were considered and would result in achieving the Project Benefits described in **Section 2.5**.

However, the option to develop a wind farm of up to 48 WTGs within the Development Corridor (summarised in **Section 3.6** and identified in **Figure 3.1**) is currently preferred as it:

- Incorporates feedback from Host landholders and neighbours.
- Maximises distance offsets to non-associated dwellings to the east and northeast.
- 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 GHG emissions across the NSW and Australian economies.

This option (as represented by the Development Corridor) is that which 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 that 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 Strategies to Avoid or Minimise Impacts

The key impact avoidance and minimisation strategies implemented by ACEN during the early stages of design development are provided below:

- A variable buffer (minimum 1,000 m) to all host landholder dwellings.
- A suitable buffer (31 approx. 300 m) from the existing 330 kV transmission line alignment which is to be agreed with Transgrid.
- A minimum 250 m buffer to road reserves.
- No blade overhang over the Project Boundary (31 approx. 100 m buffer from the centre of the turbine).
- A buffer of 100 m on the 2nd Fresnel zone of all radio links to avoid electromagnetic interference.
- A buffer of 1000 m to any radio communications sites.
- Avoidance of any land that is used for irrigation cropping.
- Turbines in locations that are compatible with host landowners' existing land uses.

3.8.1 Refinement of Project Design

The indicative Project design has been developed through an iterative process, with the objective of avoiding and minimising environmental and social impacts to the greatest extent practicable. The focus of this process has been potential off-site amenity (visual and noise) impacts and heritage and ecology constraints.

This process is summarised in **Table 3.2** below and encompassed three substantial design revisions throughout the Scoping phase of the Project. Additionally, **Figure 3.3** below shows the progressive removal of WTGs as a result of this process. While not shown in **Figure 3.3**, WTGs have also been progressively relocated in response to environmental and social constraints, as noted in **Table 3.2** below.

As a result of the design development, and progressive avoidance and minimisation strategies employed during the Project Scoping Phase:

- The indicative Project Area has been reduced from approximately 13,000 ha to 6,806 ha (a reduction of 6,194 ha or approximately 48%).
- The number of proposed WTGs has reduced from a maximum of 80 to 48 WTGs (a reduction of 32 WTGs or 40%).

Table 3.2 Progressive Avoidance and Minimisation During Scoping Phase

Design Revision	Revision Summary
May 2022	In response to a preliminary constraints assessment and subsequent design workshop led by Umwelt, the following design changes were made: • Removal of two WTGs (and relocation of other turbines and ancillary infrastructure) in the northern and western sections of the Project Area (near the Mookerawa State Recreation Area and Stuart Town, respectively) to assist maximise distance offsets to neighbouring dwellings in that area and minimise potential visual and noise impacts. • Relocation of WTGs (and associated ancillary infrastructure) to avoid sensitive archaeological areas (i.e., creeklines, riparian areas etc.) established via preliminary predictive statements for archaeological potential within the Project Area.
August 2022	In response to community feedback, the Project design was revised to remove all WTGs west of the Main Western Railway Line. This change involved: • Removal of 20 WTGs and ancillary infrastructure, reducing potential visual impacts to Euchareena and non-associated dwellings in the southwest (in the localities of Buck Swamp, Limestone Camp and Finchs Caves). • A reduction to the indicative Project Area in the order of 6,000 ha, resulting in a reduced Project disturbance footprint and associated ecology and heritage impacts.
December 2022	In response to community and Government agency feedback, a further ten WTGs were removed from the Project design in December 2022, including: • Removal of four WTGs located east and southeast of Stuart Town. • Removal of three WTGs nearest to R262, a non-associated dwelling that was identified as newly inhabited during the Community Information Session, and subsequently attributed with the highest predicted noise levels due to the Project layout.

Design Revision	Revision Summary
	• Removal of two turbines near the southwestern Project Boundary (nearest to AQ32 and AQ34) in response to community feedback at August 2020 Community Information Session. • Removal of one WTG due to proximity to Host dwelling R1. As a result of these changes: • The Project Area was reduced by 221 ha (from 7,028 ha to 6,806 ha or approximately 3%) and the indicative Development Corridor was reduced by 143 ha (from 1,618 ha to 1,497 ha or approximately 9%). • The indicative Project disturbance footprint was reduced from 480 ha to 388 ha (a reduction of 92 ha or approximately 19%).

3.8.2 Summary of Avoidance/Minimisation and Next Steps

The Project layout revisions summarised above reduced the number of turbines from a maximum of 80 to a maximum of 48 as represented in this Scoping Report (refer to **Figure 3.1**). During the Scoping stage the indicative Project layout was revised on (at least) three occasions 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.

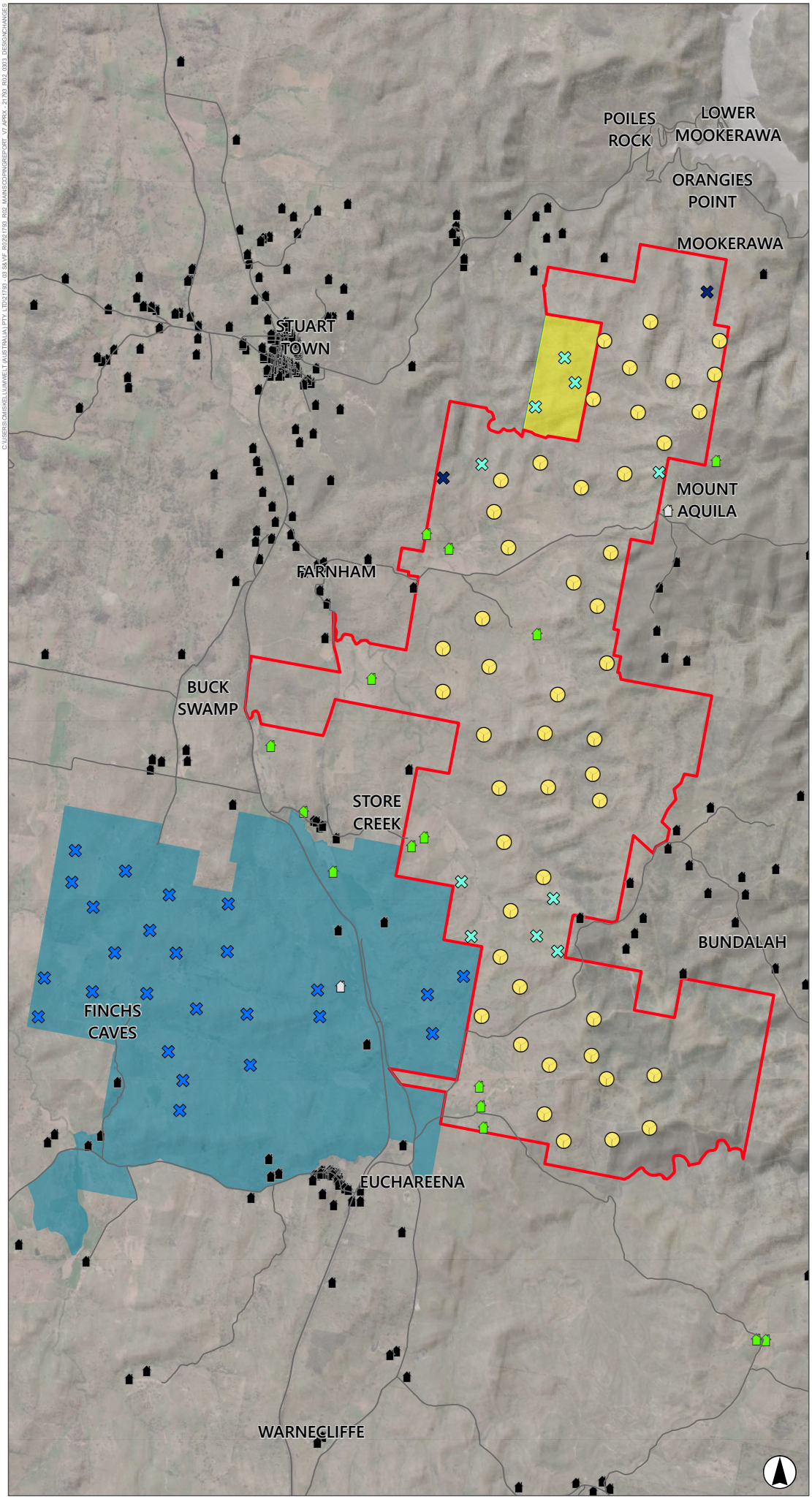


FIGURE 3.3

Summary of Design Changes – Avoidance and Minimisation

Legend

- Project Boundary
- Potential Project Area – Removed August 2022
- Potential Project Area – Removed December 2022
- Indicative Turbine Locations (April 2023)

Turbine Design Changes

- Removed (May 2022)
- Removed (August 2022)
- Removed (December 2022)

Existing Dwellings

- Host Dwelling
- Non-associated Dwelling

Proposed Dwelling

- Potential Future Dwelling

0 1 2
Kilometres

Scale 1:100,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

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 the NSW DPE. Currently the Project has a CIV estimated at approximately one 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, 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 Independent Planning Commission (IPC) (if the development is of a kind for which the Commission is declared the consent authority by an environmental planning instrument) or the Minister (if the development is not of that kind).

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

- Dubbo Regional Council object to the application.
- 50 submissions (other than from the Council noted above) are made objecting to the Project.
- ACEN discloses a reportable political donation of $1,000 or greater.

If these criteria are not triggered, DPE will determine the development application on behalf of the Minister.

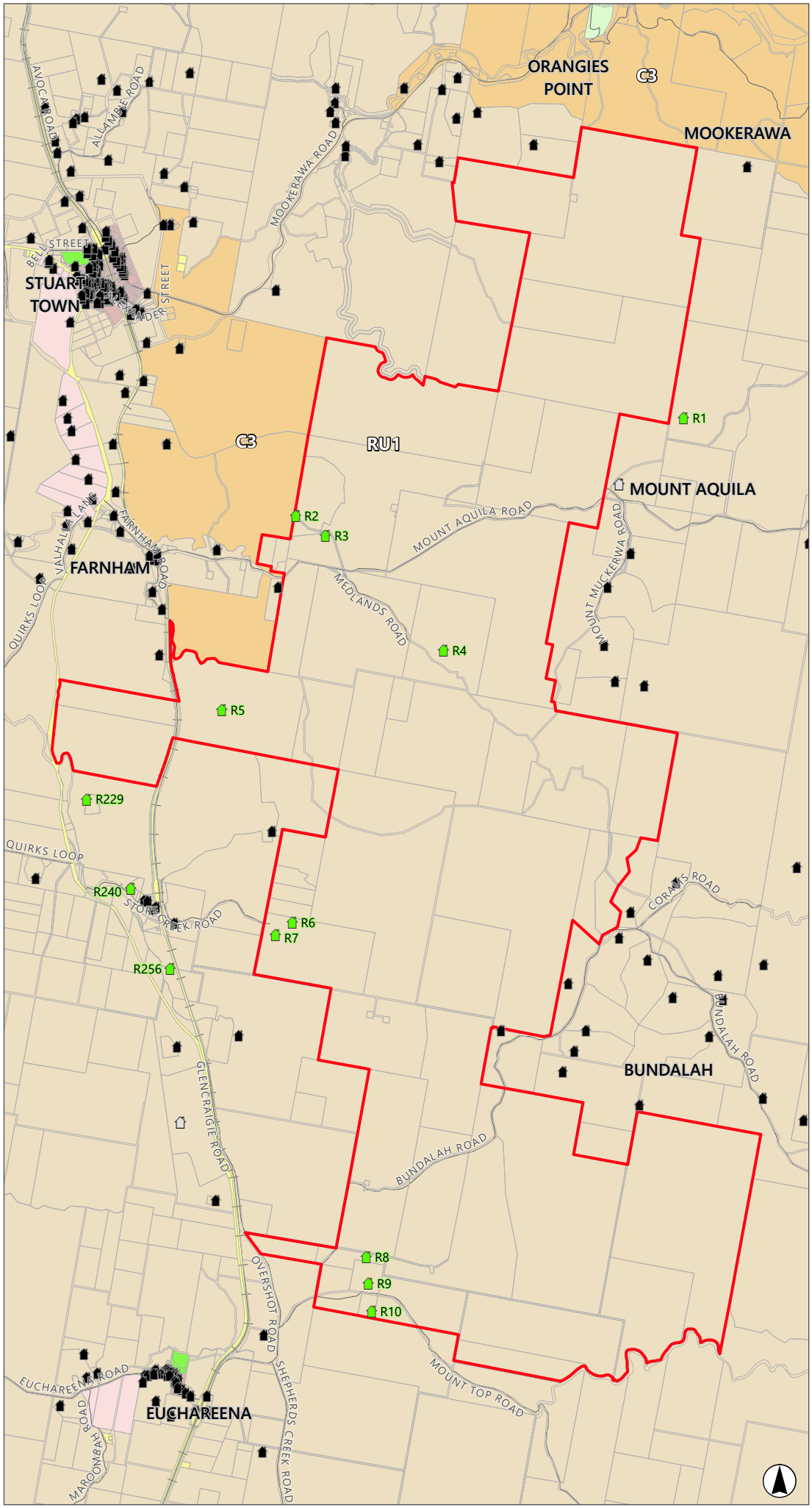
4.1.2 Permissibility

As outlined in **Section 2.2**, the Project Area is situated predominately within the Dubbo Regional Council LGA. The Project Area is zoned as RU1 Primary Production within the Dubbo Regional LEP 2022 (refer to **Figure 4.1**). Electricity generating works are not permitted on land zoned RU1 within the Dubbo Regional LEP.

However, Clause 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 Clause 2.7(1) of the TI SEPP, the provisions prevail where there are inconsistencies with any other Environmental Planning Instruments (EPIs), including LEPs. Due to the operation of Clause 2.36(1)(b) of the TI SEPP the Project is permissible with development consent.

FIGURE 4.1

Land Zoning



Legend

- Project Boundary
- Lot Boundary
- Road
- Railway Line

Proposed Dwelling

- Potential Future Dwelling

Existing Dwellings

- Host Dwelling (labelled with R#)
- Non-associated Dwelling

Land Zones

- C3 Environmental Management
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU5 Village
- SP2 Infrastructure

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); NSW DPE (2022); ACEN (2022)

4.1.3 Other Approvals

In addition to development consent under the EP&A Act, a number of other NSW Acts and/or planning policies are applicable or potentially applicable to the Project. **Table 4.1** below 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. There are some areas of Crown Land (e.g. Crown reserves) within the Project Area and should any works be proposed in these areas an approval 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 and ecological communities, and migratory species. Further discussion around potential impacts to threatened species is provided in **Section 6.2.3**.

An EPBC 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. These statutory requirements are categorised as per the DPE Scoping 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 ACEN 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 Dubbo Regional LEP 2022. Electricity generating works are not permitted on land zoned RU1 within the Dubbo Regional LEP 2022. Clause 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. Under Clause 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.
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 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 Stakeholder and Community Engagement

ACEN recognises that respectful, inclusive, and meaningful engagement is fundamental to the development of wind projects. ACEN recognises that effective engagement is a key component of the SSD process, in line with the Engagement Guidelines (DPE, 2022f).

ACEN acknowledges that effective engagement requires everyone involved to do their part, at the appropriate stage in the process. ACEN 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 ACEN) has prepared a CSEP for the Project (refer to Appendix A of **Appendix 3**) to outline the objectives and approach to community engagement throughout the life of the Project from development through construction and operation. 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.

Through the implementation of the CSEP, ACEN aims to:

- Inform and consult with the community in relation to the proposed Project.
- Develop an understanding of the social locality/social area of influence of the Project, specifically the host community/communities in which the Project is proposed.
- Scope and identify any impacts upon people associated with the Project.
- Enable community and stakeholder input into the Project design, planning and development.
- Collaboratively develop relevant strategies to respond to impacts in the form of mitigation or enhancement measures and community benefit sharing options.
- Identify future engagement preferences of stakeholders and potential partnerships between the Proponent and the community.

The CSEP provides an overview of ACEN's approach to stakeholder engagement throughout all stages of the Project, outlines the Project and the relevant stakeholders, provides detail on the consultation undertaken to date and outlines various community benefits.

5.2 Stakeholder Engagement

ACEN has undertaken early community and stakeholder engagement to build relationships with near neighbours and key stakeholders in relation to the Project, as well as to inform Project design and development. This has assisted in identifying and understanding the perceived issues and impacts early in the planning and assessment process.

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 hosts, 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	Stakeholders
Host Landholders	• Landholders with the potential to host WTGs and/or Project infrastructure.
Neighbouring Landholders	• Neighbouring dwellings within 8 km of the potential WTG locations.
Community within the Social Locality	• Proximal/local communities/localities, including Stuart Town, Euchareena, Farnham and Mullion Creek. • Regional towns and communities, including Dubbo, Wellington and Orange.

Government – State	• NSW DPE (Crown Lands).
	• National Parks and Wildlife Services (NPWS).
	• Department of Finance, Services and Innovation – Telco Authority.
	• DPE, including:
	  ○ Biodiversity, Conservation and Science (BCS).
	  ○ Energy Corporation.
	  ○ Water Group.
	• Department of Primary Industries – Agriculture and Fisheries (DPI).
	• Energy Corporation.
	• Environment Protection Authority (EPA).
	• Fire and Rescue NSW.
	• Heritage NSW.
	• NSW Rural Fire Service.
	• Regional NSW – Mining, Exploration and Geoscience (MEG).
	• Transport for NSW (TfNSW).

Government – Federal	• Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW). • Airservices Australia. • Bureau of Meteorology (BOM). • Civil Aviation Safety Authority (CASA). • Department of Defence.
Local Council	• Dubbo Regional Council – representatives from the Planning & Environment, and Corporate & community Services teams, Mayor.
Community, Development, and Special Interest Groups	• Mumbil District Progress Association. • Mumbil Action Group. • Stuart Town Advancement Association. • Regional Development Australia – Orana Branch. • Mid Macquarie Landcare.

Stakeholder Group	Stakeholders
Aboriginal Groups	• Wellington Local Aboriginal Land Council. • Wellington Aboriginal Corporation.
Other Stakeholders	• Stuart Town Facebook group.

5.2.1 Community Engagement

ACEN has commenced stakeholder engagement as part of the initial Project design phase. The community consultation undertaken to date is summarised in **Table 5.2**, and is supplemented by additional information in **Section 5.2.1.2** and **Appendix 4**. **Table 5.2** also includes the additional consultation activities which will be undertaken during preparation of the EIS.

Table 5.2 Community Engagement Undertaken to Date and Proposed During the EIS

Mechanism	Targeted Stakeholder	Engagement Objective[3]	Description	First Round of Consultation (Scoping Phase)	Second Round of Consultation (EIS Phase)
Website	Traditional Owners Host landholders Community groups Broader community Local businesses and service providers Local media	Inform & Consult	A website dedicated to the Project including a description of the Project, an overview of the development application process, company information, responses to key concerns, 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, with responses to key concerns provided progressively as detailed assessments are undertaken.
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 (Molong Express; Daily Liberal; Central Western Daily) and a radio station (Binjang FM 91.5) in August 2022 to advise of upcoming consultation opportunities and provide Project updates.	Subsequent media releases will be developed when required in the EIS phase.
Community Newsletters	Broader community (~2,905 households and businesses)	Inform	Project information sheets to distribute information about the Project to the broader community.	**No. 1** – Project overview, overview of the assessment process and invitation to participate in the SIA via the drop-in session and other	**No. 2** – To provide a Project update and validate the feedback received from

[3] International Association for Public Participation (IAP2) Public Participation Spectrum. 2015.

Mechanism	Targeted Stakeholder	Engagement Objective[3]	Description	First Round of Consultation (Scoping Phase)	Second Round of Consultation (EIS Phase)
				mechanisms. Distributed in August 2022.	community received during the scoping phase. **No. 3** – To provide a Project update, present the draft findings of SIA and EIS and inform the community of the exhibition process.
Drop-in session	Broader community Community groups Local businesses and service providers	Inform, Consult & Involve	Multi-hour time periods when stakeholders can drop in to speak to the Project team, view documents and plans and ask questions.	One session held at Stuart Town Hall of Arts on Tuesday 30 September 2022 between 2 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 on 2 September 2022, with all feedback received as at 19 September included in this SIA scoping report. Survey distributed by email to registered attendees at the Drop-in Session, via the Aquila Wind Website, and via the Stuart Town Community Facebook Page.	The survey will be updated and distributed during the EIS phase to provide further opportunity for community feedback and to validate impacts identified during the scoping phase. Also used to understand potential mitigation and enhancement measures.
Personal Meetings or Interviews	Local Government Community groups Traditional Owners	Involve & Collaborate	Introductions to the Project, semi-structured interviews to listen to individual concerns and interests and to gain an improved understanding of sensitivities, information needs and future engagement preferences.	One on one meetings held throughout the months 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.

Mechanism	Targeted Stakeholder	Engagement Objective[3]	Description	First Round of Consultation (Scoping Phase)	Second Round of Consultation (EIS Phase)
Project briefings	State Government Local Government Traditional Owners Community groups	Involve & Collaborate	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.
Targeted one-on-one engagement	Proximal neighbours (located within 3,350 m of a proposed wind turbine)	Inform, Consult & Involve	Engagement with proximal neighbours through phone calls and in-person meetings.	Targeted proximal neighbour consultation undertaken between August 2023 and January 2024.	Further targeted landowner consultation will be undertaken as the Project progresses into the EIS phase and beyond. It is anticipated that the next round of targeted engagement will include landholders located between 3,350 m (i.e. the 'black line' under the Visual Bulletin) and 4,950 m (i.e. the 'blue line' under the Visual Bulletin) of a proposed wind turbine (refer to Table 5.3 and **Section 5.2.1.2**).

Stakeholders that have participated in the scoping phase of the Project's planning and assessment process to date, as well as those who have informed the development of this report, are outlined in **Table 5.3**.

Table 5.3 Stakeholders Contacted and Consulted During Scoping Phase

Stakeholder Group	Mechanism Used		Number Contacted	Number Engaged
Host Landholders	Consultation with ACEN		10	10
Neighbouring Landholders	Early consultation with ACEN		26	26
Broader Community	Media Release		4	-
	Project Website		-	-
	Project email/hotline		-	12
	Community Newsletter		~2,905 households and businesses	-
	Drop-in Community Information Session		-	38
	Broader Community Survey		-	13
	Recent one-on-one Engagement[1]	In person	65[2]	24
		Phone call		13
Local Government	Project briefing and interview		3	1
Aboriginal stakeholders	Project briefing and interview		3	-
Local Community, Environmental and Special Interest Groups	Project briefing and interview		12	1
			Total	**138**

Note 1: 2023 targeted consultation, focussed primarily on non-associated dwellings within 3,350 m of a wind turbine.

Note 2: Includes all 60 non-associated dwellings inside the 3,350 m buffer (i.e. the 'black line' under the Visual Bulletin). Of the 65 dwellings noted above 10 were identified by ACEN (via ground-truthing) as potentially uninhabited buildings.

Quantitative and qualitative information collected through these consultation activities has been analysed to inform the preliminary analysis of social impacts associated with the Project, as discussed in the SISR (refer to **Appendix 3**).

It is noted that the formal notification process for the Aboriginal Cultural Heritage Assessment will commence following receipt of the SEARs. 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, 2010b). Further detail on the proposed heritage assessment is provided in **Section 6.2.4**.

5.2.1.1 Community Views

As discussed in the SISR (refer to **Appendix 3**), 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, both prompted and unprompted, the top issues raised included:

- Impacts on surrounds, and in particular the potential for the Project to impact on the visual amenity of the social locality and generate unwanted noise and vibration.
- Impacts relating to traffic and conditions on local roads.
- Impacts on livelihoods, in particular the potential decline in property values resulting from the introduction of the Project to the community.

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

- The provision of renewable energy to the national electricity market.
- The improvement of livelihoods with the inclusion of employment and contracting opportunities required to construct and operate of the Project.
- The sharing of Project benefits through direct investment in the local community, as well as improvement to roads, and the stability of electricity price affordability.

Community views in relation to the Project are discussed further in **Section 6.2.6.2** below and **Appendix 3**.

5.2.1.2 Continued Engagement

ACEN has committed to undertake targeted consultation with proximal landholders located within 4,950 m of proposed WTGs (i.e. the 'blue line' under the Visual Bulletin) prior to and during the development of the EIS.

This consultation is occurring progressively, with priority given to the closest proximal landholders. Key features of this consultation are summarised as follows:

- Between August and December 2023, ACEN visited all 60 non-associated dwellings identified within 3,350 m of proposed WTGs (i.e. the 'black line' under the Visual Bulletin), refer to **Table 5.3**.
- As a result, ACEN has met with or engaged by phone with 37 non-associated proximal landholders, refer to **Table 5.3**.
- These engagement efforts are ongoing, including in respect of landholders who have not been contactable to date, and will continue as the Project progresses into the EIS phase.
- ACEN's targeted consultation strategy that has informed the engagement completed to date and planned future engagement, is detailed in **Appendix 4**.

More broadly, ACEN 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.
- Maintaining a Project website.
- Community information sessions.
- Community surveys.

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 5.4**.

Table 5.4 Agency Consultation

Agency	Date	Mechanism	Details
Dubbo Regional Council	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
Stuart Town Advancement Association Incorporated	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
Regional Development Australia – Orana Branch	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
Cabonne Shire Council	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
Wellington Business Chamber	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
Wellington Local Aboriginal Land Council	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
NSW Aboriginal Land Council – Central Region	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
Mid Macquarie Landcare	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
Friends of Burrendong Arboretum	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.

Agency	Date	Mechanism	Details
Orange Local Aboriginal Land Council	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
Wellington Aboriginal corporation	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
NSW Farmers – Molong Branch	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
NSW Farmers – Central Orana Regional Branch	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
Dubbo Aboriginal Employment Services (AES)	18 August 2022	Email	Introduction to the Project, and invitation to attend Community Information session on 30 August 2022 or to have an in-person project briefing.
Regional Development Australia – Orana Branch	30 August 2022	In-person meeting	In-person project and proponent briefing.
Dubbo Regional Council	30 August 2022	In-person meeting	In-person project and proponent briefing.
EnergyCo	19 September 2022	Community Information session	ACEN Australia attendance at Wellington Community Information Session as Candidate Foundation Generator/Provide information to community on ACEN projects within CWO REZ.
Department of Planning and Environment	16 November 2022	Scoping Meeting	Project briefing and discussion regarding key issues of concern, approval pathway and approach to assessment.
	21 March 2023 and 11 May 2023	Meetings	Update on design revisions and Scoping Report changes.
	14 June 2023	Email	Seeking DPE feedback on draft Scoping Report.
	15 December 2023	Meeting	Project briefing meeting, including updates to DPE on Project status and Scoping Report status.
Biodiversity Conservation Division	25 November 2022	Project Briefing	Project briefing, overview of biodiversity context and preliminary constraints and discussion regarding survey approach and methodology.
	9 August 2023	Email	Project update, consultation on draft bird and bat utilisation survey methodology and clarification regarding threatened fauna survey methodologies and assessment expectations.

Consultation with agencies and elected officials to date has been primarily to commence engagement, introduce the Project and key Project team members. Consultation with further agencies will be undertaken throughout the assessment process, in accordance with the SEARs for the Project.

5.4 Feedback from Proximal Neighbours

The following section summarises consultation outcomes with proximal neighbours situated with an approximate 8 km radius of the Project.

5.4.1 Specific Feedback from Neighbours within 8 km of a Wind Turbine

The feedback received from receivers within 8 km of the Project Area was generally mixed towards the Project, with an average acceptance score of 5 (out of 10), which highlights that there are moderate levels of acceptance for the Project, and a scoring of 6.5 (out of 10) for level of concern. The SISR in **Appendix 3** of this Scoping Report outlines some of the feedback received from neighbouring landholders as well as the wider community.

The below lists some specific positive and negative feedback from proximal neighbours to the Project:

> *"More renewable energy into the grid. Less fossil fuel means more opportunities for transition to green energy."*
>
> *"Local employment is key in Stuart Town. We have sufficient recreation areas for a small community but more services and opportunity for social development would be welcomed."*
>
> *"Training opportunities for people involved in coal mining to encourage more employment opportunities. Electrical engineering etc."*
>
> *"The wind farm's size and capacity should consider the local communities demand and need – as opposed to supplying towns farther away."*

Concerns were raised in regard to the likely visual changes to the landscape, with one respondent noting: "Views of the countryside and down the trainline from the town should be unhindered and turbines should not be visible from any property in Stuart Town. The views from town are what define it, and turbines – that feed larger towns nearby – will detract from the inherent sense of place and quaintness." Consideration of preliminary visual consultation is addressed further in **Section 5.4.2** below.

Similar concerns were raised in response to potential impact on the social amenity of nearby residents as a result of noise generated by Project activities. One respondent at the community drop-in session expressed concern in relation to the potential 'swooshing' sound and vibrational sound of the turbines whilst operational, echoed by similar responses from other respondents: "*The prevailing winds are often from the north and north-east (especially in autumn and winter) making NOISE an issue at our home from the multiple turbines proposed for this direction."*

Another primary concern expressed by the community related to potential impacts to local roads and traffic, with one respondent highlighted that increased traffic and people in the area would affect the surrounding amenity of the locality, whilst others highlighted the potential for heavy traffic to cause road deterioration thus affecting road safety. Despite these concerns, two stakeholders saw upgrades to local roads and infrastructure as a potential positive of the Project, with one noting the potential for ACEN to work with local authorities to develop a mechanism to improve local road infrastructure as follows:

"*Negotiate with Governmental agencies to fix/mitigate any potential damage to roads/access."*

5.4.2 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' (i.e. repeated and ineffective consultation with the same local communities) these questions were incorporated into the broader Project-related community and stakeholder engagement, proportionate to the scale and likely impacts of the Project.

In summary, the format of this visual consultation (including but not limited to landholders within 8 km of a wind turbine) included distributed newsletters, online surveys, phone interviews, in addition to a drop-in community information session held on 30 September 2022 at the Stuart Town Hall of Arts between 2 pm and 6 pm.

Where possible, participants were asked targeted questions relating to visual and landscape features, including:

1. *Are there any areas or landscape features close to the proposed Project site that are of significant value to yourself, your business, or your community?*
2. *What are the best lookouts/ public viewing areas in the area? If you have a visitor, where do you take them to showcase your local area?*
3. *Are there things ACEN could do to reduce the visual impact of the wind farm or make it more visually appealing?*
4. *Please rate the scenic value of the following landscape features:*
    a. *Grazing Land.*
    b. *Bushland Areas.*
    c. *Rivers/Creeks.*
    d. *Vegetation.*
    e. *Hills.*
    f. *Ridgelands.*
    g. *Townships.*

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 (DPE, 2016b). A summary of this consultation, including number of surveys received, number of survey/phone call attempts and Umwelt dissemination mechanisms is provided in **Table 5.5** and **Table 5.6**.

Responses to the general visual questions are summarised in **Table 5.7** below. Reponses from participants that ranked landscape features and their scenic quality (into high, moderate or low visual significance as outlined in the Visual Bulletin) are then provided in **Table 5.8** below.

Ongoing consultation on these matters will occur during the EIS and incorporated into the detailed 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 5.5 Surveys Completed/Attempted

Status	Summary
Completed	A total of 18 surveys were completed.
Contacted (not completed)	Total contacted: 21 people on the stakeholder list that had previously attended the information session or registered for information on the Project. A link to the survey was also posted on the 'Aquila Wind' Facebook page hosted by ACEN, and on the 'Stuart Town' Facebook page hosted by the Stuart Town Advancement Association Incorporated. The Stuart Town Advancement Association Incorporated also distributed the survey link to their members via email.

Table 5.6 Additional Methods for Broader Community

Format	Comment
Project Newsletter	Delivered by Australia Posts Unaddressed mail system to 2,905 households across Stuart Town, Euchareena, Apsley, Mount Arthur, Mumbil, Walmer and Cundumbul.
Media release	Via the Aquila Wind website, social media posts, advertisements in local papers and on local radio stations.

Table 5.7 Summary of Responses to General Visual Questions

Question	summary of Responses
In your opinion, what are the key landscape features in the area? (Note these can include natural features such as distinct mountain peaks or cultural features such as an iconic church).	• Approximately 50% of survey responses identified green, rolling hills and undulating countryside as the key landscape feature of the area. • Approximately 16% of survey responses commented on the agricultural character of the landscape. • Approximately 16% of survey responses also commented on existing vegetation and wildlife as a key landscape feature. • The majority of survey responses related to regional scenic values, however, approximately 11% of survey respondents commented on the quality of existing views from their own properties. • Specific landscape features identified in survey responses included Burrendong Dam and its surrounds (16%), historic Stuart Town (5%) Catombal Range (5%), Mt Arthur and the Bell River (5%).
What are the best lookouts/ public viewing areas in the area? If you have a visitor, where do you take them to showcase your local area?	• The most common survey responses were Burrendong Dam (26%) and Mount Aquila (20%) and specific hilltop locations on the respondents' own properties (20%). • Other survey responses included Stuart Town Common (13%), Mt Arthur (6%), Bundalla Hill (6%), Harris Lookout (6%), Avoca Road above the Railway Station (6%), Kurrajong Valley (6%).

5.5 Responses to Community Feedback

As discussed in **Section 3.8.1**, the indicative Project design has been progressively refined in response to stakeholder feedback and with the objective of avoiding and minimising environmental and social impacts (with a particular focus on off-site amenity impacts such as visual and noise) to the greatest extent practicable.

Three substantial design revisions have occurred throughout the Scoping phase of the Project, resulting in:

- The indicative Project Area has been reduced from approximately 13,000 ha to 6,806 ha (a reduction of 6,194 ha or approximately 48%).
- The number of proposed WTGs has reduced from a maximum of 80 to a maximum of 48 WTGs (a reduction of 32 WTGs or approximately 40%), to minimise amenity impacts to Stuart Town, Euchareena, scattered rural dwellings to the south-west and south-east of the Project Area and Mookerawa State Recreational Area.

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.

Table 5.8 Responses that Ranked Landscape Features and their Scenic Quality

Stakeholder Group/Location	Please rate the scenic value of the following landscape features: Grazing land	Please rate the scenic value of the following landscape features: Bushland areas	Please rate the scenic value of the following landscape features: Rivers/creeks	Please rate the scenic value of the following landscape features: Vegetation	Please rate the scenic value of the following landscape features: Hills	Please rate the scenic value of the following landscape features: Ridgelands	Please rate the scenic value of the following landscape features: Townships
Landholders Within 8 km Radius							
Euchareena	High	High	High	High	High	High	Moderate
Euchareena	High	Low	Low	Moderate	High	High	Low
Euchareena	High	High	Low	High	High	High	Low
Euchareena	High	High	High	High	High	High	High
Euchareena	High	Low	Moderate	Moderate	Moderate	Moderate	Low
Farnham	High	High	High	High	High	Moderate	Low
Mount Aquila	High	High	High	High	High	High	High
Mount Aquila	Moderate	High	High	High	High	High	Low
Stuart Town	High	High	High	High	High	High	Moderate
Stuart Town	Moderate	Moderate	Low	Low	Moderate	Low	Low
Stuart Town	Moderate	High	High	Moderate	High	High	Moderate
Stuart Town	High	High	High	High	High	High	High
Stuart Town	Low	Moderate	High	Moderate	Moderate	Moderate	High
Stuart Town	Moderate	Moderate	High	High	Moderate	Moderate	High
Stuart Town	High	High	High	High	High	High	High

Stakeholder Group/Location	Please rate the scenic value of the following landscape features: Grazing land	Please rate the scenic value of the following landscape features: Bushland areas	Please rate the scenic value of the following landscape features: Rivers/creeks	Please rate the scenic value of the following landscape features: Vegetation	Please rate the scenic value of the following landscape features: Hills	Please rate the scenic value of the following landscape features: Ridgelands	Please rate the scenic value of the following landscape features: Townships
Landholders Outside 8 km Radius							
Mumbil	Moderate	High	High	High	High	High	Moderate
Wellington	Moderate	High	High	Moderate	High	Moderate	High
Stakeholder Group							
Local Aboriginal Land Council (LALC)	Low	High	High	High	High	High	Moderate

6.0 Proposed Assessment of Impacts

6.1 Key Environmental and Social Matters

A review of the environmental and social 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 by the Scoping Guideline (DPE, 2022b), 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 Scoping 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 the Scoping Guideline). **Appendix 1** presents a Scoping Table Summary showing the outcome of the scoping stage review of matters as required under the Scoping Guideline (DPE, 2022b).

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 Visual Amenity

A Preliminary Visual Impact Assessment (PVIA) has been undertaken by Moir Landscape Architecture Pty Ltd (Moir) in accordance with the requirements of the Visual Bulletin. This section provides a summary of the outcomes of the PVIA with the full report attached in **Appendix 5**.

The Project Area and its surrounds are primarily characterized by undulating, rolling hills to steep, rocky slopes, with general elevations range from 350–850 m. River and lake valleys are dominated by these rocky cliff edges with shallow soils which are prone to erosion and are severely limited for land uses other than grazing activity over native pastures. Other parts of the Project Area are gently undulating with rolling hills that are 450–750 m in elevation. These areas are moderately prone to erosion and are currently used for grazing over extensively cleared lands.

As outlined in **Section 5.0**, ACEN undertook community consultation during the scoping phase with landholders within and surrounding the Project Area. The likely visual changes to the landscape were identified as an issue through community consultation. Key landscape features identified during consultation included Lake Burrendong State Park and the Mookerawa State Recreation Area.

The community consultation completed to date indicates that visual impacts associated with the Project were noted as a key issue for some proximal landholders. The visual impact issues of some proximal landholders include how WTGs will impact the views from their properties and in some instances that the nature of large, built structures is contrary to the natural values of the social locality. It is also noted that there were many landholders that were interested in WTGs being considered at their properties.

Extensive areas within and surrounding the Project Area have been cleared for agricultural purposes, with areas of remnant vegetation scattered throughout the Project Area. The Project will be visible from both Host and non-associated landholders which will be a key focus of the detailed LVIA.

6.2.1.1 Visual Magnitude Assessment

Visual magnitude is a key visual parameter in the preliminary assessment tool within the Visual Bulletin. The visual magnitude is determined by a ratio of turbine height and distance, determining the visual extent of WTGs relative to dwellings and key public viewpoints. This visual extent assists with identifying viewpoints that may require further assessment during the preparation of the EIS.

The Visual Bulletin provides a graph which provides an indication of where proponents should give detailed consideration to the visual impacts on dwellings or key public viewpoints from WTGs. In accordance with the Visual Bulletin, proposed WTGs below the 'black line' must be identified along with the dwellings or key public viewpoints. The proposed WTGs are based on a worst-case scenario with a tip height of 250 m. As shown on **Figure 6.1**, the 'black line' intersects at a distance of 3,350 m and the 'blue line' intersects at 4,950 m. Results of the visual magnitude assessment within the PVIA (**Appendix 5**) indicate that:

- 60 non-associated dwellings and 13 Host dwellings were identified within the black line of visual magnitude (i.e. 0–3,350 m).
- 157 non-associated dwellings and two (2) Host and were identified between the black and blue lines of visual magnitude (i.e. 3,350–4,950 m).
- 72 non-associated dwellings were identified between the blue line of visual magnitude and the purple line (i.e. 4,950–8,000 m).
- In total there are 304 dwellings (15 Host and 289 non-associated) within 8,000 m of the proposed wind turbine locations.

Additionally, the Mookerawa Waters Holiday Park to the north of the Project Area (within the Mookerawa State Recreation Area) has been identified as a key public viewpoint within 4,950 m of the nearest turbines. The Mookerawa Waters Holiday Park comprises a range of accommodation types including cabins and camp sites, as well as recreational areas facilities including a golf course and boating facilities.[4] Impacts to the Holiday Park are discussed further in **Section 6.2.1.2** below.

[4] Accommodation within the Mookerawa Waters Holiday Park is not included in the list of dwellings above. A representative viewpoint for the Holiday Park has been included in the PVIA, and it will be separately assessed in the LVIA as a sensitive receiver (tourist and visitor accommodation and/or recreation, cultural or scenic site) in accordance with the Visual Bulletin.

Figure 6.2 illustrates the Visual Zone of Influence Analysis, which indicates the theoretical number of WTGs that will be visible within the landscape. It should be noted the Visual Zone of Influence Analysis is preliminary only and is generated from topography mapping and does not take into consideration other factors that would restrict views such as orientation, vegetation, distance, perspective, etc. It should also be noted that the Visual Bulletin preliminary assessment tools are not determinative, and rather provide early indication of where placement of WTGs will require further detailed assessment and justification. Further detailed assessment and justification will be completed in the LVIA.

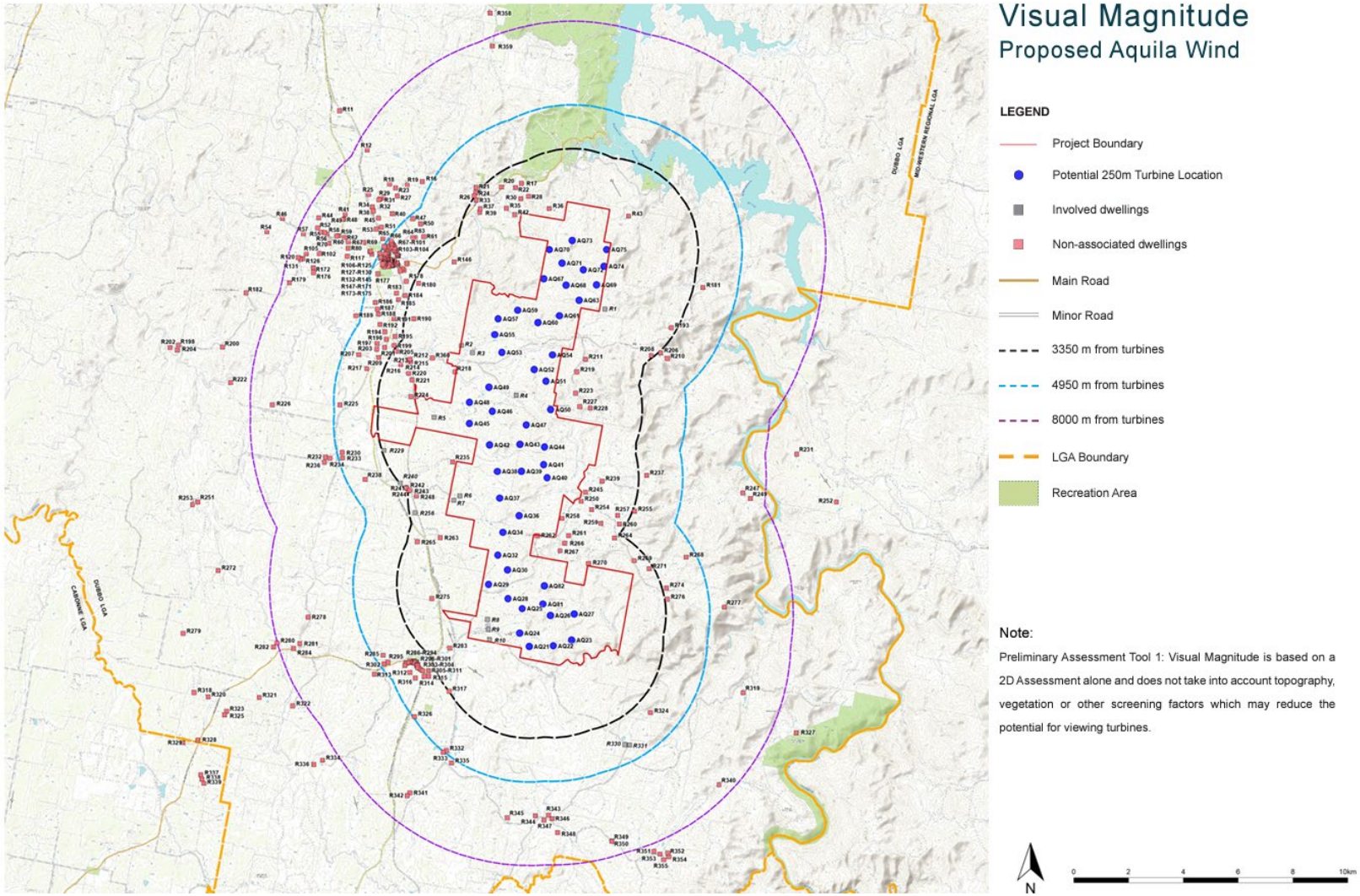
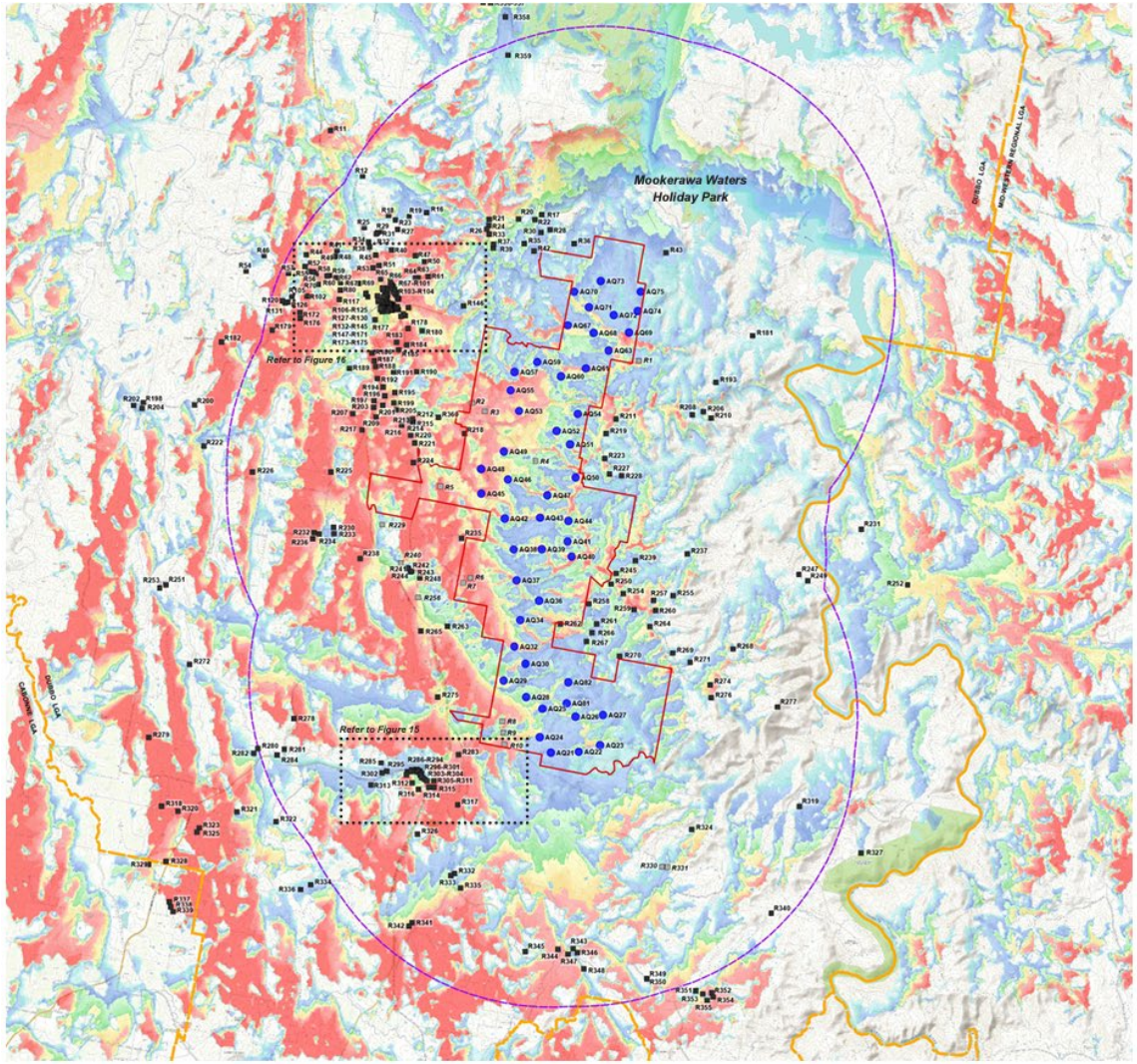


Figure 6.1 Preliminary Assessment Tool 1: Visual Magnitude



Zone of Visual Influence
Blade Tip Height 250 m
Proposed Aquila Wind

LEGEND

- Project Boundary
- Potential 250m Turbine Location
- Non-associated dwellings
- Involved dwellings
- 8000 m from turbines (Study Area)
- LGA Boundary

Number of visible turbines (at tip height)
(Based on topography alone):

- 0
- 1 - <8
- 8 - <18
- 18 - <28
- 28 - <38
- 38 - <=48

Note:

The ZVI is a preliminary assessment tool that represents a bare ground scenario - i.e. 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

Figure 6.2 Zone of Visual Influence

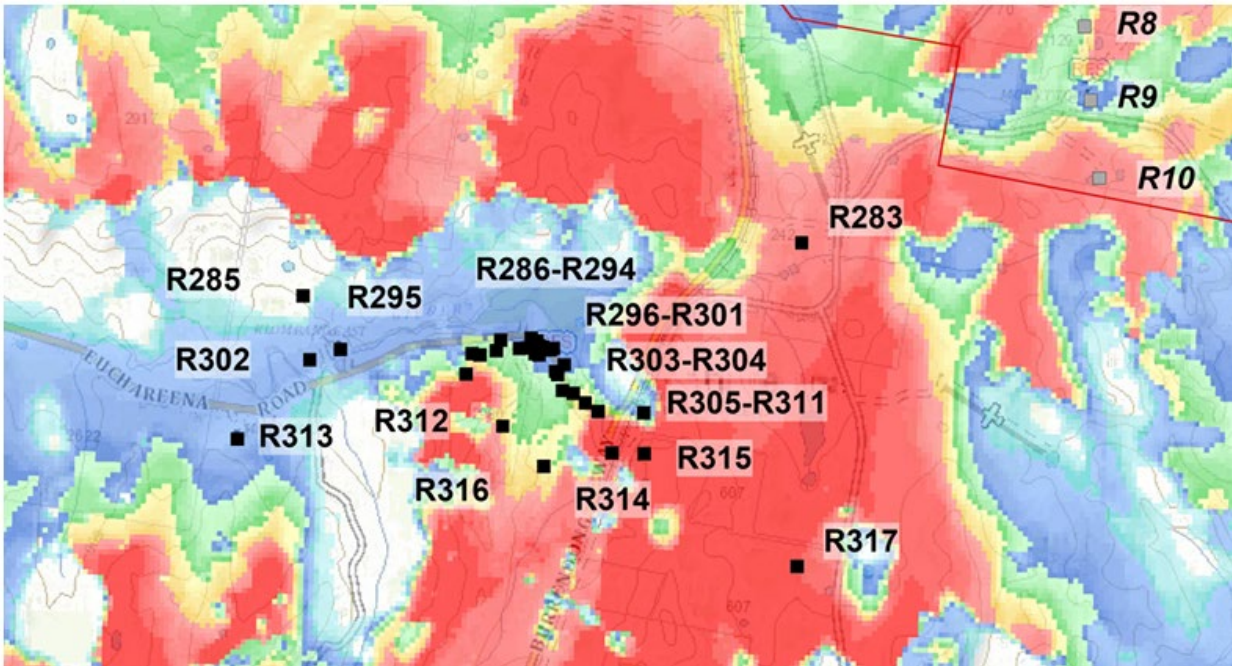


Figure 6.2A Zone of Visual Influence – Euchareena (inset)

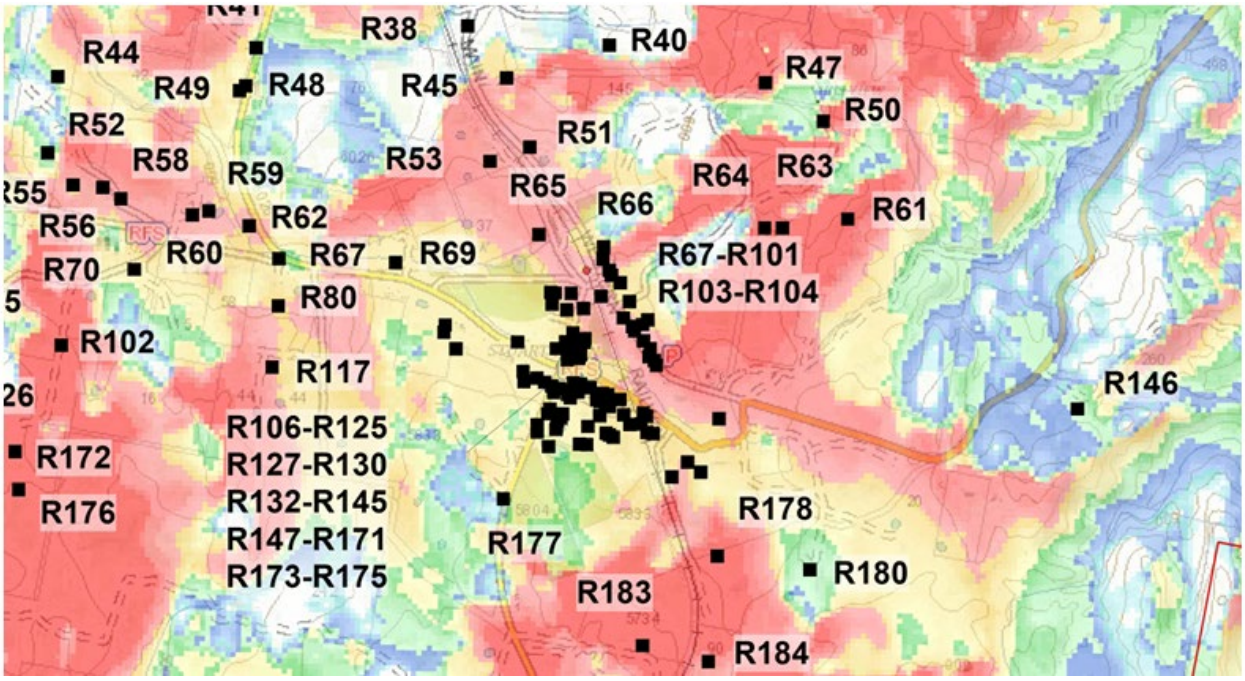


Figure 6.2B Zone of Visual Influence – Stuart Town (inset)

6.2.1.2 Multiple Wind Turbine Analysis

The Visual Bulletin outlines the requirements for the multiple wind turbine assessment which provides a preliminary indication of potential cumulative impacts arising from the proposed wind energy 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. This gives an indication of the number of WTGs visible across the landscape, however, it should be noted that this is based on topography alone and does not take into consideration other factors such as orientation, vegetation, distance, perspective etc. which would restrict views of the WTGs. This may result in the WTGs being either completely screened from view or only partially visible (i.e. only the tip of the WTG may be visible). It is noted that the PVIA does not take into account topography, vegetation or other screening factors which may reduce the potential for viewing turbines.

The results of the Multiple Wind Turbine Tool (**Appendix 5**) indicate that:

- 76 non-associated dwellings will have visible WTGs (within 8,000 m) in one 60° sector.
- 94 non-associated dwellings will have visible WTGs in two 60° sectors.
- 16 non-associated dwellings will have visible WTGs in three 60° sectors (up to 180°).
- Nine non-associated dwellings will have visible WTGs in four 60° sectors (up to 240°).

A representative viewpoint for the Mookerawa Waters Holiday Park was also identified on Mookerawa Road. Views of the turbines from this location will be available in one 60° sector, which is deemed an acceptable level in accordance with the Visual Bulletin. Additionally, three key public viewpoints were identified within the Lake Burrendong State Park, however these viewpoints are located over 8,000 m from the nearest turbine and therefore are not expected to have any 60° sector views.

6.2.1.3 Existing Topography and Shielding

Based on the findings of the PVIA, and observations made by Umwelt during preliminary site investigations at and near the Project Area, there is existing topography and vegetation (between wind turbines and receivers) that has the potential to shield/screen views of the Project for select dwellings and public viewpoints. Whilst this screening of views due to existing landscape features is not of influence at all dwelling/viewpoint locations it is anticipated to reduce impacts at most receivers. This is a key matter that will be investigated in detail during the EIS phase, to fully understand likely visual impacts.

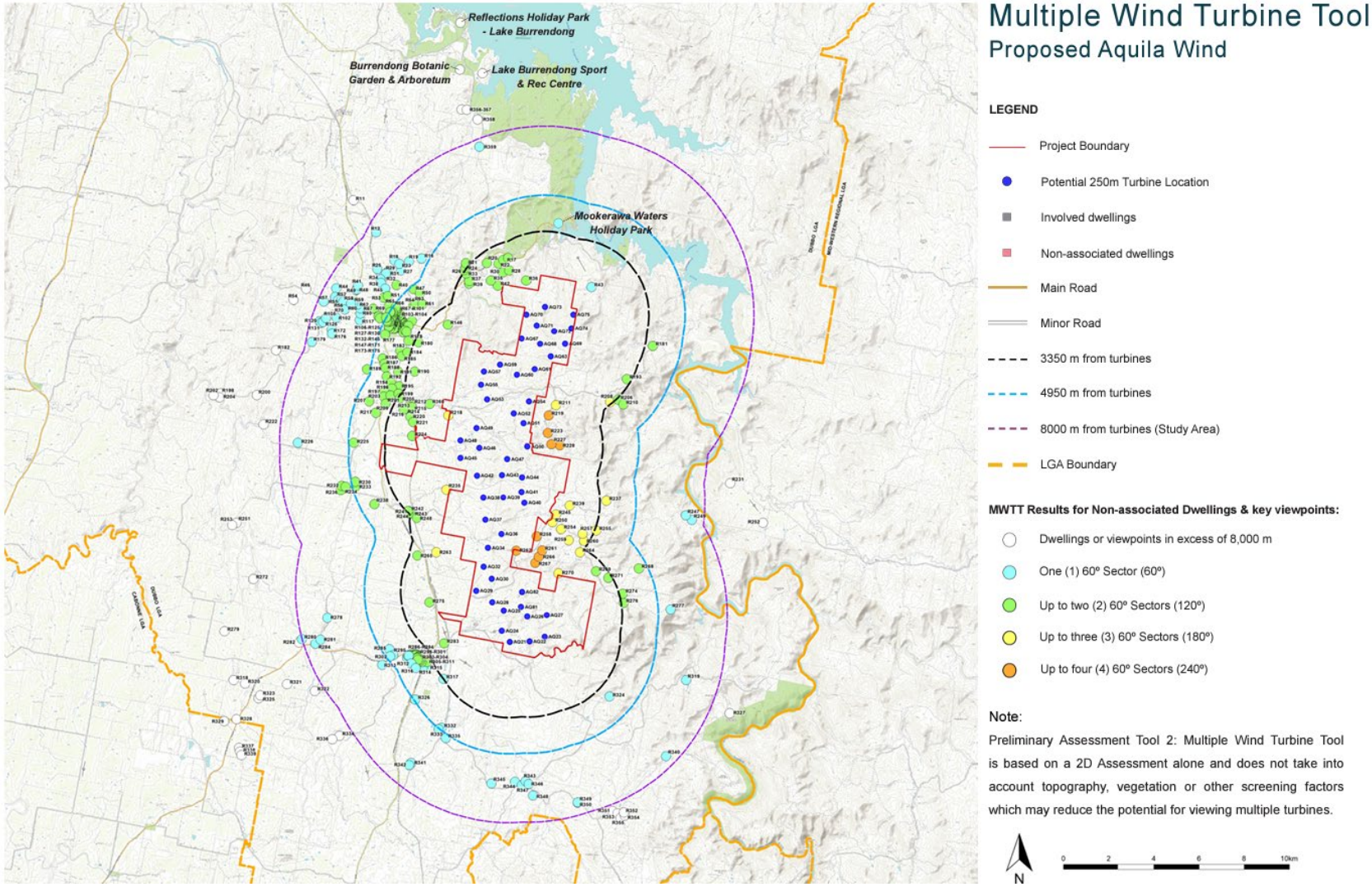


Figure 6.3 Multiple Wind Turbine Tool

6.2.1.4 Landscape Visual Impact Assessment

The detailed LVIA will be prepared in accordance with the requirements of the Visual Bulletin which comprises three main steps:

- Preparation of visual baseline study inputs, including consulting the community on aspects of the baseline study.
- Establishing visual influences zones from viewpoints using data collected in the baseline study.
- Visual performance evaluation requiring application of visual performance objectives to the proposed WTG layout.

The detailed LVIA will also include:

- A detailed assessment of the Project layout with consideration to all influencing factors such as topography, relative distance, perspective, orientation and existing vegetation that may obscure views of the Project.
- An assessment of cumulative visual impacts associated with other approved and proposed renewable energy projects in the surrounding locality.
- Consultation with potentially impacted landholders.
- Ground truthing, photography and photomontages of the Project.
- A description of the proposed mitigation measures to reduce visual impacts.

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

- Deletion of WTGs from the Project or repositioning of WTGs.
- Screening and/or supplementary planting.
- Night lighting of ancillary infrastructure being limited to low-level lighting for security, night time maintenance and emergency purposes.
- Consideration of WTG and Project infrastructure colour and design during final commercial tender process to minimise visibility and contrast.
- Entering into negotiated agreements with impacted landholders.

6.2.2 Noise and Vibration

A preliminary noise assessment has been undertaken by Marshall Day Acoustics Pty Ltd (Marshall Day) in accordance with the Noise Bulletin. The results of the preliminary noise assessment are summarised below, with the full report provided in **Appendix 6**. As a wind turbine model with the proposed Project specifications is not yet commercially available, an alternative turbine model with slightly altered dimensions (for which manufacturer's noise data is currently available) was used for the purposes of the preliminary noise assessment. A candidate turbine model (or models) with specifications consistent with the Project design would be used for the purposes of the detailed noise assessment in the EIS.

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). The Noise Bulletin enables the baseline criteria to be higher for Host or associated dwellings. It is noted that background noise level monitoring conducted as part of the detailed EIS process may result in an increase in the noise assessment criteria for the Project above that of the 35 dB(A) baseline noise criterion, however this is unlikely given the remoteness of the Project Area.

The preliminary noise assessment assumes a turbine sound power level of 105.8 dB(A), including 1 dB for test uncertainty, which is considered typical of noise emissions from comparable multi-MW WTG models. The preliminary noise assessment includes modelled noise predictions for all dwellings within 3 km of a proposed WTG. The modelling adopted a single worst-case scenario with emission source values being based on wind speeds of 10 m per second (m/s) at hub height, with wind direction travelling from the WTG to the dwelling.

The results of the preliminary noise modelling indicate that noise levels are predicted to exceed the baseline noise limit of 35 dB(A) at six non-associated dwellings (refer to **Figure 6.4**), being R211, R218, R219, R223, R227 and R262. The highest noise level at any non-associated dwelling would occur at R262, where noise levels of up to 38 dB(A) were predicted, with exceedances of less than 2 dB(A) predicted at the other five dwellings. The extent that predicted values exceed the baseline noise limit is summarised as follows:

- For three of the non-associated receivers, R211, R218 and R227, the predicted levels are < 1 dB above the 35 dB LAeq base noise limit.
- For two of the non-associated receivers, R219 and R223, the predicted levels are >1 dB < 2 dB above the 35 dB LAeq base noise limit.
- At one of the non-associated receivers, R262, the most affected receiver near the wind farm, the predicted levels are 3 dB above the 35 dB LAeq base noise limit.

Noise predictions were below the 35 dB(A) baseline noise limit at all other non-associated dwellings within 3 km. Modelled noise levels remained below 45 dB(A) at all Host dwellings. The highest noise level for host dwellings would occur at R4, where noise levels of up to 39.9 dB(A) were predicted (refer to **Figure 6.4**).

This preliminary analysis and the further detailed assessment to be undertaken as part of the EIS will help inform the detailed design of the Project and seek to minimise any significant noise impacts. This may include measures such as modifications to the WTG layout or the development of a mitigation strategy for affected non-associated dwellings. The EIS assessment will also assess construction phase impacts including on-site construction noise sources and road traffic noise impacts.

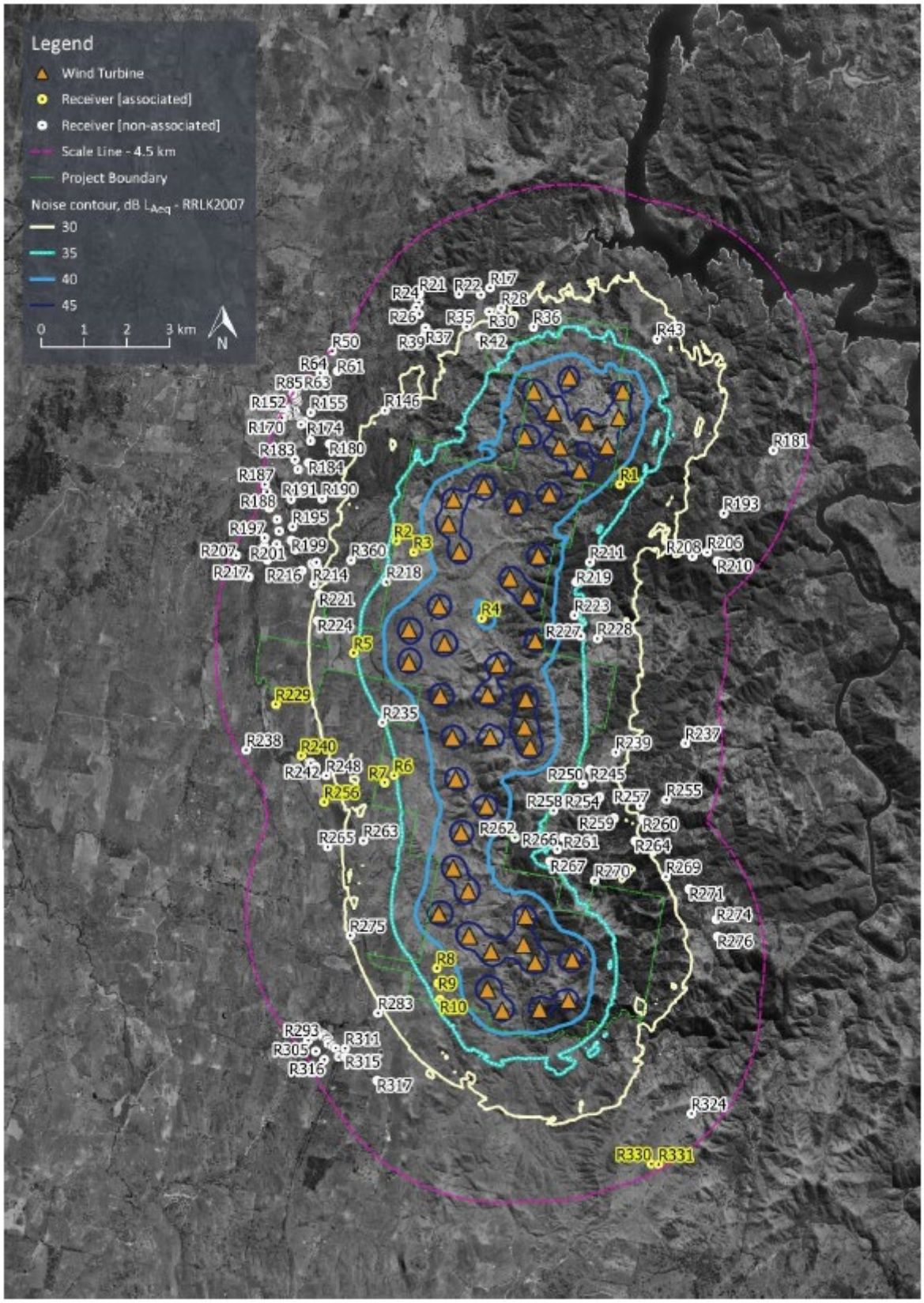


Figure 6.4 Highest Predicted Noise Levels (Hub Height Wind Speed 10 m/s or Greater)

6.2.2.2 Existing Emission Sources and Baseline Data

Based on the findings of the preliminary noise assessment, and observations made by Umwelt during preliminary site investigations at and near the Project Area, there are existing noise emission sources (such as roadways, railway lines and vegetation) near select receivers that have the potential to increase ambient and background noise levels. Whilst this feature of the existing noise environment is not present at all dwelling/receiver locations there is potential at some that wind speed-based background noise levels (from which noise limits are derived) could be elevated above 30 dBA. In these circumstances a resultant noise limit of above 35 dBA could be derived which is less stringent when compared to the base noise limit of 35 dBA, used in the preliminary noise assessment. This is a key matter that will be investigated in detail during the EIS phase, to fully understand likely noise impacts.

6.2.2.3 Construction and Road Noise Impacts

The construction of the Project will generate noise and vibration associated with vegetation removal and earthworks, construction of access tracks, and installation of Project infrastructure (including turbines and ancillary infrastructure). Additionally, the construction of the Project will generate additional traffic movements associated with the transportation of the WTGs, blades and other heavy-duty equipment by heavy vehicle movements (including OSOM vehicles), as well as the movement of the construction workforce to and from the site.

Construction noise and vibration and road traffic noise impacts will be investigated in detail during the EIS phase.

6.2.2.4 Noise and Vibration Impact Assessment Methodology

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:

- deletion of WTGs from the Project or repositioning of WTGs
- 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

Biodiversity is a key consideration in the Project design and assessment work commenced in mid-2022 aiming to progressively gather information to inform the Project design process, assisting to avoid and minimise impacts.

A Biodiversity Constraints Assessment (BCA) was undertaken between July 2022 and February 2023 incorporating desktop analysis, vegetation mapping and a preliminary site inspection. The BCA identified potential ecological constraints present within the Project Area listed under the BC Act and the EPBC Act including Plant Community Types (PCTs), threatened species, populations or threatened ecological communities (TECs). The BCA also outlines potential direct, indirect, prescribed and serious and irreversible (SAII) impacts that may result from the Project.

The BCA is provided in **Appendix 7** of this Scoping Report, with the key aspect summarised in the subsequent sections below.

6.2.3.1 Potential Vegetation Communities

Plant Community Types

A review of baseline NSW vegetation mapping of the broader Project Area was undertaken as part of the BCA, which identified 19 PCTs within the Project Area. The site visit confirmed the likely occurrence of these PCTs, however their distribution across the Project Area differed to that depicted in the baseline mapping. The presence and extent of PCTs within the Project Area is outlined in **Table 6.1** and illustrated on **Figure 6.5** below.

Table 6.1 Preliminary PCTs and their Extent in the Project Area

Plant Community Type	BC Act	EPBC Act	Area (ha) within Project Area	Area (Ha) within Development Corridor
Non-native vegetation	-	-	4,354.6	1,239.8
PCT 185: Dwyers Red Gum – White Cypress Pine – Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	-	-	1.1	0.0
PCT 186: Dwyers Red Gum – Black Cypress Pine – Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion	Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion (Critically Endangered).	-	0.9	0.0
PCT 266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	62	10.7
PCT 268: White Box – Blakelys Red Gum – Long-leaved Box – Nortons Box – Red Stringybark grass-shrub woodland on shallow soils on hills in the NSW South Western Slopes Bioregion	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	1.1	0.0
PCT 272: White Box – Black Cypress Pine – red gum +/- Mugga Ironbark shrubby woodland in hills of the NSW central western slopes	-	-	0.7	0.0

Plant Community Type	BC Act	EPBC Act	Area (ha) within Project Area	Area (Ha) within Development Corridor
PCT 273: White Box shrubby open forest on fine grained sediments on steep slopes in the Mudgee region of the of central western slopes of NSW	-	-	0.3	0.0
PCT 277: Blakelys Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	5.9	0.0
PCT 280: Red Stringybark – Blakelys Red Gum +/- Long-leaved Box shrub/grass hill woodland of the NSW South Western Slopes Bioregion	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	5.6	0.0
PCT 292: She oak – Fringe Myrtle heathland on rocky ranges in the NSW South Western Slopes Bioregion	-	-	0.3	0.0
PCT 332: Tumbledown Red Gum – Black Cypress Pine – Red Stringybark woodland on rocky hills in the NSW central western slopes	-	-	0.7	0.0

Plant Community Type	BC Act	EPBC Act	Area (ha) within Project Area	Area (Ha) within Development Corridor
PCT 347: White Box – Blakelys Red Gum shrub/grass woodland on metamorphic hillslopes in the mid-southern part of the upper slopes sub-region of the NSW South Western Slopes Bioregion	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered)	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered)	952.3	104.0
PCT 461: Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion	-	-	27.4	0.0
PCT 511: Queensland Bluegrass – Redleg Grass – Rats Tail Grass – spear grass – panic grass derived grassland of the Nandewar Bioregion and Brigalow Belt South Bioregion	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	74.4	0.0
PCT 1330: Yellow Box – Blakelys Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	4.3	0.0

Plant Community Type	BC Act	EPBC Act	Area (ha) within Project Area	Area (Ha) within Development Corridor
PCT 3399: Southwest Hills White Box-Blakelys Red Gum Forest	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	228.5	22.0
PCT 3406 – Southwest Ranges White Box Woodland	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	3.1	0.0
PCT 3534: Central West Stony Hills Stringybark-Box Forest	-	-	384.9	40.3
PCT 3734: Central Tableland Dry Slopes Stringybark-Box Forest	-	-	697.6	80.1
PCT 4063 – Central and Southern Tableland River Oak Forest	-	-	2.8	0.0
Total non-native vegetation			**4,354.6**	**1,239.8**
Total native vegetation			**2,453.9**	**257.1**

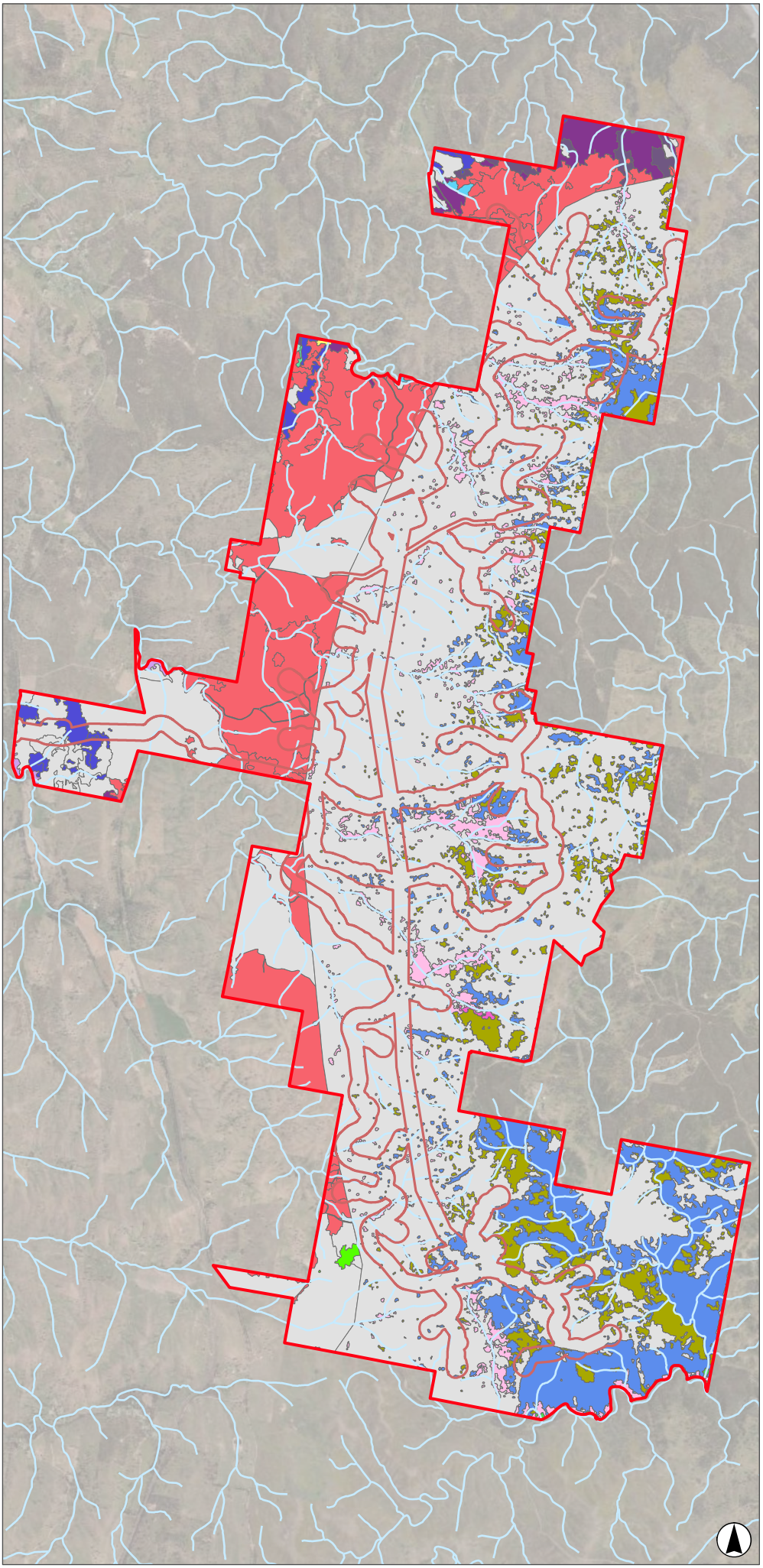


FIGURE 6.5

Preliminary Plant Community Types within the Project Area

Legend

- Project Boundary
- Development Corridor
- Named Watercourse

PCT ID & Name (State Vegetation Type Mapping)

- 185: Dwyers Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
- 186: Dwyers Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion
- 266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion
- 268: White Box - Blakelys Red Gum - Long-leaved Box - Nortons Box - Red Stringybark grass-shrub woodland on shallow soils on hills in the NSW South Western Slopes Bioregion
- 272: White Box - Black Cypress Pine - red gum +/- Mugga Ironbark shrubby woodland in hills of the NSW central western slopes
- 273: White Box shrubby open forest on fine grained sediments on steep slopes in the Mudgee region of the of central western slopes of NSW
- 277: Blakelys Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
- 280: Red Stringybark - Blakelys Red Gum +/- Long-leaved Box shrub/grass hill woodland of the NSW South Western Slopes Bioregion
- 292: She oak - Fringe Myrtle heathland on rocky ranges in the NSW South Western Slopes Bioregion
- 332: Tumbledown Red Gum - Black Cypress Pine - Red Stringybark woodland on rocky hills in the NSW central western slopes
- 347: White Box - Blakelys Red Gum shrub/ grass woodland on metamorphic hillslopes in the mid-southern part of the upper slopes sub-region of the NSW South Western Slopes Bioregion
- 461: Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion
- 511: Queensland Bluegrass - Redleg Grass - Rats Tail Grass - spear grass - panic grass derived grassland of the Nandewar Bioregion and Brigalow Belt South Bioregion
- 1330: Yellow Box - Blakelys Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
- 3399: Southwest Hills White Box-Blakelys Red Gum Forest
- 3406: Southwest Ranges White Box Woodland
- 3534: Central West Stony Hills Stringybark-Box Forest
- 3734: Central Tableland Dry Slopes Stringybark-Box Forest
- 4063: Central and Southern Tableland River Oak Forest
- Not native vegetation

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

6.2.3.2 Threatened Ecological Communities

Prior to the site visit, the desktop assessment identified six TECs with a moderate or higher likelihood of occurring within a 30 km radius of the Project Area. After the site visit, two were determined as occurring within the Project Area (including Box Gum Woodland, listed under the both the NSW BC Act and EPBC Act) with a further four being assessed as having a moderate likelihood of occurrence within the Project Area. The six TECs identified in the desktop assessment as potentially occurring within the Project Area are replicated from Table 3.3 of the BCA as **Table 6.2** below.

Further information regarding each of the two TEC determined as occurring within the Project Area is provided in Section 3.4.2.1 of the BCA.

Table 6.2 TECs Recorded in the Project Area

Threatened Ecological Community	BC Act Listing	EPBC Act Listing	Entity with the Potential for Serious and Irreversible Impact (SAII)	Likelihood of Occurrence	Area (Ha) within Project Area	Area (Ha) within Development Corridor
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Not listed	Endangered	No	Moderate	-	-
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Endangered	Not listed	No	Moderate	-	-
Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions	Endangered	Not listed	No	Moderate	-	-
Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South East Corner Bioregions	Critically endangered	Not listed	Yes	Moderate	-	-
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions – (Box Gum Woodland, BC Act)	Critically endangered	Not listed	Yes	**Recorded**	1337.2	136.7
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – (Box Gum Woodland, EPBC Act)	Not listed	Critically endangered	-	**Recorded**		

The desktop assessment and vegetation mapping undertaken as part of the BCA is preliminary and will require further surveys as part of future biodiversity assessment carried out to support the EIS. As detailed vegetation surveys and analysis across the Project Area has not been carried out to date, the presence of other TECs occurring within the Project Area cannot be discounted.

Figure 6.6 below illustrates the TECs within the Project Area.

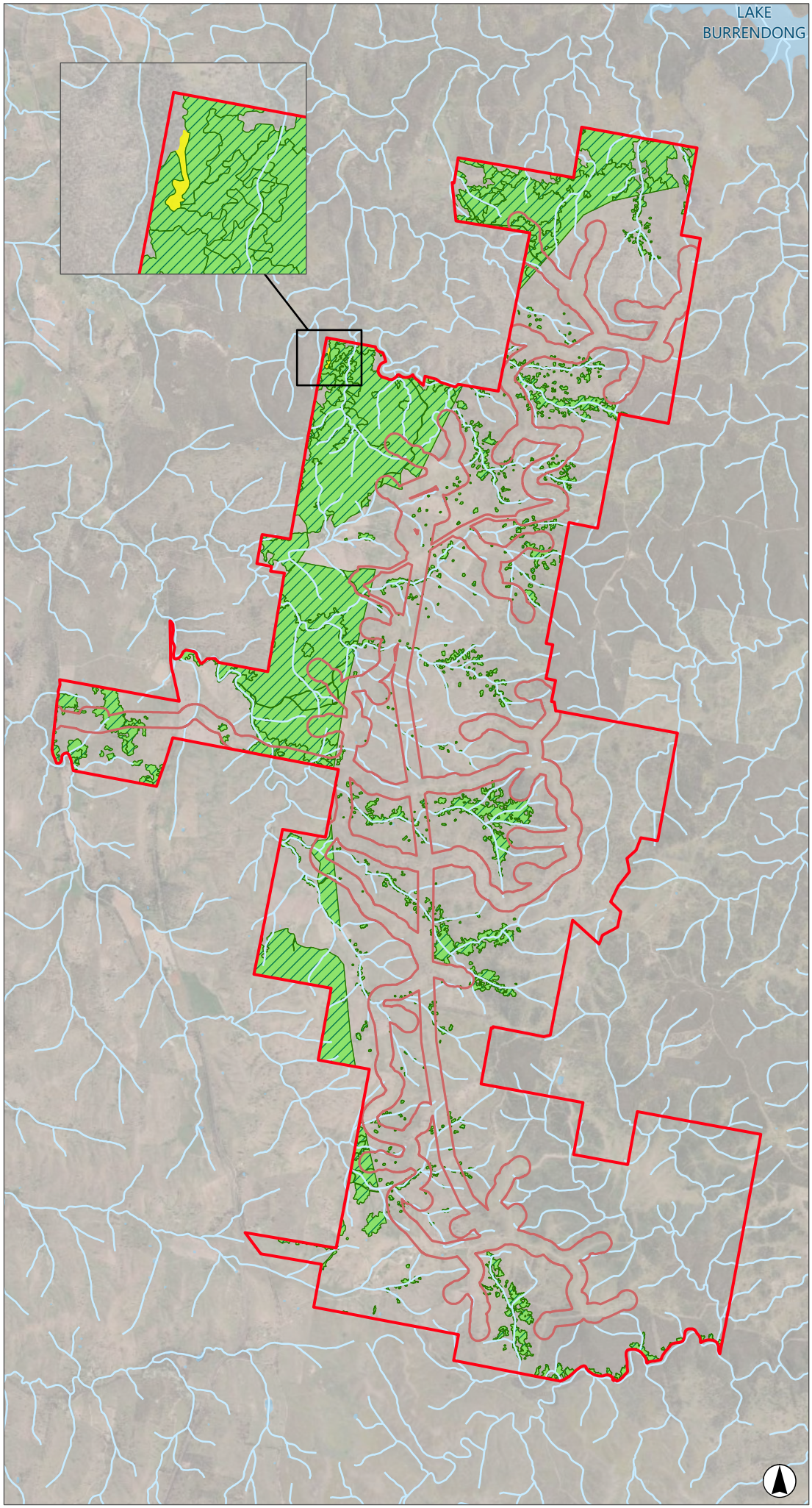


FIGURE 6.6

Threatened Ecological Communities within the Project Area

Legend

- Project Boundary
- Development Corridor
- Named Watercourse

Threatened Ecological Communities (EPBC Act)

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

Threatened Ecological Communities (BC Act)

- Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion
- White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Box Gum Woodland, BC Act)

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

6.2.3.3 Indicative Clearing of Native Vegetation

Based on the information above and the indicative Project layout represented in **Figure 3.1**, it is estimated that the total indicative disturbance footprint for the Project would be in the order 388 ha, or 5–6% of the total Project Area. This value is indicative only, and subject to change as Project designs progress and biodiversity assessment works continue.

The disturbance footprint (indicatively 388 ha) would be wholly located within the Development Corridor of 1,497 ha, which the preliminary PCT mapping indicates is primarily comprised of non-native vegetation (refer to **Table 6.1**). As indicated in **Table 6.1** and **Table 6.2**, the preliminary PCT mapping indicates approximately 257.1 ha of native vegetation (including approximately 136.7 ha of Box Gum Woodland TEC) within the Development Corridor may be directly impacted by the Project. However, it should be noted that this mapping is preliminary and would require further surveys during the EIS phase. Additionally, the disturbance footprint (indicatively 388 ha) is substantially smaller than the Development Corridor (1,497 ha) and will be refined during the EIS phase to minimise impacts to native vegetation where practicable.

6.2.3.4 Matters of National Environmental Significance (MNES)

The EPBC Act provides protection of the environment from actions proposed to '*have the potential to significantly impact on MNES or the environment of Commonwealth land*'. A search of the Commonwealth Protected Matters Search Tool (PMST) was undertaken as part of the BCA on 7 December 2023. The search included a 30 km buffer from the Project Area. The search results are summarised below in **Table 6.3** and a record of the PMST report is provided in Appendix A of the BCA (refer to **Appendix 7**).

Table 6.3 MNES Within 30 km of the Project Area

MNES	Relevance to Development
World Heritage Properties	0
National heritage properties	0
Wetlands of international importance	5
Threatened ecological communities	3
Threatened species	61
Migratory species	11
State and territory reserves	4
Commonwealth marine area	0
Commonwealth Lands	7
The Great Barrier Reef Marine Park	0

Surveys to determine the presence and likelihood of impacts to MNES would be undertaken during the preparation of the EIS. Regardless, the Project would be referred to the Commonwealth DCCEEW. The purpose of this referral to DCCEEW is to determine whether the proposed action (i.e. the Project) will need formal assessment and approval under the EPBC Act. The referral provided to DCCEEW would be the principal basis for the Minister's decision as to whether approval is necessary and, if so, the type of assessment that will be taken. In this case, the referral would be made even though the action may not have a significant impact, and potential impacts are uncertain.

6.2.3.5 Species-Credit Species Survey Requirements

All BAM assessments require extensive field surveys including the collection of floristic data, vegetation mapping and targeted seasonal species-credit species surveys. As outlined in Section 4 of the BCA, the Biodiversity Assessment Method Calculator (BAMC), BioNet Atlas records, and PMST were used to derive a list of candidate species that would likely require survey and assessment in accordance with the BAM.

Threatened flora and fauna species-credit-species which would likely require survey and assessment for the Project are detailed in **Table 6.4** and **Table 6.5** respectively.

Table 6.4 Threatened Flora Species Credit Species Likely Requiring Survey

Common Name (*Scientific Name*)	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the Potential for SAII	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ausfeld's Wattle (*Acacia ausfeldii*)	V	-	Footslopes and low rises on sandstone		No												
Capertee Stringybark (*Eucalyptus cannonii*)	V	-	-	-	No												
Grevillea divaricata	E	-	-	-	Yes												
Hoary Sunray (*Leucochrysum albicans var. tricolor*)	-	E	-	-	No												
Clandulla Geebung (*Persoonia marginata*)	V	V	-	-	No												
Small Purple-pea (*Swainsona recta*)	E	E	-	-	No												
Silky Swainson-pea (*Swainsona sericea*)	V	-	-	-	No												
Veronica blakelyi	V	-	-	-	No												
Granite Zieria (*Zieria obcordata*)	E	E	Rocky areas, Land containing granite or boulders	-	Yes												

Table 6.5 Threatened Fauna Species Credit Species Likely Requiring Survey

Common Name (*Scientific Name*)	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the Potential for SAII	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Regent Honeyeater (Breeding) (*Anthochaera phrygia*)	CE	CE	As per mapped areas (not in Project Area)	-	Yes												
Pink-tailed Legless Lizard (*Aprasia parapulchella*)	V	V	Rocky areas or within 50 m of rocky areas	-	No												
Bush Stone-curlew (*Burhinus grallarius*)	E	-	Fallen/standing dead timber including logs	-	No												
Gang-gang Cockatoo (Breeding) (*Callocephalon fimbriatum*)	V	E	Hollow bearing trees Eucalypt tree species hollows greater than 9 cm diameter	-	No												
Glossy Black-Cockatoo (Breeding) (*Calyptorhynchus lathami*)	V	-	Hollow bearing trees Living or dead tree with hollow greater than 15 cm diameter and greater than 8 m above the ground	-	No												
Eastern Pygmy-possum (*Cercartetus nanus*)	V	-	-	-	No												

Common Name (*Scientific Name*)	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the Potential for SAII	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Large-eared Pied Bat (*Chalinolobus dwyeri*)	V	V	Cliffs Within 2 km of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within 2 km of old mines or tunnels	-	Yes												
White-bellied Sea-Eagle (Breeding) (*Haliaeetus leucogaster*)	V	-	Living or dead mature trees within suitable vegetation within 1 km of a rivers, lakes, large dams or creeks, wetlands and coastlines	-	No												
Little Eagle (Breeding) (*Hieraaetus morphnoides*)	V	-	Nest trees - live (occasionally dead) large old trees within vegetation)	-	No												
Key's Matchstick Grasshopper (*Keyacris scurra*)	E	-	-	-	No												
Swift Parrot (Breeding) (*Lathamus discolor*)	E	CE	As per mapped areas (not in Project Area)	-	Yes												

Common Name (*Scientific Name*)	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the Potential for SAII	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Green and Golden Bell Frog (*Litoria aurea*)	E	V	Semi-permanent/ ephemeral wet areas Within 1 km of wet areas/swamps /waterbodies	-	No												
Booroolong Frog (*Litoria booroolongensis*)	E	E	-	-	No												
Square-tailed Kite (breeding) (*Lophoictinia isura*)	V	-	-	-	No												
Large Bent-winged Bat (Breeding) (*Miniopterus orianae oceanensis*)	V	-	Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records	-	Yes												
Barking Owl (Breeding) (*Ninox connivens*)	V	-	Hollow bearing trees Living or dead trees with hollows greater than 20 cm diameter and greater than 4 m above the ground	-	No												
Powerful Owl (Breeding) (*Ninox strenua*)	V	-	Hollow bearing trees Living or dead trees with hollow greater than 20 cm diameter	-	No												

Common Name (*Scientific Name*)	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the Potential for SAII	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Purple Copper Butterfly, Bathurst Copper Butterfly (*Paralucia spinifera*)	E	V	*Bursaria spinosa* or within 40 m of *Bursaria spinosa*	-	No												
Greater Glider (*Petauroides volans*)	-	V	-	-	No												
Squirrel Glide (*Petaurus norfolcensis*)	V	-	-	-	No												
Brush-tailed Phascogale (*Phascogale tapoatafa*)	V	-	-	-	No												
Koala (*Phascolarctos cinereus*)	E	E	Presence of koala use trees	-	No												
Superb Parrot (Breeding) (*Polytelis swainsonii*)	V	V	Hollow bearing trees Living or dead *E. blakelyi, E. melliodora, E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. mannifera, E. intertexta* with hollows greater than 5 cm diameter greater than 4 m above ground or trees with a DBH of greater than 30 cm	-	No												

Common Name (*Scientific Name*)	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the Potential for SAII	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Grey-headed Flying-fox (Breeding) (*Pteropus poliocephalus*)	V	V	Breeding camps	-	No												
Masked Owl (Breeding) (*Tyto novaehollandiae*)	V	-	Hollow bearing trees Living or dead trees with hollows greater than 20 cm diameter	-	No												

6.2.3.6 Potential Impacts

The BAM requires the assessment of discrete types of impacts on biodiversity values resulting from proposed development during both construction and operational phases. Based on the findings of the desktop assessment and site inspection undertaken as part of the BCA, the potential impacts to biodiversity from the Project are detailed in **Table 6.6** below. The purpose of **Table 6.6** is to provide a preliminary overview of direct, indirect, SAII and prescribed impacts that could theoretically occur as a result of the Project, and which will therefore require detailed assessment in the BDAR.

Table 6.6 Potential Impacts Associated with the Project

Impact Type	Potential Impact	Details
Direct impacts	Removal of native vegetation Removal of threatened species and their habitat Fauna mortality	• 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 may contribute to further fragmentation of native vegetation communities within the locality. • Removal of grassland habitat may impact suitable habitat for the Pink-tailed Legless Lizard and the Striped Legless Lizard known to occur within the Project Area. • 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. The proposal has the potential to remove these tree hollows, thereby impacting on threatened species that may utilise them as habitat. • Construction of WTGs and access roads may clear the rocky habitat of threatened fauna species such as the Spotted-tailed Quoll. • Construction of WTGs and their access roads may clear logs and debris used by threatened flora and fauna species predicted to occur within the Project Area.
Indirect impacts	Inadvertent impacts on adjacent habitat or vegetation Reduced viability of adjacent habitat due to edge effects Reduced viability of adjacent habitat due to noise, dust or light spill Transport of weeds and pathogens from the site to adjacent vegetation Changed fire regimes	• 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. • Noise and vibration disturbances to fauna. • Fire mitigation strategies may result in changes to fire regime across the Project Area. Changes to fire regime is known to negatively impact Plains-wanderer and its habitat.

Impact Type	Potential Impact	Details
Prescribed impacts	Impacts from wind turbine strike	• The operation of the proposed WTGs has the potential to directly impact upon threatened birds and bats, through turbine blade strike. • 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. • Project construction may require the augmentation 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	
SAII	As per examples listed above	• A number of entities with the potential for SAII could be present within the Project Area. • The BAM assessment will likely require an assessment of impacts on SAII entities as identified in Section 3.5 and Section 3.6 of the BCA (**Appendix 7**).

6.2.3.7 Additional Biodiversity Assessment

Additional detailed biodiversity surveys will be undertaken within the Project Area with a focus on the proposed Development Corridor and in the vicinity of proposed WTG and infrastructure locations. Following the completion of the surveys, a Biodiversity Development Assessment Report (BDAR) will be prepared. The BDAR will include:

- Field surveys and GIS mapping:
    - PCT survey and GIS mapping.
    - Targeted species-credit survey.
    - Bird and bat utilisation survey.
- Results of the literature review.
- 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 sheets, figures and associated GIS files.

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

- Avoiding areas of high value native vegetation (including TECs) as far as practicable. An avoid-minimise hierarchy has been provided in Section 6 of the Biodiversity Constraints Assessment (**Appendix 7** of this Scoping Report). Impacts to entities with the potential for SAII should be avoided where feasible and minimised as a priority.
- Implementation of a comprehensive biodiversity mitigation and management strategy to minimise the unavoidable impacts of the Project on biodiversity values, including:
    - Salvage of biodiversity features, including habitat resources (e.g. hollow logs, tree hollows, fallen timber and rocks/boulders) from areas to be cleared.
    - Implementation of a pre-clearing procedures.
    - Weed management.
    - Bushfire management.
    - Erosion and sedimentation control.
- A biodiversity offset strategy.

6.2.4 Heritage

A Preliminary Heritage Constraints Assessment (PHCA) has been prepared to support this Scoping Report, contained in **Appendix 8**. The key aspects of the PHCA are summarised in the subsequent sections below.

6.2.4.1 Aboriginal Heritage

Desktop heritage investigations were undertaken utilising available resources to map and then provide an indication of potential heritage constraints that may occur within the Project Area. A high-level Aboriginal heritage assessment was then conducted to provide an overview of identified heritage constraints and the associated risk, based on a review of relevant databases and subsequent analysis of identifiable landscape features.

The AHIMS database search (conducted 6 December 2023) indicates that there are 110 Aboriginal sites registered within the Study Area, which encompasses the proposed Project Boundary plus a buffer to 10 km. Five of these Aboriginal sites were registered within the Project Boundary. The 110 registered Aboriginal sites include:

- Five (5) Open Artefact Sites within the Project Boundary (refer **Table 6.7** below).
- 65 Open Artefact Sites, within 10km of the Project Boundary.
- Nine (9) Stone Quarries.
- One (1) Open Artefact Site; Hearth.
- 25 Culturally Modified Trees.

- One (1) Ochre Quarry.
- One (1) Water Hole.
- One (1) Stone Arrangement.
- One (1) PAD.
- One (1) AHIMS item with information restrictions (Restricted Aboriginal Site 36-5-0085). Heritage NSW has confirmed that this site would not be impacted by any works within the Project Area.

In total, 30 of these sites were identified in the vicinity of Lake Burrendong. As the Project Boundary is 8.5 km south of Lake Burrendong, direct (and indirect) impacts are unlikely. Direct and indirect impacts to the remaining sites outside the Project Boundary are also unlikely but these matters would be further investigated during the EIS phase of works as a component of the Aboriginal cultural heritage assessment. No Aboriginal places were identified within the Study Area.

AHIMS Sites Within the Project Boundary

The results of the AHIMS search indicated that there are five Aboriginal sites registered within the Project Boundary. No Aboriginal places were identified within the Project Area. A copy of the extensive AHIMS search results is provided in the PHCA (refer to **Appendix 8**), and a summary of registered AHIMS sites is presented in **Table 6.7**.

Table 6.7 AHIMS Sites within the Project Boundary

Name	ID	Site Type	Site Features
Stockyard Creek; Stockyard Creek 1	36-5-0017	Open Camp Site	Artefact
Backwater Creek; Backwater Creek 2	36-5-0026	Open Camp Site	Artefact
Backwater Creek; Backwater Creek 3	36-5-0025	Open Camp Site	Artefact
Stockyard Creek; Stockyard Creek 4	36-5-0030	Open Camp Site	Artefact
Stockyard Creek; Stockyard Creek 5	36-5-0029	Open Camp Site	Artefact

A summary of the AHIMS search results and relevant site card information is provided for AHIMS ID#: 36-5-0017, 36-5-0025, 36-5-0026, 36-5-0029 and 36-5-0030 within Section 4.3 of the PHCA (refer to **Appendix 8**).

The presence of these sites also indicates that an Aboriginal cultural heritage assessment or survey may have been undertaken in the area and this will be reviewed during the EIS phase. This information will assist to inform the pattern and distribution of the sites and will have implications for providing advice regarding the potential for other sites, at that later time. It is noted that the currently proposed wind turbine locations are at least 500 m from the identified AHIMS sites. Site cards have been obtained for these five AHIMS sites within the Project Boundary to gain an understanding of the nature and extent of each site, provided in Appendix 2 of the PCHA (refer to **Appendix 8**).

The AHIMS sites within the Project Boundary (and those recorded more broadly, as shown in the PHCA) demonstrate the presence of Aboriginal objects within the Project Area and the local area and suggests that additional Aboriginal objects/sites may be present within the Project Area. The abovementioned potential is normal for a development of this scale and locality. Direct and indirect impacts would be further investigated during the EIS phase of works following normal Aboriginal cultural heritage assessment practices. It is noted that the presence of Aboriginal objects (including registered AHIMS sites) does not preclude any impact occurring in the vicinity of these sites. Rather, impacts to heritage sites (including total or partial loss of a site) would require detailed assessment and mitigation (e.g. surface collection or salvage excavation prior to works occurring).

Given the known presence of Aboriginal sites within the Project Area, 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.

6.2.4.2 Historic Heritage

The results of the PHCA (**Appendix 8**) indicate that:

- A search of the World Heritage List, National Heritage List and Commonwealth Heritage List on the Department of Agriculture, Water and Environment's website was undertaken on 6 December 2023. No items were identified within 10 km of the Project Boundary that were listed as World, National or Commonwealth heritage.
- It is noted that three items were identified within 10 km of the Project Boundary that are listed in the Register of the National Estate. This register was closed in 2007 and is no longer a statutory list. Two of these sites were nominated to the register for their natural (rather than cultural) heritage values. The Stuart Town General Cemetery was nominated based on its historic heritage values.
- A search of the NSW State Heritage Inventory (SHI) was undertaken on 6 December 2023 for the Study Area. The results of the search indicated that there is no State heritage listed items within the Project Boundary and two State heritage listed items within 10 km of the Project Boundary.

- Dubbo Regional LEP 2022, Mid-Western Regional LEP 2012 and Cabonne LEP 2012 were reviewed on 6 December 2023, for any listed heritage items or heritage conservation areas within 10 km of the Project Boundary. The results of the search indicated that there are no local heritage items within the Project Boundary. A total of 22 locally listed heritage items were identified within 10 km of the Project Boundary. Two of the locally listed heritage items are also listed in the SHI.

With the above-mentioned heritage items being located within the Study Area (the Project Area plus a buffer of 10 km), it is expected that a Historic Heritage Assessment (HHA) would be conditioned within the SEARs to support the EIS.

The HHA would assess the potential for unlisted heritage items and non-Aboriginal archaeological remains to be present within the Project Area and evaluate the potential direct and indirect impacts of the Project. The HHA 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 International Council on Monuments and Sites (ICOMOS) Charter for Places of Cultural Significance (ICOMOS, 2013).

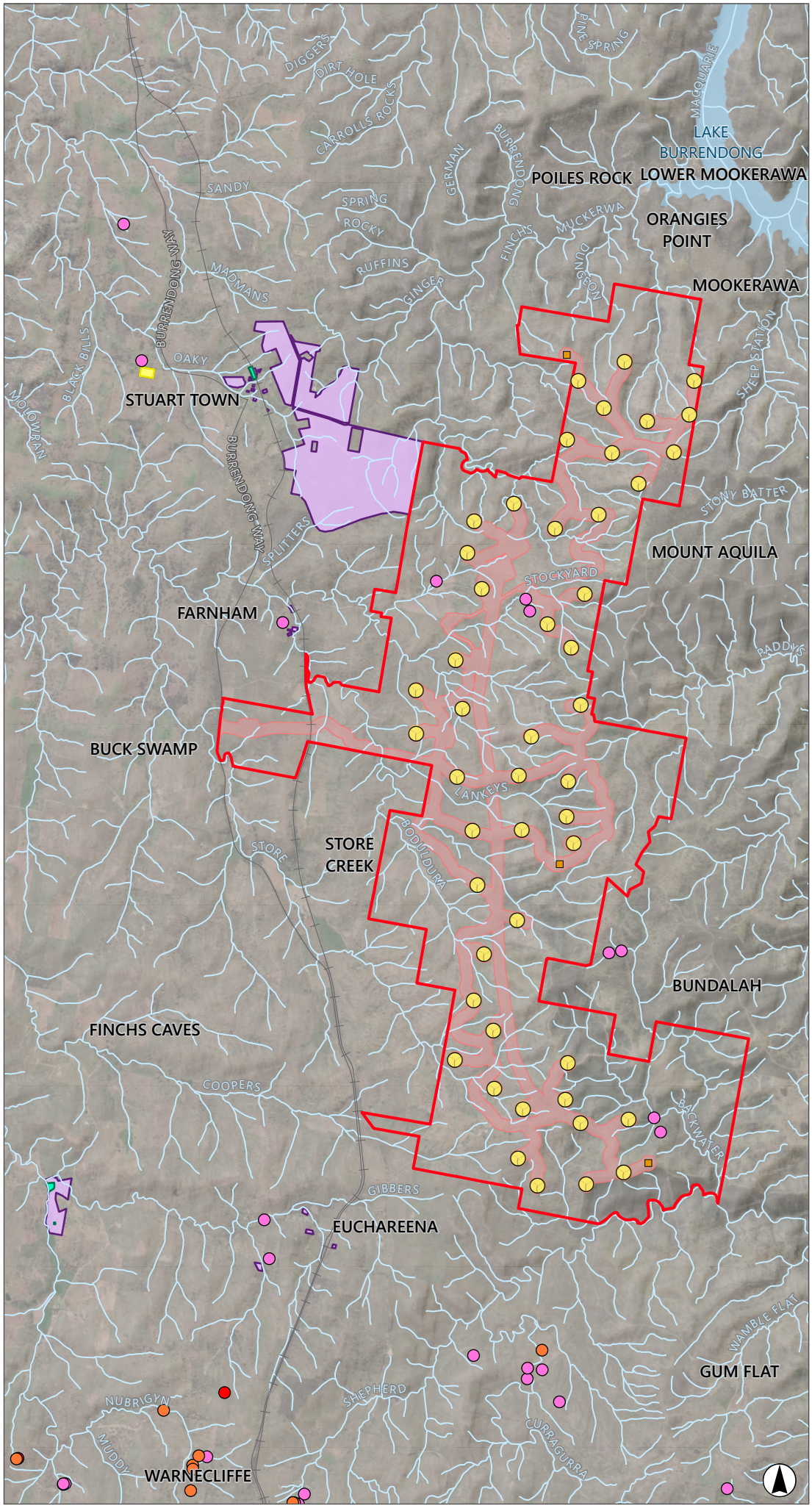


FIGURE 6.7

Known Aboriginal and Historic Heritage Sites

Legend

- Project Boundary
- Development Corridor
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Waterbody
- Named Watercourse
- Road
- Railway Line

Aboriginal Sites

- Culturally Modified Tree
- Open Artefact Site
- Stone Quarry

Historic Heritage Sites

- Register of the National Estate Sites
- State Heritage Sites
- Local Heritage Sites

0 2 4
Kilometres

Scale 1:100,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

6.2.5 Traffic and Transport

Primary access to the Project Area will likely be via a new access point proposed off Burrendong Way in the western most portion of the Project Area. The position of the primary access point off Burrendong Way will allow the transport of Project-related materials to the Project Area from the north via Wellington utilising the Mitchell Highway/Golden Highway from the Port of Newcastle, or from the south via Orange utilising Lachlan Valley Way/Hume Highway towards Port Botany/Port Kembla. Secondary Project access is proposed along Mount Aquila Road, which would be accessed via Burrendong Way approximately 3.5 km north-east of the primary access point. This access point will likely service the transport of materials from the north via Wellington.

The preferred transport route of WTG components and other Project related materials will be confirmed via port and transport route assessment, to be prepared as part of the EIS. As noted in **Section 3.5**, a preferred port and transport route have not yet been established but several options are available as previously indicated in **Figure 3.2**.

It is expected that upgrades to local roads (secondary access routes) will 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 CWO REZ may occur prior to the Project and routes used by those preceding projects utilised, with the required works being completed prior to this Project commencing.

Access tracks will be constructed on site to provide access to the proposed WTG locations (refer to **Figure 3.2**). The proposed delivery route, access tracks and level of construction/maintenance required will be confirmed and assessed during the preparation of the EIS. Existing access tracks within the Project Area will also be upgraded (where appropriate) to facilitate delivery of the WTGs and other heavy-duty equipment. 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 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-alone and cumulative traffic impacts during the construction and operational phases of the Project (including intersection performance, capacity and safety).
- 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 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.

6.2.6 Socio-Economic Impacts

A SISR has been undertaken by Umwelt in accordance with the scoping phase requirements of the SIA Guideline (DPE, 2023). The SISR has been provided in **Appendix 3** and is summarised in the subsequent sections below.

6.2.6.1 Regional Setting

The Project Area is located within the Central West-Orana Region in NSW, a diverse and productive region with good connectivity to Sydney, Canberra, and Newcastle. Key regional cities include Bathurst, Orange and Dubbo, with the increasingly popular centres of Lithgow, Mudgee and Cowra located nearby. The Project is specifically located wholly within the Dubbo Regional LGA (formerly Western Plains Regional LGA). The townships of Stuart Town, Mullion Creek, Mumbil, Molong and Wellington are key communities of interest for the Project given their proximity to the Project Area.

Stuart Town is home to approximately 241 people (as at the 2021 census) and can be characterised by its history and heritage associated with the mid 1850s gold rush in central NSW. Mullion Creek (suburb) is located south of the Project Area and is situated on Burrendong Way. It contains a population of 561 people (as at the 2021 census).

The localities of Farnham and Euchareena are much smaller by comparison, containing a population of 28 and 170 respectively. In contrast, Wellington and Molong are home to a larger number of residents (4,726 and 2,595 respectively) and acts as centres for the surrounding rural community.

The closest larger population centres are Dubbo with a population of 43,516, and Orange with a population of 41,232 (as at the time of the 2021 census), which both act as large regional service centres for the surrounding localities and contain a wide range of services and facilities to support the surrounding population.

6.2.6.2 Perceived and Likely Social Impacts

The SISR includes the compilation of a social baseline profile for the Project, early-stage community and stakeholder consultation to inform the scoping of Project-related social impacts and opportunities, and preliminary social impact prediction and evaluation. The preliminary impact prediction and evaluation was undertaken to inform and support the refinement of Project design and plans to reduce potential negative project impacts and achieve greater positive project benefits.

Feedback from the community and other stakeholders' engagement activities outlined in **Section 5.0** identified perceived social impacts from the Project. These social categories and perceived impacts are summarised in **Table 6.8** and will be subject to assessment as part of the SIA.

Table 6.8 Perceived Social Impacts

Impact Categorisation		Perceived Social Impact
Positive or Negative	**Category**	
Positive	**Accessibility**	• Improved site accessibility. • Electricity price stability and affordability. • Road improvements.
	Livelihoods	• Payments to host landholders. • Training and upskilling opportunities for locals. • Opportunities for community benefit sharing.
	Way of life	• Provision of renewable energy to the grid.
Negative	**Health & Wellbeing**	• Stress and anxiety as a result of the Project.
	Way of Life	• Change to the character of the community.
	Decision-making Systems	• Limited Project consultation/ inability to influence project decision-making. • Inadequate project justification (financial/whole of life GHG).
	Accessibility	• Impacts on recreational land-use. • Deterioration in road conditions.
	Community	• Inequitable distribution of project benefits (host landholders and neighbours).
	Livelihoods	• Impacts on tourism. • Changing and conflicting land use. • Declining property value.
	Surroundings	• Feral pest proliferation due to changing land management practices. • Generation of waste. • Impacts to flora and fauna. • Increased fire risk. • Increased traffic movements. • Noise impacts and vibrations. • Visual impacts.

A key part of addressing the perceived social impacts identified in **Table 6.7** will be the stakeholder engagement program. ACEN, 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.

An SIA will be submitted with the EIS and will be prepared in accordance with the SIA Guideline (DPE, 2023). 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 and bushfire threat.

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. The Dubbo City Regional Airport is located approximately 90 km northwest of the Project Area. There are also a number of small private airstrips and runways located within the vicinity of the Project Area which will be considered in the assessment.

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 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 undertaken 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 is addressed by 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 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 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 6.9** below.

Table 6.9 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
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 the *Hazardous and Offensive Development of State Environment Planning Policy (Resilience and Hazards),* 2021 (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 involve:

- 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 the Multi-Level Risk Assessment Guideline (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

Portions of the Project Area are identified as bushfire prone land under the NSW RFS Bushfire Prone Land Mapping Tool (refer to **Figure 6.8**).

There are areas of remnant vegetation within the Project Area, 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 (NSW Rural Fire Service, 2019). Consultation with the NSW RFS will also be undertaken during the preparation of the EIS.

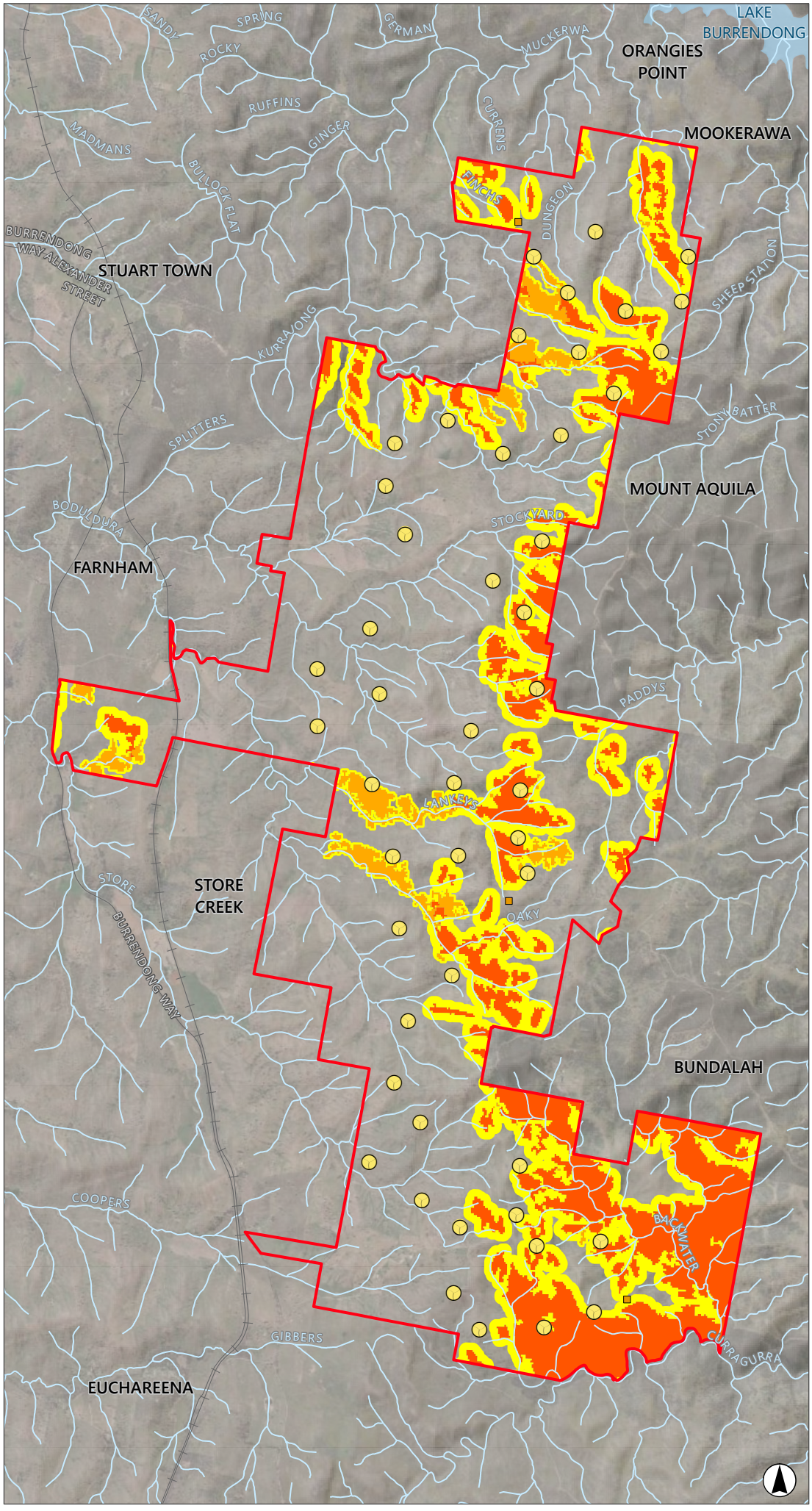


FIGURE 6.8

Bushfire Prone Land

Legend

- Project Boundary
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Waterbody
- Named Watercourse
- Road
- Railway Line

Bushfire Prone Land Vegetation Category Mapping

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

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); NSW RFS (2022); ACEN (2022)

6.2.8 Water and Soil Resources

6.2.8.1 Surface Water and Flooding

The Project Area falls within the Macquarie-Bogan Catchment and is located in proximity to the Macquarie River which runs parallel to the eastern portion of the Project Boundary, approximately two km from the north/northeastern boundary and five km from the eastern boundary. Lake Burrendong is located approximately 8.5 km north of the Project Boundary. Lake Burrendong has been substantially modified to establish a large dam, involving modification to the Macquarie and Cudgegong Rivers.

The principal watercourse networks that traverse the Project Area from the north and east emanate from the Macquarie River and include Muckerwa, Paddys and Backwater Creeks. Boduldura, Stockyard and Lankeys Creeks emanate west towards the Project Area from Bells River and the Macquarie River further upstream. The principal watercourses within the Project Area are shown in **Figure 6.9**.

As depicted in **Figure 6.9**, there are a number of watercourse (i.e. creek) crossings that will need to occur to facilitate the construction and ongoing operation of the Project, which will be subject to detailed assessment during the EIS to understand the potential for surface water impacts and to develop appropriate, Project-specific management measures and strategies to avoid, minimise and then manage any residual impacts. Consideration of potential impacts requiring further assessment are discussed in **Table 6.10**.

As no flood studies have been undertaken within the Project Area, it is not mapped as flood prone. However, it is noted that the Macquarie River has been subject to major historical flooding events, most notably in 1955–1956. Additionally, minor flooding has been noted along the Macquarie River downstream of Burrendong Dam towards Wellington in late 2022 after heavy rainfall in the region (BoM, 2022a). As such, there may be the potential for flows from the Macquarie River to be conveyed through the interconnected watercourses within and surrounding the Project Area in major flood events. Potential for flood-related impacts will also be assessed in detail during the preparation of the EIS.

6.2.8.2 Soil and Land Capability

There is a small area of BSAL (approximately 0.6 ha) in the northeastern corner of the Project Area (refer to **Figure 6.10**). No Project-related infrastructure or other ancillary disturbance is proposed within this area. Additionally, there are no mapped Class 1–3 soils under the Land and Soil Capability Assessment Scheme (LSC) present within the Project Area (refer to **Figure 6.10**). All land within the Project Area is mapped as LSC Classes 5, 6 or 7. Existing land uses within the host properties will continue and co-exist with the Project. There are no mapped high-risk areas for acid sulphate soils within the Project Area.

6.2.8.3 Groundwater

There are five registered groundwater bores located within the Project Area (BoM, 2022b) as shown in **Figure 6.11**. Of these, three are identified as water supply bores, one is a stock and domestic supply bore and one is for monitoring purposes. The drilled depth of the on-site groundwater bores ranges between 22.6 m and 99.0 m and only four of these bores are listed as currently functional, including GW038378 GW054522, GW054536, and GW018440.

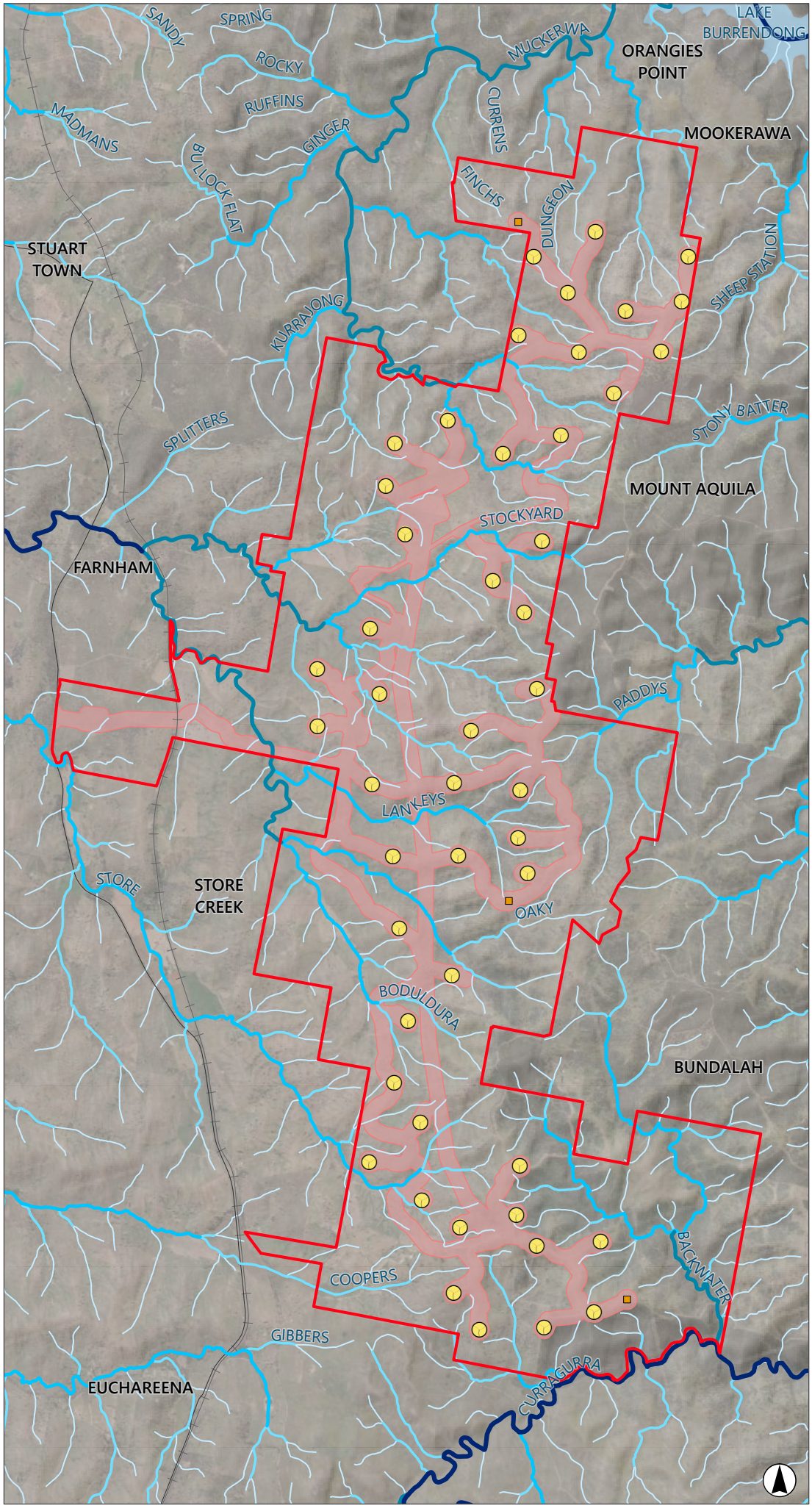
Further desktop investigation will be undertaken during the EIS phase to understand groundwater characteristics (including groundwater levels) within the Project Area, and this may be supplemented by a baseline groundwater monitoring program where existing data proves insufficient.

The EIS would include an assessment of any anticipated groundwater take and consideration of water licensing requirements under relevant Water Sharing Plans.

According to the Groundwater Dependent Ecosystem (GDE) Atlas (BoM, 2017), the Project Area is mapped as containing both aquatic and terrestrial GDEs of low to moderate potential (refer to **Figure 6.11**). Further details are provided in the BCA (refer to **Appendix 7**).

FIGURE 6.9

Strahler Stream Order



Legend

- Project Boundary
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Waterbody
- Named Watercourse
- Road
- Railway Line

Strahler Stream Order

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream
- 4th Order Stream
- 5th Order Stream or Higher

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); NSW RFS (2022); ACEN (2022)

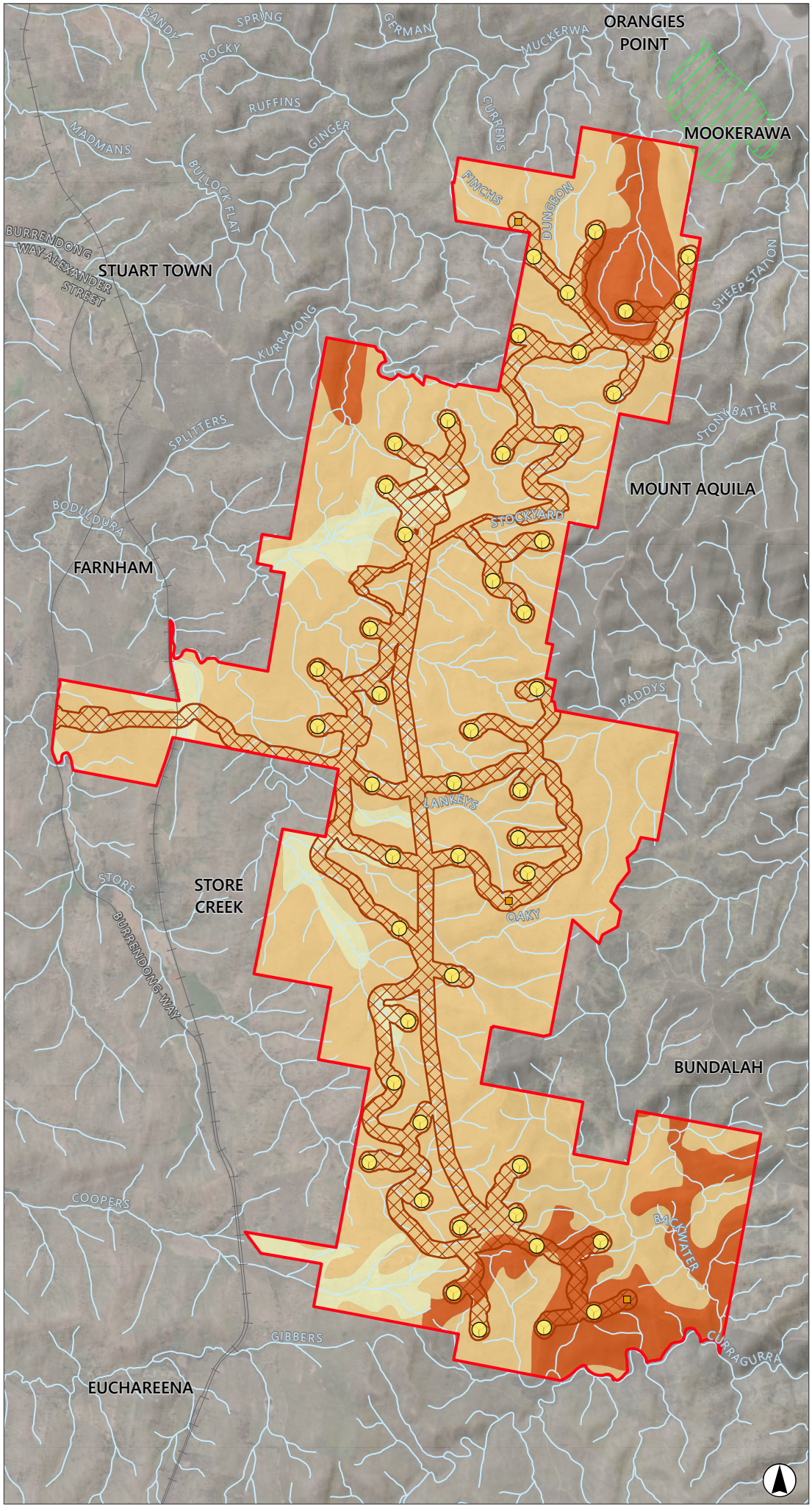


FIGURE 6.10

Land and Soil Classification and BSAL

Legend

- Project Boundary
- Development Corridor
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Road
- Railway Line
- Named Watercourse
- Waterbody
- Biophysical Strategic Agricultural Land (BSAL)

Land and Soil Capability Mapping

- 5 - Severe Limitations
- 6 - Very Severe Limitations
- 7 - Extremely Severe Limitations

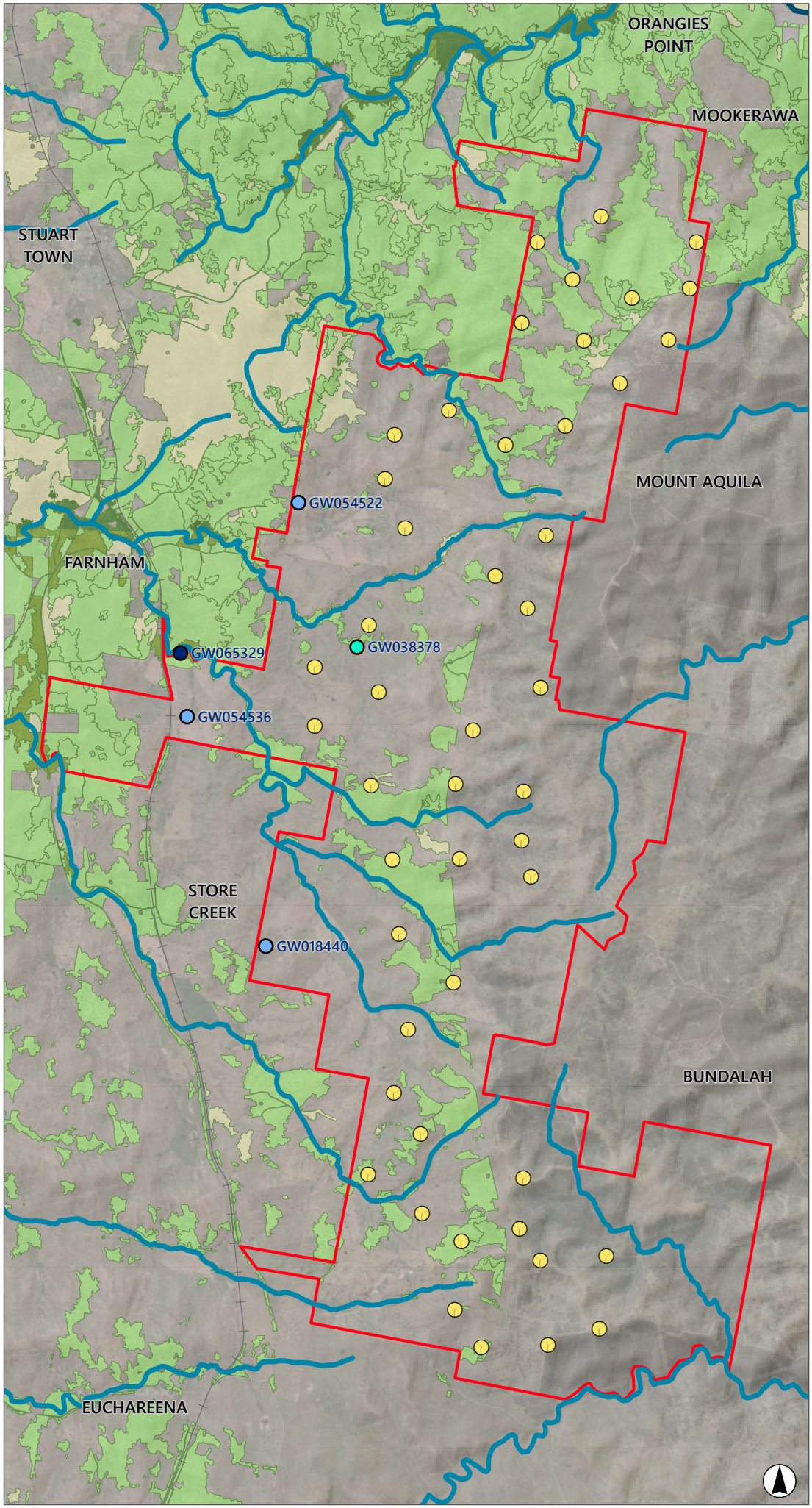
0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); NSW RFS (2022); ACEN (2022)

FIGURE 6.11

Groundwater Usage within Project Area



Legend

- Project Boundary
- Railway Line
- Indicative Turbine Locations

Monitoring Bores within Project Area

- Monitoring
- Stock and Domestic
- Water Supply

Aquatic Groundwater Dependant Ecosystems

- High Potential
- Moderate Potential

Terrestrial Groundwater Dependant Ecosystems

- High Potential
- Moderate Potential
- Low Potential
- Unclassified

0 1 2
Kilometres

Scale 1:72,894 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); BOM (2021); ACEN (2022)

6.2.8.4 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 6.10** below. **Table 6.10** 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 6.10** provides an overview of matters requiring specific consideration in the WRIA, including a summary of potential mitigation measures to address these impacts.

Table 6.10 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 (including the establishment/upgrading of creek crossings). • Potential fish passage obstruction and impacts to downstream riparian ecology associated with erosion and sedimentation and establishment/upgrading of creek crossings. • 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 erosion and sedimentation risk and associated impacts to downstream water users and riparian ecosystems) over the life of the Project. This assessment will have regard to NSW Water Quality Objectives and environmental values and will include detailed measures to mitigate potential impacts, including upstream and downstream monitoring to detect changes in water quality and facilitate adaptive management of surface water impacts.	• Implementation of appropriate erosion and sediment control measures, developed in accordance with relevant guidelines. • Minimising the number of new creek crossings and ensuring that any new/upgraded creek crossings are appropriately sited and constructed to minimise impacts to stream flows 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 Macquarie River.	• Minimising the disturbance footprint and rehabilitating areas impacted during the construction phase that are not required for ongoing operations.

Aspect	Nature of Potential Impact	Matters Requiring Further Assessment/Consideration in EIS	Potential Mitigation Measures
		• Additional flood modelling (e.g. direct rainfall coarse grid TUFLOW 2D) to define local flood conditions (flood extent, depth, velocity and hazard) where no existing information is available. • 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. • Base case flood modelling would be undertaken for a range of flood events, including the 1% Annual Exceedance Probability (AEP) and Probable Maximum Flood events, as well as a sensitivity analysis for climate change scenarios (0.2% and 0.5%). Project case modelling may also be undertaken on a risk basis, for example, if any proposed Project infrastructure would be located within the 1% AEP flood extent.	• Minimising works within protected lands along waterways. • 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. local council) 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	• Minimising the extent and depth of ground disturbance, particularly in proximity to potential terrestrial GDE.

Aspect	Nature of Potential Impact	Matters Requiring Further Assessment/Consideration in EIS	Potential Mitigation Measures
		potential cumulative impacts, and detailed measures to mitigate potential impacts. • Identification of any anticipated groundwater take, consideration of relevant water licensing requirements under the WM Act, and a strategy for meeting those requirements.	

6.2.9 Summary of Key Constraints

The key constraints currently mapped or known to be within the Project Area are presented in **Figure 6.12** and **Figure 6.13** below. They are based on the:

- Existing strategies implemented by ACEN to avoid and/or minimise impacts, as discussed in **Section 3.8** of this Scoping Report.
- The environmental matters discussed in **Section 6.2** above.

Figure 6.13 is reproduced from the BCA (refer **Appendix 7** of this Scoping Report) and shows mapped PCT and TEC across the Project Area. It is provided separately to **Figure 6.12** to improve readability but these environmental constraints, have been to date, and will continue to be considered collectively during the EIS.

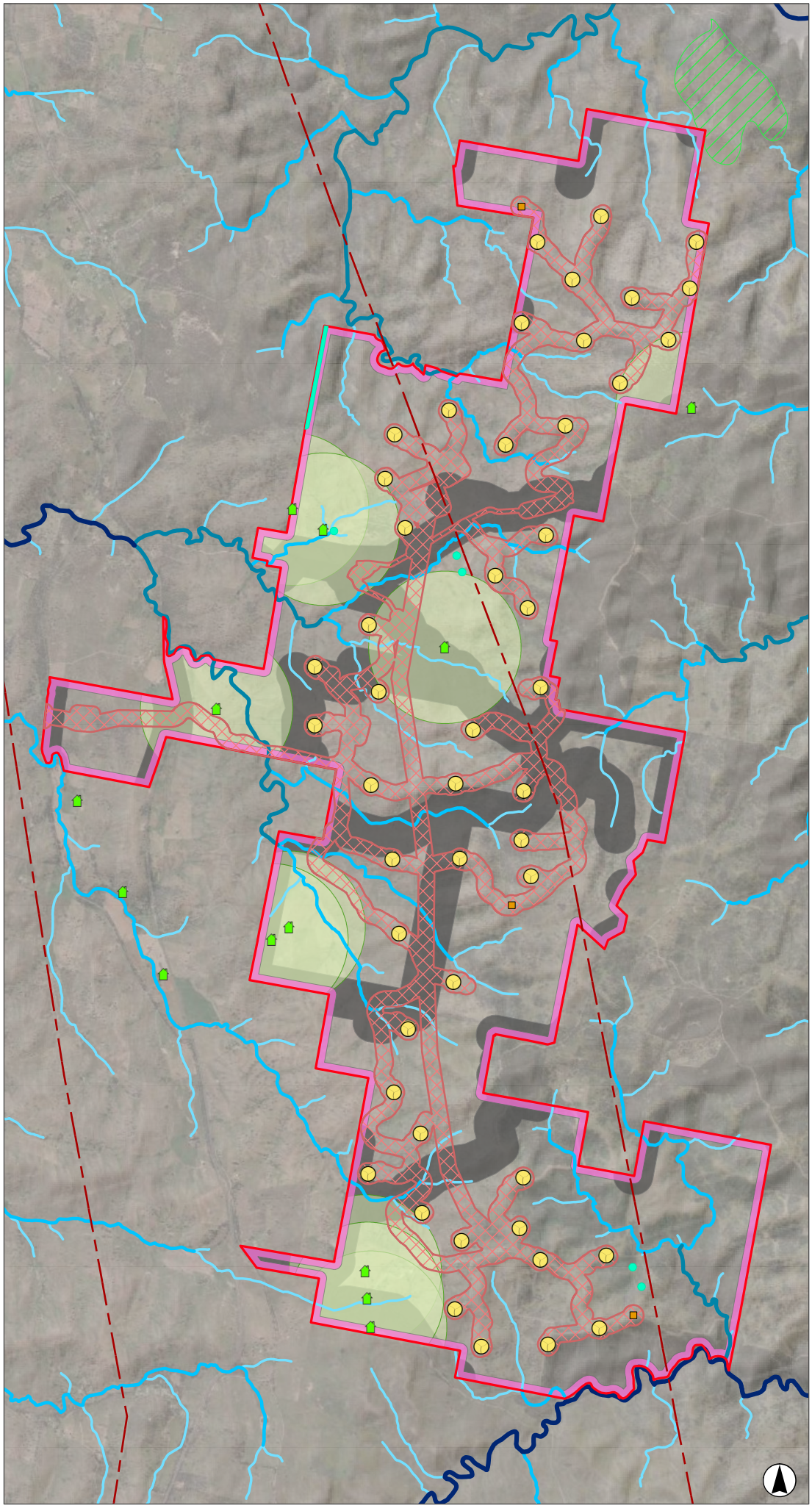


FIGURE 6.12

Key Environmental Constraints (General)

Legend

- Project Boundary
- Development Corridor
- Proposed Permanent Met Masts
- Indicative Turbine Locations
- Host Dwelling
- Aboriginal Site/Local Heritage Constraint Buffer (50m)
- Internal Project Boundary Constraint Buffer (100m)
- Host Dwelling Constraint Buffer (1 km)
- Road Corridor Constraint Buffer (250m)
- Biophysical Strategic Agricultural Land (BSAL)

Strahler Stream Order

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream
- 4th Order Stream
- 5th Order Stream or Higher

0 1 2
Kilometres

Scale 1:72,894 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); BOM (2021); ACEN (2022)

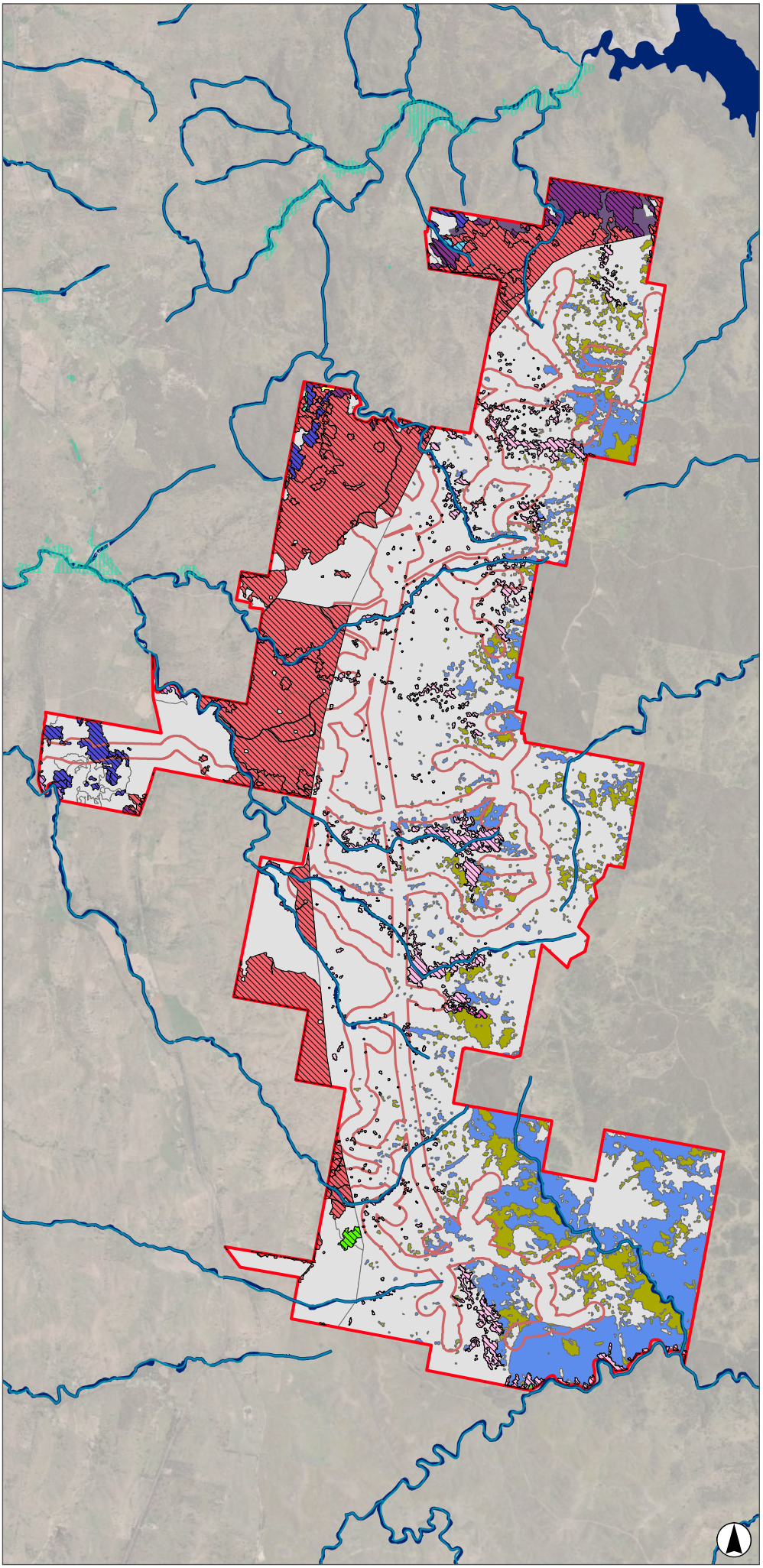


FIGURE 6.13

Key Environmental Constraints (PCT and TEC)

Legend

- Project Boundary
- Development Corridor
- High Potential Terrestrial Groundwater Dependant Ecosystems
- Moderate Potential Aquatic Groundwater Dependant Ecosystems
- Biodiverse Riparian Land (Biodiversity Values v13.5)
- BC and/or EPBC Act Threatened Ecological Communities

PCT ID & Name (State Vegetation Type Mapping)

- 185: Dwyers Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
- 186: Dwyers Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion
- 266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion
- 268: White Box - Blakelys Red Gum - Long-leaved Box - Nortons Box - Red Stringybark grass-shrub woodland on shallow soils on hills in the NSW South Western Slopes Bioregion
- 272: White Box - Black Cypress Pine - red gum +/- Mugga Ironbark shrubby woodland in hills of the NSW central western slopes
- 273: White Box shrubby open forest on fine grained sediments on steep slopes in the Mudgee region of the of central western slopes of NSW
- 277: Blakelys Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
- 280: Red Stringybark - Blakelys Red Gum +/- Long-leaved Box shrub/grass hill woodland of the NSW South Western Slopes Bioregion
- 292: She oak - Fringe Myrtle heathland on rocky ranges in the NSW South Western Slopes Bioregion
- 332: Tumbledown Red Gum - Black Cypress Pine - Red Stringybark woodland on rocky hills in the NSW central western slopes
- 347: White Box - Blakelys Red Gum shrub/grass woodland on metamorphic hillslopes in the mid-southern part of the upper slopes sub-region of the NSW South Western Slopes Bioregion
- 461: Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion
- 511: Queensland Bluegrass - Redleg Grass - Rats Tail Grass - spear grass - panic grass derived grassland of the Nandewar Bioregion and Brigalow Belt South Bioregion
- 1330: Yellow Box - Blakelys Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
- 3399: Southwest Hills White Box-Blakelys Red Gum Forest
- 3406: Southwest Ranges White Box Woodland
- 3534: Central West Stony Hills Stringybark-Box Forest
- 3734: Central Tableland Dry Slopes Stringybark-Box Forest
- 4063: Central and Southern Tableland River Oak Forest
- Not native vegetation

0 1 2
Kilometres

Scale 1:80,668 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

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 CIA Guidelines (DPE, 2022h) are also applicable to the Project.

As discussed in **Section 2.3**, the Project is located within the CWO 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 2.2**), including Kerrs Creek Wind Farm, Mumbil Solar Farm and Burrendong Wind Farm, which are all located within approximately 11 km of the proposed Project.

Given the proximal location to these projects to the proposed Project, there is potential for cumulative impacts across key environmental matters including (but not limited to) visual, noise, socio-economic, and traffic and transport. The impacts are difficult to quantify at this stage of Project development and would be dependent on the final size, timing and duration of the construction and operation of the surrounding projects. However, these key matters (as well as other relevant environmental matters) will be subject to a detailed cumulative impact assessment during the preparation of the EIS for the Project.

Appendix 1 outlines where a CIA will be undertaken for the relevant matters including the level of assessment and associated engagement. A stand-alone CIA Scoping Summary table has also been prepared in **Appendix 2** to provide a summary of the cumulative impacts to be assessed during the EIS, in line with the CIA Guidelines (DPE, 2022h). **Table 6.11** provides a summary of the key considerations in relation to CIA for the Project.

The relevant detailed environmental assessments required to support the EIS will include an assessment of the potential cumulative impacts associated with the Project, in accordance with the CIA Guidelines (DPE, 2022h) and other relevant guidelines specific to each technical discipline.

Table 6.11 Cumulative Impact Assessment Considerations

Scoping Cumulative Impact Assessment	Detail
What to assess?	As outlined in **Appendix 1**, the following key matters will require consideration of CIA: • Visual amenity. • Noise and vibration. • Traffic and transport. • 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.

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 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 – 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.

6.3 Matters Requiring No Further Assessment in the EIS

Table 6.12 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 6.12 Matters Requiring No Further Assessment in the EIS

Issue	Comment
GHG 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 Area will be assessed as part of the TIA. Additionally, a detailed Aviation Impact Assessment will be prepared (refer to **Section 6.2.7.1**).
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	Cumulative Impact Assessment 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 3.5**
Air	Atmospheric emissions Gases Particulate matter	Low	Direct Indirect	Sensitive (local and regional air quality)	Standard	Likely	No	General	• NSW Climate Change Policy Framework (OEH, 2016). • National Greenhouse Accounts Factors – Australian Government (2021).	**Section 6.2.11**
Amenity	Noise	High	Direct Cumulative Perceived	Sensitive (change in noise amenity, nearby dwellings, townships and land uses)	Detailed	Likely	Yes	Specific	• Noise Bulletin (DPE, 2016c). • NPfI (EPA, 2017). • Interim Construction Noise Guidelines (DECC, 2009). • Road Noise Policy (DECCW, 2011). • NSW Government – Department of Environment and Conservation – Assessing Vibration: A Technical Guideline (2006).	**Section 6.2.2**
	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 Aquatic flora and fauna Terrestrial flora and fauna	High	Direct Indirect Cumulative	Sensitive (potential high sensitivity for select flora and fauna species, some being endangered and critically endangered)	Detailed	Likely	Yes	Specific	• NSW Biosecurity Strategy 2013–2021 (DPI, 2013). • NSW BAM (2020).	**Section 6.2.3**
Economic	Livelihood	Low	Indirect Perceived Cumulative	Sensitive (potential resource sterilisation, reduced agricultural land uses)	Standard	Likely	Yes	General	• SIA Guidelines (DPIE, 2021f). • Undertaking Engagement Guidelines (DPIE, 2021g).	**Section 6.2.6**
Hazards and risks	Bushfire	Low	Direct Indirect	Sensitive (emergencies, safety)	Standard	Likely	No	Specific	• Planning for Bushfire Protection (RFS, 2019).	**Section 6.2.7.7**
	Flooding	Moderate	Direct Indirect	Sensitive (onsite activities, emergencies, safety) Sensitive (local hydrology)	Detailed	Likely	No	General	• Refer **hydrology** below.	**Section 6.2.8.1**
Hazards and risks (cont'd)	Hazardous and offensive development (Battery Energy Storage System, BESS)	Low	Direct	Sensitive (emergencies, safety)	Detailed	Likely	No	General	• State Environmental Planning Policy (Resilience and Hazards) 2021. • Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (DPI, 2011).	**Section 6.2.7.6**

Group	Matter	Scale of Impact	Nature of Impact	Sensitivity of Receiving Environment	Level of Assessment	Mitigation Measures Required	Cumulative Impact Assessment Required?	Engagement	Relevant Government Plans, Policies and Guidelines	Section in Scoping Report
									• Assessment Guideline: Multi-level Risk Assessment (DPI, 2011). • Hazardous Industry Planning Advisory Paper No 6: Hazard Analysis (DPI, 2011).	
	Waste	Low	Direct Indirect	Sensitive (safety, environment)	Standard	Likely	No	General	• Waste Classification Guidelines DECCW, 2009).	**Section 6.2.11**
	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 (2019).	**Section 6.2.7.1**
	Tele-communications and EMI	Moderate	Direct Cumulative	Sensitive (interference with local/ regional communications)	Detailed	Likely	Yes	Specific	• The Wind Energy Guideline (DPE, 2016a).	**Section 6.2.7.3**
	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.	**Section 6.2.7.2**
	Blade Throw	Low	Direct	Sensitive (safety)	Standard	Likely	No	General	• Applicable international standards for design of wind turbine components.	**Section 6.2.7.4**
	Shadow Flicker	Low	Direct Cumulative Perceived	Sensitive (change in visual amenity, nearby dwellings, townships and public viewpoints)	Standard	Likely	No	General	Refer **visual** above.	**Section 6.2.7.5**
Heritage	Aboriginal, encompassing any natural heritage	High	Direct Indirect Cumulative Perceived	Sensitive (Aboriginal cultural heritage value, Traditional Custodians)	Detailed	Likely	Yes	Specific	• Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW, (Department of Premier and Cabinet, 2011). • Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010). • Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010).	**Section 6.2.4.1**
	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.	**Section 6.2.4.2**
Land	Land capability	Low	Direct Indirect Perceived	Sensitive (existing local agricultural activity and economy)	Standard	Likely	No	General	• Agricultural Land Use Mapping Resources in NSW (DPI, 2017). • The Land and Soil Capability Scheme (OEH, 2012).	**Section 6.2.8.2**
	Soil chemistry			Sensitive (erosion, contamination and fertility of soils)					• The Land and Soil Capability Scheme (OEH, 2012). • Soil and Land Survey Handbooks. • Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004).	

Group	Matter	Scale of Impact	Nature of Impact	Sensitivity of Receiving Environment	Level of Assessment	Mitigation Measures Required	Cumulative Impact Assessment Required?	Engagement	Relevant Government Plans, Policies and Guidelines	Section in Scoping Report
									• Managing Urban Stormwater: Soils and Construction Volume 2 (DECC, 2008). • DPI – Agricultural Land Use Mapping Resources in NSW (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). • Undertaking Engagement Guideline (DPIE, 2021g).	**Section 6.2.6**
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	• Floodplain Risk Management Guidelines (OEH, 2019). • Floodplain Development Manual: The management of flood liable land (2005). • Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018). • NSW Government – NSW Water and River Flow Objectives (2006). • NSW Government – Department of Environment and Climate Change – Floodplain Risk Management Guidelines (2016). • NSW Government – Floodplain Development Manual: The management of flood liable land, dated 2005. • Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004). • Managing Urban Stormwater: Soils and Construction Volume 2 (DECC, 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, environment and economic values)	Detailed	Likely	Detailed	Specific	• CIA Guidelines (DPIE, 2021h).	**Section 6.2.10**

APPENDIX 2

Cumulative Impact Assessment Scoping Summary

Appendix 2.A Cumulative Impact Assessment Scoping Summary Table – Assessment Matrix

Level of Assessment	Description
Detailed Assessment	The Project may result in significant impacts on the matter, including cumulative impacts. Detailed assessment is characterised by: • Potential overlap in impacts between a future project and the proposed Project. • Potential for significant cumulative impacts as a result of the overlap, requiring detailed technical studies to assess the impacts. • Sufficient data is available on the future project to allow a detailed assessment of cumulative impacts with the proposed Project for the relevant matter. • Uncertainties exist with respect to data, mitigation, assessment methods and criteria.
Standard Assessment	The Project is unlikely to result in significant impacts on the matter, including cumulative impacts. Standard assessments are characterised by: • Impacts are well understood. • Impacts are relatively easy to predict using standard methods. • Impacts are capable of being mitigated to comply with relevant standards or performance measures. • the assessment is unlikely to involve any significant uncertainties or require any detailed cumulative impact assessment.
No Assessment Required	No potential overlap in impacts between a future project and the proposed Project that would warrant any consideration in the cumulative impact assessment.

Appendix 2.B Cumulative Impact Assessment Scoping Summary Table

Future Project	Approx. Distance to Project	Project Status	Potential Overlap Between Impacts of Project and Impact of Other Projects			
			Access (Traffic)	Amenity (Visual)	Amenity (Noise)	Social (e.g. Accessibility, Health and Wellbeing, Livelihoods etc.)
Kerrs Creek Wind Farm	Directly south of the proposed Project Area.	• Prepare EIS. • Construction to commence 2026.				
	Key features: • Up to 441 MW. • Up to 63 WTGs. • Project Area spans ~9,000 ha, with a disturbance footprint of ~142 ha.		Transport of project-related materials and access to each project will likely utilise the same roads (i.e. Burrendong Way). Cumulative impacts are anticipated, as such a detailed cumulative impact assessment will be required.	Cumulative visual impacts anticipated at nearby sensitive receptors given proximity of proposed Project to Kerrs Creek Wind Farm. Detailed cumulative impact assessment required.	Cumulative noise impacts anticipated at nearby sensitive receptors given proximity of proposed Project to Kerrs Creek Wind Farm. Detailed cumulative impact assessment required.	Cumulative social impacts anticipated at nearby sensitive receptors given proximity of proposed Project to Kerrs Creek Wind Farm. Detailed cumulative impact assessment required.
Burrendong Wind Farm	7.5 km north-east of the proposed Project Area	• EIS on exhibition. • Project revised to increase Project Area, WTGs and supply capacity. • If approved, construction would begin within one (1) to five (5) years of receiving				

Future Project	Approx. Distance to Project	Project Status	Potential Overlap Between Impacts of Project and Impact of Other Projects			
			Access (Traffic)	Amenity (Visual)	Amenity (Noise)	Social (e.g. Accessibility, Health and Wellbeing, Livelihoods etc.)
		development consent.				
	Key features: • ~400-500 MW. • Up to 70 WTGs. • Development Corridor of approximately 3,000 ha.		Potential risk of cumulative traffic and transport-related impacts subject to the selection of the transport route. Further assessment of cumulative impacts required.	Cumulative visual impacts anticipated at nearby sensitive receptors given proximity of proposed Project to Burrendong Wind Farm. Detailed cumulative impact assessment required.	Cumulative noise impacts anticipated at nearby sensitive receptors given proximity of proposed Project to Burrendong Wind Farm. Detailed cumulative impact assessment required.	Cumulative social impacts anticipated at nearby sensitive receptors given proximity of proposed Project to Kerrs Creek Wind Farm. Detailed cumulative impact assessment required.
Yarrabin (Phoenix) Pumped Hydro	9 km north-northeast of the Proposed Project Area	• Recently announced SSD Project. • Technical, environmental, cultural, social and economic assessments commenced. • Construction of the project and associated infrastructure will take approximately 4 years, starting in ~2025.				

Future Project	Approx. Distance to Project	Project Status	Potential Overlap Between Impacts of Project and Impact of Other Projects			
			Access (Traffic)	Amenity (Visual)	Amenity (Noise)	Social (e.g. Accessibility, Health and Wellbeing, Livelihoods etc.)
		• Operation of the project to last 50 years.				
	Key features: • Pumped hydro technology. • 810 MW, 12-hour pumped hydro project 35 km west of Mudgee, within the CWO REZ. • capable of delivering up to 9,600 MWh of energy.		Transport of project-related materials and access to each project has the potential to utilise similar roads. Cumulative impacts are anticipated, as such a detailed cumulative impact assessment will be required.	Potential risk of cumulative visual-related impacts subject to further evaluation of hydro and wind interactions on amenity. Further assessment of cumulative impacts required.	Potential risk of cumulative noise-related impacts subject to further evaluation of hydro and wind interactions on amenity. Further assessment of cumulative impacts required.	Cumulative social impacts anticipated at nearby sensitive receptors given proximity of proposed Project to Phoenix Pumped Hydro. Detailed cumulative impact assessment required.
Mumbil Solar Farm	11 km northwest of the proposed Project Area	• Original SEARs provided in 2017. • Revised Addendum Scoping Report prepared in July 2019 to assess a slightly larger area including a BESS. • Project no longer appears on NSW Major Projects website, though a Project website is available.				

Future Project	Approx. Distance to Project	Project Status	Potential Overlap Between Impacts of Project and Impact of Other Projects			
			Access (Traffic)	Amenity (Visual)	Amenity (Noise)	Social (e.g. Accessibility, Health and Wellbeing, Livelihoods etc.)
	Key features: • ~120–150 MW. • Potential 70 MW/420 MWh BESS. • Project Area spans ~440 ha.		Potential risk of cumulative traffic and transport-related impacts subject to the selection of the transport route. Further assessment of cumulative impacts required.	Low risk of cumulative visual-related impacts given the distance of the proposed Project to the Mumbil Solar Farm Project Area. No further consideration required.	Low risk of cumulative noise-related impacts given the distance of the proposed Project to the Mumbil Solar Farm Project Area. No further consideration required.	Potential for cumulative social impacts within the rural community of Wellington, and smaller local towns of Mumbil and Stuart Town. Further assessment of cumulative impacts required.
Uungula Wind Farm	22 km north of the proposed Project Area	• The project received development consent in May 2021. • Construction was expected to commence in 2023. • 262 jobs expected to be created.				
	Key features: • ~414 MW. • 93 WTGs. • Project Area spans ~440 ha.		It is expected that given the location and distance from the proposed Project, there will be no potential overlap in access, traffic and transport impacts between this project and the proposed Project.	It is expected that given the location and distance from the proposed Project, there will be no potential overlap in visual-related impacts between this project and the proposed Project.	It is expected that given the location and distance from the proposed Project, there will be no potential overlap in noise-related impacts between this project and the proposed Project.	Potential for cumulative social impacts within the rural community of Wellington. Further assessment of cumulative impacts required.

APPENDIX 3

Social Impact Scoping Report

umwelt
Environmental & Social Consultants

ACEN Australia

AQUILA WIND

Social Impact Scoping Report

FINAL

February 2024

AQUILA WIND

Social Impact Scoping Report

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
ACEN Australia

Project Director:	Nathan Baker
Project Manager:	Lauren Evans
Technical Director:	Dr Sheridan Coakes
Technical Manager:	Rhiannon Jaeger-Michael
Report No.	21793/R07
Date:	February 2024

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.

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
01	Karen Lamb	03 Oct 2022	Nathan Baker	21 October 2022
02	Lauren Evans	14 November 2022	Nathan Baker	14 November 2022
03	Lauren Evans	22 November 2022	Nathan Baker	22 November 2022
04	Lauren Evans	06 February 2023	Nathan Baker	10 February 2023
05	Lauren Evans	20 February 2023	Nathan Baker	20 February 2023
06	Lauren Evans	7 December 2023	Nathan Baker	7 December 2023
07	Lauren Evans	19 January 2024	Nathan Baker	19 January 2024
08	Lauren Evans	25 January 2024	Nathan Baker	25 January 2024
09	Lauren Evans	9 February 2024	Nathan Baker	9 February 2024

Author Declaration

As outlined in the SIA Guideline (DPE, 2023), 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 (SIA Project Manager), under the guidance and review of Dr Sheridan Coakes (SIA Project Director). We declare that this report, completed on 7 December 2023:

- 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**.
- 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.
- That the SIA contains all relevant information.

Table 1 Project Team Qualifications, Experience and Competency

Requirement	SIA Project Manager Rhiannon Jaeger-Michael	Reviewer Dr Sheridan Coakes
Suitable qualifications	• Bachelor of Science – Psychology • Master of Disaster Resilience and Sustainable Development.	• Doctor of Philosophy – Psychology, Honours First Class – Psychology • Bachelor of Applied Science – Psychology.
Proven experience in SIA practice and social science methods	5 years	30 years
Professional membership	Environmental Institute of Australia and New Zealand, International Association of Impact Assessment	

Abbreviations

Abbreviation	Description
ABS	Australian Bureau of Statistics
ACEN	ACEN Australia
ASR	Age Standardisation Rate
BESS	Battery Energy Storage System
BSAL	Biophysical Strategic Agricultural Land
CSEP	Community and Stakeholder Engagement Plan
CWO REZ	Central-West Orana Renewable Energy Zone
DC	Direct current
DPE	Department of Planning and Environment [current]
DPIE	Department of Planning, Industry and Environment [former]
EIS	Environmental Impact Statement
EL	Exploration License
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
GHG	Greenhouse gas
GP	General Practitioner
GW	Gigawatts
the Guideline	NSW Social Impact Assessment Guideline for State Significant Projects (2021)
Ha	Hectares
Hwy	Highway
kV	Kilovolt
LEP	Local Environmental Plan
LGA	Local Government Area
MW	Megawatts
NSW	New South Wales
PEL	Petroleum Exploration Licence
REZ	Renewable Energy Zone
RTS	Response to Submissions
SA2	Statistical Area 2
SAL	Suburbs and Localities
SEARs	Secretary's Environmental Assessment Requirements
SEIFA	Socio-Economic Indexes for Areas
SIA	Social Impact Assessment
SSC	State Suburb

Abbreviation	Description
SSD	State Significant Development
TRRA	Three Rivers Regional Assembly
UCL	Urban Centre and Locality
Umwelt	Umwelt (Australia) Pty Ltd
VPA	Voluntary Planning Agreement
WTG	Wind turbine generator

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1.0 Introduction

This report documents the process and outcomes of the scoping phase of the Social Impact Assessment (SIA) undertaken by Umwelt for Aquila Wind (the Project). The Report forms part of the Project's application for the Secretary's Environmental Assessment Requirements (SEARs) lodged with the NSW Department of Planning and Environment (DPE) by ACEN Australia (ACEN). The Project is a State Significant Development (SSD) pursuant to Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

This Report has been prepared in accordance with the scoping phase requirements of the NSW Social Impact Assessment Guideline for State Significant Projects (DPE, 2023) (the Guideline), and the associated Technical Supplement (DPE, 2023). Following the issuance of SEARs, the Environmental Impact Statement (EIS) for the Project will be prepared and will include a SIA of which this report forms the foundation.

1.1 Project Overview

ACEN proposes to develop Aquila Wind to supply renewable electricity to the National Electricity Market (NEM) and reduce Australia's greenhouse gas (GHG) emissions through the generation of renewable electricity powered by the wind, as an alternative to the burning of fossil fuels.

The Project is located approximately 2.5 km southeast of Stuart Town and 2 km northeast of Euchareena, in the Central West region of NSW, within the Dubbo Regional Council Local Government Area (LGA) (refer to **Figure 1.1**) and on the lands of the Wiradjuri Nation. Dubbo is situated approximately 70 km northwest of the Project Boundary[1] (the northern most extent). The other regional centres of Mudgee, Wellington and Orange are situated approximately 40 km to the northeast, 30 km to the northwest and 35 km to the south respectively (refer to **Figure 1.1**). Lake Burrendong is located approximately 8 km north of the Project Boundary. The Project Area[2] is traversed by the Main Western Railway and is located approximately 14 km east of the Mitchell Highway.

The Project design includes up to 48 x 6.2 megawatt (MW) Wind Turbine Generators (WTGs) (each with a blade-tip height of up to 250 m) comprising an installed capacity of up to 300 MW, a Battery Energy Storage System (BESS) approximately 100 MW (2-hr), temporary and permanent meteorological masts, vegetation removal, earthworks, ancillary civil and electrical engineering infrastructure, temporary construction facilities and temporary concrete batching plants, and permanent worker facilities. The Project will create employment opportunities for approximately 300 temporary workers during the 2-year construction phase plus 15 permanent workers during the operational phase.

The 'Main Western Railway' extends north to south and passes through the westernmost portion of the Project Area for approximately 500 m, between Store Creek and Farnham.

The Project Area is located within the Central West-Orana Renewable Energy Zone (CWO REZ) identified in the NSW Government's Electricity Strategy (refer to **Section 3.1.1**). The CWO REZ is expected to play a vital role in the delivery of renewable energy to the National Electricity Market (NEM). The Central West-Orana

[1] The Project Boundary is the maximum spatial extent of potential land access defined by the boundaries of the Host landholder properties (i.e. all agreed lots owned by Host landholders). The Project Boundary is outlined in red in the supporting figures throughout this BCA.

[2] The Project Area encompasses all land within and including the Project Boundary.

region has been identified as having a high wind resource, with preliminary wind studies undertaken by ACEN guiding the development of the preliminary WTG layout for the Project.

The Project Boundary comprises an area of approximately 6,806 ha. ACEN has identified an indicative Development Corridor of approximately 1,497 ha within which all Project infrastructure will be placed. Within this indicative Development Corridor, it is estimated that the actual land disturbance area (based on the current Project layout) would be in the order of 388 ha, or approximately 5–6% of the total Project Area.

The Project Area (all land within and including the Project Boundary) is situated at an elevation of approximately 600 to 800 m above sea level (ASL) and comprises a complex terrain, with steep arid hills to the eastern Project Boundary and rolling ridge lines to the west that are dominated by improved pasture used for grazing.

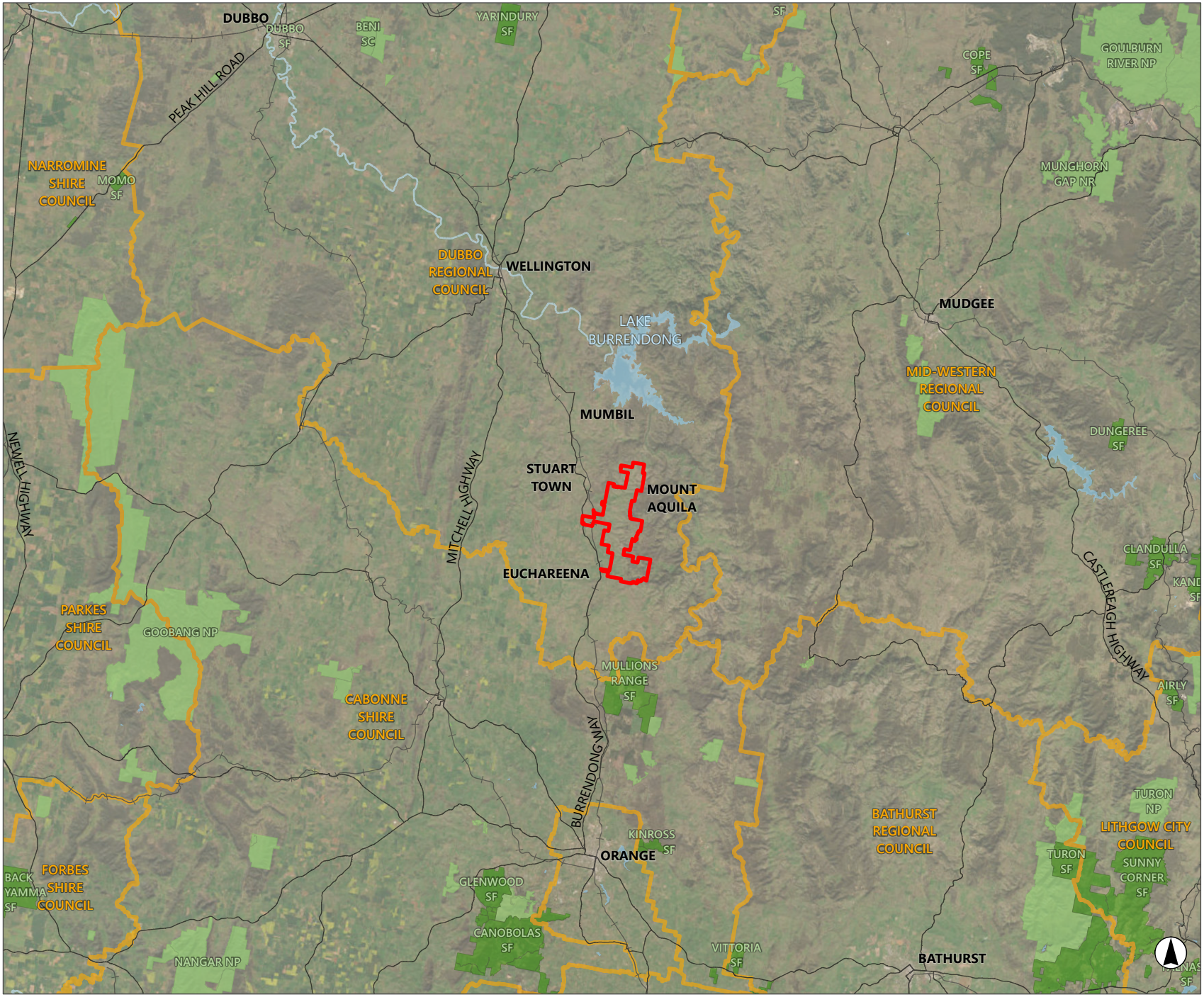
Within the Project Boundary ACEN has identified 12 private landholdings (ten (10) hosting turbines, one (1) containing other infrastructure and one (1) not currently hosting any Project infrastructure). Existing 132 kV and 330 kV transmission lines traverse the Project Area (in a north to south direction), with the grid connection occurring at a position within the Project boundary and near the 330 kV line. The preliminary layout for the Project (refer to **Figure 1.2**) will be subject to further review and refinement as the EIS and SIA progress.

Land use within the Project Area and the surrounding locality is largely characterised by cropping and grazing. Key sensitive receivers currently identified in relation to the Project include:

- 60 non-associated dwellings and 13 Host dwellings were identified within the black line of visual magnitude (i.e., 0–3,350 m).
- 157 non-associated dwellings and two (2) Host and were identified between the black and blue lines of visual magnitude (i.e., 3,350–4,950 m).
- 72 non-associated dwellings were identified between the blue line of visual magnitude and the purple line (i.e., 4,950–8,000 m).
- In total there are 304 dwellings (15 Host and 289 non-associated) within 8,000 m of the proposed wind turbine locations.

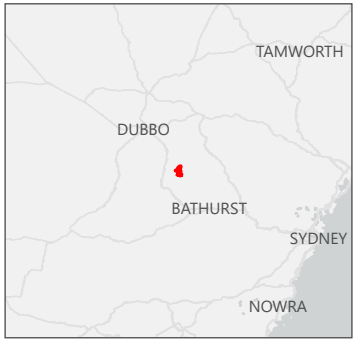
FIGURE 1.1

Project Location



Legend

- Project Boundary
- Local Government Area Boundary
- State Forest
- NPWS Estate
- Roads
- Railway
- Waterbodies



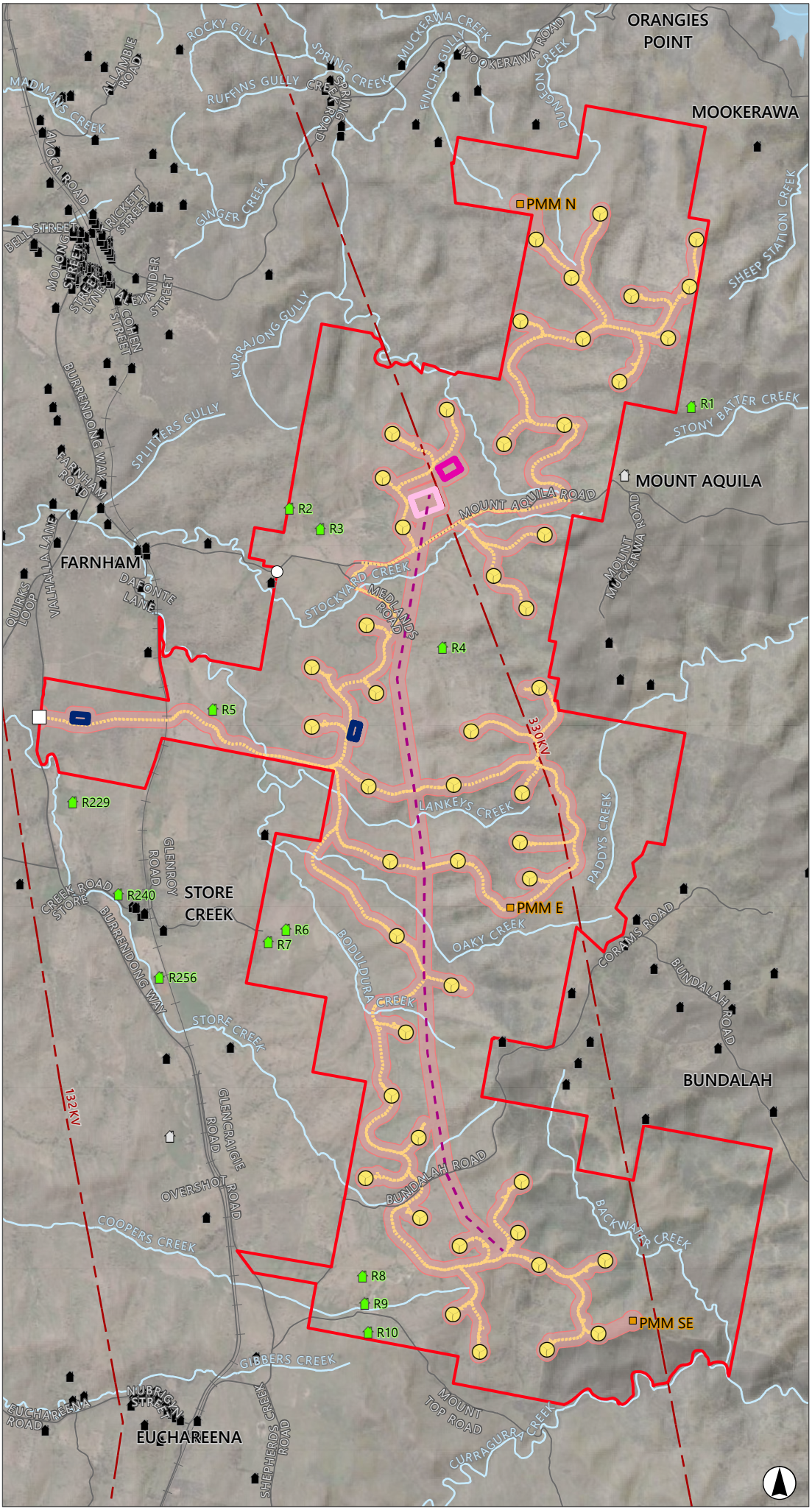
0 10 20
Kilometres

Scale 1:750,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

FIGURE 1.2

Aquila Wind Project Preliminary Layout



Legend

- Project Boundary
- Development Corridor
- Proposed BESS
- Proposed Compounds
- Proposed Substation
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Primary Access Point
- Secondary Access Point
- Proposed Transmission Lines
- Existing Electricity Transmission Line
- Railway Line
- Waterbody
- Named Watercourse

Existing Dwellings

- Host Dwelling (labelled with R#)
- Non-associated Dwelling

Proposed Dwelling

- Potential Future Dwelling

0 1 2
Kilometres

Scale 1:72,500 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

1.2 The Proponent

The proponent, ACEN Australia (ACEN), is the platform representing ACEN's renewable energy assets in Australia. It includes several solar, wind, battery, pumped hydro and energy storage projects across NSW, Tasmania, Victoria and South Australia in development and construction. ACEN is the listed energy platform of the Ayala Group, which has approximately 3,800 MW of attributable capacity in the Philippines, Vietnam, Indonesia, India, and Australia.

ACEN aims to provide low cost, clean electricity in a socially and environmentally responsible way, using innovative technology solutions, and aspires to be the largest listed renewables platform in Southeast Asia, with a goal of reaching 5,000 MW of renewables capacity by 2025.

ACEN has been a partner of UPC\AC Renewables in Australia since 2018, and, in 2021, ACEN began a transaction to eventually own 100% of UPC\AC Renewables by early 2023. This marks a strategic pivot for ACEN as it embarks on its first wholly owned development and operations platform outside of the Philippines.

In October 2021, ACEN announced its commitment to achieve net-zero greenhouse gas emissions by 2050. Furthermore, ACEN is a signatory to the Clean Energy Council 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 ACEN operates.

1.3 Report Purpose

Pursuant to the objectives of the Guideline, the purpose of the Social Impact Scoping Report is to:

- Obtain an understanding of the Project's social locality, including the community's socio-economic and demographic characteristics.
- Identify stakeholder groups that may have an interest in, or be affected by, the Project.
- Document outcomes from community consultation undertaken during the scoping phase.
- Identify issues or opportunities that the Project presents within the social locality.
- Provide an initial evaluation of predicted social impacts associated with the Project.
- Consider potential Project refinements in response to identified social impacts.
- Describe the approach for undertaking the remaining phases of the Social Impact Assessment (SIA).

2.0 Methodology

SIA is an approach to predicting and assessing the likely social consequences of a proposed action and developing options and opportunities to improve outcomes for people. Best practice SIA is participatory and involves understanding impacts from the perspectives of those involved in a personal, community, social or cultural sense, to provide a complete picture of potential impacts, their context, and implications. This section outlines the approach taken in the development of the SIA.

2.1 Assessment Requirements

This report has been prepared in accordance with the NSW Government's Social Impact Assessment Guideline for State Significant Development Applications (the Guideline) (DPE, 2023) and the associated Technical Supplement (DPE, 2023), as part of the initial project development and scoping phase, as illustrated in **Figure 2.1**.

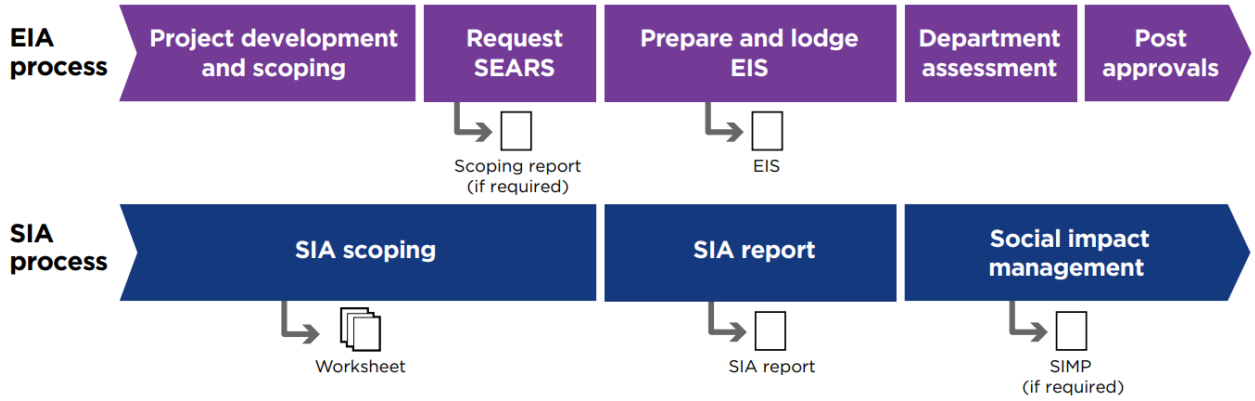


Figure 2.1 SIA and EIA Process Alignment

Source: DPE, 2022.

This report forms part of the broader Scoping Report, and the accompanied Request for SEARs, and includes the following key components:

- **Social baseline profiling** – to define the baseline social context in which the Project is situated and area of social influence.
- **Issues scoping** – preliminary identification and evaluation of social impacts and issues relevant to the Project, to determine the level of assessment required for the EIS proportionate to the scale of the Project and the matters of importance to the community.

Early commencement of SIA, which is informed by community and stakeholder consultation, affords opportunities to effectively assess and integrate social outcomes within the detailed Project planning, design, and assessment phase.

As is the case with any type of change, some individuals or groups within the community may benefit, while others may experience negative impacts. If negative impacts are predicted, it is the role of the SIA to determine how these impacts may be addressed effectively to reduce the degree of disruption to those affected. If positive impacts are predicted, the aim of the SIA is to maximise these opportunities and identify how they might be further enhanced and realised.

Figure 2.2 provides an overview of the key SIA program phases, with this report relevant to the 'Scoping' phase.

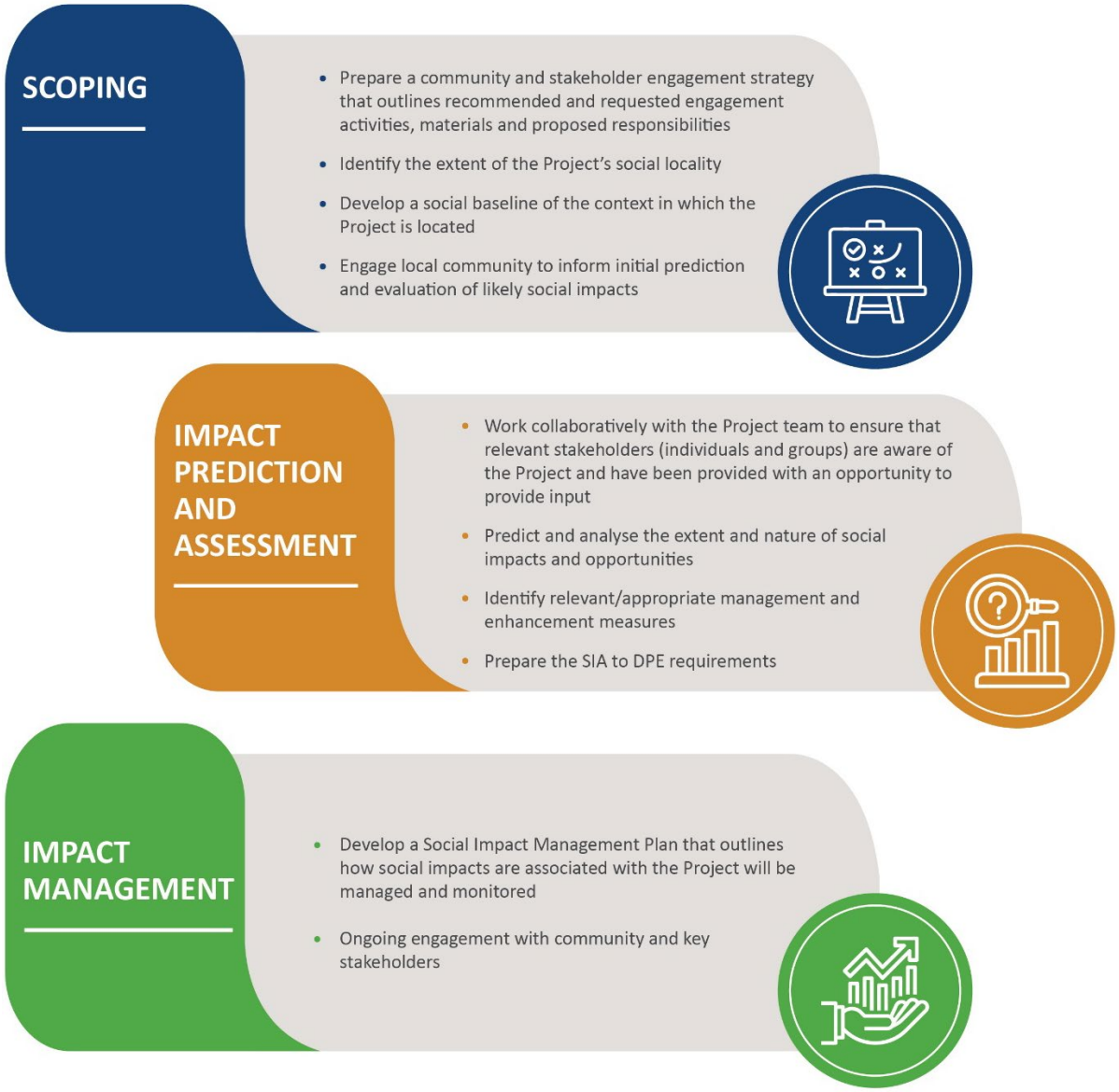


Figure 2.2 SIA Program Phases

© Umwelt, 2023.

According to the Guideline, and as outlined in **Figure 2.3**, social impacts can be grouped according to several different categories and may involve impacts and changes to people's way of life, community, accessibility, culture, health and wellbeing, surroundings, livelihoods, and decision-making systems.

Figure 2.3 DPE Social Impact Categories

Source: DPE 2023, Designed by Umwelt, 2022.

2.2 Defining the Social Locality

The term 'social locality' or 'area of social influence' is commonly used in SIA practice. There is no fixed meaning or predefined geographic boundary to a social locality (e.g., the local suburb, or 'within 500 m'). Instead, the scale of the social locality should be established on a case-by-case basis, having regard to the nature of the project and its impacts (DPE, 2023). For further direction, the Guideline states that the social locality is defined by:

- The scale and nature of the project.
- Who may be affected by the project.
- Whether any vulnerable or marginalised people may be affected by the project.
- Built or natural features on or near the project that could be affected, and the intangible values that people may associate with these features.
- Relevant social, cultural, demographic trends or social change processes occurring now or in the past near the project site and in the broader region.
- The history of the proposed project and the area, and any similar experiences people near the project have had, including change prior to, or created by, the planning assessment process.

In defining the social locality for Project, statistical areas prescribed by the Australian Bureau of Statistics (ABS), as well as the land tenure composition of properties in or nearby the Project Area have also been used to determine the social locality (or 'area of social influence'). The primary communities of interest that comprise the social locality for the purpose of this assessment are outlined in **Table 2.1**, with **Figure 2.4** visually representing the area of social influence.

Table 2.1 Communities of Interest in the Social Locality

Community of Interest and Purpose	Statistical Area
Key townships proximate to the Project	• Euchareena SAL[3] • Stuart Town SAL • Mullion Creek SAL • Wellington UCL (2016) • Mumbil SAL • Molong SAL • Orange SAL • Dubbo SAL
Project Location: Local Government Area (LGA)	• Dubbo Regional LGA
Neighbouring LGAs	• Cabonne Shire LGA • Mid-Western Regional LGA.

[3] It is important to note that most data captured in the ABS Census and other sources is typically withheld or randomly adjusted to safeguard residents' anonymity. The data should be interpreted with this limitation in mind.

Community of Interest and Purpose	Statistical Area
Sub-Regional	• Wellington SA2.
Region	• Central-West Orana.
State	• NSW.

It is noted that the Project intersects, or is proximally located to the following Suburbs and Localities (SALs)[4] that recorded comparably small populations at the time of the 2021 Census (<100 persons), and as such, have been statistically represented in aggregate form at the LGA level for accuracy in reporting purposes:

- Farnham.
- Mount Aquila.
- Mookerawa.
- Triamble.
- Kerrs Creek.

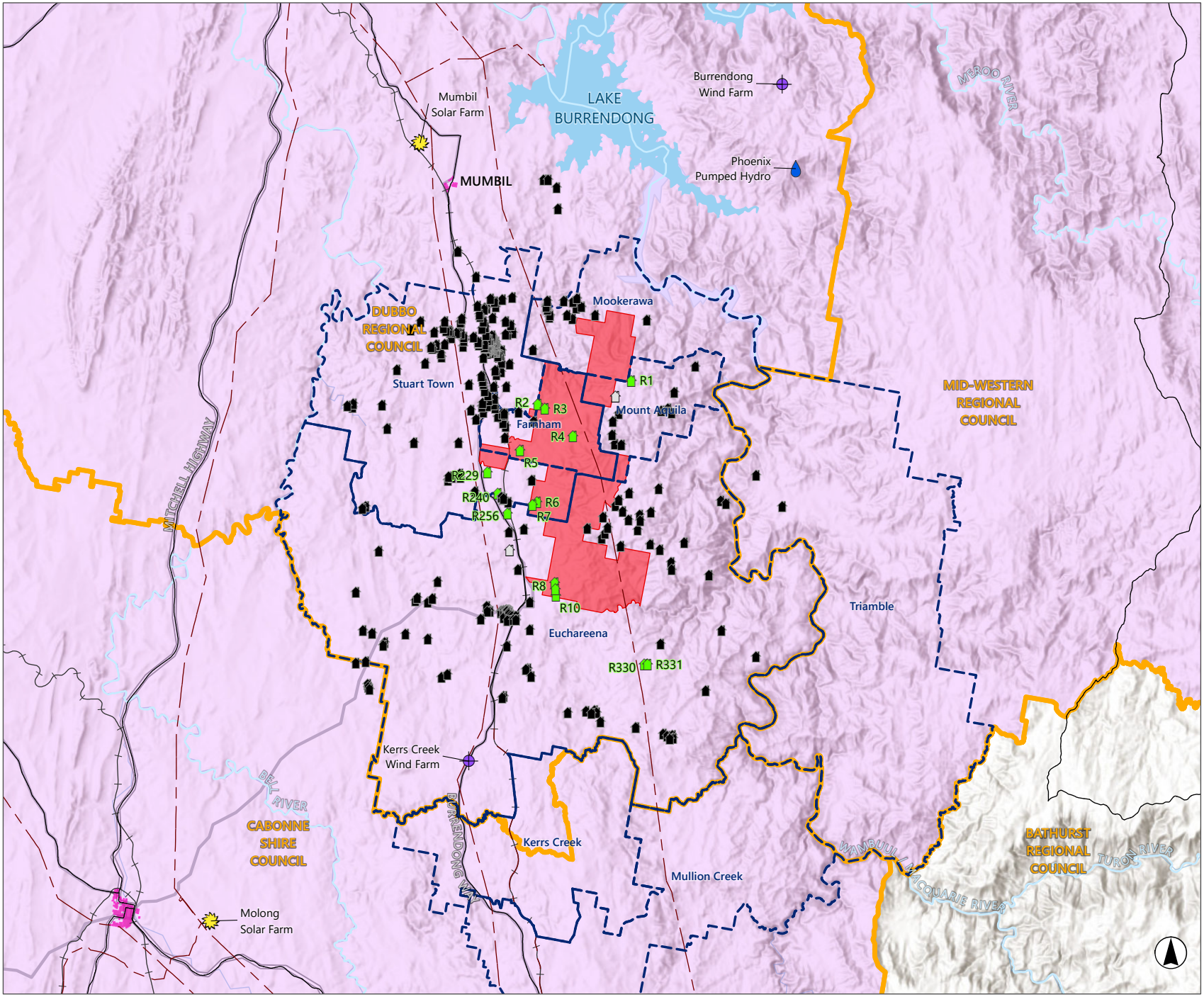
Notwithstanding, these localities are considered of high importance to the Project and are included as key localities in the Project's social locality.

The extent of influence of a project, its impacts, and associations may change as projects and communities develop and evolve over time. Consequently, the social locality may be adapted, minimised, or extended beyond the parameters identified in **Table 2.1** at subsequent stages of Project planning and assessment, to include locations where construction workforces may be based and where suppliers and/or materials may be sourced for the Project.

[4] Suburbs and Localities (SALs), formerly referred to as State Suburbs (SSCs), are an ABS Mesh Block approximation of the officially recognised boundaries of suburbs (in cities and larger towns) and localities (outside cities and larger towns) as defined by the State and Territory governments of Australia. Suburbs and Localities are created to enable the release of ABS data on areas that approximate the official localities. This allows for the comparison of ABS data with other data collected using localities as the geographic reference. ABS approximations of administrative boundaries do not match official legal boundaries and should only be used for statistical purposes.

FIGURE 2.4

Social Locality



Legend

- Project Boundary
- Social Locality
- Surrounding SAL Boundaries
- Local Government Area Boundary
- Built Up Areas
- Waterbodies
- Major Watercourse
- Roads
- Railway
- Electricity Transmission Line

Other Renewable Projects

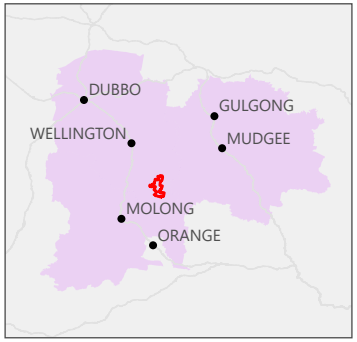
- Solar
- Wind
- Pumped Hydro

Existing Dwellings

- Host Dwelling (labelled with R#)
- Non-associated Dwelling

Proposed Dwelling

- Potential Future Dwelling



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Kilometres

Scale 1:300,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

2.3 Social Baseline Profile

The development of a baseline social profile gathers knowledge from both primary and secondary data sources to increase understanding of the existing social environment in which a project is proposed, and of potentially affected communities. The social baseline profile is a foundational component of a scoping SIA, as it provides the basis from which social impacts associated with the Project may be identified and predicted.

2.3.1 Sustainable Livelihoods Approach

To better understand the communities of interest to the Project and to evaluate their resilience and adaptive capacity to change, the social baseline has utilised the Sustainable Livelihoods Approach (U.K. Department for International Development (DFID, 2001), and the community capitals outlined in the IAIA SIA Guidance (IAIA, 2015).

According to the Sustainable Livelihoods framework, people seek to maintain their livelihood within a context of vulnerability (Coakes & Sadler, 2011). 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 broad categories of community capitals as a fundamental basis to identifying and further enhancing community capacity and resilience and has been used in many SIA studies (Coakes & Sadler, 2011; IAIA, 2015). The vulnerability in each capital area can be assessed through the selection of a suite of indicators selected to assess a community's vulnerability to change, or conversely, their adaptive capacity. Elements of each capital area are further outlined in **Figure 2.5**.

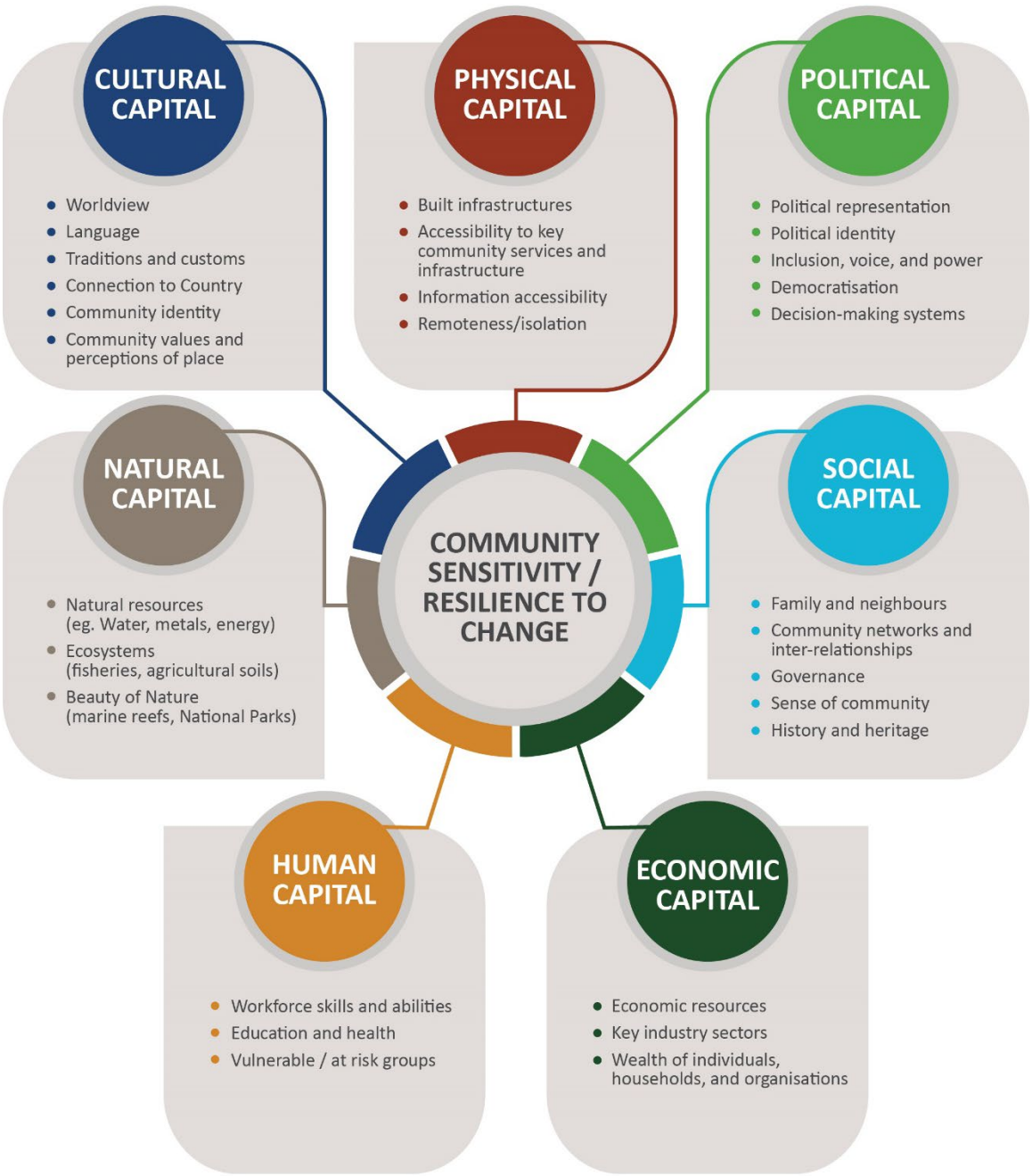


Figure 2.5 Community Capitals Framework

Source: Coakes & Sadler, 2011, Designed by Umwelt, 2021.

2.3.2 Data Sources

The social baseline within this report has made use of a range of data sources to understand the socio-economic, cultural, and demographic characteristics of the communities within the Project's locality. The social profile is used as a basis to determine how the Project may affect different aspects of people's lives - the Project's social impacts (refer to **Figure 2.3**).

Data for the social baseline profile has been gathered and summarised from publicly available secondary datasets, including the most recent Australian Census (2021), as well as through a review of local media, government plans and strategies and other literature as it relates to the social locality.

Statistical and comparative analysis using ABS data has been undertaken at the LGA level to capture key characteristics and trends across local communities. Suburbs and Localities (SALs) level data has also been utilised, with key indicators compiled and data sources utilised outlined in **Table 2.2**.

Table 2.2 Social Baseline Profile Indicators and Data Sources

Capital	Indicator	Data Source
Political	• Existing political and governance structures at local, state, and federal levels. • Representation and governance of Traditional Owners. • Existing public participation systems. • Existence of Project-specific community consultation strategy and feedback and response mechanisms.	• State representative and electoral information (Parliament of New South Wales, n.d.; Electoral Commission NSW, 2020). • Registered Aboriginal Parties. • Divisions in New South Wales (NSW) (Australian Electoral Commission, 2019).
Natural	• Land use profile. • Vulnerability to natural disaster or severe climate events. • Rate of tourism and recreation based on natural resources. • Community values associated with natural or built environment. • Measures of access to and level of dependency on natural assets (e.g., agricultural production, water supply, mineral resources).	• NSW Land Use 2017 (DPIE, 2020). • Regional Statistics by LGA (ABS, 2018). • Local Government Areas Council Strategic Planning Documents.
Human	• Population size by gender, and by age. • Population trends and projections. • Median age. • Aboriginal population size and proportion. • Population diversity (proportion of population born overseas / languages spoken at home). • Highest level of formal education attainment. • SEIFA Index of Education and Occupation. • Public health status including self-assessed fair or poor health, level of psychological stress, rate of hospital admissions, life expectancy.	• ABS Community Profiles (2006, 2011, 2016, 2021). • DPE population projections (2019). • Social Health Atlas of Australia (PHIDU, 2021).
Social	• Household size and composition. • Volunteering rates. • Incidents and rates of selected crimes and top crimes committed. • Population mobility/stability (proportion of population with a different address 1 and 5 years ago). • Index of Relative Advantage and Disadvantage (SEIFA).	• SEIFA Indexes for Australia (ABS, 2018). • NSW Bureau of Crime (2021).

Capital	Indicator	Data Source
Economic	• Proportion (%) of the labour force that are: employed full-time, part-time, unemployed. • Key industries of employment. • Median household income. • Median mortgage repayment. • Median weekly rent. • Level of housing stress (median housing costs as a proportion of median household income). • Indices of economic resources (SEIFA).	• ABS Community Profiles (2016). • Rental vacancy rates (REINSW, 2021). • SEIFA Indexes for Australia (ABS, 2018). • Tourism Research Australia Local Government Area Profiles (2016).
Cultural	• Native Title claims and/or determinations. • Aboriginal ethnography and histories. • Aboriginal heritage places. • European heritage places. • Cultural values. • Language, dialect, and belief-systems.	• ABS Community Profiles (2006, 2011, 2016, 2021). • Register of Native Title Claims (National Native Title Tribunal, 2021). • Local Government Areas Councils' Local Strategic Planning Documents. • Heritage Management Systems (Heritage NSW, 2021).
Physical	• Housing typology – proportion of occupied private dwellings that are: owned with/without a mortgage, rented, public housing. • Number of dwellings by type (housing stock). • Private-car dependency (car ownership by household). • Availability of health and education facilities. • Availability of short-term accommodation. • Health services and infrastructure (proximity of health services, resident to GP ratio, availability of specialist services). • Access to Internet from dwelling.	• ABS Community Profiles (2006, 2011, 2016, 2021). • SEIFA Indexes for Australia (ABS, 2018). • Central West and Orana Regional Plan 2036 (NSW Government, 2016). • Local Government Areas Council Strategic Planning Documents. • NSW State Tourism Statistics (Destination NSW, 2016, 2020).

2.4 Stakeholder Identification and Consultation

SIA involves the participation of and collaboration with 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 affected by the Project e.g., may be required to relocate because of the Project.

A stakeholder identification process was undertaken during the scoping phase for the Project to support the planning and delivery of community and stakeholder consultation to inform the SIA. This process involved identifying stakeholders with an interest in the Project, or those directly and indirectly affected by the Project. This included identifying any potentially vulnerable or marginalised groups.

Identification of key stakeholders (refer to **Figure 2.6**) is important to ensure effective engagement, and to develop an understanding of relevant community values, and to scope impacts, issues or opportunities associated with the Project, and to understand how these may by experienced differently by stakeholder groups. Further definition of the stakeholder identification process is outlined in the Community and Stakeholder Engagement Plan (CSEP) in **Appendix A**. Consultation in this phase has been undertaken in accordance with the requirements of Undertaking Engagement Guidelines for State Significant Developments (NSW DPE, 2022) and consideration has been given to the general and CWO REZ specific First Nations Guidelines (Office of Energy and Climate Change, 2022).

Figure 2.6 Key stakeholder groups

ACEN has undertaken early community and stakeholder engagement to build relationships with near neighbours and key stakeholders in relation to the Project, as well as to inform Project design and development. This has assisted in identifying and understanding the perceived issues and impacts early in the planning and assessment process.

Stakeholder groups engaged during the scoping phase are bolded in **Figure 2.6**. Subsequent phases of the SIA will seek broader involvement across all stakeholder groups and will include broader community involvement as part of the broader EIS and SIA process. Mechanisms that have been utilised in the scoping phase, and are planned in subsequent phases, to engage with each stakeholder group are outlined in **Table 2.3**.

Table 2.3 Stakeholder Consultation and Engagement Undertaken During Scoping Phase and Proposed for the EIS Phase

Mechanism	Targeted Stakeholder	Engagement Objective[5]	Description	First Round of Consultation (Scoping)	Second Round of Consultation (EIS phase)
Website	Aboriginal stakeholders Host landholders Community and special interest groups Broader community Local businesses and service providers Local media	Inform & Consult	A website dedicated to the Project including a description of the Project, an overview of the development application process, company information, responses to key concerns, 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, with responses to key concerns provided progressively as detailed assessments are undertaken.
Media release	Local Government Aboriginal stakeholders Host landholders Neighbouring/ proximal landholders Community and special interest 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 (Molong Express; Daily Liberal; Central Western Daily) and a radio station (Binjang FM 91.5) in August 2022 to advise of upcoming consultation opportunities and provide Project updates.	Subsequent media releases will be developed when required in the EIS phase.
Community Newsletters	Broader community (~2,905 households and businesses)	Inform	Project information sheets to distribute information about the Project to the broader community.	**No. 1** – Project overview, overview of the assessment process and invitation to participate in the SIA via the drop-in session and other mechanisms. Distributed in August 2022.	**No. 2** – To provide a Project update and validate the feedback received from community received during the scoping phase.

[5] IAP2's Public Participation Spectrum.

Mechanism	Targeted Stakeholder	Engagement Objective[5]	Description	First Round of Consultation (Scoping)	Second Round of Consultation (EIS phase)
					No. 3 – To provide a Project update, present the draft findings of SIA and EIS and inform the community of the exhibition process.
Drop-in session	Broader community Community and special interest groups Local businesses and service providers	Inform, Consult & Involve	Multi-hour time periods when stakeholders can drop in to speak to the Project team, view documents and plans and ask questions.	One session held at Stuart Town Hall of Arts on Tuesday 30 September 2022 between 2 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 on 2 September 2022, with all feedback received as of 19 September included in this SIA scoping report. Survey distributed by email to registered attendees at the Drop-in Session, via the Aquila Wind Website, and via the Stuart Town Community Facebook Page.	The survey will be updated and distributed during the EIS phase to provide further opportunity for community feedback and to validate impacts identified during the scoping phase. Also used to understand potential mitigation and enhancement measures.
Personal Meetings or Interviews	Local Government Community groups Aboriginal stakeholders	Involve & Collaborate	Introductions to the Project, semi-structured interviews to listen to individual concerns and interests and to gain an improved understanding of sensitivities, information needs and future engagement preferences.	One on one meetings held throughout the months 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 Aboriginal stakeholders Community groups	Involve & Collaborate	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.

Mechanism	Targeted Stakeholder	Engagement Objective [5]	Description	First Round of Consultation (Scoping)	Second Round of Consultation (EIS phase)
Targeted one-on-one engagement	Proximal neighbours (located within 3,350 m of a proposed wind turbine)	Inform, Consult & Involve	Engagement with proximal neighbours through phone calls and in-person meetings.	Targeted proximal neighbour consultation undertaken between August 2023 and January 2024.	Further targeted landowner consultation will be undertaken as the Project progresses into the EIS phase and beyond. It is anticipated that the next round of targeted engagement will include landholders located between 3,350 m (i.e. the 'black line' under the Visual Bulletin) and 4,950 m (i.e. the 'blue line' under the Visual Bulletin) of a proposed wind turbine (refer to Table 5.3 and Section 5.2.1.2 of the Scoping Report.

Stakeholders that have participated in the scoping phase of the Project's planning and assessment process to date, as well as those who have informed the development of this Report, are outlined in **Table 2.4**.

Table 2.4 Stakeholders Contacted and Consulted During Scoping Phase

Stakeholder Group	Mechanism Used		Number Contacted	Number Engaged
Host Landholders	Consultation with ACEN		10	10
Neighbouring Landholders	Early consultation with ACEN		26	26
Broader Community	Media Release		4	-
	Project Website		-	-
	Project email/hotline		-	12
	Community Newsletter		~2,905 households and businesses	-
	Drop-in Community Information Session		-	38
	Broader Community Survey		-	13
	Recent one-on-one Engagement[1]	In person	65[2]	24
		Phone call		13
Local Government	Project briefing and interview		3	1
Aboriginal stakeholders	Project briefing and interview		3	-
Local Community, Environmental and Special Interest Groups	Project briefing and interview		12	1
			Total	**138**

Note 1: 2023 targeted consultation, focussed primarily on non-associated dwellings within 3,350 m of a wind turbine.

Note 2: Includes all 60 non-associated dwellings inside the 3,350 m buffer (i.e. the 'black line' under the Visual Bulletin). Of the 65 dwellings noted above 10 were identified by ACEN (via ground-truthing) as potentially uninhabited buildings.

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

Proposed consultation activities undertaken during Round 2 will be focused on responding to questions, concerns or issues that arose during the scoping phase with ongoing negotiations sought to be resolved and project refinements to be integrated where possible. This subsequent round of consultation will be an opportunity to further explore and validate the social issues, interests, and impacts, that were identified during the scoping phase. The SIA program and findings gathered through the various technical studies will also be further communicated during this phase, to assist in gathering feedback from key stakeholders and the broader community, on predicted project impacts.

Further consultation to be undertaken as part of the Project, during subsequent phases of the SIA, is outlined in the CSEP (refer to **Appendix A**).

2.5 Issues Scoping and Preliminary Impact Evaluation

Quantitative and qualitative information collected through consultation activities has been compiled and analysed to inform the identification of potential social impacts associated with the Project (refer **Section 4.0**). These impacts are from the perspectives of affected parties, and enable the preliminary evaluation of social impacts, an understanding of the level of assessment required for each impact in the EIS/SIA-preparation phase, and inform Project refinements, design, and planning.

The significance assessment has been undertaken using the risk matrix provided in the Guideline (**Figure 2.7**) 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).

		Magnitude level				
		1	2	3	4	5
Likelihood level		Minimal	Minor	Moderate	Major	Transformational
A	Almost certain	Low	Medium	High	Very High	Very High
B	Likely	Low	Medium	High	High	Very High
C	Possible	Low	Medium	Medium	High	High
D	Unlikely	Low	Low	Medium	Medium	High
E	Very unlikely	Low	Low	Low	Medium	Medium

Figure 2.7 Social Impact Significance Matrix

Source: (DPE, 2023).

Dimensions of social magnitude level, and likelihood level are further described in **Figure 2.8** and **Figure 2.9** respectively.

Magnitude level	Meaning
Transformational	Substantial change experienced in community wellbeing, livelihood, infrastructure, services, health, and/or heritage values; permanent displacement or addition of at least 20% of a community.
Major	Substantial deterioration/improvement to something that people value highly, either lasting for an indefinite time, or affecting many people in a widespread area.
Moderate	Noticeable deterioration/improvement to something that people value highly, either lasting for an extensive time, or affecting a group of people.
Minor	Mild deterioration/improvement, for a reasonably short time, for a small number of people who are generally adaptable and not vulnerable.
Minimal	Little noticeable change experienced by people in the locality.

Figure 2.8 Defining Magnitude Levels of Social Impacts

Source: (DPE, 2023).

Likelihood level	Meaning
Almost certain	Definite or almost definitely expected (e.g. has happened on similar projects)
Likely	High probability
Possible	Medium probability
Unlikely	Low probability
Very unlikely	Improbable or remote probability

Figure 2.9 Defining Likelihood Levels of Social Impacts

Source: (DPE, 2023).

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 Guideline. Social impacts to be further investigated and validated as part of the EIS are also noted.

A key objective of the scoping phase SIA is to identify the level of assessment required for each impact in the assessment phase, as per the SIA Guideline. The level of assessment determines the extent of effort and data required to assess the impact.

2.6 Assessment Limitations

This report comprises the issues scoping phase of the broader SIA process framework. Matters identified hereafter are based on preliminary identification and evaluation of social impacts and issues relevant to the Project only, to determine the level of assessment required for the EIS, proportionate to the scale of the Project and the matters of importance to the community.

The scoping report highlights themes that have emerged through consultation to date and in consideration of the interrelationships, complementary and contradictory insights which will be explored in detail in subsequent SIA Phases. However, due to its nature, this scoping report does not (and cannot) offer a full treatment of all ideas, perspectives, and nuances in the rich and wide-ranging opinions and perspectives of potentially affected stakeholders. Further investigation and consideration of these perspectives will be undertaken in the EIS phase.

Additionally, limitations in the current scoping report that may affect assessment outcomes include:

- It is noted that a large portion of data from the recent ABS Census (2021) was not available at the time this report was developed.
- Consultation has been initiated with various Aboriginal stakeholders; however, no Project briefings or personal meetings with this stakeholder group have been held to date. There is a commitment by ACEN to build ongoing relationships with Aboriginal stakeholders through the planning and assessment phases of the Project, with engagement with these stakeholders to be scheduled as part of Round 2.

3.0 Social Baseline Profile

This section describes the profile of the communities in the social locality/social area of influence. It provides a compilation of the defining characteristics of the communities considering a range of indicators as outlined in **Table 2.2**.

The social baseline is a critical component of SIA as it provides the foundation from which social impacts associated with the Project may be assessed and predicted, with the following components considered:

- **Development context** – a review of the other major projects and other development factors, as well as previous experiences with comparable projects, to ascertain the response of local communities to potential change processes.
- **Geographic and spatial** – identification of communities of interest and relevant stakeholders in the social locality and their respective socio-economic and demographic characteristics and values.
- **Socio-political setting** – an understanding of the relevant governance structures including those of Traditional Owners and local, State and Federal government jurisdictions.
- **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, challenges, and priorities** – identification of community values through both primary and secondary sources, documentation of current community needs or issues, and goals or priorities, as identified in key strategic planning documents, regional plans or studies as well as within local and regional media.

The following section outlines the strategic planning and regional development context of the Project.

3.1 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.

3.1.1 Energy Policy In NSW

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 in the Central-West Orana, South-West, New England, Hunter-Central Coast and Illawarra regions to encourage investment in projects that generate, store, and transmit renewable energy (NSW Energy, 2020). REZs co-locate renewable energy generation, energy storage, and transmission lines with the aim of providing affordable, reliable and low-emissions electricity to the grid. REZs aim to install the transmission infrastructure required to attract private investment, and to enable the transition to an electricity network powered by renewable energy sources.

The proposed location of this Project is within the CWO REZ, the State's first pilot REZ, and one of five REZs being implemented by the NSW Government (refer to **Figure 3.1**). The recent establishment of the CWO REZ is already attracting significant interest from renewable energy and storage developers (Energy NSW, 2020).

The CWO REZ is anticipated to unlock up to 3 gigawatts of new network capacity by the mid-2020s, enough to power 1.4 million homes. New transmission infrastructure will enable generators (such as solar and wind farms) participating in the CWO REZ to export electricity to the rest of the network. It is expected to bring up to $5.2 billion in private investment to the Central-West Orana region by 2030. At its peak, this REZ is expected to support around 3,900 construction jobs within the region (EnergyCo NSW, 2022).

Figure 3.1 Geographic Area of the Central-West Orana REZ

Source: EnergyCo NSW, 2022.

3.2 Local and Regional Setting

The Project Area is located within the Central West-Orana Region in NSW. Key regional centres within the CWO REZ, and in proximity to the Project are outlined in **Table 3.1**.

Table 3.1 Key Regional Centres

Population/ Regional Centre	Proximity to the Project (Straight Line Measurement)	Proximity to the Project (Travel Distance)	Population (UCL, ABS, 2021)
Dubbo	~70 km northwest of the Project	~88 km	38,783
Mudgee	~40 km northeast of the Project	~130 km	11,563
Orange	~35 km south of the Project	~55 km	40,127

The Project is located within the LGA boundaries of Dubbo Regional Council LGA (formerly Western Plains Regional Council LGA following the amalgamation of City of Dubbo and Wellington Council in 2016). The townships of Stuart Town, Mullion Creek, Mumbil, Molong and Wellington are key communities of interest for the Project given their proximity to the Project Area (~3 km, 22 km, 10 km, 29 km and 31 km respectively).

Stuart Town is home to approximately 241 people (as at the 2021 census) and can be characterised by its history and heritage associated with the mid 1850s gold rush in central NSW. **Mullion Creek** is located south of the Project site and is situated on Burrendong Way. It contains a population of 561 people (as at the 2021 census).

The localities of **Farnham** and **Euchareena** are much smaller by comparison, containing a population of 28 and 170 respectively. In contrast, **Wellington** and **Molong** are home to a larger number of residents (4,726 and 2,595 respectively) and acts as centres for the surrounding rural community.

The closest larger population centres are **Dubbo** with a population of 43,516, and **Orange** with a population of 41,232 (as at the time of the 2021 census). These both act as large regional service centres for the surrounding localities and contain a wide range of services and facilities to support the surrounding population. It is noted that in terms of travel distance both Dubbo and Orange are considerably closer to the Project than Mudgee, which is located approximately 130 km from the Project Area (refer to **Table 3.1** above). On this basis, the social baseline profile in this section focusses primarily on Dubbo and Orange as key populations of relevance to the Project.

The Project Area includes Burrendong Way and the Main Western Railway line. The road and railway line connect Orange to the south, with Wellington and Dubbo to the North. Other key routes in the social locality include the Mitchell Highway providing access to the Hunter region and Sydney as well as inland road links to south-east Queensland.

The population of the broader Central-West Orana Region is expected to reach 300,000 people by 2036, and as such, there has been a strong focus from the NSW Government to develop the region into '*the most diverse regional economy in NSW with a vibrant network of centres leveraging the opportunities of being at the heart of NSW*' (NSW Government, 2016).

The NSW Government's *Central West and Orana Regional Plan 2041* (2022) notes the following in their vision for the region:

> *Landmark solar, wind and bioenergy projects and the Central–West Orana REZ make the region a renewable energy leader.*

The Plan outlines the role renewable energy will play in creating a sustainable future for the region, particularly by promoting local jobs and development opportunities for associated industries with these opportunities articulated through **Objective 18** – *Leverage existing industries and employment areas and support new and innovative economic enterprises.*

Appendix D contains an overview of local and regional strategic plans relevant to the social locality to inform an understanding of the development priorities and interests of the region. The regional plans identify that the Project is broadly aligned with the various local government strategic priorities, such that it will:

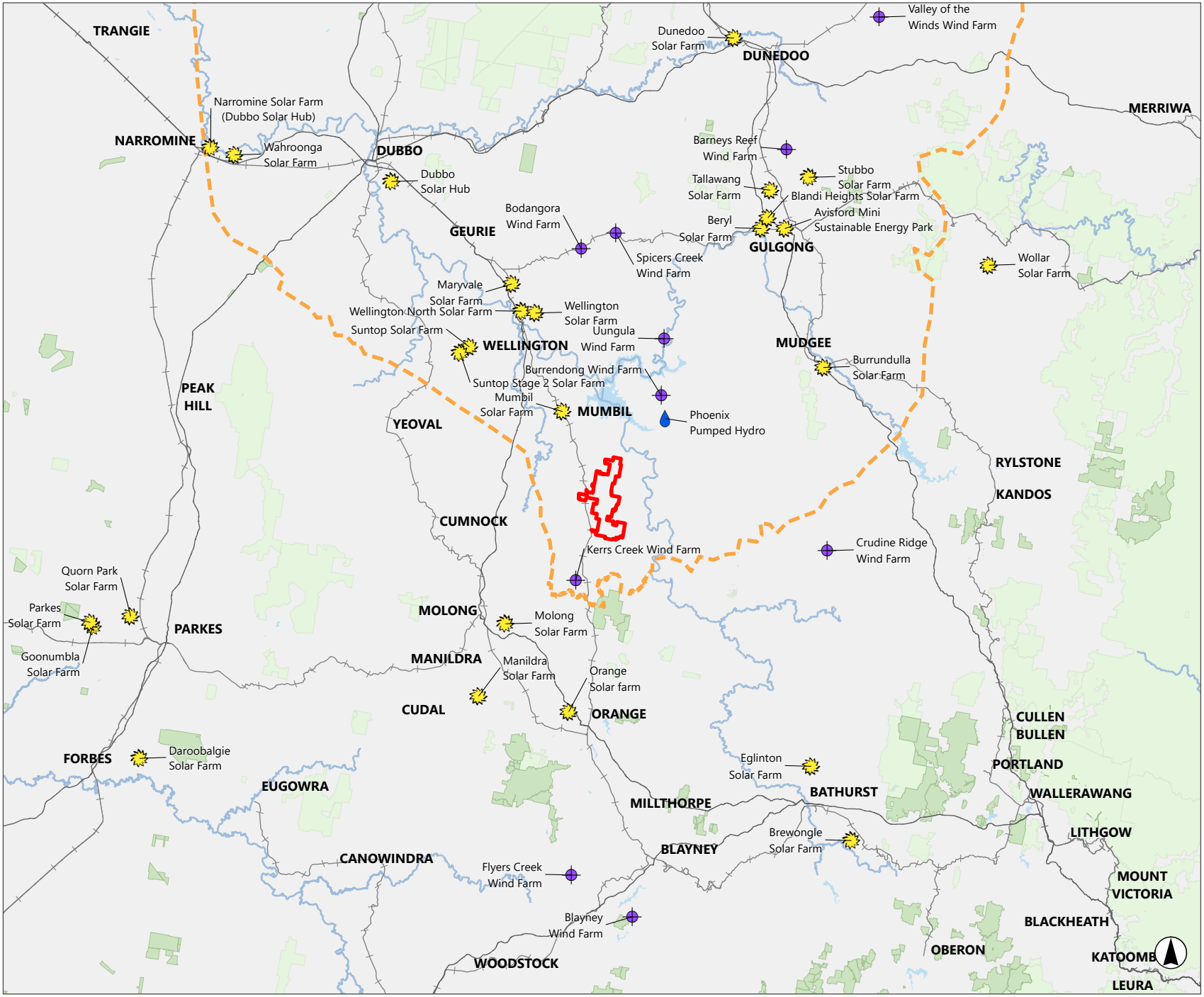
- Support 'a prosperous and diversified economy delivering lifestyle benefits to the community through employment, income, and sustainable growth' (Mid-Western Regional Council, 2016).
- Provide 'opportunities available for us to grow as a community, our improved natural environment, and being recognised as the inland capital of regional NSW' (Dubbo Regional Council, 2018).
- Enhance and 'have a strong and diverse local economy that provides employment opportunities for people of all ages and abilities' (Dubbo Regional Council, 2023).
- Ensure the 'economy is resilient and adaptable to change, thriving from our location and lifestyles' (Warrumbungle Shire Council, 2022).

In accordance with the regional planning context, there are several other major projects which are recently developed, or currently being considered within the region, which could result in changes to the community, or which may have further cumulative effects across the region, particularly in relation to impacts associated with concurrent construction activities. Such project developments, in combination with the number of renewable projects approved or in the planning phase, may further intensify impacts to be experienced by local communities across the region.

Given the location of the Project Area in the CWO REZ, there are other renewable energy projects that are operating, under construction, or are currently being planned. These projects, summarised in **Appendix C** and shown in **Figure 3.2**, inform an understanding of cumulative development in the region, and potential cumulative effects that multiple nearby projects may have on the community.

FIGURE 3.2

Central- West Orana Renewable Energy Zone



Legend

- Indicative Central West Orana Renewable Energy Zone Boundary

Other Renewable Projects

- Solar
- Wind
- Pumped Hydro
- Project Boundary
- State Forest
- NPWS Estate
- Roads
- Railway
- Major Watercourse
- Waterbodies

0 20 40
Kilometres

Scale 1:1,100,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

3.3 Political Capital

Political capital refers to the individuals, institutions, and systems that contribute to a community's ability to maintain 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 key characteristics of the study areas from a political capital perspective is provided in **Table 3.2** below.

Table 3.2 Political Capital

Key Aspects	Description
Federal Government	The Project is located within the Australian Commonwealth Electoral Division of Calare. Andrew Gee Nationals MP was elected to the House of Representatives for Calare in 2016, succeeding retired Nationals MP John Cobb (Australian Electoral Commission, 2019).
State Government	The Project Area is represented at the State level under the Legislative Assembly District of Dubbo. Dugald Saunders of the National Party is the incumbent Member for Dubbo, assuming office in 2019 and succeeding Troy Grant of the National Party (NSW Electoral Commission, 2021). Dugald Saunders is the Minister for Agriculture, and the Minister for Western New South Wales. The Nationals Party have consistently held office in the district of Dubbo since 2011.
Local Government	The Project is located within the Dubbo Regional LGA, which is represented by the Dubbo Regional Council. Council consists of nine Councillors and Mayor Mathew Dickerson, who was elected in December 2021. In its Local Strategic Planning Statement, Dubbo Regional Council recognises the need to manage resources and renewables, however a clear priority within the Statement is to ensure that any renewables, are appropriately managed to minimise impacts on local amenity, minimise the impacts to productive agricultural land.
Traditional Owners and Aboriginal Governance	The Project Area is located within the traditional lands of the Wiradjuri nation. Wiradjuri means '*the people of the three rivers'*, and the nation's traditional and modern-day connections to Country extend over a large area of NSW encompassing the Macquarie, Lachlan and Murrumbidgee Rivers, bounded by the Murray River in the south (Three Rivers Regional Assembly, 2021). The Project Area intersects the modern-day NSW Local Aboriginal Land Council's (LALC) of Wellington, located in the Central Region, and Orange, located in the Wiradjuri Region. The current Councillor of the Central Regional is Grace Toomey, a Wiradjuri woman from Dubbo who is Secretary of the Dubbo Aboriginal Community Working Party of the Three Rivers Regional Assembly. The current Councillor of the Wiradjuri Region is Leeanne Hampton, a Wiradjuri / Ngiyampaa woman from West Wyalong who was the first female Aboriginal Deputy Mayor of the Bland Shire Council. There are no registered native title claims in or surrounding the Project Area.

3.4 Natural Capital

Natural capital refers to the natural assets and resources that contribute to community sustainability. It 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 key characteristics of the study areas from a natural capital perspective is provided in **Table 3.3** below.

Table 3.3 Natural Capital

Key Aspects	Description
Primarily agricultural land uses in proximity to the site	Land within and surrounding the Project Area has been subject to extensive vegetation clearing associated with historic agricultural land uses and is predominately utilised for grazing activities. Agriculture (primarily sheep grazing with some cattle grazing) is the main land use in the LGA. The Project Area is zoned as RU1 Primary Production under the Dubbo Regional Local Environmental Plan (LEP) 2022. The land is mapped as Class 5, 6 and 7 capability agricultural land. A small portion of the Project Area (in the northeast) is mapped classified as Biophysical Strategic Agricultural Land (BSAL) under the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007,* however no disturbance to this area of mapped BSAL is proposed as part of the Project.
Lake Burrendong is a well-known nature-based recreation destination	Lake Burrendong State Park is located to the north and northeast of the Project, surrounding Lake Burrendong. There are recreation facilities and holiday parks located near Lake Burrendong, northeast of Mumbil, and further south along the Macquarie River in Mookerawa. Lake Burrendong State Park is a well-regarded tourist attraction in the region and offers a range of nature-based attractions including bush-walking tracks, an arboretum, picnicking sites, gold fossicking locations, fishing, boating, water-skiing, sailing, and swimming.
The region is located in a significant mining area, with associations to the central-west NSW goldrush	Stuart Town was formerly called Ironbark and was established as a gold mining settlement during the Central-West NSW gold rush in the 1850s. Gold discovery in the region dates back to the year 1851, when Edward Hammond Hargraves recorded that alluvial gold was found along the Macquarie River. The region sits within the Lachlan Orogen geological province which hosts traditional metal resources such as gold, silver and base metals, and a significant proportion of the State's emerging critical mineral resources such as cobalt, scandium, rare earth elements and titanium. There are two existing mineral exploration licences that apply to the western portion of the Project Area, held by Kaiser Reef Limited (EL8491), and Godolphin Tenements Pty Ltd (EL8901). Gold exploration activities are ongoing by Kaiser Reef Limited at the Stuart Town Gold Project.
The region is home to a significant agricultural industry, with Orange containing a strong	The primary agricultural industries in the Dubbo Regional LGA are wool ($28.5 million), cereal crops (worth $27.4 million), and cattle and calves ($23.2 million) (NSW Government, 2016). In the Dubbo Regional LGA, the 'Food Product Manufacturing' sector was the largest exporter, with goods valued at $401.06 million (Dubbo Regional Council, 2019).

Key Aspects	Description
viticulture industry and heritage	The Central West Orana's agriculture industry is estimated to produce $2.4 billion of agricultural commodities annually, including $1.3 billion from wine, beef, wool, vegetables, cotton, wheat, fruit and timber. This represents 18% of all agricultural production in NSW annually (Department of Planning, Industry and Environment, 2022). The broader region also contains the Orange wine region, named after the town of Orange. Producers in the Orange region benefit from a cooler climate and vineyard sites with an altitude of between 600 and 1100 m of elevation. The viticultural history in the region began in the 1940s, when an experimental viticulture station was established. The first commercial vines were planted at Bloodwood in 1983.
The region experiences water supply deficiencies and is noted as being susceptible to natural hazards	Water supply deficiencies (of more than 50% by 2036) are forecast for the Dubbo Regional LGA. New water security projects and water management initiatives, such as stormwater harvesting and innovative water management approaches, are currently being employed to improve water security (NSW Government, 2016). Extended drought conditions and large-scale bushfires have negatively affected agricultural communities in recent years. However, above-average rainfall since March 2021 has eased long-term rainfall deficiencies and encouraged optimism in agricultural communities in the region. The rate of warming in the region has accelerated since 1960, and in the mid- to long-term, there is projected decreases in winter rainfall and harsher fire weather with high confidence (OEH, 2014; Bureau of Meteorology, 2021). The 2017 Western Enabling Regional Adaptation Central West and Orana region report identifies the region's vulnerability to climate change and provides the basis for ongoing work to support the region's adaption. The region is also notable as being susceptible to natural hazards, with recent events including: • The 2019–2020 bushfires which burnt 3,230 km^2 within the region. • Severe droughts between mid-2017 and 2020 which resulted in towns and industries facing the prospect of running out of water. • Floods, including September 2016 when flood levels peaked at 10.67 m at the Forbes Iron Bridge (Department of Planning, Industry, and Environment, 2021).
Respondents to the broader community survey identified the landscape and surrounding natural environment as valuable aspects of the locality.	During the community survey undertaken to support the preparation of this scoping report, respondents identified key landscape features that were of value to them such as: *The rolling hills; a quiet, peaceful, calm, beautiful, uncluttered environment free of huge man-made structures. It's good for the soul and mental health.* *My views are amazing, I'm on-top of a hill and am not interested in compromising them.* *The unobtrusive natural beauty, rolling hills, and the few peaceful bushlands that remain in the area.* Additionally, respondents were also asked to identify what they value most about the existing natural and built environment, the following provides an overview of responses: *I love the Common, though it needs attention. The Macquarie River of course for water it provides for the environment. The little town is cute but could be better cared for.* *Lake Burrendong, to swim and enjoy relaxing and cool environment. The natural bushland that remains and the diverse wild and birdlife.* *Other than our beautiful property and surrounding views we love the Mookerwa Dam.* *The stands of Wattle that line various sections of the road are beautiful.*

3.5 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 the prevalence of vulnerable, marginalised, or at-risk groups within the community.

A summary of the key characteristics of the study areas from a human capital perspective is provided in **Table 3.4** below (refer also to **Appendix B**).

Table 3.4 Human Capital

Key Aspects	Description
Regional population centres have recorded strong population growth. However, smaller towns and localities have recorded stagnant or declining populations.	The population has increased in the Dubbo Regional, Cabonne Shire, and the City of Orange LGAs since 2006 and is expected to continue to increase until 2041 (refer to population trends in **Appendix B**). However, the SALs of Euchareena, Mullion Creek, Stuart Town, and Mumbil recorded relatively stable, or declining populations over the most recent Census periods.
The social locality is experiencing an ageing population	Whilst the populations of Dubbo Regional, Cabonne Shire, and the City of Orange LGAs are growing, median population ages are projected to increase to 2040 which indicates an ageing population. For Dubbo Regional LGA, growth in the population is expected to be concentrated in the people aged 65 years or older. Notably, rural areas also recorded a higher-than-average age of residents compared with the state (42 years). The localities with the highest average ages were Farnham (54 years), Mumbil (51 years), and Stuart Town (50 years).
Higher proportion of Aboriginal and/or Torres Strait Islander Residents	Dubbo Regional LGA contains a higher proportion of Aboriginal and/or Torres Strait Islander residents than the NSW average (15%; compared to 3% in NSW). The urban centre of Wellington has a significantly higher Aboriginal and Torres Strait Islander population (26%). Stuart Town (10%), Euchareena (18%), Mumbil (9%), and Molong (20%) recorded similarly high proportions of the population identifying as Aboriginal and/or Torres Strait Islander.
Lower rates of high school completion, and lower rates of higher education achievement	The local population has a low rate of Year 12 completion compared to the NSW average (44% in Dubbo Regional, compared to 59% in NSW), with a higher percentage of certificate level qualifications rather than Bachelor level qualifications in all study communities (23% hold certificates and 10% hold bachelor's degrees; compared to 18% certificates and 16% bachelor's degrees in NSW). Notwithstanding the proportion of the population completing Year 12 and tertiary education has increased across the LGA since 2006 (an increase of 10%).
Higher burden of disease experienced in the social locality	Health data (PHIDU, 2020) suggests that when compared to NSW, Dubbo Regional LGA has higher rates of obesity (30.9 and 44 ASR per 100 respectively), heart, stroke and vascular disease (4.9 and 5.2 ASR per 100 respectively), and mental and behavioural problems (18.8 and 24.9 ASR per 100 respectively). The LGA also has higher rates of behaviours that are considered to increase risk of several lifestyle diseases such as smoking (14.4 and 18.7 ASR per 100 respectively) and are more likely to die a premature death (238.4 and 317.4 ASR per 100,000 respectively).

By way of summary, **Figure 3.3** outlines the Socio-Economic Indexes for Areas (SEIFA), prepared by the ABS. A low score indicates a greater degree of disadvantage, with the lowest 10% of areas receiving a decile of one, and the highest, a ten. It should be noted that no comparison can be made between LGAs and state suburbs on ranking, as rankings are only comparative within each geographic classification.

The SEIFA Index of Education and Occupation (IEO) for each of the SSCs reflects the general level of education and occupation-related skills of people within an area, indicative of relative disadvantage compared to other areas in NSW. The highest IEO index across the communities is within the 5th decile, indicating that approximately half of the other SSCs and LGAs in NSW have a higher level of education and occupation-related skills in comparison.

The social locality has a comparatively lower level of education and occupation-related skills compared to the other communities in the state of NSW. The suburbs of Mumbil, and Wellington, and the broader sub region of Wellington SA2 are ranked within the lowest decile ranking in NSW indicating a high level of disadvantage.

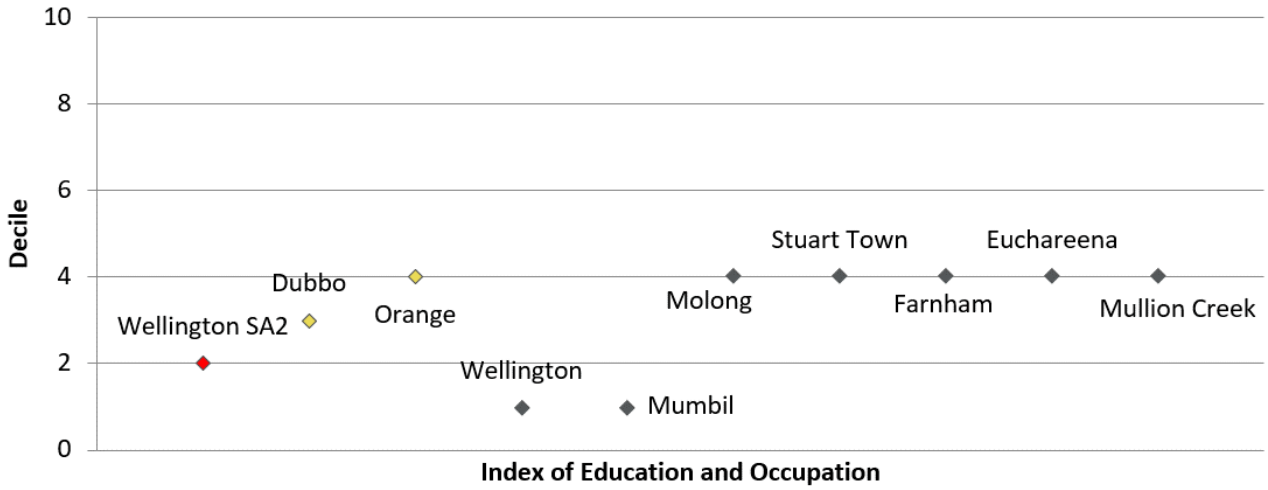


Figure 3.3 SEIFA Index of Education and Occupation – Decile Ranking for Localities

Source: SEIFA, 2016.

3.6 Cultural Capital

Cultural capital refers to underlying factors that provide human societies with the means and adaptions to maintain themselves in 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).

A summary of the key characteristics of the study areas from a cultural capital perspective is provided in **Table 3.5** below.

Table 3.5 Cultural Capital

Key Aspects	Description
Lower proportion of the population born overseas	There are significantly fewer people born overseas in all of the study communities when compared to the NSW average (30%). The most diverse community is Mumbil SAL with approximately 14% of the population born overseas. In contrast, the suburb of Farnham recorded that none of its population had been born overseas. Populations in Dubbo Regional LGA identify predominately as being of 'Australian', 'English', 'Irish', and 'Scottish' descent (>80% of the population), with most people being born within Australia (>84%) and speaking only English (>86%).
The Project is located on the lands of the Wiradjuri Nation	Wiradjuri country is the largest Aboriginal Nation in NSW, stretching from the eastern boundary of the Great Dividing Range. Drawing a line from the towns of Hay and Nyngan approximates the western boundary while Gunnedah and Albury mark the northern and southern boundaries of Wiradjuri country. Initially peaceful early interactions between Europeans and Wiradjuri people led to violent conflict when crop sharing was misinterpreted as theft by a settler. Following this outbreak of violence, Aboriginal people were shot, poisoned and displaced by pastoral settlements. In turn, livestock, stockmen, and shepherds were speared in retaliation (Bathurst Regional Council, 2022). Further incursion of settlements led to intense conflict, termed the Bathurst Wars (ABC News Local, 2015). Over the years, the Wiradjuri people were increasingly displaced from their traditional lands and cultural practices. This and the introduction of European diseases caused significant reduction in the Wiradjuri population and led to many Wiradjuri people settling close to pastoral homesteads and working as shepherds and labourers (ABC News, 2018). The social locality falls within the Three Rivers Regional Assembly (TRRA) area which extends from Lithgow in the east of NSW through to Nyngan in the west and represents the interests of Aboriginal people across the communities of Bathurst, Dubbo, Gilgandra, Mudgee, Narromine, Nyngan, Orange, Parkes, Peak Hill, Trangie, Warren and Wellington. The TRRA facilitates the involvement of Aboriginal communities in setting regional priorities and strengthening the capacity of leaders and community members.

3.7 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.

A summary of the key characteristics of the study areas from a social capital perspective is provided **Table 3.6** below (refer also to **Appendix B**).

Table 3.6 Social Capital

Key Aspects	Description
Lower levels of population transience amongst residential population	The proportion of the community with a different address one year ago (15% in Dubbo Regional LGA), and five years ago (38% in Dubbo Regional LGA), is consistent with or lower than the State's average (14% and 39% respectively), meaning residents have less mobility. Furthermore, the level of mobility of Dubbo Regional LGA residents has been decreasing since 2006. Lower levels of transience may be an indicator that residents are more affixed to a specific locality, and in turn may have strong social ties, and place-based attachments.
Higher rates of Volunteerism	Across the broader Dubbo Regional LGA volunteerism was higher (20%) than the state average (18%) which is reflective of other regional areas in NSW. However, the rate of volunteerism has decreased in the LGA since 2006. The rate of volunteerism in the suburbs of Wellington UCL and Dubbo SSC is lower than the State average. High rates of volunteering are often used as an indicator of connection, cohesion, and sense of community in the local area.
High proportion of single parent families within Wellington	Wellington UCL recorded a very high proportion of single parent families relative to the broader NSW population (29% compared to 8% in NSW). The proportion of single parent families in the broader LGA was also higher than the State average (20%).
The majority of households in the social locality are family households	The majority of households in the social locality are family households (a range between 55% - 82% across the study communities; with 71% in Dubbo Regional LGA). Mumbil SSC recorded the highest proportion of households (43%) as lone person households, and Wellington UCL recorded the second highest proportion of households as lone person households across the study communities (36%) (refer to **Appendix B**).
Crime is indicated as an ongoing social problem in Dubbo Regional LGA	In 2020, the prevalence of crime was notably higher in the Dubbo Regional LGA, with the top three crimes as ranked across all LGAs in NSW being steal from person (3 out of 128 LGAs), fraud (5 out of 128 LGAs), and non-domestic violence related assault (5 out of 128 LGAs).

Figure 3.4 provides the overall socio-economic status and level of disadvantage within each community, as determined by the Index of Relative Socio-economic Disadvantage (IRSD) - 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, with the lowest 10% of areas receiving a decile of one, and the highest, ten. It should be noted that no comparison can be made between LGAs and state suburbs on ranking, as rankings are only comparative within each geographic classification.

When considering the relative socio-economic disadvantage of the study communities, all localities score within the bottom 5 deciles indicating a comparatively high level of disadvantage with respect to other localities across the State. Wellington, Mumbil, Stuart Town, Farnham, and Euchareena SSC's specifically recorded decile rankings of 1, meaning that they were ranked amongst the lowest deciles across the State.

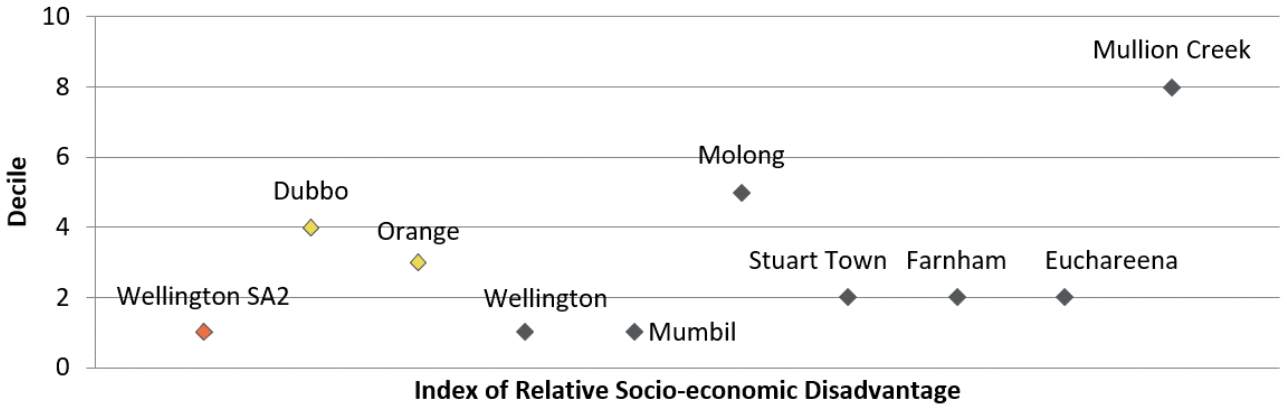


Figure 3.4 SEIFA Index of Relative Socio-economic Disadvantage – Decile Ranking for Localities

Source: SEFIA, 2016.

3.8 Economic Capital

Examining a community's economic capital involves consideration of several indicators, including industry and employment, workforce participation and unemployment, income levels and cost of living pressures, such as weekly rent or mortgage repayments.

A summary of the key characteristics of the study areas from an economic capital perspective is provided in **Table 3.7** below (refer also to **Appendix B**).

Table 3.7 Economic Capital

Key Aspects	Description
Very low unemployment rates	The unemployment rate in the Dubbo Regional LGA has been on a long-trend decrease after peaking between 2014–2017, albeit except for a short-term increase coinciding with the COVID-19 pandemic in August 2021. During the March 2022 quarter the unemployment rate for Dubbo Regional LGA was recorded at 2.9%, lower than the rate of 4.0% unemployment recorded for NSW (ABS, 2022). Rates of unemployment in the Wellington SA2 region mirror the general unemployment trend of the broader LGA. However, they are consistently higher than the LGA by approximately 2%. The unemployment rates in Dubbo Regional LGA coincide with relatively stable labour force participation rates. This data indicates a slower expansion of the labour force in Dubbo Regional LGA which may be generally attributable to cycles of economic stagnation or decline. Rates of unemployment in the proximal LGAs of Cabonne Shire and City of Orange are lower than in Dubbo Regional LGA at 1.4% and 2.3% respectively compared to 2.9%. It is noted that this unemployment rate is the lowest recorded in the ten years of available data. Refer to **Appendix B** for more data.
Rates of unemployment and labour force participation generally coincide with economic	As indicated by ABS data, the rates of part-time employment in the labour force have been increasing since 2006 across all LGAs, this trend is common in ageing populations. At the time of the 2016 Census, the unemployment rate was the highest in Wellington UCL (12.4% compared to the 6.3% in NSW) which aligns with it having the lowest SEIFA index scores amongst the study communities. Mumbil SSC recorded

Key Aspects	Description
cycles and demographic conditions	that the highest proportion of the population as out of the labour force (7.3%), which coincides with the locality having the highest median age (51 years).
Lower-than-average median household incomes, coinciding with lower-than-average housing costs	As at the 2021 census, the median weekly household income was below the NSW average ($1,829) across all communities in the social locality. The suburb with the lowest median weekly household income is Euchareena SAL ($900 a week). In most cases, the cost of living in the study communities is lower than the state, with the median monthly mortgage repayments in all study communities being lower than the NSW average. Similarly, mortgage prices have also been on the rise in both LGAs since 2006. The same trend has been experienced in regard to rental prices, with the weekly median rent for a 3-bedroom house across the social locality below the state median and rental costs in the LGAs rising since 2006. Dubbo SAL and Molong SAL recorded the highest median weekly rent at $310 in comparison to the NSW median of $420.
Regional centres recorded high proportion of the labour force employed in service industries, whereas the region surrounding the Project recorded agriculture as the dominant employment industry	As at the 2016 ABS Census, approximately 15.4% of workers in the Dubbo Regional LGA were recorded under the census category of 'health care and social assistance' as their industry of employment. In contrast, 'agriculture, forestry and fishing' was recorded as the top industry of employment in the Wellington SA2 region (17%). The disaggregation of services and primary producing sectors across the LGA and the region indicates that Dubbo and Orange likely function as regional centres for the surrounding industries. The agricultural industry is the top employer in localities where rural land uses are common (Wellington SA2, Stuart Town, Farnham, Euchareena, Molong, Mullion Creek) whereas suburbs with more diverse land uses attract a wider range of industries of employment recorded (Orange, Mumbil, Dubbo SSCs and Wellington UCL).
The region is home to a well-developed tourism sector	The Central NSW Tourism Region (in which the social locality is located) attracts over 3,771,000 domestic day, and 2,831,000 domestic overnight visitors (2019 pre-COVID results) each year through its diverse viticulture, eco-tourism, food, sport, and cultural events (Tourism Research Australia, 2020). Central Orana is also recognised for its well developed its eco-tourism attractions and gliding events. Taronga Western Plains Zoo is the biggest attraction in the region, attracting 228,092 paid admissions in 2016–17. Other known attractions are the Wellington Caves, Lake Burrendong, Old Dubbo Gaol and heritage gardens (NSW Government, 2018). According to Tourism Research Australia, there were a total of 576,000 visitors to the Dubbo Regional LGA in 2019, who spent on average 2 nights in the area, with a total expenditure of $404 million (Tourism Research Australia, 2019). The Orange region is also a well-known tourist destination due to its' association with winemaking and fine food. The Orange wine region is home to more than 60 vineyards and 40 cellar doors. According to Tourism Research Australia, there were a total of 1,162,000 visitors in 2019, who spent on average 3 nights in the area, with a total expenditure of $324 million (Tourism Research Australia, 2019).

The SEIFA Index of Economic Resources (IER) reflects the economic resources of households within an area and includes variables such as household income, housing expenditure (e.g., rent) and wealth (e.g., home ownership). A low score indicates a relative lack of access to economic resources in general, while a high score indicates greater access to economic resources. When considering the study communities, Mumbil

and Wellington are the most disadvantaged, scoring a decile ranking of 1. Lower-than-average (<5) decile rankings were also recorded for Orange, Molong, Stuart Town, Farnham, Euchareena, and Dubbo SSCs. The only locality to score above the median decile ranking, when compared to other localities across the State was Mullion Creek with a decile score of 9 (refer to **Figure 3.5**).

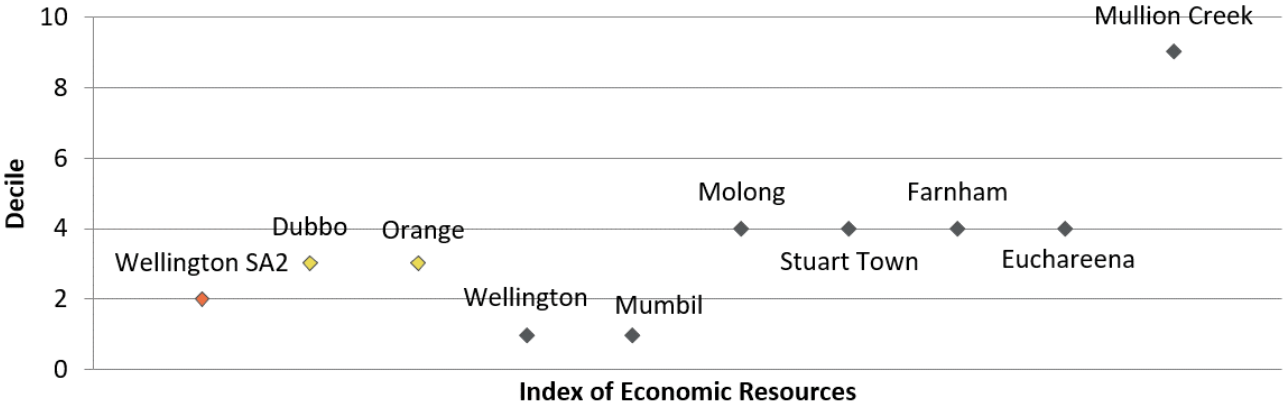


Figure 3.5 SEIFA Index of Economic Resources

Source: SEIFA, 2016.

3.9 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.

The Project's area of social influence can be characterised as having a wide range of community services (refer to **Appendix B**).

A summary of the key characteristics of the study areas from a physical capital perspective is provided in **Table 3.8** below (refer also to **Appendix B**).

Table 3.8 Physical Capital

Key Aspects	Description
High rates of home ownership	The Dubbo Regional LGA contained a higher proportion of dwellings that are fully owned (without a mortgage) than the NSW average (31.4% compared with 29.8%). Rates of outright home ownership is decreasing in line with a rising proportion of people renting or owning their home with a mortgage (refer to **Appendix B**). Proportions of dwellings that are being rented in the Dubbo Regional LGA are comparable to the state average (30.7% and 31.8% respectively). The small regional localities generally contained higher rates of outright home ownership compared with the state, with the highest proportion of those owning their home owned outright being in Farnham (90%), Euchareena (63%), Mumbil (52%) and Stuart Town (40%). The suburb with the lowest proportion of outright home ownership was Dubbo SSC at 28.9%.
The proportion of households experiencing	The proportion of households in mortgage stress in the Dubbo Regional LGA have decreased since 2006, with the lowest level recorded in Dubbo Regional at 5.1% of households. In contrast, the proportion of households experiencing rental stress has increased across the

Key Aspects	Description
rental stress has been increasing	LGA, surpassing 26.2% of households. This is a sign of high demand in the rental market which can often result in increased rental prices. It is noted that rates of households in rental stress have been increasing across the Cabonne Shire and City of Orange Council.
Access to healthcare services is limited in rural and remote areas in the social locality, meaning that most people travel to access services.	Regarding the provision of social infrastructure, there has been much controversary in recent years relating to the under supply of health care in the region. The Dubbo Regional LGA has a higher average rate of transport (4.5 ASR per 100) and cost (3.2 ASR per 100) affecting healthcare in comparison to the NSW average (4.3 ASR per 100 and 2.5 ASR per 100 respectively). Health Infrastructure is currently redeveloping the Dubbo Hospital campus to significantly upgrade and expand health service delivery to the Dubbo community and the regional and remote areas of western NSW (Health Infrastructure, 2022). The NSW Government has committed $150 million toward the redevelopment project which is nearing completion. The Project will: • Deliver a new three-storey clinical building to enable highly valued health staff to provide the very best care to the community. • Help attract and retain essential health staff and expand their skills through the delivery of contemporary models of care. • Provide a culturally appropriate, safe, and welcoming place for all people in the western NSW district.
The region has good transport connectivity	The Mitchell Highway transverses the social locality and serves as a main route of travel for inland residents, connecting with Sydney on the coast, and inland regions in NSW and south-east Queensland. Existing railway lines also traverse the social locality, connecting Sydney with Western NSW. The network provides opportunities for the region to expand the freight network and support the local agricultural industry. As a result of the proximity to major national highways, the Central West and Orana Regional Plan 2036 outlines a vision to capitalise on the location to grow the freight industry which may result in opportunities for new intermodal facilities and support rail infrastructure (NSW Government, 2016). Dubbo has an airport which provides weekday multiple daily return routes to Sydney, daily weekday return routes to Bourke and Broken Hill, and weekly return trips to Newcastle, Walgett/Lightning Ridge, Essendon, Brisbane, Ballina, and Melbourne. Orange also contains a regional airport, providing return flights to Sydney, Brisbane, and Melbourne.
Demand for temporary accommodation services is high	Based on service capacity assessments undertaken in the region, strain on accommodation services is evident, due to the large influx of seasonal and itinerant workers for mining and agribusiness, such as in the viticulture, pome fruit, nut, cotton, and stone fruit industries, particularly during harvest periods (DPIE, 2016). A range of accommodation options is needed to meet this temporary workforce demand, particularly in the context of growth in other sectors such as renewable energy.

3.10 Local Challenges and Opportunities

The key challenges and opportunities for the host LGA are outlined in **Table 3.9**. These challenges and opportunities have been derived from the review of local, regional, and state government reports, strategies and plans, ABS Census data and other secondary sources of data, local media, and through community consultation.

Table 3.9 Local Challenges and Opportunities

Challenges	Capital	Opportunities
• The region contains several major project developments across a range of jurisdictions. Future developments may need to negotiate competing plans and priorities for the region.	**Political**	• Future development and land use planning in the area is supported by a range of local and regional strategic planning systems and mechanisms. • Political support for renewable energy development at Federal and State government levels.
• Water security and drought prone area, the area is also sensitive to climate change. • Impacts of multiple cumulative developments on natural environment require management and regulation.	**Natural**	• Social locality has quality agricultural land, used for the purposes of grazing, winemaking, and orchard growing. • Community members value the beautiful natural environment and aesthetic values of the landscape. • The area has been identified as having favourable natural resources for renewable energy development (solar and wind). • The region contains Burrendong Lake and the Macquarie River, which are notable for their recreation-based values.
• Limited general and specialised health services, particularly in smaller communities. • Difficulties in attracting and retaining General Practitioners (GPs). • Limited tertiary education options. • An ageing population.	**Human**	• The population is growing in both Dubbo and Orange. • The proportion of residents undertaking tertiary education increasing. • The Dubbo region has a strong technical training and skills base.
• The area has an extensive post-colonial occupation that has destroyed many Aboriginal sites of cultural significance.	**Cultural**	• There is a long history of European cultural heritage exemplified through heritage buildings and places and the landscape. • Stuart Town is known historically through its' association with the Gold rush in Central NSW. • Aboriginal people are strongly represented in the social locality through organisations such as the TRRA. • Residents' cultural identity is tied with the landscape and land uses contained within the region.

Challenges	Capital	Opportunities
• Temporary workers accommodation facilities are available, however can have unintended detrimental social consequences, such as segregation from the existing community. • High crime rate in the LGA.	**Social**	• Council's plan to increase housing options in the region. • Thriving tourism, arts and cultural sectors. • Tight-knit community. • Representation of Aboriginal and Torres Strait Islander people in the community. • Low mobility of residents resulting in sustained sense of community.
• Potential for labour force competition due to mining, and agricultural activity. • Increasing retirement age population leading to decrease in skilled employee base. • Low median weekly household income resulting in less spending in the local economy. • Increasing housing prices.	**Economic**	• Region has strong and diverse industries including mining, tourism, and agriculture. • Council supports Projects that create new jobs in the region and help to build a diverse and multi-skilled workforce. • Strong business services sector. • Low cost of living relative to other localities in NSW.
• There are a number of other major developments under construction or proposed in the social locality which may place potential strain on existing infrastructure.	**Physical**	• Hospital expansion located in Mudgee and Dubbo. • Good inter-regional connectivity via main roads and rail infrastructure.

4.0 Perceived and Likely Social Impacts

This section summarises the social impacts (positive and negative) in relation to the Project and has been framed in accordance with the social impact categories outlined in the SIA Guideline (DPE, 2023). The impacts have been identified through community consultation and the findings of the social baseline profile.

A summary of the scoped impacts identified by attendees at the community drop-in session and the online survey distributed in September 2022 are outlined in **Table 4.1** below. The following sections provide further discussion regarding the key potential social impacts identified by respondents. Given the low sample size, frequency of response has not been calculated by stakeholder group to avoid potentially identifying respondents.

Table 4.1 Perceived Social Impacts (Unprompted[6])

Impact Categorisation		Impact	Frequency
Positive Identified Social Impacts	Way of Life	Provision of renewable energy to the grid	5
	Livelihoods	Employment and contracting opportunities	4
		Opportunities for community benefit sharing	2
		Payments to host landholders	1
		Training and upskilling opportunities for locals	1
	Accessibility	Electricity price stability and affordability	2
		Road improvements	2
		Improved site accessibility	1
Negative Identified Social Impacts	Surroundings	Visual impacts	8
		Noise impacts and vibrations	6
		Increased traffic disruptions	5
		Impacts to flora and fauna	4
		Increased fire risk	4
		Generation of waste	2
		Feral pest proliferation due to changing land management practices	1
	Livelihoods	Declining property value	5
		Changing and conflicting land use	3
		Impacts on tourism	2
	Community	Inequitable distribution of project benefits (host landholders and neighbours)	3

[6] Impacts were identified using an unprompted recall of social impacts approach, where community members were asked to directly to recall potential social impacts associated with the project, rather than being asked to identify the significance of potential pre-identified social impacts.

Impact Categorisation		Impact	Frequency
	Way of Life	Change to the character of the community	2
	Decision-making Systems	Limited Project consultation/ inability to influence project decision-making	2
		Inadequate project justification (financial/whole of life GHG)	2
	Accessibility	Deterioration in road conditions	3
		Impacts on recreational land-use	1
	Health & Wellbeing	Stress and anxiety as a result of the Project	1

Source: Umwelt, 2022. Aquila WF Community Drop-in Session, Stuart Town, 30 August 2022, base n = ~50 attendees (38 registered on sign-on sheet); Umwelt, 2022. Aquila WF Online Community Survey, 5 September 2022 – 19 September 2022, base n = 11. Umwelt, 2022. Aquila WF Community Information Session Evaluation Form, 30 August, base n = 4.

Figure 4.1 and **Figure 4.2** also show the self-reported levels of 'acceptance' and 'concern' in relation to the Project, as obtained from responses to the broader community survey. **Figure 4.1** indicates an average acceptance score of 5 (out of 10), which highlights that there are moderate levels of acceptance for the Project. **Figure 4.2** indicates an average concern score of 6.5 (out of 10), showing that most respondents recorded higher levels of concern in relation to the Project.

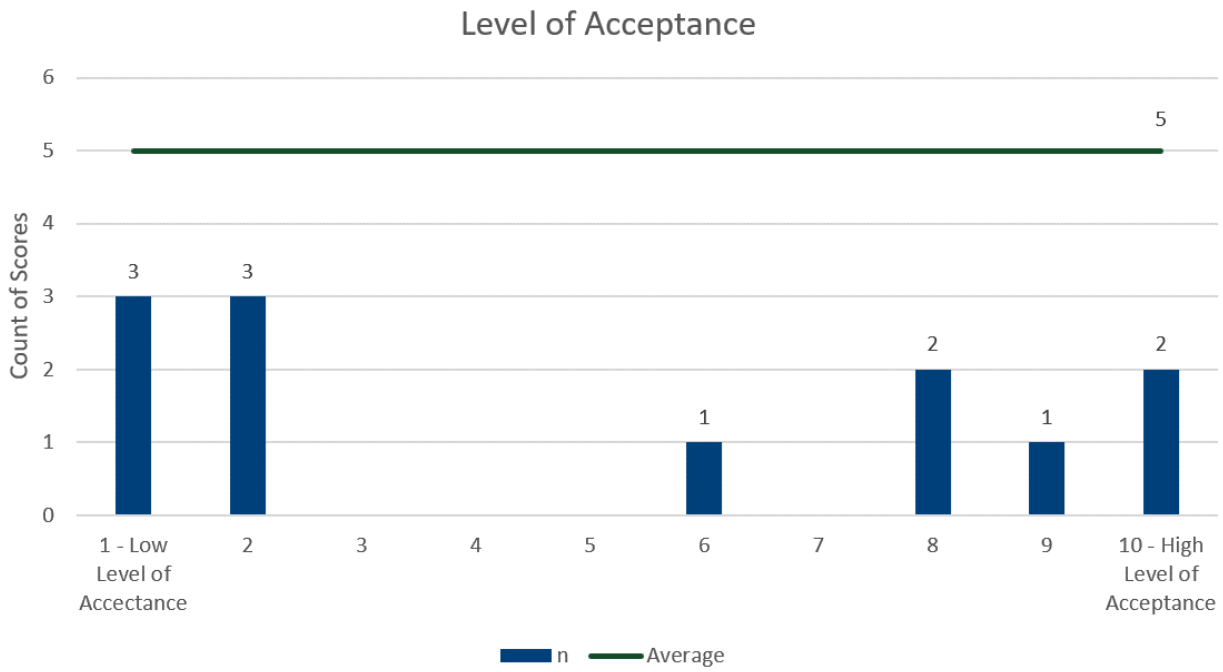


Figure 4.1 Self-Reported Level of Project Acceptance

Source: Umwelt, 2022. n = 12.

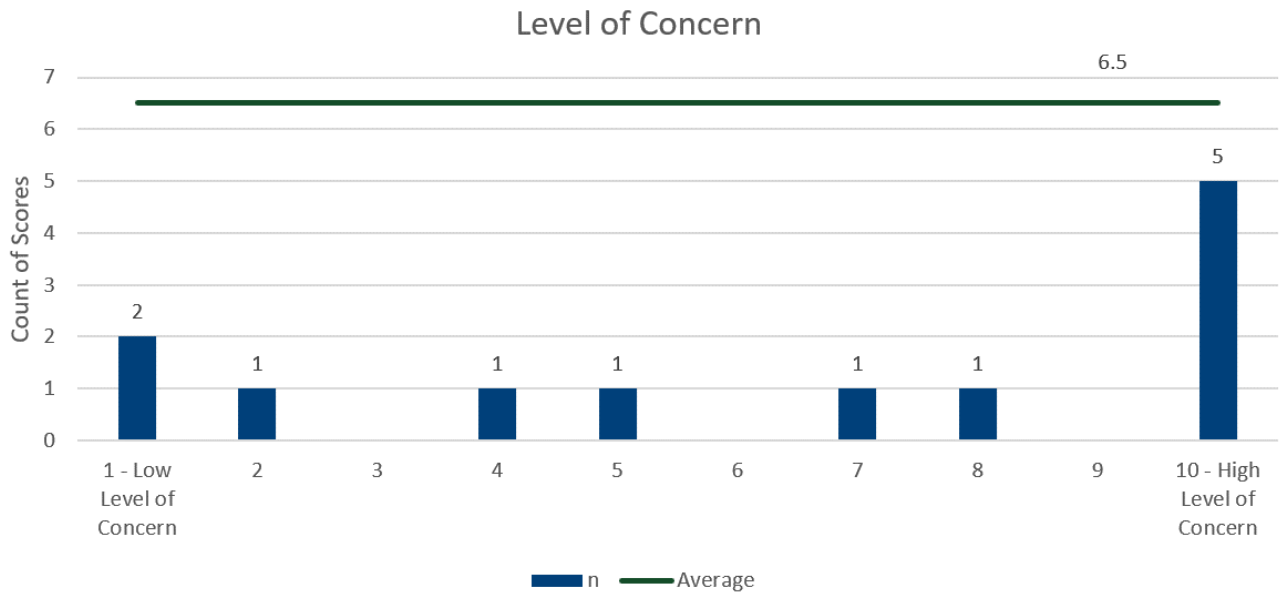


Figure 4.2 Self-Reported Level of Project-Related Concern

Source: Umwelt, 2022. n = 12.

4.1 Surroundings

Impacts upon people's surroundings refer to changes that the Project may cause on a community's experience of the landscape, environmental assets, and resources. This can include people's amenity, their access to and use of the natural and built environment, and the aesthetic value of the surrounds.

4.1.1 Visual Amenity

The likely visual changes to the landscape were a key concern identified through community consultation (n = 8). An increase of built infrastructure and resulting industrialisation of the landscape was described as a concern by some respondents that noted the change may have impacts to the broader visual landscape in the area.

As indicated in **Table 4.1**, visual impacts associated with the Project were frequently noted as a key concern for proximal landholders. Three respondents directly highlighted that the Project would interfere with the views from their properties and produce shadow flickering, highlighting that the nature of large, man-made structures is contrary to the natural values of the social locality.

> *The view outside our home will be significantly impacted… the towers, which are approximately the height of a >50 storey building, will tower over any trees and completely dominate the landscape. The view from the hill behind the house will be ruined as the whole project will be visible – Proximal landholder.*

> *Views of the countryside and down the trainline from the town should be unhindered and turbines should not be visible from any property in Stuart Town. The views from town are what define it, and turbines - that feed larger towns nearby - will detract from the inherent sense of place and quaintness – Proximal landholder.*

While we support renewable energy projects in principle, our support for any particular project depends on its design and location. With respect to Aquilla Wind, we have grave concerns regarding the size of the turbines and the close proximity to residences – Proximal landholder.

4.1.2 Social Amenity – Noise and Vibration

The potential impact on the social amenity of nearby residents as a result of noise generated by Project activities was raised as a key concern by some stakeholders (n = 6), particularly proximal landholders. One respondent at the community drop-in session expressed explicit concern in relation to the potential '*swooshing*' sound and vibrational sound of the turbines whilst operational.

The prevailing winds are often from the north and north-east (especially in autumn and winter) making NOISE an issue at our home from the multiple turbines proposed for this direction – Proximal landholder.

The project will ruin the local area on a number of levels…. noise, damaging vibrational frequencies – Broader community.

4.1.3 Impacts on Flora and Fauna

The effects of the Project on the natural environment were noted as a concern amongst some stakeholders (n = 4). One participant at the community drop-in session, and three responses to the online survey specifically expressed concern for wildlife, especially birds and the potential for bird strike from operating wind turbines (refer **Appendix C**).

One respondent to the broader community survey also noted that the Project may alter land management practices (including the management of feral pest populations) on the Project site.

Controlled feral pest hunting will be abandoned due to the construction and service people ongoing in the area – Proximal landholder.

4.1.4 Emissions, Waste Pollution and Land Rehabilitation

Two (2) attendees at the community drop-in session questioned the volume of waste generated by the Project, and the rehabilitation of the land following the conclusion of the Project's operational life. An attendee similarly 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 construction of the Project, emphasising the impact the renewable projects can have on the environment. Another response to the broader community survey also questioned the justification of the Project against the impact of the Project on the surrounding landscape. Construction phase activities generating rubbish and pollution, particularly during construction phase activities, and the development of site infrastructure were noted by other survey respondents.

An environmental disaster remaining after a short lifespan of turbines that will never cover their "whole of life" carbon footprint..... – Broader community.

Rubbish in the bushland from the people and construction – Broader community.

Concerns over the extensive road network that will need to be put in to maintain the huge number turbines – Proximal landholder.

4.1.5 Impacts on Road Safety

Impacts to local roads and traffic were also of concern for proximal landholders and community members. Of those who completed the online survey, five (5) stakeholders identified increased traffic and the impact this would have on road safety as a concern. One (1) respondent highlighted that increased traffic and people in the area would affect the surrounding amenity of the locality, whilst others (n=3) highlighted the potential for heavy traffic to cause road deterioration thus affecting road safety.

The disturbance of the traffic and people in the area poses a great risk to my property and lifestyle – Proximal landholder.

Roads are already damaged and dangerous – Proximal landholder.

I'd be worried that the terrible roads in some areas out here would be made worse by increased heavy traffic – Community group.

Widespread damage to local roads because of an increase in heavy vehicle traffic – Proximal landholder.

Despite these concerns, two (2) stakeholders saw upgrades to local roads and infrastructure as a potential positive of the Project, with one noting the potential for ACEN to work with local authorities to develop a mechanism to improve local road infrastructure.

Negotiate with Governmental agencies to fix/mitigate any potential damage to roads / access – Community group.

4.1.6 Fire Risk and Aviation

Fire risk was also highlighted as a key community concern both during the community information session and via the online community survey. Respondents (n = 4) raised concern that the Project may limit aviation movements in, and near the Project site, and thus impact on the accessibility of the site and surrounding area for aerial firefighting units. The topography of Mount Aquila was noted as being rugged and largely inaccessible for ground fire-fighting crews. There was concern amongst several members of the community that the Project may indirectly result in impacts on property and personal safety in the event of a bushfire.

Potential negative impacts [include] aerial firefighting limitations – Proximal landholder.

Catastrophic fire danger issues due to water bombing perimeter around project zone – Broader community.

Safety issues were highlighted in relation to the 2019 fire season across the east coast of Australia. Given the community's awareness and understanding of these events, it was expressed that ACEN needed to address concerns about community safety and ensure that the Project is designed so as not to impede access for bushfire fighting, noting:

> *It is not a case of if… it is a case of when a fire will occur – Broader community.*

While technical fire risk is a project planning consideration, community perceptions of risk factors are also an important consideration as they reflect the fears and aspirations of a community.

4.2 Livelihoods

Impacts upon people's livelihoods refer to the capacity of community members to sustain their livelihood through income-generating activities such as employment or business. This impact category considers the changes that economic conditions caused by the Project may have on individuals and businesses and whether people experience any personal disadvantage.

Respondents frequently identified negative impacts to livelihood associated with the Project due to changing land uses (n = 3), potential impact on land values (n = 5) and potential impacts on tourism operators (n = 2). Conversely, positive impacts to livelihoods, namely in the form of employment opportunities (n = 4), and opportunities for community benefit sharing (n = 2) was one of the most identified benefits that various stakeholder groups associated with the Project.

4.2.1 Impact to Land Values and Conflicting Land Use

A number of respondents cited concerns that the Project will impact on property prices (n = 5). The perceived change in rural property values associated with land adjacent to, or within eyesight of Project infrastructure, is perceived to be detrimental to people's livelihoods and their futures.

Most land use concerns were associated with the placement of Project infrastructure and its impact on agricultural activities such as grazing and how this would impact people's ability to sustain their livelihoods. The cumulative impact of multiple renewable energy generation projects across the CWO REZ was also noted as problematic:

> *We are concerned that the renewable energy zones will be counterproductive as renewable energy sources such as wind/solar will utilise productive farming/grazing land to the detriment of feeding the people of the world – Broader community.*

Two (2) respondents to the online community survey also highlighted the potential for the Project to impact on the region's ability to attract tourism, due to a perceived change in the natural environment and a degradation of the aesthetic values of the surrounding region.

> *I want to see Stuart Town remain in its current state and develop more toward attracting tourism - wind turbines may distract from the environment, regional beauty, and prevent other developments happening in the town – Proximal landholder.*

> *A huge noisy wind farm towering over homes would not add any long-term benefit. It would cause harm in the longer term e.g., loss of tourism – Proximal landholder.*

4.2.2 Distributional (in)equity of Project Benefits

Despite the above concerns being noted, two attendees to the drop-in session expressed a desire to host Project infrastructure on their properties, and one respondent raised payments to host landholders as an associated Project benefit. Positive impacts associated with hosting turbines that were noted by consultation participants included potential financial benefits, arising from both hosting of Project infrastructure and potential compensation for neighbouring landholders or hosts of ancillary infrastructure (including access tracks). It was therefore noted that the Project has the potential to benefit multiple landowners and diversify household income streams.

Whilst landholder payments provide a benefit to the host recipients, distributive equity impacts were noted by three members at the community information session, as host landholders receive financial compensation while neighbouring landholders may not receive a commensurate level of compensation despite still experiencing the impacts of the projects.

The potential impacts of distributional inequity are discussed further at **Section 4.3.2** below.

4.2.3 Opportunities for Local Employment, Training, and Procurement

Respondents (n = 4) highlighted the opportunity for local employment and contracting services to increase the commercial activity for local businesses and job security for local job seekers. Stakeholders focussed on the economic benefits the Project could provide to the local community, and the Project's potential role in providing employment and contracting opportunities for service providers and businesses.

> *Short term jobs in a low socio-economic area, with the distinct possibility of some long-term employment, maintenance – Community group.*

> *Local employment is key in Stuart Town. We have sufficient recreation areas for a small community but more services and opportunity for social development would be welcomed – Proximal landholder.*

> *Stuart Town has an ageing and low-income population with few local employment opportunities in town – Proximal landholder.*

During consultation, stakeholders expressed support for initiatives and programs to support employment training and procurement. One respondent raised the matter that young Aboriginal people were underrepresented in the workforce and suggested targeted efforts to support Aboriginal education and employment.

The opportunity to establish a capacity building and skills development program for the local population to support contracting, supplier, and employment opportunities was raised by some stakeholders. Stakeholders expressed a desire to see local contracting and employment opportunities prioritised with one stakeholder noting a need to create local industries that capitalise on the implementation of the REZ and the level of investment and interest in the region to foster local employment opportunities. This sentiment was echoed by a respondent to the broader community survey:

> *Training opportunities for people involved in coal mining to encourage more employment opportunities. Electrical engineering etc – Proximal landholder.*

The indirect impacts on people's livelihoods, such as an anticipated increase in commercial activity for local service providers and suppliers in nearby townships during the construction period, were also noted as having the potential to bring positive flow-on social benefits and improved community wellbeing.

However, concern has been raised in response to other projects across the CWO REZ, based on a review of comparable projects, that there are limited opportunities for local suppliers given that most infrastructure components are manufactured internationally. Some stakeholders attending the drop-in community information session also queried who in the community would actually benefit from employment, noting that the construction of infrastructure may use specialised roles and/or contractors that cannot be sourced from the local area.

4.2.4 Energy Costs

Two (2) stakeholders saw the benefits of the Project in contributing to price stability and increased access to affordable electricity. Some stakeholders, however, were more sceptical as to how much impact the Project would have on electricity prices.

> *You need to provide a consistent flow of energy and you need to provide back up evidence as to how this will be achieved and costings to the project and the government. Wind and solar only provide intermittent energy without back up batteries – Broader community.*

It is noted that the Project design proposes a BESS (refer to **Section 1.1**).

Support for renewable energy is often influenced by perceptions regarding the cost of electricity. 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).

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, citing recent rises in the cost of living, and media attention surrounding rises in electricity prices across the country. However, there was some scepticism raised around the justification of this Project specifically (refer to **Section 4.5** for further discussion).

4.3 Way of Life and Community

Impacts in relation to way of life refers to the potential impacts on how people live, work, play and interact with one another; with community impacts referring to changes in the composition, cohesion, and character of the population, as well as how the community functions and impacts on sense of community and sense of place.

4.3.1 Provision of Renewable Energy

Respondents recognised the potential benefits to the environment arising from the Project's generation of low emission energy, and implicitly, the mitigation of climate change impacts. Some community members (n = 5) identified that the most positive benefit of the Project related to the provision of clean energy. One respondent to the broader community survey highlighted the potential for the Project to contribute to a structural change to the way in which communities access energy, noting that Aquila Wind, being a renewable energy project, supports a transition away from fossil fuel energy generation.

More renewable energy into the grid. Less fossil fuel means more opportunities for transition to green energy – Proximal landholder.

4.3.2 Impacts to Sense of Community Due to Community Division

Some respondents felt that their overall way of life could be affected by the Project (n = 2). Further related impacts associated with livelihoods, and a change in the way that people use and perceive their surroundings, can result in alteration to people's pattern of living, their plans for the future and the feasibility of certain life choices. These are discussed in greater detail within **Section 4.1**.

Some respondents have also raised concerns that the local benefits of the Project would primarily be felt by property owners who receive financial compensation for hosting Project infrastructure, compared to neighbours who live on or own adjacent properties but who do not receive such benefits. Inequitable distribution of project benefits can damage interpersonal relations and the function of social systems within a community. Such events can also lead to a growth of mistrust and speculation. The following response to the community survey echoes this sentiment:

I am a supporter of renewable energy projects but not a supporter of having a renewable energy project in my backyard that we are not benefiting from – Proximal landholder.

I will not be compensated for any of this project, yet I am in the middle of the location. The effect this will have on future family impacts as will no longer be a quiet dream home place – Proximal landholder.

4.3.3 Change in Community Cohesion and Composition

Based on comparable projects with large temporary workforces in regional settings, communities can also experience changes to the composition and character of local towns due to transient workforces. Over time, this can potentially cause a level of income disparity between differing groups of the population. Whilst this specific matter was not raised directly during consultation with community members, such issues have been noted in other wind farm projects.

The development of multiple projects in the region has been identified during other project assessments as causing community division and reducing levels of community cohesion. Uncertainty surrounding future development has the potential to cause stress and anxiety about the future and impact on local surroundings and way of life.

4.4 Accessibility

Impacts to community accessibility refers to people's ability to access and use infrastructure, services, and facilities and how the Project may inhibit or enhance this access.

4.4.1 Road Deterioration and Traffic Disruption

Respondents (n = 3) raised concerns over the use of local roads, particularly during construction, and the disruption associated with traffic, deterioration of local road conditions and potential roads closures. Respondents were particularly concerned with regards to the potential for the Project to impede access to tourist facilities and private property.

I'd be worried that the terrible roads in some areas out here would be made worse by increased heavy traffic. And might affect access to the tourist resorts at Mumbil and Stuart Town. (Mookerawa Waters Holiday Park & Lake Burrendong Holiday Park) – Community group.

Impact to our driveway as more cars will be travelling the road – Proximal landholder.

In noting these concerns, several stakeholders identified potential infrastructure upgrades as one of the key potential benefits of the Project for the broader community.

4.4.2 Reduced Access to Local Services

During consultation, some stakeholders highlighted that the accommodation needs of the Project workforce may have the potential to cause a strain on existing service providers and may potentially limit the availability and affordability of housing to local residents.

It was also noted that any strain on short-term accommodation may have the potential to cause changes to the local tourism sector, which is a key industry for the City of Orange (refer to **Section 3.8**). It is noted that demand for accommodation in the area is already high due to demand from other industry sectors e.g., tourism and mining and ongoing coinciding development in the region.

Additional pressure on local accommodation provision can affect access and affordability for other user groups, including workers from other sectors, visitors, and tourists, who may also experience an increase in housing and accommodation prices during the construction period.

Roads are a problem as would be accommodation venues for project workers. Finding accommodation anywhere will be a problem for you – Community group.

Cumulative impacts on service provision in the area, particularly in small towns such as Wellington, have also been raised in proximal projects, particularly with regards to impacts on accommodation and health services given the number of coinciding projects proposed or under way. The strain on local services will be further explored during further preparation of the EIS and SIA, in consultation with service providers.

4.5 Decision-Making Systems

Impacts in relation to decision-making systems relate to people's ability to make meaningful contributions to decisions that affect their lives, including their ability to influence change.

4.5.1 Project Justification and Ability to Influence Project Decision-Making

It was recognised by some respondents, that the Project, while still in its early planning stages, required more detailed information be made available before concerns or benefits could be identified and discussed. A number of community members noted that they were not sure of the potential impacts, with three in particular highlighting that more information was required to accurately assess any potential impacts.

There is little solid, definite information about the project, e.g., exact placement of turbines, max noise levels, pulsatile modulated wind noise at night – Proximal landholder.

The only knowledge I have been provided is that guided by the company which often doesn't contain depth. The website and community engagement day was very rehearsed and did not have information other than that which can be applied to all general projects – Broader community.

Concern was also raised about the nature and size of the development and the justification of this size of the Project given that it appeared to drastically exceed the existing needs of the local community.

The wind farm's size and capacity should consider the local communities demand and need – as opposed to supplying towns farther away – Proximal landholder.

Two (2) attendees to the community information session expressed anxiety regarding the environmental impact assessment process, feeling that their concerns may not be considered in the Project design or inform decision making processes.

Community members in response to proximal renewable energy projects in the broader CWO REZ have emphasised the importance of consultation that is open, transparent, and responsive, and which focuses on listening to the concerns and experiences of individual and local stakeholders. It has become clear that community members appreciate ongoing consultation during all stages of a project's timeline, to ensure that projects are more aligned with community identified values and address project impacts.

4.6 Health and Wellbeing

Some respondents raised concern that the Project could result in increased anxiety and stress for nearby residents due to a fear of the unknown, feelings of uncertainty and of losing control over one's future and local surroundings. In particular, as a result of disturbance to their way of life and social amenity.

Pulsatile noise impacting on life and health. For example, disruption of sleep at night which is known to significantly impact on health and quality of life. Potential impacts on mental health.

4.7 Culture

Impacts on culture include changes that may occur to values, shared beliefs, customs, and connections of those who reside within a social locality due to a particular Project.

As noted in **Section 2.6**, consultation has been initiated with local Aboriginal stakeholder groups and future consultation will ensure that the interest and concerns of key stakeholders are understood. Impacts on culture identified in other similar projects include land rights, land use and management; the disturbance of cultural sites, objects and artefacts, and the preservation of traditional practices; cultural connections to country; community programs and partnerships; and support for representation and the interests of Aboriginal people in the local area.

Impacts upon culture and on local Aboriginal communities, will be further explored during further preparation of the EIS and SIA.

5.0 Community Identified Enhancement and Mitigation Measures

Community identified strategies to mitigate, enhance or respond to issues and impacts, as well as opportunities for the Project to positively contribute to the local community have been compiled in **Table 5.1**. This information may inform the development of a community benefit sharing scheme or similar initiatives during subsequent phases of the Project.

Alignment of Project-led strategies to support local communities and collaboration with host communities, through a participatory identification process of local needs and opportunities can result in improved social outcomes. Local benefit sharing schemes and targeted local investment can over time generate improvements in community infrastructure, social cohesion and sense of place, and the capacity of local organisations.

Table 5.1 Identified Potential Strategies and Opportunities

Impact Theme	Identified Strategy/Opportunity
Accessibility	• Proactive support and establishment of a community investment fund that supports infrastructure and service provision improvements such as local roads and route upgrades, common property fencing, community facilities. • Collaboration and engagement with local Councils to identify strategies for the housing and accommodation needs of a temporary workforce, and to generate legacy infrastructure development to support changing needs in the broader community.
Surroundings	• Consideration of neighbour/adjacent property impacts and mechanisms to address personal issues on a case-by-case basis, including potential refinements to the Project design to reduce impacts on landholders (where reasonable/feasible). • Capacity-building or resourcing support for local environmental restoration and protection programs, including weed control and restoration works for community-owned nature reserves and landholder properties.
Livelihoods	• Provision of opportunities for local workers to gain employment and training opportunities. • Provision of opportunities for local workers to specialise, re-skill, or upskill in collaboration with local training organisations. • Establishment of community benefit sharing mechanisms which aim to improve distributive equity in the vicinity of the Project, and within the broader community.
Decision making systems/Cumulative impacts	• Establishment of programs and engagement strategies that support collaboration to address impacts and priorities. • Establishment and implementation of a Project specific grievance process. • Collaboration with other renewable energy developers across the REZ to ensure that cumulative negative impacts associated with concurrent ongoing and planned developments are identified and effectively mitigated.

5.1.1 Refinement of Project Design

The indicative Project design has been developed through an iterative process, with the objective of avoiding and minimising environmental and social impacts to the greatest extent practicable. The focus of this process has been potential off-site amenity (visual and noise) impacts and heritage and ecology constraints.

This process is summarised in **Table 5.2** below and encompassed three substantial design revisions throughout the Scoping phase of the Project. As a result of the design development, and progressive avoidance and minimisation strategies employed during the Project Scoping Phase:

- The indicative Project Area has been reduced from approximately 13,000 ha to 6,806 ha (a reduction of 6,193 ha or approximately 48%).
- The number of proposed WTGs has reduced from a maximum of 80 to 48 WTGs (a reduction of 32 WTGs or approximately 40%).

Table 5.2 Progressive Avoidance and Minimisation During Scoping Phase

Design Revision	Revision Summary
May 2022	In response to a preliminary constraints assessment and subsequent design workshop led by Umwelt, the following design changes were made: • Removal of two WTGs (and relocation of other turbines and ancillary infrastructure) in the northern and western sections of the Project Area (near the Mookerawa State Recreation Area and Stuart Town, respectively) to assist maximise distance offsets to neighbouring dwellings in that area and minimise potential visual and noise impacts. • Relocation of WTGs (and associated ancillary infrastructure) to avoid sensitive archaeological areas (i.e. creeklines, riparian areas etc.) established via preliminary predictive statements for archaeological potential within the Project Area.
August 2022	In response to community feedback, the Project design was revised to remove all WTGs west of the Main Western Railway Line. This change involved: • Removal of 20 WTGs and ancillary infrastructure, reducing potential visual impacts to Euchareena and non-associated dwellings in the southwest (in the localities of Buck Swamp, Limestone Camp and Finchs Caves). • A reduction to the indicative Project Area in the order of 6,000 ha, resulting in a reduced Project disturbance footprint and associated ecology and heritage impacts.
December 2022	In response to community and Government agency feedback, a further ten WTGs were removed from the Project design in December 2022, including: • Removal of four WTGs located east and southeast of Stuart Town. • Removal of three WTGs nearest to R262, a non-associated dwelling that was identified as newly inhabited during the Community Information Session, and subsequently attributed with the highest predicted noise levels due to the Project layout. • Removal of two turbines near the southwestern Project Boundary (nearest to AQ32 and AQ34) in response to community feedback at August 2020 Community Information Session. • Removal of one WTG due to proximity to Host dwelling R1.

Design Revision	Revision Summary
	As a result of these changes: • The Project Area was reduced by 221 ha (from 7,028 ha to 6,806 ha, approximately 3%) and the indicative Development Corridor was reduced by 143 ha (from 1,618 ha to 1,497 ha approximately 9%). • The indicative Project disturbance footprint was reduced from 480 ha to 388 ha (a reduction of 92 ha, approximately 36%).

5.1.2 Summary of Avoidance/Minimisation and Next Steps

The Project layout revisions summarised above reduced the number of turbines from a maximum of 80 to a maximum of 48 as represented in this Scoping Report (refer to **Table 5.2**). During the Scoping stage the indicative Project layout was revised on (at least) three occasions 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.

6.0 Preliminary Impact Evaluation

The preliminary impact evaluation undertaken using the DPE SIA Guideline (DPE, 2023) and Technical Supplement (DPE, 2023) is outlined in **Table 6.1**. Notably, it considers a range of social impacts relating to the Project and determines the level of assessment to be undertaken for each identified impact in subsequent phases of the SIA process. In line with the SIA guideline, a standard assessment will be undertaken for impacts that will be able to be evaluated using standard methods. Detailed asssesments will be undertaken where the project may result in a significant social impact, and will require collection of additional data and information from other specialise studies. Both standard and detailed assessments will draw on the outcomes of community engagement, relevant social research and specialist studies to inform social impact significance ranking. Community engagement will incorporate local knowledge into the impact evaluation and development of relevent strategies to address social impacts. The outcomes of community engagement will also be integrated into relevant specialist studies.

Table 6.1 Preliminary Social Impact Evaluation

Social Impact Category	Potential Social Impact on People	Project Aspect/ Activity	Timing/ Duration[7]	Affected Stakeholder Group	Perceived Impact Significance[8]	Possible Project Refinements/Management Measures	Residual Impact Significance	Phase 2 Assessment Level
Livelihoods **Surroundings** **Accessibility** **Health and wellbeing**	Personal livelihood and safety impacts resulting from potential increase in fire risk to property and reduced accessibility for emergency services.	Establishment and operation of Project infrastructure including ancillary infrastructure	C & O	Host and proximal landholders, including for ancillary infrastructure	High negative (likely, moderate)	Implementation of an effective community engagement program to discuss risk with affected landholders. Collaboration with emergency services units to ensure appropriate site accessibility. Detailed assessment of bushfire hazard and aviation safety impacts. Engagement of RFS and other relevant stakeholder in the development of a Bushfire and Emergency Response Plans.	Medium negative (possible, minor)	Standard Assessment
				Emergency service providers	Medium negative (possible, minor)	Implementation of an effective community engagement program to discuss risk with affected landholders. Collaboration with emergency services to ensure appropriate site accessibility. Detailed assessment of bushfire hazard and aviation safety impacts. Engagement of RFS and other relevant stakeholder in the development of a Bushfire and Emergency Response Plans.	Low negative (unlikely, minor)	
Surroundings **Way of Life**	Changes in sense of place as a result of visual impacts of the Project and perceived industrialisation of the landscape.	Establishment of Project infrastructure, particularly WTG installation and operation.	C & O	Host and proximal landholders, nearby residents	High negative (almost certain, moderate)	Consideration of neighbour/adjacent property impacts and mechanisms to address personal issues on a case-by-case basis.	High negative (likely, moderate)	Detailed Assessment
				Tourists, and tourism operators	Medium negative (almost certain, minor)	Consideration of visual screening at key sites of natural value	Medium negative (likely, minor)	
Surroundings **Health and wellbeing**	Changes to way of life as a result of reduced social amenity due to noise, vibration, lighting and dust.	Establishment and Construction of Project Infrastructure	C	Host and proximal residents	Medium negative (likely, minor)	Development and implementation of a Construction Environmental Management Plan (CEMP) in consultation with local communities and key stakeholders. Construction and operational management controls to be developed in consultation with key stakeholders to ensure appropriate social amenity conditions during construction and operational activities. Ensure appropriate mechanisms to enable open, transparent and accessible communication of Project information to key stakeholders.	Medium negative (possible, minor)	Standard Assessment

[7] P = Planning Phase, C = Construction Phase, O = Operational Phase.
[8] Refer **Section 2.5** for issue scoping and preliminary impact evaluation methodology.

Social Impact Category	Potential Social Impact on People	Project Aspect/ Activity	Timing/ Duration[7]	Affected Stakeholder Group	Perceived Impact Significance[8]	Possible Project Refinements/Management Measures	Residual Impact Significance	Phase 2 Assessment Level
				Broader community	Medium negative (possible, minor)	Development and implementation of a Construction Environmental Management Plan (CEMP) in consultation with local communities and key stakeholders. Construction and operational management controls to be developed in consultation with key stakeholders to ensure appropriate social amenity conditions during construction and operational activities. Ensure appropriate mechanisms to enable open, transparent and accessible communication of Project information to key stakeholders.	Medium negative (possible, minor)	
		Operation of Project Infrastructure	O	Host and proximal residents	Medium negative (possible, minor)	Development and implementation of an Operational Environmental Management Plan in consultation with local community and key stakeholders. Ensure appropriate mechanisms to enable open, transparent, and accessible communication of Project information to key stakeholders, including a dedicated complaints/grievance mechanism.	Low negative (unlikely, minor)	Standard assessment
Decision-Making Systems	Perceived inability to influence planning and decision-making in relation to the project.	Community and stakeholder engagement activities	P	Proximal landholder and broader Community	Medium negative (possible, moderate)	Organise in-person community consultation and community information sessions during EIS preparation period. Continue proactive personal engagement with community members and proximal residents. Respond to community suggestions on preferred engagement mechanisms, prioritising personal and face-to-face consultation.	Low negative (unlikely, minor)	Standard Assessment
Way of Life Community Livelihoods	Reduced community cohesion due to perceived inequity of landowner compensation payments.	Payments to landholders	P, C & O	Host and Proximal landholder	Medium negative (possible, moderate)	Further consultation to characterise and assess specific circumstances and extent. Open, transparent and accessible communication of Project information. Development of participatory local benefits scheme or good neighbour programs including potential financial compensation, where appropriate.	Medium negative (possible, minor)	Standard Assessment
				Broader community	Medium negative (possible, minor)	Open, transparent and accessible communication of Project information. Development of participatory local benefits scheme or good neighbour programs including potential financial compensation, where appropriate.	Low negative (unlikely, minor)	
Community	Potential reduction in community cohesion due to differing views of the Project (i.e. supporters and detractors)	Establishment and operation of Project infrastructure including ancillary infrastructure	P, C & O	Broader Community	Medium negative (possible, moderate)	Ensure appropriate mechanisms to enable open, transparent, and accessible communication of Project information to key stakeholders, i.e. Community and Stakeholder Engagement Strategy. Ensure community feedback is considered and acknowledged in Project planning and development.	Medium negative (possible, minor)	Standard Assessment

Social Impact Category	Potential Social Impact on People	Project Aspect/ Activity	Timing/ Duration[7]	Affected Stakeholder Group	Perceived Impact Significance[8]	Possible Project Refinements/Management Measures	Residual Impact Significance	Phase 2 Assessment Level
Health and Wellbeing **Way of life**	Potential increase in stress and anxiety for proximal residents who feel uncertain about their futures and changes to their way of life associated with Project development.	Public release of Project plans and documentation	P & C	Host and proximal landholders	Medium negative (possible, moderate)	Ensure appropriate mechanisms to enable open, transparent and accessible communication of Project information to key stakeholders, i.e. Community and Stakeholder Engagement Strategy. Ensure community feedback is considered and acknowledged in Project planning and development.	Medium negative (possible, minor)	Standard Assessment
Way of Life **Livelihoods**	Livelihood impacts due to potential decline in property values.	Establishment and operation of Project infrastructure including ancillary infrastructure	P, C, & O	Proximal Landholders	Medium negative (possible, moderate)	Ensure appropriate mechanisms to enable open, transparent, and accessible communication of Project information to key stakeholders. Development of participatory local benefits scheme or good neighbour programs.	Medium negative (possible, minor)	Standard Assessment
	Improved social and economic benefit as a result of diversification of household income associated with host landholder payments.	Establishment and operation of Project infrastructure including ancillary infrastructure	C, & O	Host Landholders	Medium positive (likely, minor)	Open, transparent, and accessible communication of Project information. Development of participatory local benefits scheme or good neighbour programs including financial compensation.	High positive (likely, major)	Standard Assessment
Accessibility **Surroundings**	Reduction in the safety of local road networks due to an increase in traffic associated with construction and subsequent road deterioration.	Establishment and construction of Project Infrastructure	C	Host and proximal Landholders Broader Community and road users	High negative (likely, moderate)	Development and implementation of a CEMP in consultation with local communities and key stakeholders. Commission a detailed Traffic Impact Assessment to satisfy relevant Government guidelines and assessment standards. Develop 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.	Medium negative (possible, minor)	Standard Assessment
				Emergency service providers	Medium negative (possible, moderate)	Development and implementation of a CEMP in consultation with local communities and key stakeholders. Commission a detailed Traffic Impact Assessment to satisfy relevant Government guidelines and assessment standards. Develop 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.	Medium negative (possible, moderate)	
Accessibility **Way of Life**	Potential increases in commuter travel time due to an increase in construction related traffic disruptions.	Establishment and construction of Project Infrastructure	C	Broader Community and road users	Medium negative (likely, minor)	Development and implementation of a CEMP in consultation with local communities and key stakeholders. Commission detailed Traffic Impact Assessment to satisfy relevant Government guidelines and assessment standards. Develop 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.	Medium negative (possible, minor)	Standard Assessment

Social Impact Category	Potential Social Impact on People	Project Aspect/ Activity	Timing/ Duration[7]	Affected Stakeholder Group	Perceived Impact Significance[8]	Possible Project Refinements/Management Measures	Residual Impact Significance	Phase 2 Assessment Level
Accessibility **Livelihoods** **Way of Life** **Community**	Changing composition and nature of the community due to the influx of construction workforce.	Establishment and Construction of Project Infrastructure / influx of construction workforce	C	Broader Community	Medium negative (possible, moderate)	Develop local employment and procurement plan. Ensure appropriate mechanisms to enable open, transparent, and accessible communication of Project information to key stakeholders.	Medium negative (possible, minor)	Standard Assessment
Way of life **Community**	Perceived public safety risk relating to incoming Project workforce.	Construction of Project	C	Women and vulnerable groups	High negative (possible, major)	Develop workforce code of conduct that outlines expected behaviour of all employees.	Medium negative (unlikely, major)	Standard Assessment
Decision-Making Systems (cumulative)	Reduced levels of social cohesion given development of concurrent major projects in the locality.	Establishment, construction, and operation of Project infrastructure	C, & O	Broader community, political and community interest groups	Medium negative (possible, moderate)	Multi-stakeholder liaison to ensure widespread integration and prioritisation of social acceptance across various projects. Multi-stakeholder collaboration to jointly develop or contribute to local benefit scheme across planning and delivery of the CWO REZ and consideration of other opportunities for collaboration in the management and mitigation of project related impacts. Ensure appropriate mechanisms to enable open, transparent, and accessible communication of Project information to key stakeholders.	Medium negative (possible, minor)	Standard Assessment
Accessibility **Livelihoods** **Way of Life** **Community (cumulative)**	Reduced access to housing and accommodation due to cumulative workforce project influx.	Establishment and Construction of Project Infrastructure	C	Broader Community, Service Providers	High negative (likely, moderate)	Develop local participation plan and workforce accommodation strategy. Coordinate efforts and liaise with key stakeholders to coordinate provision of accommodation and other services or suppliers.	Medium negative (possible, minor)	Standard Assessment
				Vulnerable community groups	High negative (likely, major)	Develop local participation plan and workforce accommodation strategy. Coordinate efforts and liaise with key stakeholders to coordinate provision of accommodation and other services or suppliers.	High negative (possible, major)	
Accessibility **Livelihoods** **Way of Life** **Community**	Reduced access to health services due to cumulative workforce project influx.	Establishment and construction of Project infrastructure	C	Broader Community, Service Providers	Medium negative (possible, moderate)	Develop a local participation plan and workforce accommodation strategy which considers the placement of workers in multiple localities/towns. Liaise with key stakeholders to coordinate workforce requirements and impact on local services.	Low negative (Unlikely, minor)	Standard Assessment
				Vulnerable community groups	High negative (possible, major)	Develop a local participation plan and workforce accommodation strategy which considers the placement of workers in multiple localities/towns. Liaise with key stakeholders to coordinate workforce requirements and impact on local services.	High negative (possible, moderate)	

Social Impact Category	Potential Social Impact on People	Project Aspect/ Activity	Timing/ Duration[7]	Affected Stakeholder Group	Perceived Impact Significance[8]	Possible Project Refinements/Management Measures	Residual Impact Significance	Phase 2 Assessment Level
Surroundings	Degradation of areas holding environmental value to the community and subsequent impacts to flora and fauna, including potential bird strike.	Project establishment and operations	C, & O	Broader Community Community and special interest groups	Medium negative (likely, minor)	Engage proactively with relevant community groups to support and protect local environmental values. Development of a Biodiversity / Fauna Management Plan to protect 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.	Medium negative (Possible, Minor)	Standard Assessment
Surroundings	Potential environmental degradation on highly valued landscape features associated with decommissioning (e.g. removal of waste, recycling, site remediation) of Project Infrastructure.	Decommissioning	D	Neighbouring and host landholders Community and special interest groups	Medium negative (possible, moderate)	Development and implementation of a waste management and recycling plan for the Project. Development and implementation of a rehabilitation plan for the Project.	Medium negative (unlikely, moderate)	Standard Assessment
				Broader Community	Medium negative (possible, minor)	Development and implementation of a waste management and recycling plan for the Project. Development and implementation of a rehabilitation plan for the Project.	Low negative (unlikely, minimal)	
Culture	Potential loss of cultural connection as a result of physical impacts on Aboriginal Cultural Heritage, including artefacts, cultural sites, and connection to Country.	Establishment and construction of Project infrastructure	C	Traditional Owners	Medium negative (possible, minor)	Inclusion of Traditional Owners in decision-making processes. Active community engagement with Traditional Owners providing clear information of next steps of project development.	Medium negative (possible, moderate)	Standard Assessment
Livelihoods **Surroundings**	Changes to local livelihoods associated with land use conflict as a result of disruptions to agricultural land associated with Project infrastructure and ancillary works.	Establishment and operation of Project infrastructure including ancillary infrastructure	C & O	Host and proximal landholders	Medium negative (possible, moderate)	Consultation with host and proximal landholders to understand land use and make project changes to avoid or reduce impacts.	Low negative (unlikely, minor)	Standard Assessment
Livelihoods	Enhanced livelihoods and human capital development due to the provision of jobs and procurement opportunities.	Establishment, construction, and operation of Project infrastructure	C, O, & D	Broader Community Aboriginal stakeholders	Medium positive (possible, moderate)	Develop local participation plan to preference local employment and to target training and capacity building initiatives for local workforce.	High positive (likely, major)	Detailed Assessment
				Local businesses	High positive (likely, moderate)	Develop local participation plan to preference procurement of local businesses.	High positive (likely, major)	
Livelihoods	Opportunity for the Project to increase training, skills, and human capital development.	Establishment, construction, and operation of Project infrastructure	C, O, & D	Broader Community, Aboriginal stakeholders	Medium positive (possible, moderate)	Develop a local participation plan to prefer local employment and to target training and capacity building initiatives for local workforce.	High positive (likely, moderate)	Detailed Assessment
Livelihoods	Enhanced livelihoods given procurement of local suppliers, services and contractors.	Establishment, construction, and operation of Project infrastructure	C, O, & D	Broader Community, Local service providers and businesses	Medium positive (possible, moderate)	Develop a local participation plan. Coordinate efforts and liaise with key stakeholders to coordinate provision of accommodation and other services or suppliers giving preference to local contractors and services.	High positive (likely, major)	Detailed Assessment

Social Impact Category	Potential Social Impact on People	Project Aspect/ Activity	Timing/ Duration[7]	Affected Stakeholder Group	Perceived Impact Significance[8]	Possible Project Refinements/Management Measures	Residual Impact Significance	Phase 2 Assessment Level
Livelihoods	Potential improvement to community infrastructure, services and facilities through the implementation of a community benefit sharing program.	Community benefit fund.	P, C, & O	Broader community, Local service providers, Community groups, Local government, Vulnerable community members	Medium positive (likely, minor)	Robust community consultation process during EIS preparation and pre-construction period to understand local needs, priorities and aspirations. Develop targeted community benefit program to meet local needs and priorities.	High positive (likely, minor)	Detailed Assessment
Surroundings **Accessibility**	Environmental and social benefits arising from the Project supporting the renewable energy policy framework in the provision of a reliable energy source.	Establishment and operation of Project Infrastructure	O	Broader community, Energy consumers, State and Federal Government	Low positive (likely, minimal)	Ensure project development and refinements align with Australia's commitment to the Paris Climate Agreement and subsequent Rio Declaration, and alignment with the desired objectives and outcomes of the CWO REZ.	Medium positive (likely, possible)	Minor Assessment
Surroundings	Environmental and social benefits arising from the reduction of GHG emissions through the generation of renewable energy.	Establishment and operation of Project Infrastructure	O	Broader community, Energy consumers, State and Federal Government	Medium positive (almost certain, minor)	Ensure project development and refinements align with Australia's signatory to the Paris Climate Agreement and subsequent Rio Declaration, and alignment with the desired objectives and outcomes of the CWO REZ.	Medium positive (almost certain, minor)	Minor Assessment

7.0 Conclusion

This Social Impact Scoping Report has documented the SIA process undertaken during the scoping phase of the Aquila Wind Project and forms part of the Scoping Report to inform the issue of SEARs by the NSW DPE.

This Report has included the compilation of a social baseline profile for the Project, early-stage community, and stakeholder consultation to inform the scoping of Project-related social impacts and opportunities, and preliminary social impact prediction and evaluation. The preliminary impact evaluation has been undertaken to inform and support the refinement of Project design and plans to reduce potential negative project impacts and achieve greater positive project benefits.

As an outcome of this report, it is understood that 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 identification 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 environmental impact studies will address perceived 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 to ensure that any further data relevant to the impacts identified is obtained.
- Further identification of, and consultation with, affected communities and vulnerable groups.
- Provision of feedback to proximal landholders, 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 SIA and further opportunities for community input.
- Further consultation with proximal landholders, community members and other key stakeholders relating to key impact areas. This will involve feedback on the outcomes of the SIA and EIS and will provide opportunities for input to the development of appropriate mitigation and enhancement measures to minimise potential negative impacts and maximise Project benefits.
- A comprehensive evaluation of social impacts against existing baseline conditions.

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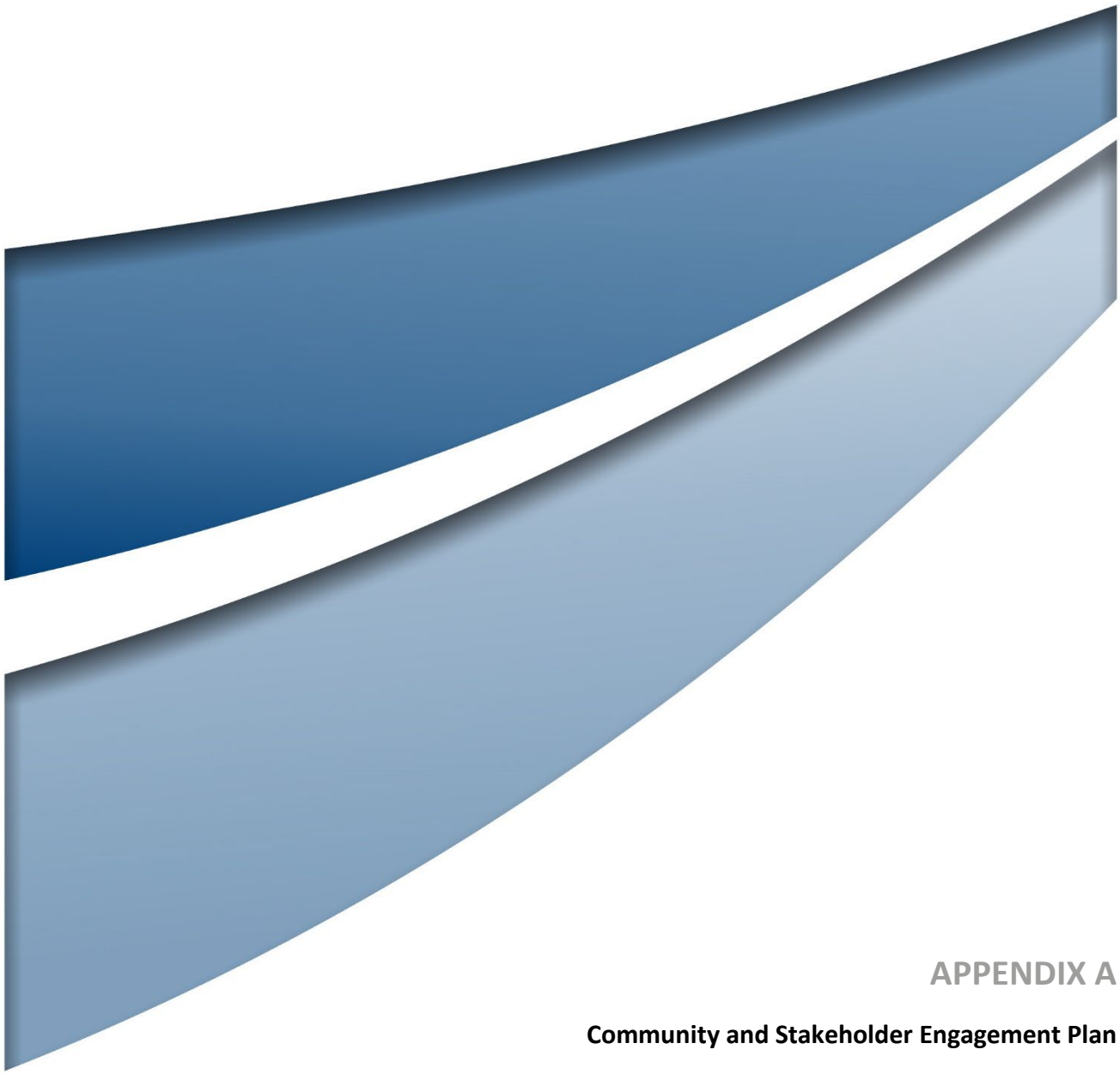

APPENDIX A

Community and Stakeholder Engagement Plan

umwelt
Environmental & Social Consultants

ACEN | Australia

COMMUNITY & STAKEHOLDER ENGAGEMENT PLAN

Aquila Wind

VERSION 8

February 2024

COMMUNITY & STAKEHOLDER ENGAGEMENT PLAN

Aquila Wind

VERSION 8

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
ACEN Australia

Project Director: Dr Sheridan Coakes
Project Manager: Rhiannon Jaeger-Michael
Report No. 21793/R03
Date: February 2024

Suite 11.01 Level 11,
213 Miller Street North Sydney
NSW 2060

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.

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
01	Dr Sheridan Coakes	11 May 2021	Nathan Baker	11 May 2021
02	Karen Lamb	4 October 2022	Karen Lamb	4 October 2022
03	Lauren Evans	14 November 2022	Nathan Baker	14 November 2022
04	Lauren Evans	22 November 2022	Nathan Baker	22 November 2022
05	Lauren Evans	06 February 2023	Nathan Baker	10 February 2023
06	Lauren Evans	19 January 2024	Nathan Baker	19 January 2024
07	Lauren Evans	25 January 2024	Nathan Baker	25 January 2024
08	Lauren Evans	9 February 2024	Nathan Baker	9 February 2024

Abbreviations

Abbreviation	Description
ABS	Australian Bureau of Statistics
AGL	Above Ground Level
BESS	Battery Energy Storage System
CSEP	Community and Stakeholder Engagement Plan
CWO REZ	Central West Orana Renewable Energy Zone
DPE	Department of Planning and Environment
EIS	Environmental Impact Statement
IAP2	International Association for Public Participation
km	Kilometre
kV	Kilovolt
LALC	Local Aboriginal Land Council
LGA	Local Government Area
MW	Megawatt
NSW	New South Wales
SA	Statistical Area
SEARs	Secretary's Environmental Assessment Requirements
SIA	Social Impact Assessment
SSC	State Suburbs
SSD	State Significant Development

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1.0 Introduction

ACEN Australia (ACEN) proposes to develop Aquila Wind (the Project) to supply renewable electricity to the National Electricity Market (NEM) and reduce Australia's greenhouse gas (GHG) emissions through the generation of renewable electricity powered by the wind, as an alternative to the burning of fossil fuels.

The Project is located approximately 2.5 km southeast of Stuart Town and 2 km northeast of Euchareena, in the Central West region of NSW, within the Dubbo Regional Council Local Government Area (LGA) and on the lands of the Wiradjuri Nation. Dubbo is situated approximately 70 km northwest of the Project Boundary[1] (the northern most extent). The other regional centres of Mudgee, Wellington and Orange are situated approximately 40 km to the northeast, 30 km to the northwest and 35 km to the south respectively. Lake Burrendong is located approximately 8 km north of the Project Boundary. The Project Area[2] is traversed by the Main Western Railway and is located approximately 14 km east of the Mitchell Highway.

The Project design includes up to 48 x 6.2 megawatt (MW) Wind Turbine Generators (WTGs) (each with a blade-tip height of up to 250 m) comprising an installed capacity of up to 300 MW, a Battery Energy Storage System (BESS) approximately 100 MW (2-hr), temporary and permanent meteorological masts, vegetation removal, earthworks, ancillary civil and electrical engineering infrastructure, temporary construction facilities and temporary concrete batching plants, and permanent worker facilities. The Project will create employment opportunities for approximately 300 temporary workers during the 2-year construction phase plus 15 permanent workers during the operational phase.

1.1 Purpose and Objectives

This Community and Stakeholder Engagement Plan (CSEP) outlines the approach and implementation program to inform the Scoping phase of the Social Impact Assessment (SIA) and broader Environmental Impact Statement (EIS) for the Project's State Significant Development (SSD) application, to be lodged with the NSW Department of Planning and Environment (DPE).

The purpose of the CSEP is to outline the approach to be undertaken in relation to community and stakeholder engagement across the Project's planning and assessment phase, to inform the preparation of relevant scoping reports (as part of the Request for SEARs) and completion of the Project's SIA technical study (as part of the EIS).

As noted in the NSW DPE SIA Guideline (2022), respectful, inclusive, and meaningful engagement is a fundamental part of project planning and development and the development of a SIA. Engagement with affected communities and stakeholders provides first-hand insight into what people value and how they expect a project to affect them. Projects may affect people in different ways, both positively and negatively, and consequently identifying and understanding social impacts helps to inform responses that aim to avoid, mitigate or reduce negative impacts and enhance positive impacts.

[1] The Project Boundary is the maximum spatial extent of potential land access defined by the boundaries of the Host landholder properties (i.e. all agreed lots owned by Host landholders). The Project Boundary is outlined in red in the supporting figures throughout this PHCA.

[2] The Project Area encompasses all land within and including the Project Boundary.

Community and stakeholder engagement is a key component of the SIA and EIS process, with the DPE SIA Guideline (2022) outlining the following objectives to guide engagement:

- To ensure those potentially affected by a project understand the project and how it will affect them.
- To collect relevant data, evidence, and insights for scoping the SIA to ensure representativeness of views.
- To understand the interests that people have and how impacts may be experienced (from their perspective).
- To consider the views of people in a meaningful way and use these insights to inform project planning and design.
- To provide opportunities for people to collaborate on project design matters and input to preferred solutions to address impacts.
- To confirm data, assumptions, findings, and recommendations.
- To ensure people know how their input has been considered, and what strategies will be put in place to address their concerns.
- To help understand how other specialist studies prepared for the EIS assist in addressing social impacts.
- To respect people's privacy, allowing them to communicate their views anonymously if requested.

Therefore, the specific objectives of this CSEP are to:

- Support the building of relationships with local stakeholders to establish a socially sustainable project.
- Guide and support a strategic and coordinated approach to engagement, including specific mechanisms, timeframes and responsibilities during the planning and assessment phase of the Project.
- Facilitate transparent and meaningful information exchange on the Project.
- Identify key stakeholders and communities relevant to the development of the Project.
- Support the Project's understanding of its local context, identification of stakeholders, including vulnerable community groups, stakeholder expectations and project alignment with local aspirations.
- Facilitate the genuine involvement of stakeholders in the planning and approvals process as well as in developing responses to impacts.
- Ensure that community and stakeholder inputs are effectively integrated into the technical assessments within the EIS and inform refinements to project design and plans.
- Meet regulatory requirements for public, stakeholder and community consultation.
- Collaborate with local stakeholders on local benefit sharing strategies to ensure they are co-designed, targeted, and appropriate to the Project's operating context.
- Align with ACEN's values and principles around timely, open, inclusive, and meaningful engagement.

1.2 Approach and Process

The NSW Government's SIA Guideline (2022) requires SIA to be undertaken for all SSDs in NSW. SIA is informed by, and relies on, the outcomes of early, and ongoing community and stakeholder engagement through the assessment phase to identify social issues/impacts and develop appropriate strategies to mitigate and/or enhance project impacts.

The approach to stakeholder engagement adopted for the Project is informed by the NSW Government's SIA Guideline (2022), the NSW Department of Planning, Industry and Environment's *'Undertaking Engagement – Guidance for State Significant Projects'* (2022), and the Wind Energy Guideline (NSW DPE, 2016), and consideration has been given to the general and CWO REZ specific First Nations Guidelines (Office of Energy and Climate Change, 2022).

Best practice engagement design and delivery is also guided by the International Association of Public Participation (IAP2) Public Participation Spectrum. The IAP2 Spectrum outlines differing levels of engagement depending upon consultation objectives, that range from 'inform' and 'consult' through to greater degrees of participation - 'involve', 'collaborate' and 'empower'.

Different approaches to engagement outlined on the spectrum may be used, perhaps simultaneously, depending on the needs of each community group or each stage of the project lifecycle. The level of community interest will evolve over the duration of the Project and engagement should be adaptive to change and emerging issues or opportunities.

2.0 Project Overview

2.1 Project Background

The Project Area is located near Mount Aquila, approximately 2.5 km southeast of Stuart Town and approximately 2 km northeast of Euchareena. Beyond these smaller townships, isolated rural residential properties surround the site.

The Project Area is zoned RU1 Primary Production pursuant to *Dubbo Regional Local Environmental Plan 2022* (Dubbo Regional LEP 2022). Land surrounding the Project Boundary is zoned part C3 Environmental Management and part RU1 Primary Production. Other land use zones further afield in and around Stuart Town include R5 Large Lot Residential, RE1 Public Recreation, RE2 Private Recreation RU1 Primary Production, RU5 Village, SP2 Infrastructure and W1 Natural Waterways.

The 'Main Western Railway' extends north to south and passes through the westernmost portion of the Project Area for approximately 500 m, between Store Creek and Farnham.

The Project Boundary comprises an area of approximately 6,806 ha. ACEN has identified an indicative Development Corridor of approximately 1,497 ha within which all Project infrastructure will be placed. Within this indicative Development Corridor, it is estimated that the actual land disturbance area (based on the current Project layout) would be in the order of 388 ha, or approximately 5–6% of the total Project Area.

The Project Area (all land within and including the Project Boundary) is situated at an elevation of approximately 600 to 800 m above sea level (ASL) and comprises a complex terrain, with steep arid hills to the eastern Project Boundary and rolling ridge lines to the west that are dominated by improved pasture used for grazing.

The Project design incorporates up to 48 WTGs (each with a blade-tip height of up to 250 m) comprising an installed capacity of up to 300 MW, a BESS, ancillary civil and electrical engineering infrastructure, temporary construction facilities, and permanent worker facilities. It is estimated that the Project will generate approximately 300 jobs during the construction phase and 15 jobs during the operational phase. The Project will connect to the National Electricity Market (NEM) via the existing 330 kV transmission line (Line 72) located within the Project Boundary.

The Project Area is located within the Central West-Orana Renewable Energy Zone (CWO REZ) identified in the NSW Government's Electricity Strategy (refer to Section 3.1.1 of the Social Impact Scoping Report). The CWO REZ is expected to play a vital role in the delivery of affordable energy to the community across NSW. The Central West-Orana region has been identified as having high wind energy resource potential, with preliminary wind studies undertaken by ACEN Australia guiding the development of the preliminary turbine layout for the Project.

Within the Project Boundary ACEN has identified 12 private landholdings (ten (10) hosting turbines, one (1) containing other infrastructure and one (1) not currently hosting any Project infrastructure). Existing 132 kV and 330 kV transmission lines traverse the Project Area (in a north to south direction), with the grid connection occurring at a position within the Project boundary and near the 330 kV line.

Land use within the Project Area and the surrounding locality is largely characterised by cropping and grazing. Key sensitive receivers currently identified in relation to the Project include:

- 60 non-associated dwellings and 13 Host dwellings were identified within the black line of visual magnitude (i.e. 0–3,350 m).
- 157 non-associated dwellings and two (2) Host and were identified between the black and blue lines of visual magnitude (i.e. 3,350–4,950 m).
- 72 non-associated dwellings were identified between the blue line of visual magnitude and the purple line (i.e. 4,950–8,000 m).
- In total there are 304 dwellings (15 Host and 289 non-associated) within 8,000 m of the proposed wind turbine locations.

2.2 Governance

The Project is located within the Dubbo Regional LGA (refer to Figure 1.1 of the Social Impact Scoping Report), which is administered by Dubbo Regional Council.

The Project Area is located within the traditional lands of the Wiradjuri nation. Wiradjuri means '*the people of the three rivers'*, and the nation's traditional and modern-day connections to Country extend over a large area of NSW encompassing the Macquarie, Lachlan and Murrumbidgee Rivers, bounded by the Murray River in the south (Three Rivers Regional Assembly, 2020). The Project Area is located in the modern-day NSW Local Aboriginal Land Council (LALC) of Dubbo. There are no registered native title claims in or surrounding the Project Area.

2.2.1 Policy Setting

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 public positioning and key messaging for the planning and development of the Project.

The proposed Project is located within the Central West-Orana Renewable Energy Zone (CWO REZ) which is the State's first pilot REZ, and one of five REZs being implemented by the NSW government. REZs co-locate renewable energy generation, energy storage and transmission lines with the aim of providing affordable, reliable and low-emissions electricity to the grid. REZs aim to install the transmission infrastructure required to attract private investment and to enable the transition to an electricity network powered by renewable energy sources.

The CWO REZ is anticipated to unlock up to 3 gigawatts of new network capacity by the mid-2020s, enough to power 1.4 million homes. New transmission infrastructure will enable generators (such as solar and wind projects) participating in the REZ to export electricity to the rest of the network. It is expected to bring up to $5.2 billion in private investment to the Central West Orana region by 2030. At its peak, the CWO REZ is expected to support around 3,900 construction jobs within the region (Energy NSW, 2020).

Figure 2.1 Geographic Area of the Central-West Orana REZ

Source: EnergyCo, 2022.

2.2.2 Regional Development Context

The Project is located within the Central West Orana Region in NSW, a diverse and productive region with good connectivity to Sydney, Canberra, and Newcastle. Key regional cities include Bathurst, Orange, and Dubbo, and the townships of Lithgow, Mudgee, and Cowra.

The population of the region is expected to reach 300,000 people by 2036, and as such, there has been a strong focus from the NSW Government to develop the region into *'the most diverse regional economy in NSW with a vibrant network of centres leveraging the opportunities of being at the heart of NSW'* (NSW Government, 2016).

The NSW Government's Central West and Orana Regional Plan (2017) notes in their vision for the region '*landmark solar, wind and bioenergy projects that distinguish the region as a leader in renewable energy development.*' The Plan outlines the role renewable energy will play in creating a sustainable future for the region, particularly by promoting local jobs and development opportunities for associated industries. Specifically, Direction 9 of the Plan is aimed at increasing renewable energy generation across the region.

2.3 Community Profile and Considerations

The study area is located proximal to several suburbs which recorded very low populations (<100 people) at the time of the 2021 Census. To the north, the township of Stuart Town (pop.241) is situated approximately 3.3 km west of the Project boundary whilst to the south the township of Euchareena (pop. 170) is situated adjacent to the Project boundary. For comparative reporting purposes, the Project is located within the ABS defined Wellington Statistical Area 2 (SA2) (pop. 8,941), which forms part of the Dubbo Regional LGA (pop. 55,894).

Data has been reviewed from publicly available secondary datasets, including the most recent Australian Census (2016 & 2021), for the study areas noted, to develop an understanding of the social and economic context of the potentially affected communities. Key characteristics of the study communities include:

- An older population than the NSW average, particularly in areas proximal to the Project.
- A higher Aboriginal and Torres Strait Islander population than the NSW average.
- A higher unemployment rate compared with the broader LGA and NSW average.
- Lower levels of internet access compared with the NSW average.
- A low number of residents born outside Australia; therefore, the community is not expected to be culturally and linguistically diverse.
- A lower level of property occupation in proximal areas, however a much higher proportion of dwellings that are owned outright or with a mortgage compared with NSW.
- High motor vehicle usage, particularly in the suburb of Stuart Town, which indicates a high level of road use or dependence on private vehicles for transportation.
- Sheep farming is the top industry of employment in nearby Stuart Town, and in the broader Wellington SA2 region. In comparison, the leading industry of employment in the Dubbo Regional LGA is Hospitals (excluding psychiatric hospitals).

2.3.1 Identified Issues and Social Risks to the Project

This section provides an overview of identified local concerns, issues, and interests as relevant to the Project for further consideration in the Project's environmental and social impact assessment process.

In recent years, proposed renewable energy projects in the CWO REZ have had diverse responses from local communities in relation to their perceived impacts. Social impacts are often inter-related and may be perceived both positively and negatively by different stakeholder groups.

Following an initial review of Project information and plans, as well as analysis of submissions received on comparable or nearby projects, local media, other publicly available documentation and Umwelt's relevant project experience in the CWO REZ, we have understood the following issues to be of relevance for consideration in planning and developing for the current Project.

- Matters relating to information sharing and community participation in project development:
    - Lack of community representation in project planning and development.
    - Lack of knowledge or experience of renewables, resulting in mistrust or scepticism.
    - Community division / polarisation.
    - Recent experiences with other projects, resulting in misinformation.
    - Consultation fatigue due to multiple concurrent projects occurring at the same time.
- Matters relating to broader community effects:
    - Strain on local infrastructure, facilities, and services.
    - Cumulative effect on community cohesion across local townships.
    - Lack of local long-term economic benefit.
    - Climate change adaptation and intergenerational equity.
    - Unequal distribution of project benefits.
- Matters relating to the Project footprint:
    - Social amenity factors such as levels of noise, visual impact and other amenity impacts.
    - Changes to local road conditions, increased traffic and concern for public safety associated with movement of the construction workforce.
    - Land use conflict with other industry sectors e.g. agriculture and disruption to farming operations and livelihoods.
    - Perceived property devaluation.
    - Health and wellbeing of workers.

The cumulative nature of renewable energy projects must also be considered given the NSW Government's NSW Electricity Infrastructure Roadmap and other development projects proposed, or in development, within the CWO REZ. These may include impacts associated with the influx of construction workforces in the region on housing and local service use, access issues associated with increased road traffic, cumulative visual impacts associated with multiple project developments etc. Such impacts will be assessed as part of the social and environmental impact assessments.

3.0 Engagement Strategy

Consistent with the SIA Guideline, community engagement undertaken as part of the Project will be respectful, inclusive, and meaningful. Engagement will be used to identify community values and aspirations in relation to the Project, and to focus the SIA and the broader EIS on key issues of concern for relevant stakeholders and local communities, including opportunities to further refine project design to address and/or enhance project impacts.

The principles underpinning community engagement adopted by ACEN align with the '*Community Engagement Guidelines for the Australian Wind Industry'* developed by the Clean Energy Council (Clean Energy Council, 2018). In adopting the principles of the Guideline, ACEN commits to the following with respect to the development of the Project:

- **Openness:** Relevant information will be shared with the community in a format that is clear, accurate, timely and honest.
- **Inclusiveness:** ACEN will work with project stakeholders to ensure their perspectives are appropriately considered.
- **Responsiveness:** All community concerns will be listened and responded to.
- **Accountability:** The Project will continue to monitor, evaluate, and disclose information about project activities and identified positive and negative impacts of the Project.

3.1 Stakeholder Identification

Social impact assessment involves the participation and collaboration of people that may 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 affected by the Project e.g., may be required to relocate because of the Project.

A stakeholder identification process was undertaken for the Project to support the planning and delivery of community and stakeholder consultation to inform the SIA and broader EIS. This process involved identifying stakeholders with an interest in the Project, and those that may be directly or indirectly affected by the Project, including any potentially vulnerable or marginalised groups.

A summary of identified key stakeholder groups relevant to the Project are included within **Figure 3.1**.

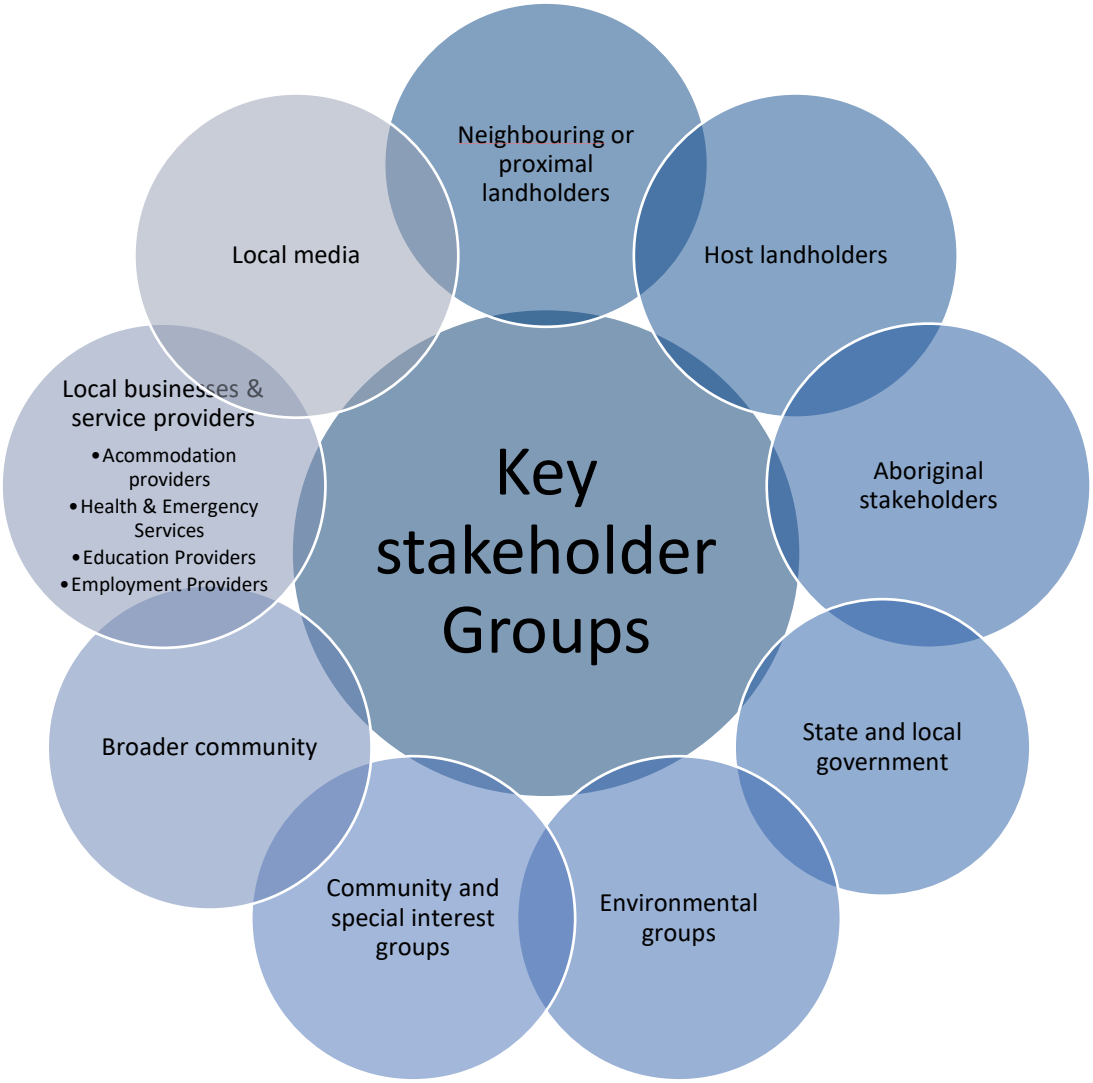

Figure 3.1 Key Stakeholder Groups

Source: Umwelt, 2022.

The purpose of the Scoping SIA report is to determine the size and scale of likely social impacts of the Project and, in turn, the scope of the SIA (DPE, 2022). This is an important process as it will define and shape the way in which key stakeholder groups are engaged and involved in project decision-making. This CSEP is therefore cognisant of the following key objective of SIA practice, as noted by the Interorganizational Committee on Guidelines and Principles (1994):

> *"Social impact assessment is predicted on the notion that decision-makers should understand the consequences of their decisions before they act, and that the people affected will not only be appraised of the effects, but have the opportunity to participate in designing their future."*

For the purposes of the SIA scoping report, key stakeholders relevant to this CSEP and SIA have been identified and are presented within **Table 3.1**.

Consistent with the IAP2 Public Participation Spectrum, identified stakeholders have been assigned a preliminary grouping according to their relevance and priority to the Project:

- High priority: stakeholders who require proactive and ***collaborative*** engagement.
- Moderate priority: stakeholders who will require information provision and/or may wish to be ***involved*** in the Project.
- Low priority: stakeholders who will be given the opportunity to be ***informed*** or ***consulted*** but may not necessarily be engaged directly.

Table 3.1 Stakeholder Identification

Affected Stakeholder Group	Potential Stakeholders	Prioritisation	IAP2 Engagement Spectrum Approach	Scoping SIA Phase 1	SIA Phase 2 Consultation
Host Landholders	Nine host dwellings	High	Collaborate	✓	✓
Proximal Landholders	Approximately 72 non-associated dwellings (i.e., those located within the 'black line' as defined by the Visual Bulletin)	High	Involve	✓	✓
Aboriginal Stakeholders	Wellington Local Aboriginal Land Council Wellington Aboriginal Corporation Orange Local Aboriginal Land Council	High	Involve	✓	✓
Local Government	Dubbo Regional Council - representatives from the Planning & Environment, and Corporate & community Services teams, Mayor Cabonne Shire Council - representatives from the Planning & Environment, and Corporate & community Services teams, Mayor	High	Involve	✓	✓
Environmental Groups	Mid Macquarie Landcare	High	Consult	✓	✓

Affected Stakeholder Group	Potential Stakeholders	Prioritisation	IAP2 Engagement Spectrum Approach	Scoping SIA Phase 1	SIA Phase 2 Consultation
Community, Development, and Special Interest Groups	Mumbil District Progress Association Mumbil Action Group Stuart Town Advancement Association Regional Development Australia – Orana Branch	High	Consult	✓	✓
Broader Community	Stuart Town Facebook group	Medium	Inform	✓	✓
Community Service Providers	Emergency services (Police, Fire and Rescue, Ambulance services) Education services Health services Accommodation providers Training and employment services	Medium	Consult		✓

3.2 Engagement Mechanisms

The engagement of stakeholders and community groups will include a combination of information provision (inform) and engagement (consult, involve) mechanisms to:

- Improve knowledge and awareness of the company, its activities, the Project, and key issues/impacts as they arise.
- Facilitate stakeholder involvement in the identification of issues/impacts, areas of interest/concern and strategies to address the issues raised.

Various methods will be used to engage with different stakeholder groups based on the objective of engagement, the type of information being conveyed, level of feedback required, understanding of stakeholder needs and identified engagement preferences.

Table 3.2 outlines the mechanisms that are planned to be utilised to engage with each stakeholder group in the SIA Scoping Phase of the Project.

Table 3.2 Mechanisms by Stakeholder Group for Scoping SIA Phase, and Proposed SIA Phase Consultation

Mechanism	Targeted Stakeholder	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	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.
Media release	Local Government Traditional Owners Host landholders Neighbouring/proximal landholders Community groups Wider community Local businesses and service providers Local media	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 when required in the EIS phase.
Community Newsletters	Broader community	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 community received 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	Description	First Round of Consultation	Second Round of Consultation
Drop-in session	Broader community Community groups Local businesses and service providers	Multi-hour time periods when stakeholders can drop in to speak to the Project team and experts, view documents and plans and ask questions.	One session held at Stuart Town Hall of Arts on Tuesday 30 September 2022 between 2 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	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 on 2 September 2022, with all feedback received prior to 19 September included within the SIA scoping report.	The survey will be updated and distributed in the second phase to provide opportunity for the community to provide 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	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	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.
Targeted one-on-one engagement	Proximal neighbours (located within 3,350 m of a proposed wind turbine)	Engagement with proximal neighbours through phone calls and in-person meetings.	Targeted proximal neighbour consultation undertaken	Further targeted landowner consultation will be undertaken as

Mechanism	Targeted Stakeholder	Description	First Round of Consultation	Second Round of Consultation
			between August 2023 and January 2024.	the Project progresses into the EIS phase and beyond. It is anticipated that the next round of targeted engagement will include landholders located between 3,350 m (i.e., the 'black line' under the Visual Bulletin) and 4,950 m (i.e., the 'blue line' under the Visual Bulletin) of a proposed wind turbine (refer to Table 5.3 and Section 5.2.1.2 of the Scoping Report.

Table 3.3 outlines the stakeholders that have participated in the scoping phase of the Project's planning and assessment process to date, as well as those who have informed the development of this Report.

Table 3.3 Stakeholders Consulted During Scoping Phase

Stakeholder Group	Mechanism Used		Number Contacted	Number Engaged
Host Landholders	Consultation with ACEN		10	10
Neighbouring Landholders	Early consultation with ACEN		26	26
Broader Community	Media Release		4	-
	Project Website		-	-
	Project email/hotline		-	12
	Community Newsletter		~2,905 households and businesses	-
	Drop in Community Information Session		-	38
	Broader Community Survey		-	13
	Recent on-on-one Engagement[1]	In person	65[2]	24
		Phone call		13
Local Government	Project briefing and interview		3	1
Traditional Owners	Project briefing and interview		3	-
Local Community, Environmental and Special Interest Groups	Project briefing and interview		12	1
			Total	**138**

Note 1: 2023 targeted consultation, focussed primarily on non-associated dwellings within 3,350 m of a wind turbine.

Note 2: Includes all 60 non-associated dwellings inside the 3,350 m buffer (i.e. the 'black line' under the Visual Bulletin). Of the 65 dwellings noted above 10 were identified by ACEN (via ground-truthing) as potentially uninhabited buildings.

3.3 Engagement Materials

Umwelt will draft and prepare relevant engagement materials and tools to support engagement in accordance with the CSEP. These will be prepared following ACEN's confirmation of the Implementation Plan (refer **Section 4.0**). Such materials will include:

- **Run sheets and/or agendas** – for formal project briefings for ACEN to hold with government agencies, and for key stakeholder meetings that the Umwelt team may facilitate in the local or regional area.

- **Interview discussion guides** – a suite of discussion guides including a standard discussion template/survey question set, as well as targeted guides for specific stakeholder or community groups and including talking points and questions for community information sessions. Each guide will likely include up to 5 open ended questions.
- **Project information sheets** – to communicate key information visually and concisely on the Project to the wider community, to be distributed via multiple means such as a resident mail drop, online format, and in hard-copy at community information/drop-in sessions.
- **Record-keeping templates** – including interview note taking templates and meeting minute templates.
- **Stakeholder engagement database** – to record contact details and outcomes of engagement, in an Excel spreadsheet or a nominated stakeholder database.

3.3.1 Scoping Phase Engagement

The SIA Guideline (2022) outlines that the scoping phase will include community engagement activities to understand likely stakeholder issues and concerns to inform the SIA.

To satisfy the SIA requirements, proposed engagement activities to be undertaken in this phase need to be targeted at identifying perceived issues of concern and/or positive impacts in relation to the proposed project, to be further considered in the subsequent EIS/SIA phase. In this regard, the SIA process calls for likely social impacts to be appropriately scoped and identified through consultation with potentially affected people and mitigation and enhancement options preliminarily explored.

Engagement in Phase 1 provides an opportunity to gauge and understand stakeholder issues/ concerns/ interests in relation to the Project; to identify possible strategies or solutions to address topics raised; and for this information to proactively inform project design and planning.

Questions to include in the interview discussion guides appropriate to this phase will include topics relating to:

- Awareness and attitudes towards solar and wind energy project developments (and other industry development in the local or regional area).
- Awareness and public perceptions of ACEN.
- Potential issues, concerns or interests related to the proposed Project.
- Community values, identity, local needs, and aspirations.
- Areas of value and use within and near the Project.
- Sense of community in the area.
- Potential sensitive receivers and/or vulnerable community groups.
- Preferred engagement mechanisms, frequency, and content.

The information gathered in the scoping phase will be used to inform the SIA and EIS preparation, by focusing the assessment on key social and environmental issues or impacts of importance to key

stakeholder groups; and by identifying project design refinements that may seek to avoid or minimise negative impacts and/or enhance positive impacts. This is an important process in project development and records of changes/revisions in project design will be recorded and discussed in the EIS.

Further engagement activities in the subsequent assessment phase, will seek to address and respond to key community issues/concerns and will also include engagement activities required to further assess the social impacts relating to the Project.

4.0 Engagement Implementation Planning

4.1 Scoping Phase

An overview of planned engagement activities and associated staging across the Scoping phase for the Project is outlined in **Table 4.1.** Engagement implementation planning for the second phase activities to support the SIA will be determined after submission of the scoping report to the NSW DPE.

Table 4.1 Engagement Implementation Plan (Scoping Phase)

Target Stakeholder Group	Mechanism	Objectives	Tasks	Responsibility	Timing
Host and Proximal Landholders	Review of existing engagement outcomes, inclusion of SIA specific questions in ACEN personal meetings.	Understand concerns and expectations, community needs and values, to inform the SIA and future engagement activities.	Provide landholder contact details and engagement outcomes to Umwelt.	ACEN Australia	August 2022
			Undertake calls/ meetings with identified key stakeholders and include SIA questions.	Umwelt	August 2022
			Analyse / report on outcomes in scoping report.	Umwelt	September 2022
			Targeted engagement with proximal landholders.	ACEN Australia	August to December 2023
			Continued engagement with hosts and proximal landholders.	ACEN Australia	Ongoing
Aboriginal Stakeholders (e.g. LALCs)	Personal meetings / Interviews	Provide project overview, understand perspectives, community needs and values.	Send Project introduction/ invitation email.	ACEN Australia	December 2022 to January 2023
			Analyse / report on outcomes in scoping report.	Umwelt	January 2023
			Organise meetings.	ACEN Australia / Umwelt	March to April 2024
			Undertake meetings.	ACEN Australia / Umwelt	March to April 2024

Target Stakeholder Group	Mechanism	Objectives	Tasks	Responsibility	Timing
			Meeting following Scoping Report submission.	ACEN Australia / Umwelt	March to April 2024
Local Government	Project briefing	Provide project overview and update, understand interests and concerns.	Send Project introduction/ invitation email.	ACEN Australia	August 2022
			Organise meetings.	ACEN Australia / Umwelt	August 2022
			Develop briefing presentation.	ACEN Australia / Umwelt	August 2022
			Attend briefings (online or in-person).	ACEN Australia / Umwelt	August 2022 to September 2022
			Analyse / report on outcomes in scoping report.	Umwelt	September 2022
			Meeting following Scoping Report submission.	ACEN Australia	March 2024
Environmental and Community Groups	Initial letters sent via email, offer of project briefing	Provide project overview, understand perspectives, community needs and values.	Send Project introduction/ invitation email.	ACEN Australia	August 2022
			Organise meetings.	ACEN Australia / Umwelt	August 2022
			Undertake meetings.	ACEN Australia / Umwelt	August 2022 to September 2022
			Analyse / report on outcomes in scoping report.	Umwelt	September 2022
			DCCEEW meeting.	ACEN Australia / Umwelt	December 2022
Broader Community	Letter / project information sheet	Disseminate key project information and increase	Draft project information sheet content.	ACEN Australia / Umwelt	August 2022
			Design project information sheet.	ACEN Australia	August 2022

Target Stakeholder Group	Mechanism	Objectives	Tasks	Responsibility	Timing
		awareness of the Project In the community. Provide a mechanism for input and ongoing community engagement.	Organise printing and distribution of Project information sheet.	Umwelt	August 2022
	Community Information Session	To provide an introductory overview of the Project including the assessment and approvals process in key townships or community locations nearby the Project.	Organise venue and key materials.	ACEN Australia / Umwelt	August 2022
			Host information session.	ACEN Australia / Umwelt	September 2022
			Analyse / report on outcomes in scoping report.	Umwelt	September 2022
			Additional information session following submission of Scoping Report.	ACEN Australia / Umwelt	March 2024

5.0 Reporting and Evaluation

5.1 Record Keeping and Stakeholder Database

A dedicated stakeholder database will be established to record stakeholder interactions and related information throughout the Project's planning and assessment phase. This will include an engagement register, based on ACEN's Stakeholder Register Template, whereby team members will record the contact details of stakeholders, summaries of each consultation or contact undertaken, and any actions that arise from these meetings. This database will be established by Umwelt on an interactive and accessible platform for live sharing with the project team (e.g., SharePoint).

Outcomes and records of each engagement activity will be documented by the team member(s) in attendance. ACEN's Interactions Register Template will be maintained throughout the delivery of the Implementation Plan to ensure consistent tracking and recording of all community or stakeholder engagement activities and outcomes.

Information to be recorded will include:

- Stakeholder contact details.
- Activity details (including stakeholder engaged, attendees, time, place, mechanism used).
- Discussion points.
- Summary of key outcomes, including any actions arising.
- Preferences for future engagement.

Following completion of engagement for each phase, outcomes and data obtained will be collated and analysed to identify key impact themes and impact prioritisation. Identified issues or impacts may also be mapped to identify any spatial/geographic patterns in the data to demonstrate the representativeness and comprehensiveness of the engagement program.

Outcomes of the engagement will then be analysed and presented in the scoping report and subsequent SIA. Outcomes of the engagement will also be provided to inform relevant EIS technical studies and for further consideration in project design and planning.

5.2 Evaluation

The implementation of the CSEP will be monitored and evaluated on an ongoing basis to ensure effectiveness in achieving the objectives outlined in **Section 1.0**. In this regard, it will be important to ensure that:

- All key stakeholders and communities relevant to the Project have been identified, in particular, vulnerable and at-risk groups.
- All identified relevant stakeholders are offered the opportunity to participate in the engagement program.

- Relevant Project information has been provided to all relevant stakeholders and all questions and queries received are followed up in a timely manner by Umwelt or ACEN.
- Regular Project team meetings will be held between Umwelt and ACEN to provide required updates and ensure a collaborative and consistent approach to engagement across the Project.
- Engagement outcomes and community feedback is meaningfully and adequately considered for the purposes of the development of a scoping report to inform future engagement and planning.
- Engagement outcomes, where possible, is used to inform Project design and refinements, including the development of enhancement or mitigation measures to address specific impacts.
- All regulatory requirements relating to community engagement are met.
- Engagement is timely, open/transparent, inclusive, and meaningful.

6.0 References

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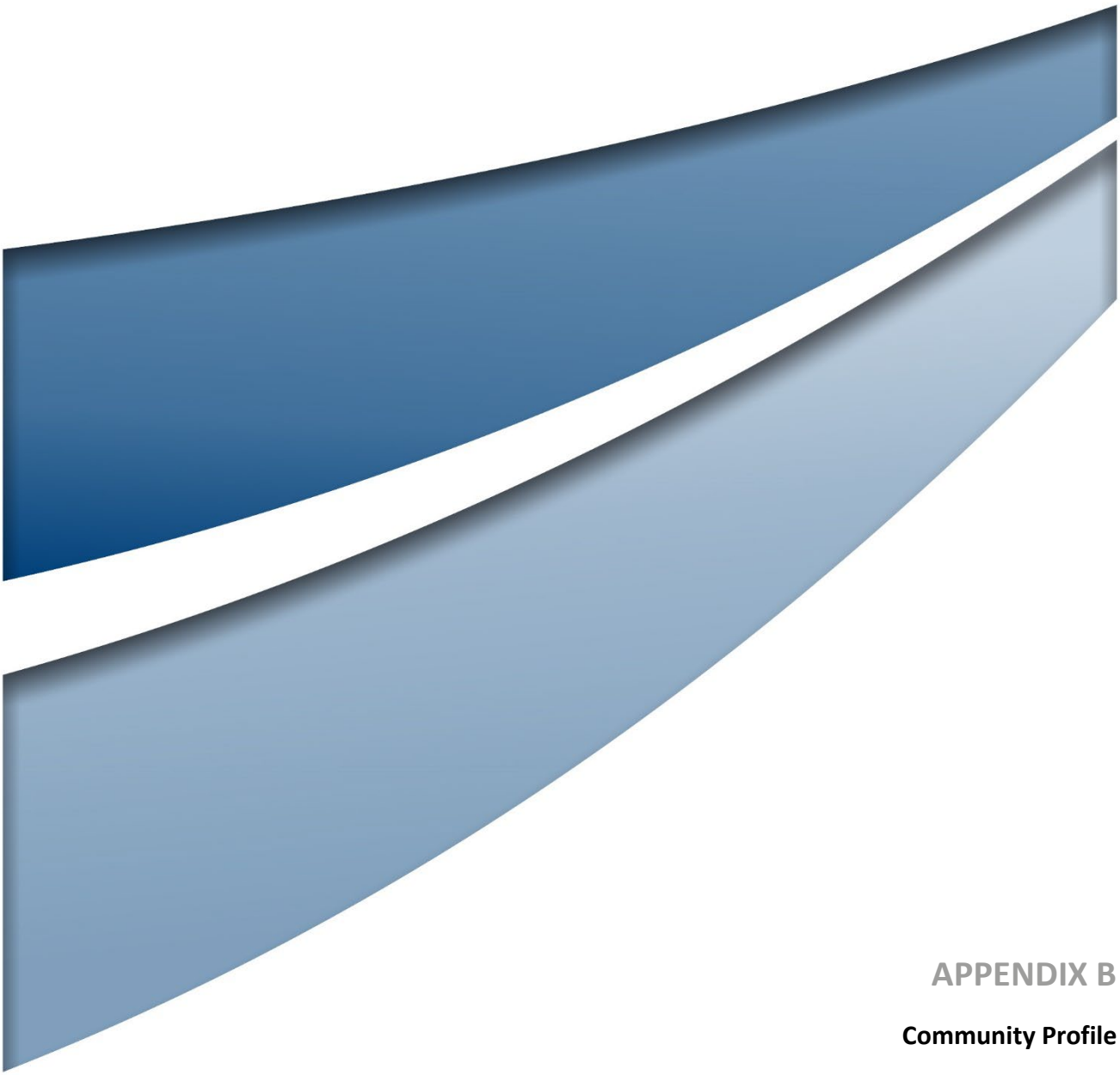


APPENDIX B

Community Profile

Table B 1 Community Profile: Local Government Areas

Indicator	Dubbo Regional LGA					Cabonne Shire LGA					City of Orange LGA					NSW	
	2006	2011	2016	2021	Change	2006	2011	2016	2021	Change	2006	2011	2016	2021	Change	2016	2021
Population Size	45,963	47,303	50,071	54,922	↑	12,396	12,823	13,391	13,766	↑	35,339	38,056	40,343	43,512	↑	7,480,228	8,072,163
Proportion Indigenous Population (%)	11%	14%	15%	17%	↑	2	3	4	5	↑	4	5	6	8	↑	3%	3%
Median Age	36	37	37	36	↑	41	41	43	44	↑	36	36	37	37	↑	38	39
Year 10 highest year of schooling (%)	37	36	34	-	↓	38	38	35	-	↓	36	34	32	-	↓	23%	-
Year 12 highest year of schooling (%)	34	38	44	-	↑	33	38	43	-	↑	35	42	47	-	↑	59%	-
Bachelor degree (%)	7	9	10	-	↑	8	9	11	-	↑	9	11	12	-	↑	16%	-
Certificate (%)	20	23	23	-	↑	20	23	24	-	↑	20	22	23	-	↑	18%	-
Proportion of population with a different address 1 year ago (%)	17	15	15	-	↓	11	11	10	-	↓	18	17	17	-	↓	14%	-
Proportion of population with a different address 5 year ago (%)	44	38	38	-	↓	36	30	30	-	↓	44	40	42	-	↓	39%	-

Indicator	Dubbo Regional LGA					Cabonne Shire LGA					City of Orange LGA					NSW	
	2006	2011	2016	2021	Change	2006	2011	2016	2021	Change	2006	2011	2016	2021	Change	2016	2021
Proportion of population aged 15+ who volunteer (%)	21	20	20	14	↓	29	27	28	22	↓	20	19	20	15	↓	18%	13
Proportion of population born overseas (%)	-	6	8	10	↑	-	6	6	6	—	-	9	10	10	↑	30%	30
Proportion of single parent families (%)	19	20	20	19	↑	11	12	12	12	↑	18	19	19	18		8%	16
Proportion of family households (%)	73	71	71	69	↓	75	-	74	74	↓	70	-	69	68	↓	72%	71
Proportion of group households (%)	-	3	4	3	↑	-	-	2	2	—	-	-	3	3	—	4%	4
Proportion of lone person households (%)	-	26	26	27	—	-	-	24	24	—	-	-	28	29	↑	24%	25
Proportion of the labour force employed full-time (%)	60.4	61.7	61.9	-	↑	63.9	62.2	60.0	-	↓	60.5	62.7	59.7	-	↓	59.2%	-
Proportion of the labour force employed part-time (%)	26.9	27.3	27.1	-	↑	25.9	27.6	29.8	-	↑	27.6	27.1	28.9	-	↑	29.7%	-
Proportion of the labour force who are unemployed (%)	5.9	5.5	5.9	-	—	3.7	3.7	4.3	-	↑	5.8	4.4	6.3	-	↑	6.3%	-

Indicator	Dubbo Regional LGA					Cabonne Shire LGA					City of Orange LGA					NSW	
	2006	2011	2016	2021	Change	2006	2011	2016	2021	Change	2006	2011	2016	2021	Change	2016	2021
Median household income ($/week)	908	1,037	1,272	1,597	^	861	1,036	1,301	1,698	^	935	1,161	1,295	1,514	^	1,486	1,829
Median mortgage repayment ($/month)	1135	1446	1500	1,517	^	1,083	1,387	1,517	1,517	^	1,272	1,625	1,629	1,625	^	1986	2,167
Median rent for a 3-bed house ($/week)	149	186	250	300	^	108	135	180	280	^	170	230	270	300	^	380	420
Median rent as a proportion of median household income (weekly)	16%	18%	20%	19%	^	12.5%	13.0%	13.8%	16.5%	^	18.2%	19.8%	20.8%	19.8%	^	26%	23%
Proportion of occupied private dwellings that are fully owned (%)	34.1%	32.1%	31.4%	30.3	v	45.9%	43.6%	42.1%	44.5%	v	33.5%	31.6%	30.7%	30.8%	v	32.2%	31.5
Proportion of occupied private dwellings that are being purchased/ owned by a mortgage (%)	32.9%	34.5%	33.%	33.9%	^	31.6%	33.5%	35.2%	34.5%	^	32.1%	32.5%	32.4%	33.7%	^	32.3%	32.5
Proportion of occupied private dwellings that are being rented (%)	29.0%	29.9%	30.7%	31.5	^	18.8%	19.5%	18.7%	15.6%	v	31.0%	32.5%	33.1%	32.6%	^	31.8%	32.6
Proportion of dwellings with internet access (%)	53	72	78	-	^	54	72	78	-	^	53	73	80	-	^	85%	-

Indicator	Dubbo Regional LGA					Cabonne Shire LGA					City of Orange LGA					NSW	
	2006	2011	2016	2021	Change	2006	2011	2016	2021	Change	2006	2011	2016	2021	Change	2016	2021
Proportion of households in mortgage stress (%)	-	7.1	5.1	9.5	⌄	-	7.9	6.2	12.4	^	-	7.0	10.0	10.0	^	7.4	17.3
Proportion of households in rental stress (%)	-	8.0	9.8	26.2	^	-	4.1	4.7	23.3	^	-	9.8	29.4	29.4	^	12.9	35.5

Table 2 Community Profile: Key Townships

Indicator	Euchareena		Mullion Creek		Stuart Town		Mumbil		Wellington		Molong		Dubbo		Orange	
	2016	2021	2016	2021	2016	2021	2016	2021	2016	2021	2016	2021	2016	2021	2016	2021
Population Size	197	170	557	561	235	241	291	298	4,519	4,726	2,577	2,595	38,943	43,516	38,097	41,232
Proportion Indigenous Population (%)	8	9	3	4	10	14	9	19	26	28	20	7	15	16	15	8
Median Age	50	40	36	39	39	51	51	48	44	41	40	43	36	35	37	36
Year 10 highest year of schooling (%)	32%	-	14%	-	33%	-	32%	-	38%	-	35%	-	34%	-	32%	-
Year 12 highest year of schooling (%)	27%	-	12%	-	39%	-	34%	-	31%	-	41%	-	45%	-	47%	-
Bachelor degree (%)	12%	-	16%	-	13%	-	2%	-	5%	-	9%	-	11%	-	12%	-
Certificate (%)	30%	-	29%	-	34%	-	20%	-	22%	-	24%	-	24%	-	23%	-
Proportion of population with a different address 1 year ago (%)	8%	-	-	-	11%	-	6%	-	13%	-	12%	-	16%	-	17%	-
Proportion of population with a different address 5 year ago (%)	27%	-	-	-	22%	-	27%	-	33%	-	33%	-	41%	-	43%	-
Proportion of population aged 15+ who volunteer (%)	23%	20%	23%	17%	16%	16%	20%	17%	18%	12	26%	21	19%	14	20%	15
Proportion of population born overseas (%)	4%	3%	2%	4%	7%	2%	14%	13%	6%	-	7%	-	8%	-	10%	-
Proportion of single parent families (%)	17%	0	8%	8%	7%	24%	11%	22%	29	31	8%	15	12%	19	11%	19

Indicator	Euchareena		Mullion Creek		Stuart Town		Mumbil		Wellington		Molong		Dubbo		Orange	
	2016	2021	2016	2021	2016	2021	2016	2021	2016	2021	2016	2021	2016	2021	2016	2021
Proportion of family households (%)	48%	75%	88%	84%	60%	64%	55%	58%	61%	61	72%	70	71%	70	68%	67
Proportion of group households (%)	0%	0%	0%	0%	0%	5%	0%	4%	3%	4	2%	1	3%	4	3%	3
Proportion of lone person households (%)	23%	25%	12%	16%	21%	31%	43%	38%	36%	-	27%	29	26%	27	29%	30
Proportion of the labour force employed full-time (%)	58.9%	-	56.3%	-	60.8%	-	42.7%	-	52.7%	-	61.2%	-	62.7%	-	59.7%	-
Proportion of the labour force employed part-time (%)	33.7%	-	33.2%	-	28.4%	-	31.3%	-	29.7%	-	29.1%	-	26.8%	-	28.7%	-
Proportion of the labour force who are unemployed (%)	7.4%	-	7.6%	-	4.1%	-	14.6%	-	12.4%	-	3.9%	-	5.5%	-	6.5%	-
Median household income ($/week)	1,020	900	1,795	2,625	1,228	1,812	710	1,187	807	1,184	1,168	1,708	1,341	1,608	1,275	1,608
Median mortgage repayment ($/month)	1,125	0	1,733	1,950	1,083	770	884	1,255	1083	1047	1517	1,641	1517	1541	1625	1541
Median rent for a 3-bed house ($/week)	38	230	180	0	163	200	120	165	190	237	240	310	265	310	270	310
Median rent as a proportion of median household income (weekly)	4%	26%	10%	-	13%	11%	17%	14%	24%	21%	21%	18%	20%	19%	21%	19%
Proportion of occupied private dwellings that are fully owned (%)	39.5%	54.7%	36.7%	37.3%	62.5%	55.1%	52.4%	43.7%	36.4%	36.3	37.3%	40.0%	28.9%	28.1	29.8%	28.1
Proportion of occupied private dwellings that are being purchased/ owned by a mortgage (%)	33.7%	24.5%	54.4%	54.1%	16.1%	29.2%	28.6%	33.6%	24.6%	26.0	33.9%	33.8%	34.3%	34.3	32.0%	34.3
Proportion of occupied private dwellings that are being rented (%)	17.4%	18.9%	6.3%	3.2%	21.4%	11.2%	15.2%	15.1%	34.4%	33.6	22.8%	21.1%	32.7%	33.7	34.3%	33.7
Proportion of dwellings with internet access (%)	78%	-	90%	-	74%	-	71%	-	65%	-	77%	-	80%	-	79%	-
Proportion of households in mortgage stress (%)	0.0	30.8	11.1	10.0	4.1	11.5	-	20.0	3.7	4.0	5.8	12.9	5.1	9.1	5.1	9.1
Proportion of households in rental stress (%)	7.5	0.0	0.0	0.0	0.0	0.0	5.2	0.0	12.3	11.0	8.1	30.4	10.6	26.0	10.6	26.0

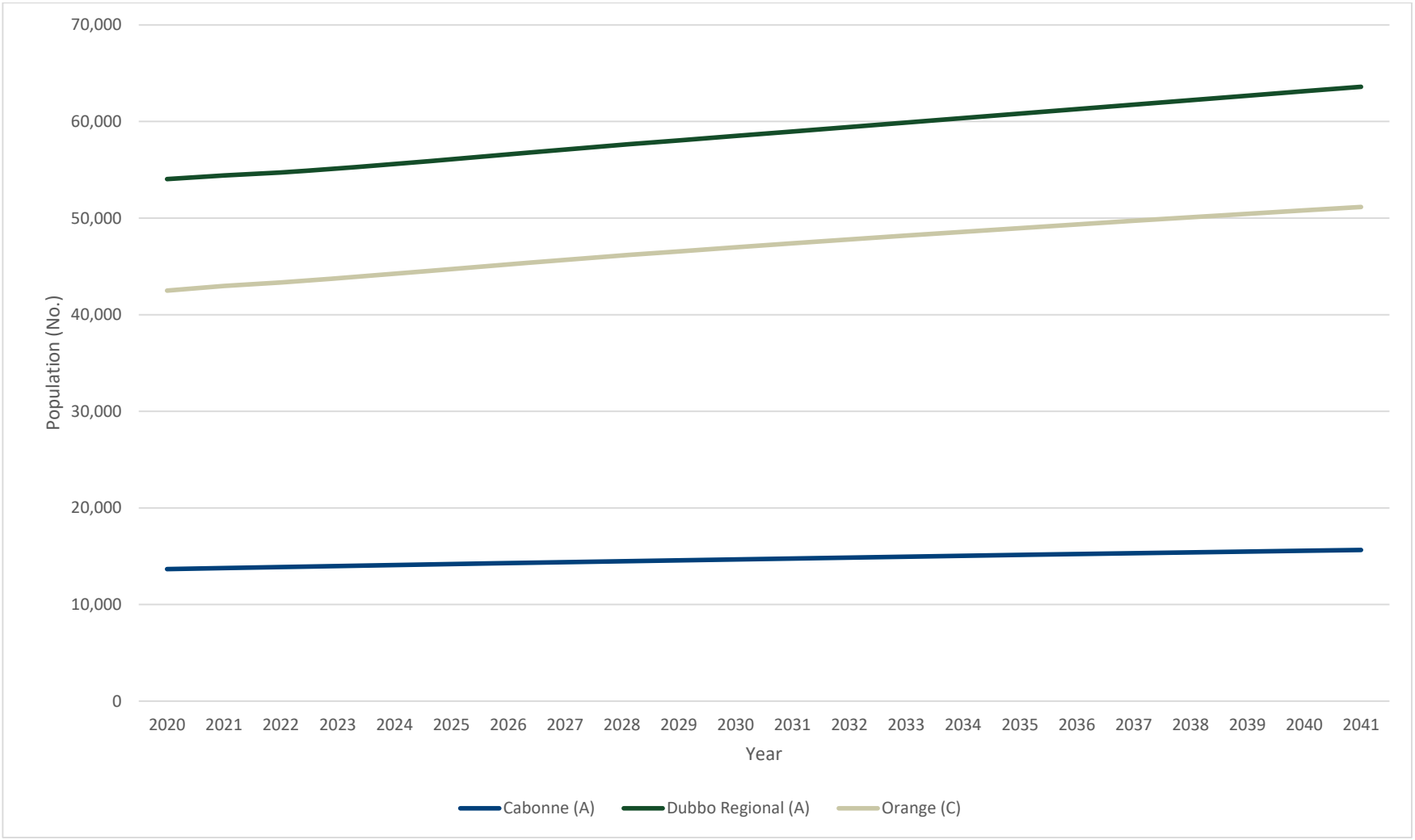
Table 3 Industries of Employment

Industry	Wellington SA2	Dubbo Regional LGA	NSW
Agriculture, forestry and fishing	16.8%	5.1%	2.1%
Mining	1.1%	1.1%	0.9%
Manufacturing	3.7%	5.8%	5.8%
Electricity, gas, water and waste services	0.9%	1.3%	0.9%
Construction	6.4%	8.5%	8.4%
Wholesale trade	1.7%	3.1%	3.1%
Retail trade	9.0%	10.9%	9.7%
Accommodation and food services	7.1%	7.4%	7.1%
Transport, postal and warehousing	3.3%	4.0%	4.7%
Information media and telecommunications	0.4%	0.9%	2.2%
Financial and insurance services	0.6%	1.8%	4.9%
Rental, hiring and real estate services	0.7%	1.2%	1.8%
Professional, scientific and technical services	3.2%	4.1%	8.1%
Administrative and support services	2.5%	2.7%	3.5%
Public administration and safety	10.5%	7.7%	6.0%
Education and training	9.3%	9.3%	8.4%
Health care and social assistance	14.0%	15.4%	12.5%
Arts and recreation services	1.1%	1.6%	1.5%
Other services	3.5%	4.4%	3.7%

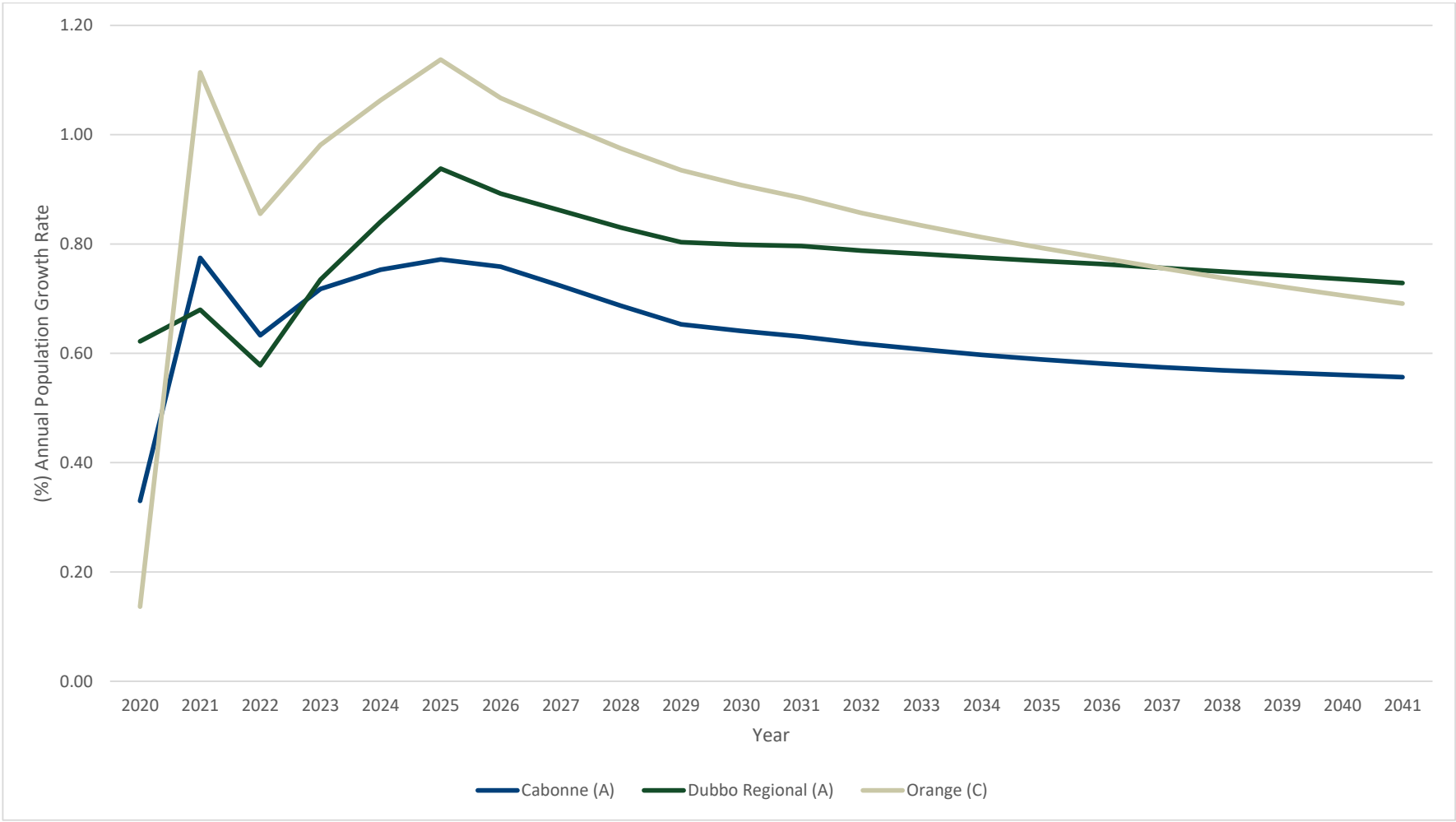
Table 4 Health Status

Category	Health Indicator	Source	Measure	Dubbo Regional LGA	NSW
Chronic diseases	Estimated number of people with mental and behavioural problems (modelled estimates)	PHIDU 2017–18	ASR per 100	24.9	18.8
	Estimated number of people with heart, stroke and vascular disease	PHIDU 2017–18	ASR per 100	5.2	4.9
	Estimated number of people aged 15 years and over with fair or poor self-assessed health	PHIDU 2017–18	ASR per 100	15.4	14.1
Risk factors	Estimated number of males aged 18 years and over with high or very high psychological distress, based on the Kessler 10 Scale (K10)	PHIDU 2017–18	ASR per 100	12.3	12.4
	Estimated number of people aged 18 years and over who had high blood pressure	PHIDU 2017–18	ASR per 100	23.6	23.1
	Estimated number of people aged 18 years and over who were obese	PHIDU 2017–18	ASR per 100	44	30.9
	Estimated number of people aged 18 years and over who were current smokers	PHIDU 2017–18	ASR per 100	18.7	14.4
Premature death	Total deaths, 0 to 74 years	PHIDU 2015-2019	ASR per 100,000	317.4	238.4

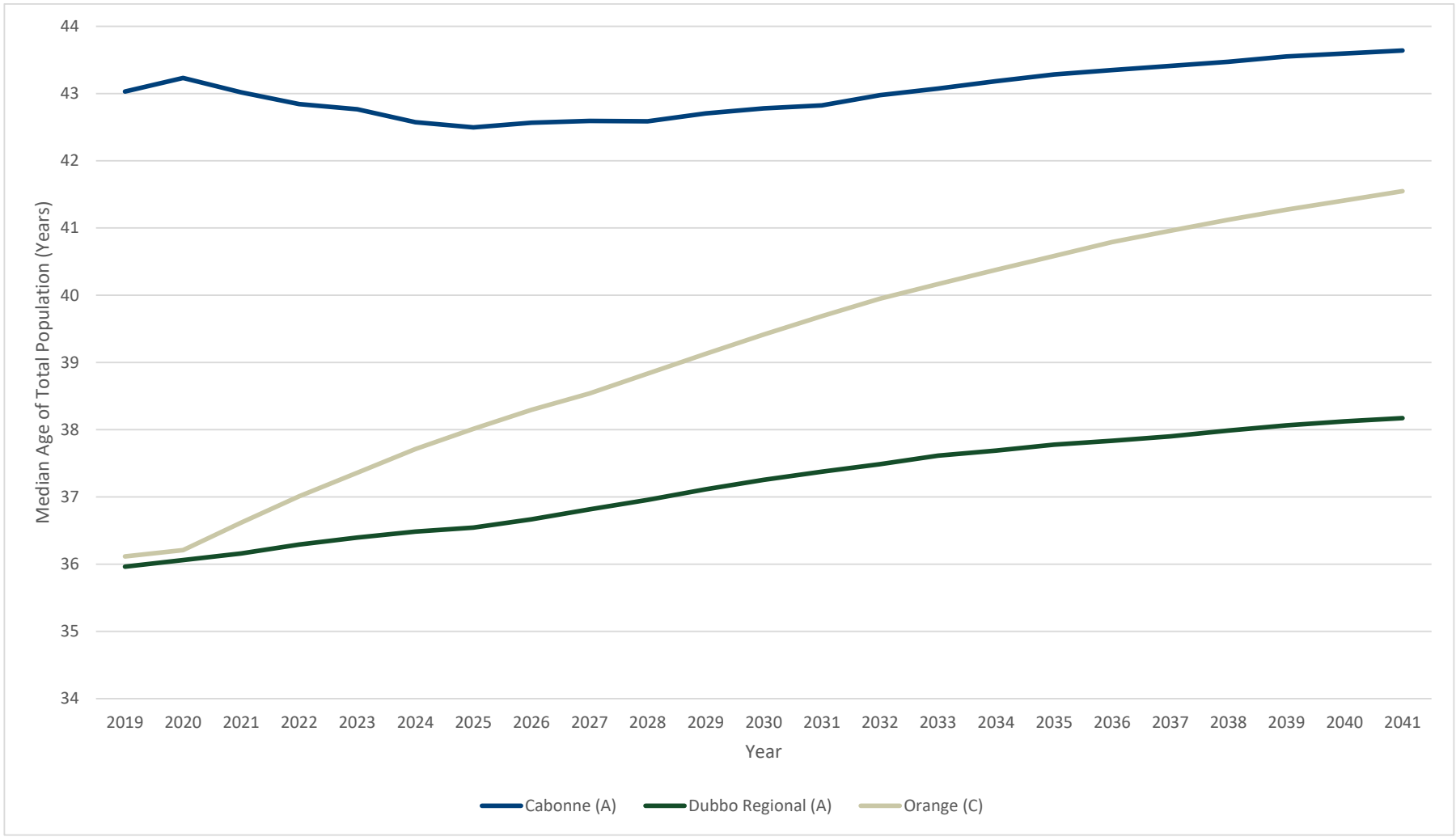
Projected Population Total: Dubbo Regional, Cabonne Shire, City of Orange



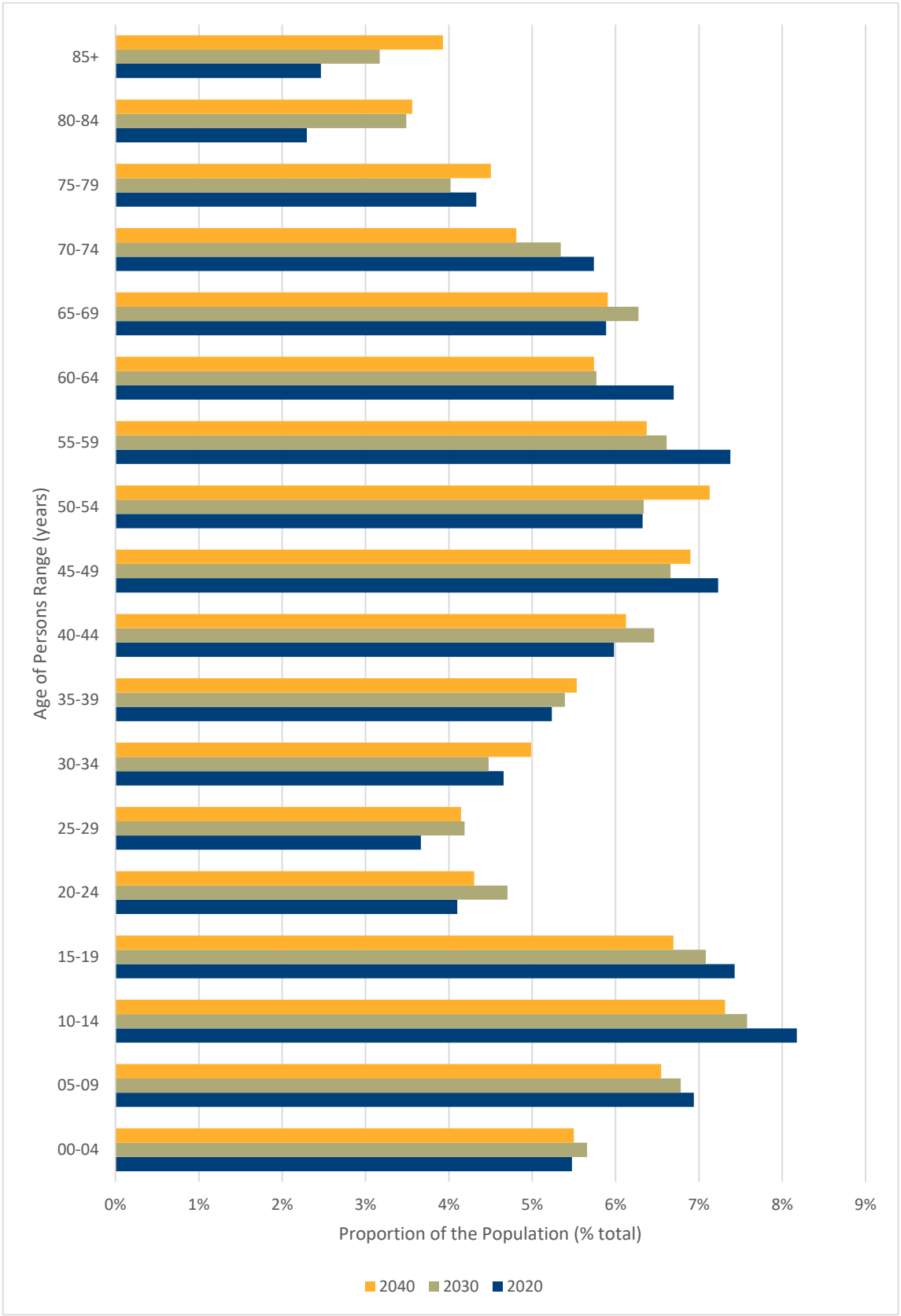
Annual Population Growth Rates: Dubbo Regional, Cabonne Shire, City of Orange



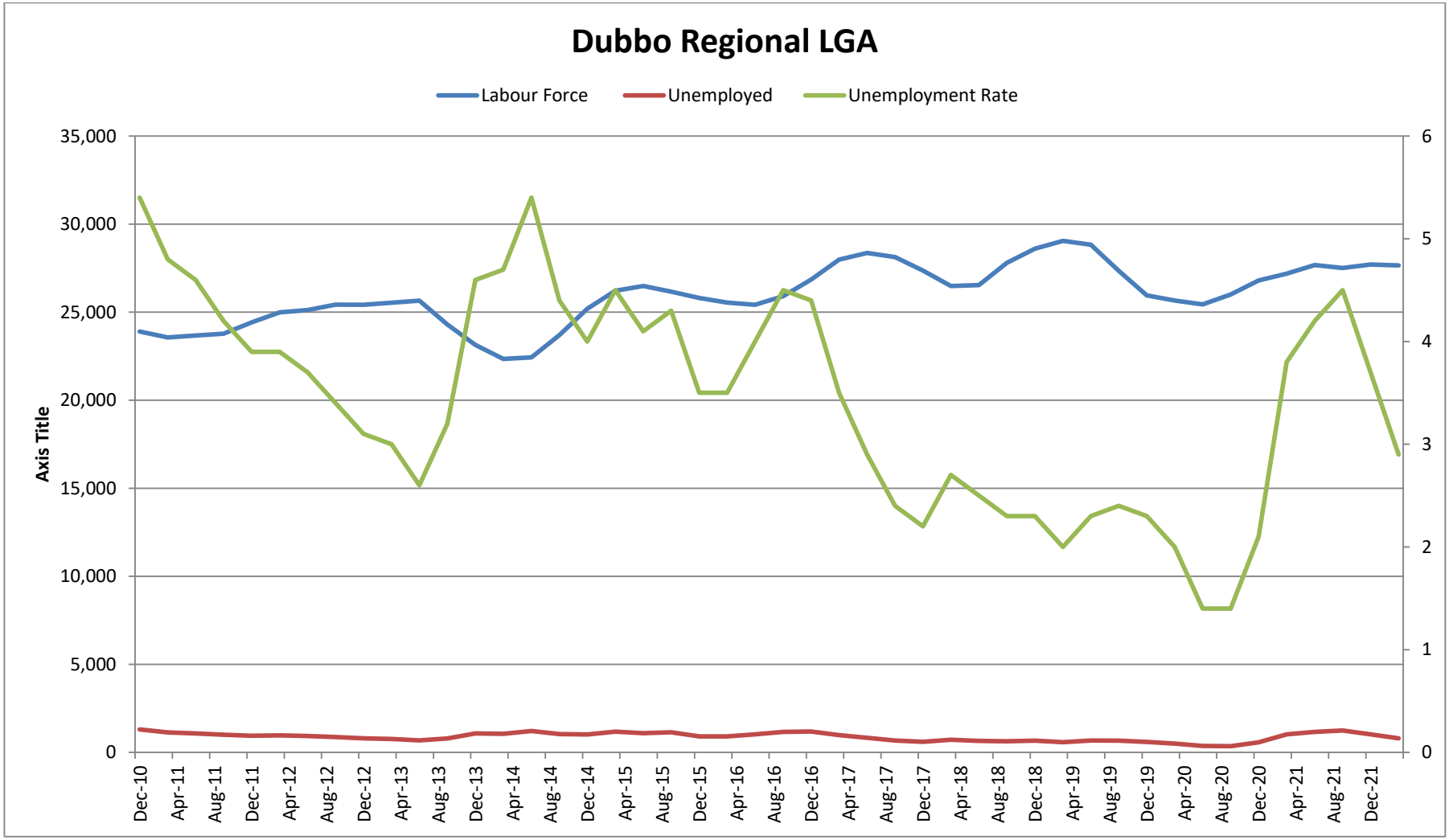
Median Age of Total Population: Dubbo Regional, Cabonne Shire, City of Orange

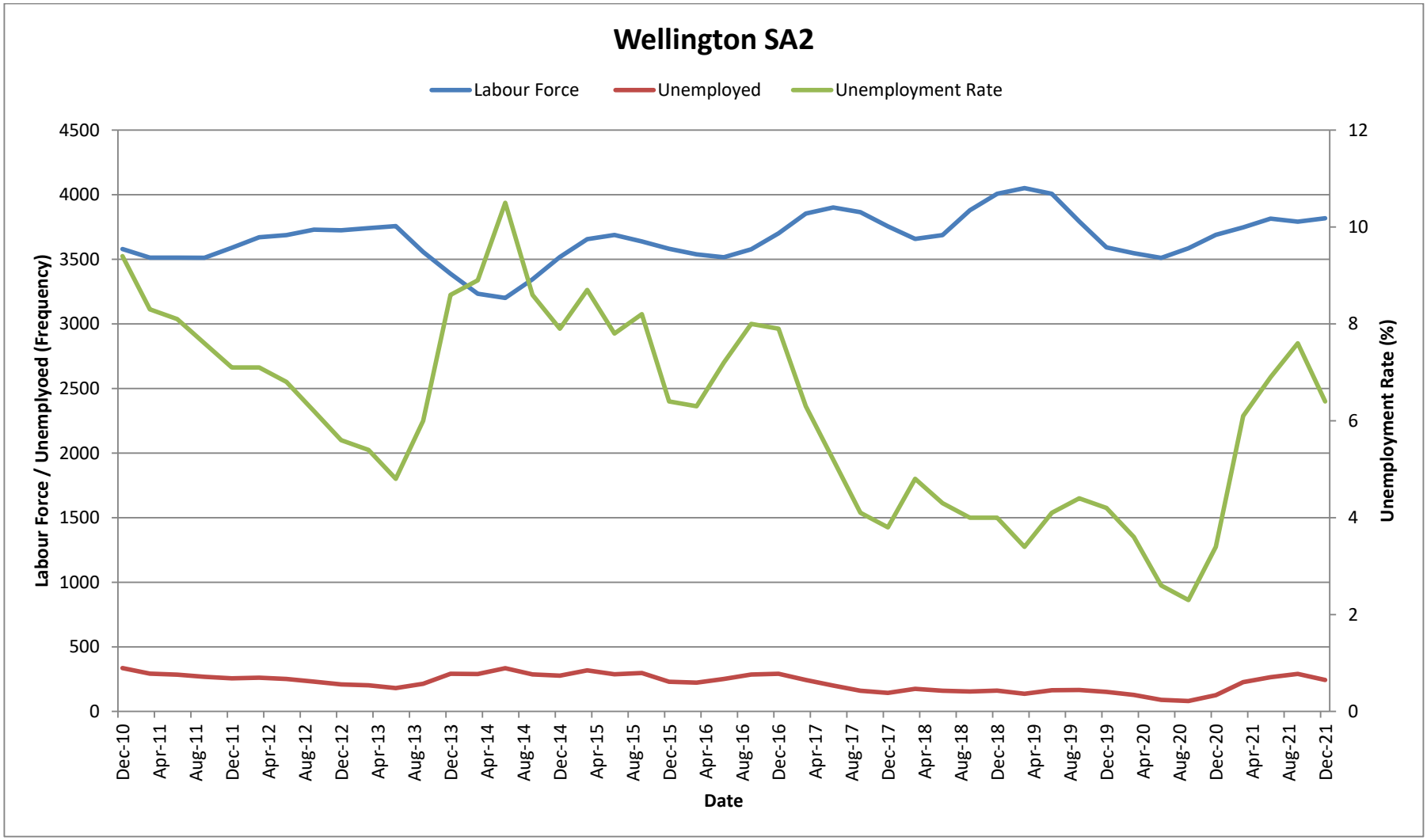


Proportional Population by Age Bracket: (Dubbo Regional LGA):



Employment Data: Small Area Labour Markets (SALM), December Quarter 2021




Wellington SA2
Labour Force
Unemployed
Unemployment Rate
Labour Force / Unemplyoed (Frequency)
Unemployment Rate (%)
Date
4500
4000
3500
3000
2500
2000
1500
1000
500
0
12
10
8
6
4
2
0
Dec-10
Apr-11
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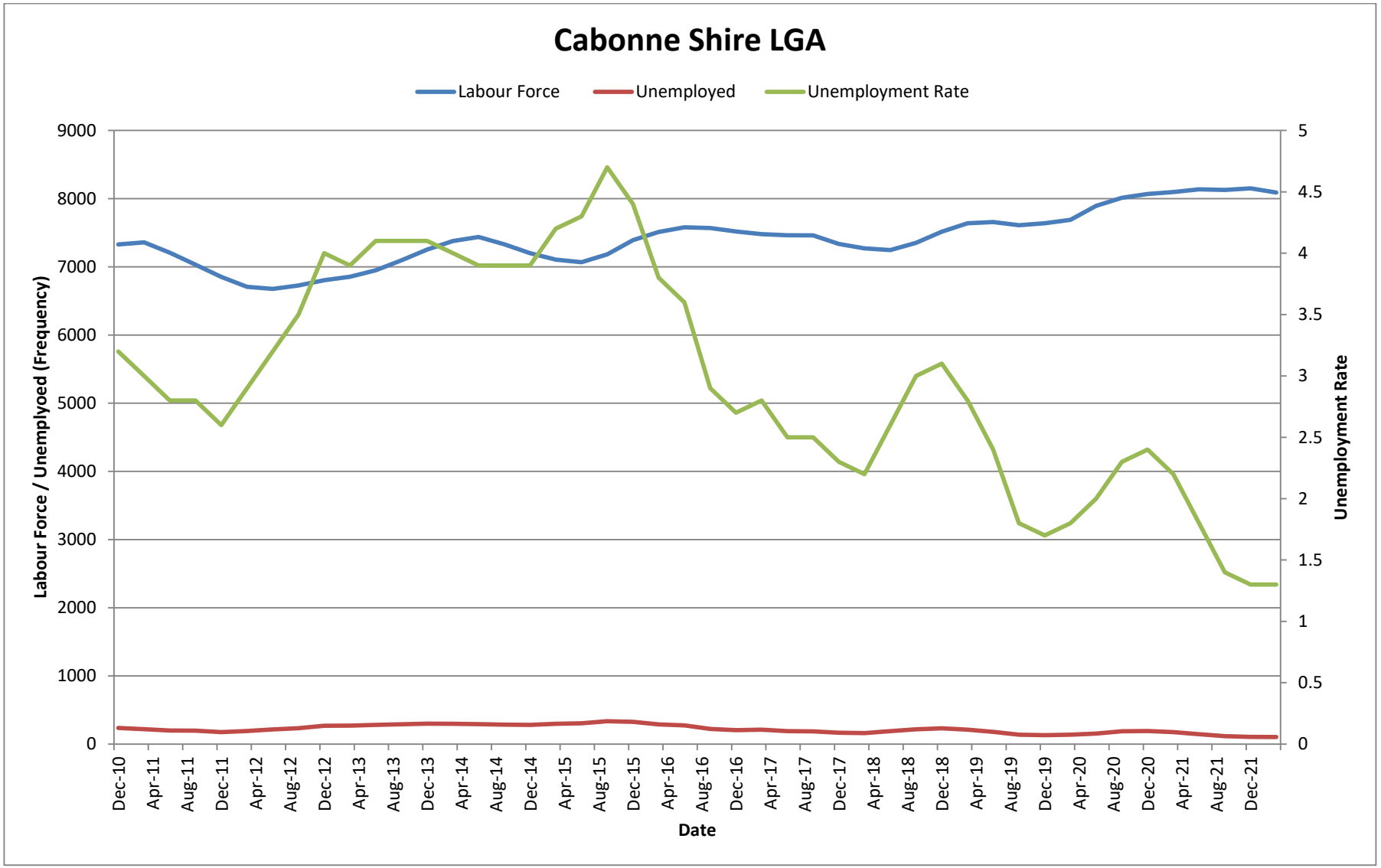
Cabonne Shire LGA
Labour Force
Unemployed
Unemployment Rate
Labour Force / Unemplyoed (Frequency)
Unemployment Rate
Date
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Dec-10
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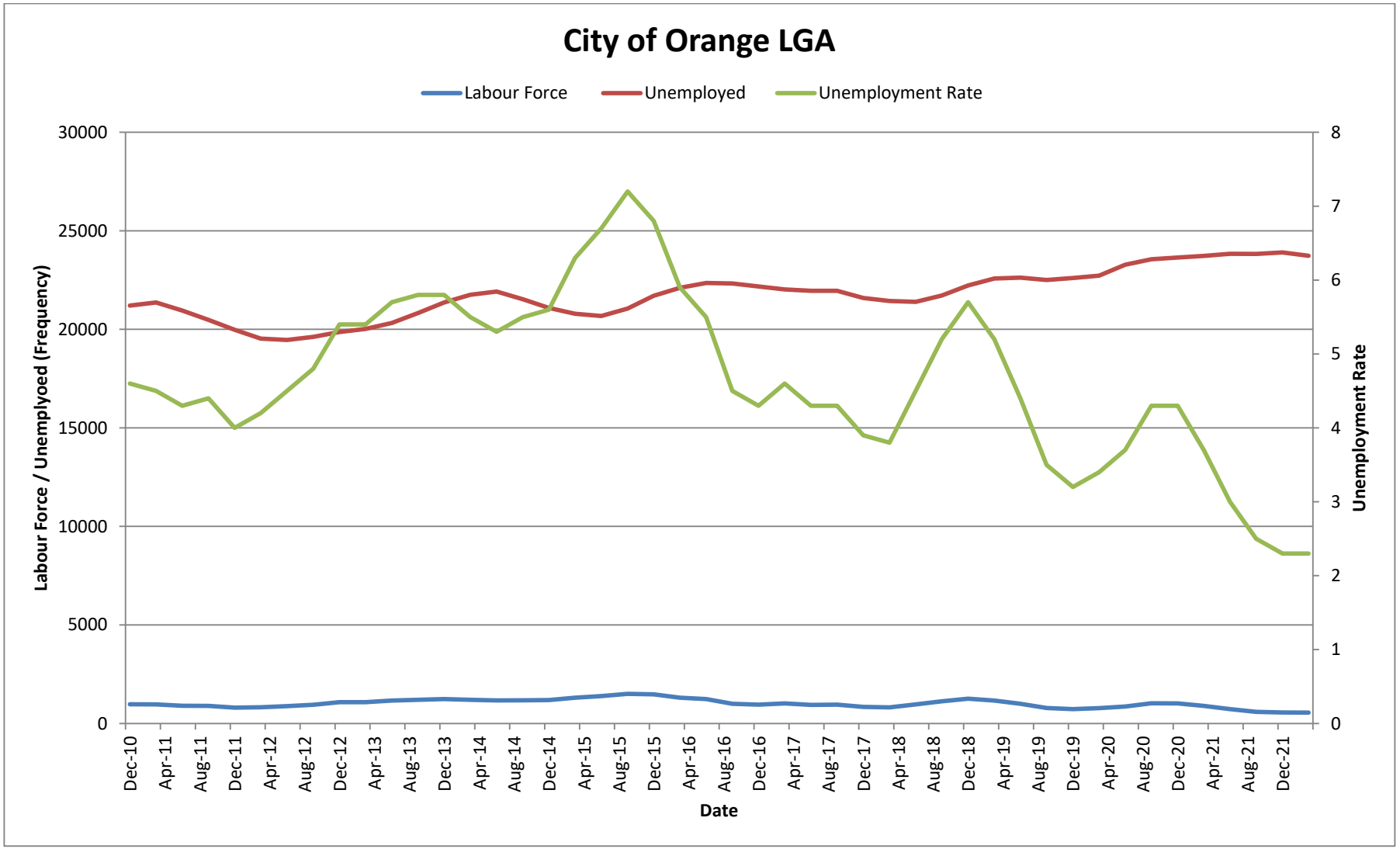
City of Orange LGA
Labour Force
Unemployed
Unemployment Rate
Labour Force / Unemplyoed (Frequency)
Unemployment Rate
Date
30000
25000
20000
15000
10000
5000
0
8
7
6
5
4
3
2
1
0
Dec-10
Apr-11
Aug-11
Dec-11
Apr-12
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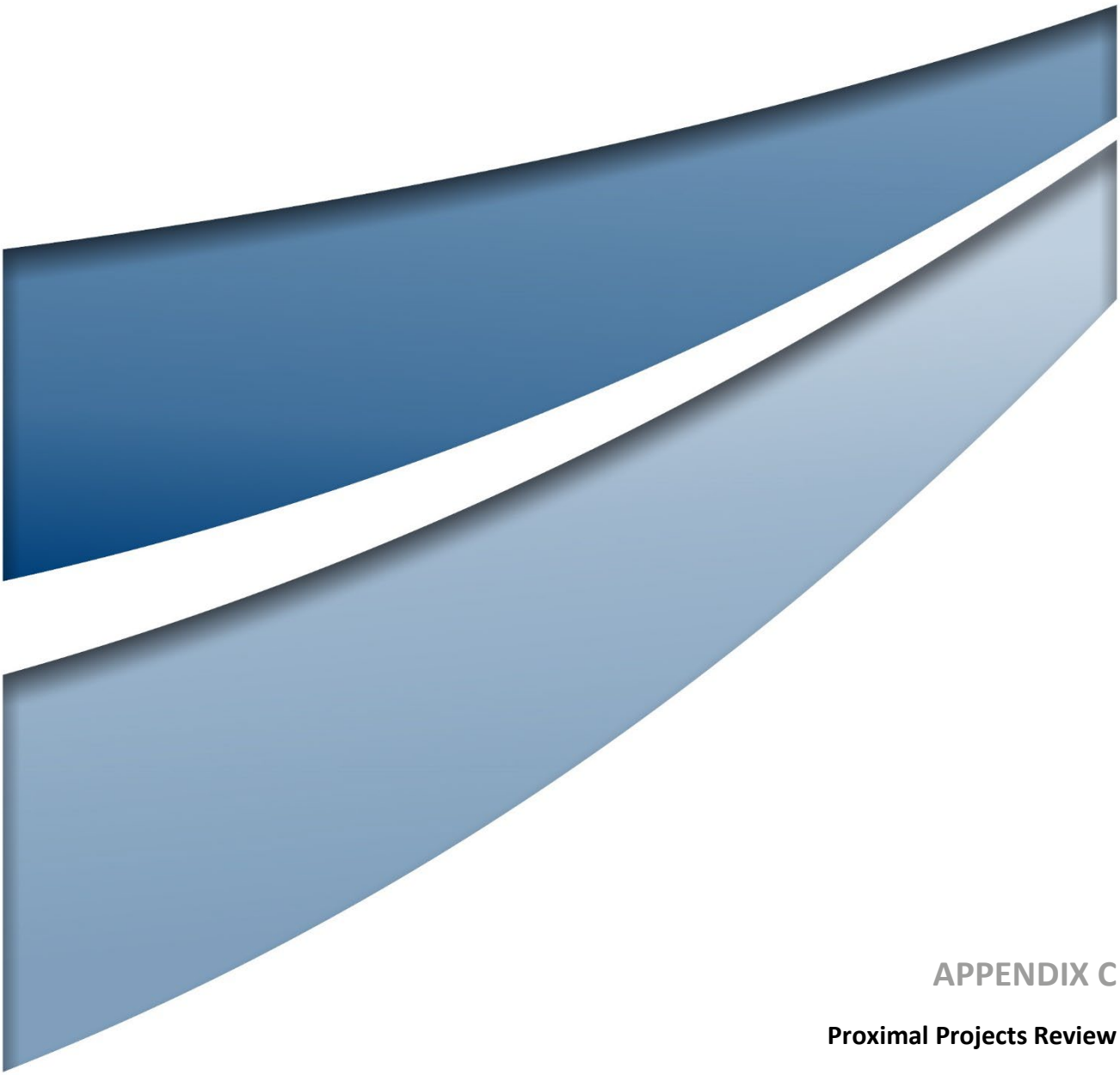

APPENDIX C

Proximal Projects Review

Proximal Cumulative Renewable Energy Projects

Project Name	Overview	Status	Key Social Impact Considerations
Central-West Orana REZ Transmission Works (EnergyCo NSW, 2022)	Proposed instalment and operation of new electricity transmission infrastructure as part of the Central West Orana REZ. The proposed transmission lines is located in Warrumbungle, Mid-Western Regional, Dubbo Regional and Upper Hunter local government areas (LGAs) and generally extends north to south from Cassilis to Wollar and east to west from Cassilis to Goolma. The Project will include: • A new switching station located at Wollar. • Around 90 kilometres of twin double circuit 500 kV transmission lines and associated infrastructure • Energy hubs at Merotherie and Elong Elong. • Around 150 kilometres of single circuit, double circuit and twin double circuit 330 kV transmission lines. • Maintenance facility within the Merotherie Energy Hub. The current study corridor is 220 kilometres (km).	An EIS was submitted in September 2023 and the Project is currently on public exhibition (as of December 2023).	• Construction workforce: 1,800 jobs during peak construction. • Amenity impacts during construction may temporarily affect sense of place and alter the way neighbouring landowners and residents use and enjoy space. • Changes to way of life as a result of delays to mobility during construction due to increased traffic and transport of construction workforce, equipment and construction materials. • The perceived unfair distribution of impacts and benefits resulting in community division affecting residents' social networks, sense of community and wellbeing. • Cumulative impacts on cultural identity in the region as a result of the increased presence of the renewable energy industry within the landscape. • Impacts on Aboriginal cultural values and wellbeing due to changes to the environment and sites of cultural heritage. • Increased demand on health/social services due to an increase in the temporary construction workforce. • Impacts to sense of safety due to an increase in traffic movements.

Project Name	Overview	Status	Key Social Impact Considerations
			• Detrimental physical and mental health outcomes on landowners subject to the acquisition process, physical changes to their properties and the way landowners use and manage their land. • Stress due to perceived bushfire risk associated with the construction and operation of power lines, particularly given the agricultural and residential land use in the area. • Stress due to perceived uncertainty in the local property market associated with cumulative impacts of the project with other nearby projects and land acquisition. • A permanent change in community character due to the loss of aesthetic values. • Perceived or actual loss of biodiversity values. • Diminished sense of safety during construction due to the increased presence of construction workers in service communities. • Change in land management practices affecting land productivity, and how people access and use their land. • Impacts on local livelihoods due to an increased demand in the local workforce market. • An increased cost of labour to small

Project Name	Overview	Status	Key Social Impact Considerations
			businesses (agriculture) and causing labour shortages for other non-project industries. • Perceived unequitable distribution of benefits, as the project is supplying energy consumers on the east coast of NSW, therefore not benefiting the communities where the infrastructure is located. • Impacts on procedural fairness and people's capacity to influence changes that may affect their lives.
Spicers Creek Wind Farm (CWP Renewables, 2022)	Proposed 700 megawatt (MW) wind farm located 25 km northwest of Gulgong and 35 km northeast of Wellington	An EIS was submitted in July 2023 and the Project is currently on public exhibition (as of December 2023).	• Construction workforce: 590 direct jobs, operational workforce: 12 ongoing jobs. • Impacts to agricultural operations. • Lack of distributions equity of project benefits. • Increase in stress / anxiety. • Increased traffic and change in road conditions. • Social amenity impacts. • Incoming construction workforce causing pressure on local facilities and services.
Stubbo Solar Farm (ACEN Renewables, 2021)	Development of a 400 MW solar farm, with battery storage of up to 200 megawatt-hour (MWh). The project is located between Blue Springs Road and Barneys Reef Road, approximately 10 km north of Gulgong.	Approved July 2021. Construction began in Mid 2023.	• Construction workforce: 400 direct jobs; operational workforce: 10 ongoing jobs. • Potential impacts to existing and future land use. • Impacts/disturbance to Aboriginal artefacts. • Impacts to landscape character and visual

Project Name	Overview	Status	Key Social Impact Considerations
			amenity. • Operational and construction noise and vibration. • Increased road traffic movements, and associate impacts to roadways. • Positive socio-economic impacts such as employment opportunities, local procurement, and a diversifying economy. • Cumulative impacts associated with other renewable energy projects.
Valley of the Winds Wind Farm (ACEN Renewables, 2020)	The project comprises the development of 131 wind turbines supplying over 800 megawatts of electricity into the National Electricity Market. The wind farm would be located close to the township of Coolah, in the Warrumbungle LGA and is being developed by ACEN Renewables.	EIS lodged April 2022. Project is currently in the Assessment phase in the assessment process.	• Construction workforce: 400 FTE jobs; operational workforce: 50 FTE jobs. • Changes to the visual landscape affecting how people experience their rural surroundings (including the effects of multiple concurrent projects). • Declining social amenity (construction, and operational noise impacts). • Increased traffic causing road safety risks and decline in quality of roads. • Changes to community composition, and changes to the character of the community as a result of changes in local population. • Changes to existing land use impacting on how people perceive their environment, and access and use the land. • Increased pressure on social and community infrastructure and services as a result of a

Project Name	Overview	Status	Key Social Impact Considerations
			temporary increase in population. • Distributive equity and decision-making systems. • Multiple concurrent and nearby major projects leading to reduced levels of social cohesion, creation of skills shortages or a shortfall in supplies.
Liverpool Range Wind Farm (Tilt Renewables, 2022)	Proposed 1000 MW wind farm project. Proponent is currently investigating modification approval to increase the maximum tip height of the turbines to 250 m, decrease in maximum number of turbines from 267 to 217, include a BESS, and update the native vegetation clearing limits. The modification is proposed as the new turbines will be more efficient than the originally proposed, allowing for a maximum potential capacity of 1300 MW.	Approved March 2018. Report to modify consent currently in the Assessment phase of the approval process. Current estimates to commence construction in 2024.	• Construction workforce: 800 direct jobs; Operational workforce: 47 FTE staff. The RTS report identified the following key community concerns associated with the Project: • Visual impacts of turbines on the local community and significant vistas. • Poor location of project infrastructure resulting in ad hoc negative visual amenity. • Scepticism surrounding the independent authenticity of the landscape and visual impact assessment. • Concern regarding noise and vibration impacts in relation to operational turbines. • Concerns around ongoing compliance monitoring for noise impacts. • Concerns regarding the operation Community Consultation Committees (CCC) , having regard to DPE guidelines. • Perceived inadequacy of approach to community engagement and collection of

Project Name	Overview	Status	Key Social Impact Considerations
			community opinions in relation to the Project. • Perceived limited ongoing benefit to local communities through few ongoing procurement and employment opportunities. • Inequality of project benefits between host landholders and neighbouring landholders. • Impacts to land values. • Impacts to local flora and fauna, and ongoing fragmentation of rural land. • Impacts to health and wellbeing as a result of operational noise associated with the Project. • Concern over the ability to fight fires from the air.
Dunedoo Solar Farm (ib vogt, 2021)	Proposed 55 MW solar farm with BESS and associated infrastructure. The Dunedoo Solar Farm proposal site is located approximately 2 km north of the township of Dunedoo.	Approved September 2021. Construction commenced in late 2023.	• Construction workforce: 100 direct, and 160 indirect positions. • Operational workforce: 3 direct, and 9 indirect positions. • Habitat clearance and impacts to natural biodiversity and ecology. • Impacts to Aboriginal heritage items. • Visual amenity concerns and changes to landscape. • Agricultural land use conflict. • Dust and noise generation during construction.

Project Name	Overview	Status	Key Social Impact Considerations
Wellington Solar Farm (Lighsource BP, 2020)	Proposed 174 MW capacity solar farm development and associated infrastructure. The proposed solar farm is located approximately 2 km northeast of the town of Wellington.	Approved May 2018. Construction activities commenced in 2019. A modification application to increase the BESS is currently being prepared.	• Construction workforce: 200 construction jobs during peak construction as well as indirect supply chain jobs. • Possible impacts to Aboriginal heritage items. • Medium and high visual impacts considered for a number of proximal localities. • Construction and operational noise disturbance affecting social amenity.
Wellington North Solar Farm (Lightsource BP, 2020)	Proposed solar farm development with a maximum capacity of 300 MW and associated infrastructure. The Wellington North Solar Plant proposal site is located approximately seven km northeast of Wellington off Goolma Road, in the Orana region of central western NSW. The proposed solar plant would connect to an existing substation approximately 2.4 km south of the site.	Approved April 2021. A modification application to add a BESS is currently being prepared.	• Construction workforce: approximately 250 local jobs. • Operational workforce: 4 employees. The RTS report identified the following key community concerns in relation to the project: • Potential for agricultural land use conflict. • Concerns relating to visual impacts associated with the development and sterilisation and industrialisation of rural land. • Potential adjacent land devaluation. • Potential social amenity impacts due to construction noise, dust, and increased traffic. • Possible health impacts due to electromagnetic fields. • Production of few long-term employment opportunities.

Project Name	Overview	Status	Key Social Impact Considerations
Wellington South Battery Energy Storage System (AMPYR Australia Pty Ltd, 2021)	Proposed battery energy storage system (BESS) and associated infrastructure located approximately three km north-east of the township of Wellington. The project will have a capacity of approximately 500 MW and up to 1,000 MWh and connect to the adjoining Wellington TransGrid substation either by way of 330 kilovolt (kV) overhead or underground transmission lines	An EIS was submitted in November 2022 and the Project an Amendment Report is currently being prepared (as of December 2023).	• Construction workforce peak: approximately 100 FTEs, construction period over 12 months.
Maryvale Solar Farm (Photon Energy Group, 2022)	Proposed 230 MW solar power plant and associated infrastructure located within the locality of Maryvale. A modification to include a 125 MW/375 MWh BESS was approved in December 2023.	Approved December 2019, with construction expected in early 2024.	• Construction workforce: 400 personnel onsite during peak construction period jobs; operational workforce: 6–10 ongoing positions. The associated RTS report highlights the following key community concerns: • Potential for land use conflict with existing agricultural operations, and loss of biophysically strategic agricultural land. • Potential increase in traffic and associated impacts to road safety. • Increased risks of fire due to the Project and impacts on the ability for firefighters to respond to bushfires in this area. • Concerns regarding transparency of consultation with landholders and the community. • Inadequate community funding and investment expenditure. commensurate to the size and nature of social impacts associated with the Project. • Reduced property values.

Project Name	Overview	Status	Key Social Impact Considerations
Mumbil Solar Farm (Ark Energy, 2022)	Proposed solar farm and associated BESS development located about 20 km southeast of Wellington. The proposed solar farm will have a capacity of up to 120 MW, with a storage capacity of 70 MW.	Early-stage site feasibility and community consultation ongoing.	• Impacts to road infrastructure because of construction vehicle movements. • Potential for loss of productive agricultural land. • Concern regarding regional perception of solar farms with regards to fear of change and/or compatibility with agriculture.
Bodangora Wind Farm (Iberdrola Australia Limited, 2022)	The 113.2 MW Bodangora Wind Farm has been operating since 2019 and comprises 33 General Electric 3.43–130 wind turbines. The wind farm is located approximately 15 km east of Wellington.	Construction completed early 2019, wind farm currently operational.	• Community fund contributions allocated a minimum investment of $50,000 of community funding per year.
Uungula Wind Farm (CWP Renewables, 2022)	The Uungula Wind Farm is a ~400 MW wind farm project, which includes 97 wind turbines and associated infrastructure, located 14 km east of Wellington.	Approval granted in May 2021, with construction expected to commence in 2024.	As detailed in the RTS report prepared in support of the project, amongst the public submissions received, common themes included: • Employment opportunities and demand for local services (direct employment and contracting). • Opportunities for Wellington and investment in the local community. • Impact to and suitability / land value. • Compensation / negotiated agreements. • Landscape and visual amenity impacts. • Social amenity impacts e.g. noise and health impacts. • Impact on tourism opportunities.

Project Name	Overview	Status	Key Social Impact Considerations
Suntop Solar Farm (Canadian Solar, n.d.)	Suntop Solar Farm is a 189 MW utility scale solar project based near the town of Wellington. Modification application preparation and planning assessment underway to include a BESS.	Approved December 2018. The construction was completed in November 2023. Modification application to include BESS underway.	As detailed in the RTS report prepared in support of the project, amongst the public submissions received, common themes included: • Potential for land use conflict with existing agricultural operations resulting in reduced land productivity. • Increased risks and liability with fire associated with the Project. • Visual impacts resulting in a loss of social amenity. • Reduced access to water from existing bore sites impacting on livestock operations. • Social amenity impacts related to the construction of the Project (noise, dust, light). • Increased invasive weed proliferation due to increased site visitation (construction and operational personal), and increased personnel movements on the Project site. • Reductions in property values associated with the Project.
Burrendong Wind Farm (Ark Energy, 2020)	Proposed development of a 400 MW wind farm consisting of 70 WTG and associated infrastructure. The project site is located approximately 30 km south-east of Wellington and is situated within the Dubbo Regional and Mid-Western Regional LGAs.	An EIS was submitted in October 2023 and the Project is currently on public exhibition (as of December 2023).	• Construction workforce: will support 250 jobs. • Issues such as operational noise, visual impact and potential impact on property values from the Project have been raised during discussions with Project neighbours.

Project Name	Overview	Status	Key Social Impact Considerations
			• Increased traffic volumes, and increased traffic risks and/or reduced safety. • Aviation safety, effects on telecommunications, and health issues related to electromagnetic fields. • Issues on known and unknown heritage impact items.
Forest Glen Solar Farm (X-Elio, 2022)	Proposed development of a 90 MW solar farm and associated infrastructure, including battery storage facility. The proposed Forest Glen Solar Farm is located approximately 16 km west of Dubbo, NSW.	The Project was granted approval in February 2023.	Construction workforce: Up to 150 - 200 workers is a maximum estimation during peak construction (approximately 10 months). The key socio-economic impacts of the proposal include: • Increased jobs (direct benefit of the proposal). • Injection of money into the local economy (direct benefit of the proposal). • Pressures on local services (adverse impact). • Safety risks and hazards associated with construction activities (adverse impact).
Wollar Solar Farm (Wollar Solar Development Pty Ltd, 2022)	Proposed solar farm development, operation and decommissioning with a capacity of 290 MW. The proposed Solar Farm would be located 7 km south of Wollar.	Approved February 2020. Construction works began on 2023.	• Construction workforce: approximately 500 jobs; Operational: 5 FTE jobs. • Potential strain on local services, particularly accommodations services. • Implementation of accommodation camps may lead to social instability and impact levels of social cohesion.

Project Name	Overview	Status	Key Social Impact Considerations
Crudine Ridge Wind Farm (CWP Renewables, 2022)	Construction and operation of a 37 turbine wind farm, with a capacity to generate up to 135 MW of electricity, plus ancillary infrastructure (including substation, grid connection, access tracks and road upgrades along the project transport route). Proposal located. Crudine Ridge Wind Farm is located 45 km south of Mudgee.	The project is currently in the operational phase.	• Construction and operational workforce anticipated to generate up to 240 direct employment opportunities. • Potential landscape and visual impacts resulting in a loss of social and landscape amenity. • Potential noise impacts associated with construction and operational activities. • Impacts to aboriginal cultural heritage items. • Traffic impacts resulting in a decrease in public safety. • Potential for aviation risk associated with tall structured. • limiting of site access and increased fire and bushfire risk.
Tallawang Solar Farm (RES, 2022)	Proposed solar farm development located adjacent to Barneys Reef Wind Farm, involving a 500 MW solar farm, a 200 MW BESS, and associated infrastructure.	SEARs issued September 2021. The Project is currently in the preparation of the Response to Submissions and Amendment Report.	• Construction workforce: 270 direct jobs; operational workforce: 7 direct jobs. • Competing land uses. • Changes to the landscape's visual character, including glare and glint from solar panels. • Increased traffic and road safety risks. • Changes to local population and increased demand for local services.
Barneys Reef Wind Farm (RES, 2022)	Proposed wind farm development located adjacent to the Tallawang Solar farm consisting of the construction and operation of approximately 63 wind turbines and associated infrastructure	SEARs Issued in September 2021. The EIS preparation is	• Construction workforce: approximately 340 jobs; operational workforce: 10 direct jobs. • Competing land uses.

Project Name	Overview	Status	Key Social Impact Considerations
	with a capacity of approximately 441 MW.	ongoing.	• Changes to the landscape's visual character. • Reduced community and social cohesion due to distributive equity of project impacts and benefits. • Increased traffic and road safety risks. • Changes to local population and increased demand for local services.
Cobbora Solar Farm (Marble Energy, 2021)	Proposed solar farm development consisting of the construction and operation of solar panel arrays with an indicative capacity of 700 MW, an 200 MW capacity BESS, and connecting infrastructure to the Central-West Orana REZ transmission infrastructure. Pending approvals, the solar farm is expected to be operational in early 2026.	SEARs issued November 2021. EIS preparation ongoing.	• Construction workforce: peak workforce of 700 FTE; operational workforce: 15 FTE ongoing. • Land use tensions. Loss of grazing land could see a decrease in ability of local farmers to earn an income. • Traffic causing delays accessing property. • Pressure of local social infrastructure and services. • Population increase due to construction workers could cause disruption to community cohesion and harmony especially with multiple projects. • Property devaluation. • Visual Amenity impacts.

Project Name	Overview	Status	Key Social Impact Considerations
Birriwa Solar Farm (ACEN Renewables, 2022)	Proposed solar farm development that will support an indicative energy generation capacity of 600 MW and included a centralised or a DC-coupled BESS of up to 1,000 MW. The project is in the locality of Birriwa, approximately 15 km south-west of the township of Dunedoo.	SEARs issued November 2021. The Project is currently in the preparation of the Response to Submissions phase.	• Construction workforce: peak of approximately 800 FTE jobs, increasing to a maximum of 970 FTE jobs if BESS construction occurs during the same time; operational workforce: 20 FTE jobs. • Disruptions to existing land-uses during construction and operation phases. • Increased traffic movements, causing increased commute times, and road degradation. • Diversification of the local economy. • Possible short term capacity constraints on local accommodation providers. • Potential for changing property values. • Changes to the landscape and visual amenity.
Goulburn River Solar Farm (Lightsource BP, 2021)	Proposed solar farm development approximately 28 km south of the township of Merriwa within the Upper Hunter LGA. The proposed Goulburn River Solar Farm (the Project) will include an approximate 550 megawatt peak (MWp) of solar electricity generation and BESS facilities with a 260 MWp and 570 MWh capacity.	The EIS was submitted in May 2023. The Project is currently in the preparation of the Response to Submissions phase.	• Competing land uses, particularly disruption to farming practices. • Provision of employment, procurement and training opportunities. • Increased pressure on local services and facilities. • Changes to community character and composition. • Effect of project on local community values. • Increase in traffic and change in road conditions affecting public safety. • Increase in noise, vibration, lighting, and

Project Name	Overview	Status	Key Social Impact Considerations
			dust resulting in social amenity impacts.
Yarrabin (Phoenix) Pumped Hydro (ACEN Phoenix Pty Ltd)	Proposed Pumped Hydro Energy Storage facility with a generating capacity of 810 megawatts for a nominal duration of 12 hours. The Project is located approximately about 35 kms southwest of Mudgee. The proposed construction period is from 2025 to 2029.	The scoping report was submitted in July 2023. SEARs were issued in August 2023	• Construction workforce: peak of approximately 500 FTE jobs. • Issues such as operational noise, visual impact and potential impact on property values from the Project have been raised during discussions with Project neighbours. • Increased traffic volumes, and increased traffic risks and/or reduced safety. • Aviation safety, effects on telecommunications, and health issues related to electromagnetic fields. • Issues on known and unknown heritage impact items.
Kerrs Creek Wind Farm (RES Group)	Construction and operation of a 63 turbine wind farm, with a capacity to generate up to 441 MW of electricity, plus ancillary infrastructure (including substation, grid connection and access tracks). Proposal located approximately 26 km north of Orange. Construction is planned to begin in 2026 with operations anticipated to be before 2030.	The scoping report was submitted in September 2023. SEARs were issued in October 2023.	• Construction workforce: peak of approximately 340 FTE jobs and approximately 10 operation FTE jobs. • Changes to local population and increased demand for local services. • Changes to the landscape's visual character. • Increased traffic and road safety risks. • Potential for aviation risk associated with tall structured. • Reduced community and social cohesion due to distributive equity of project impacts and benefits.

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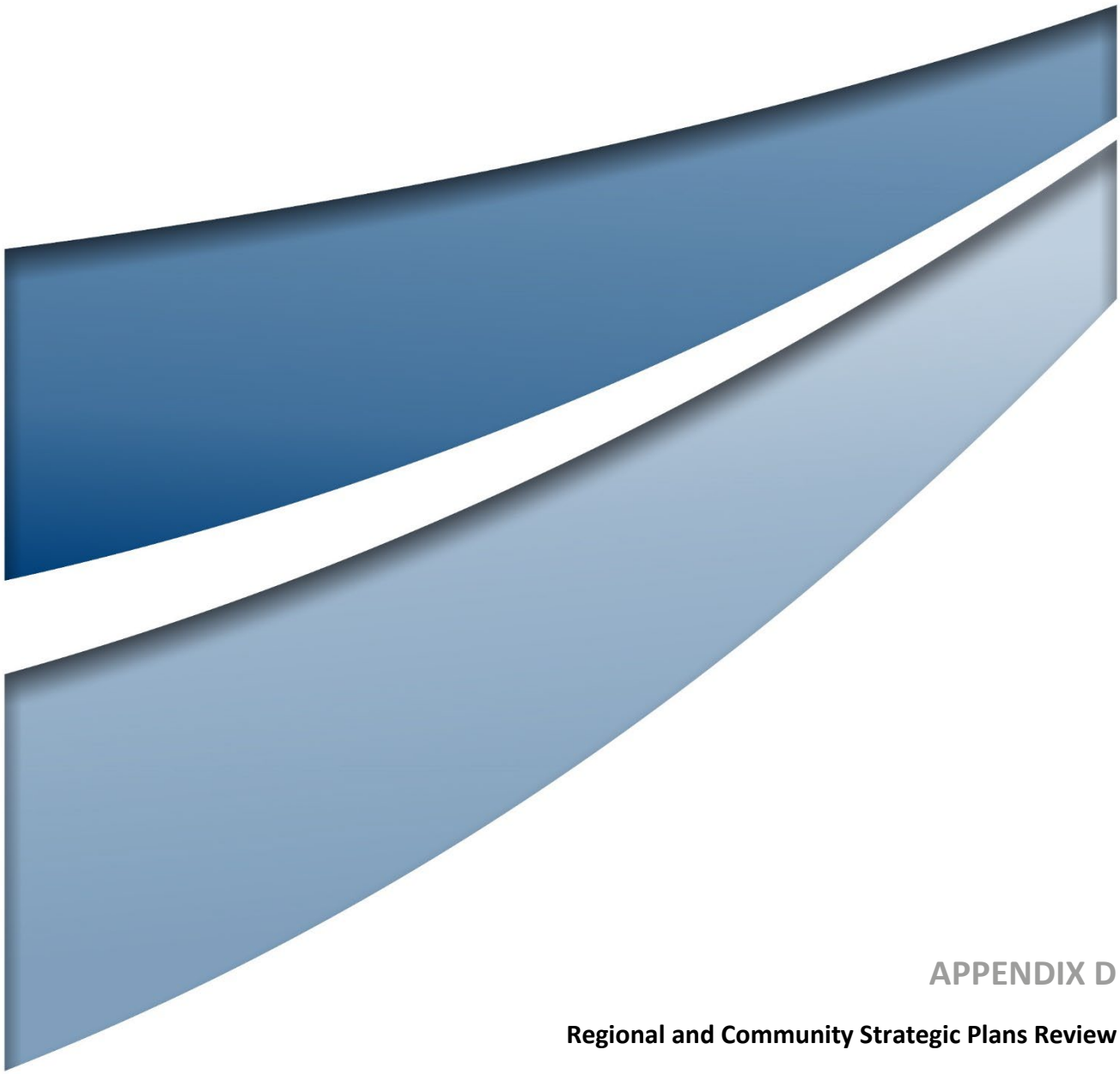
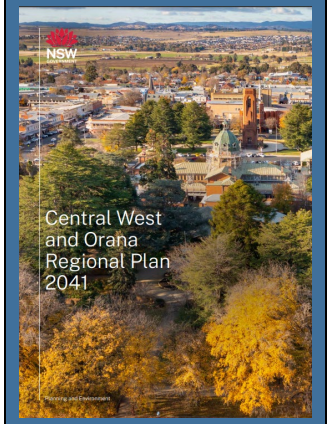


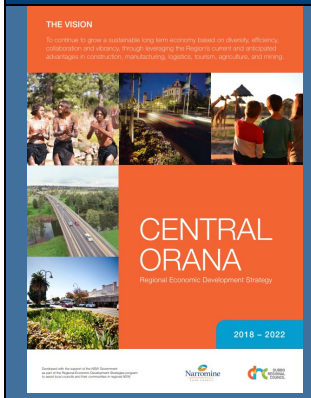
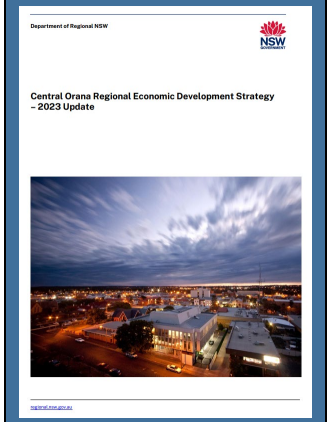
APPENDIX D

Regional and Community Strategic Plans Review

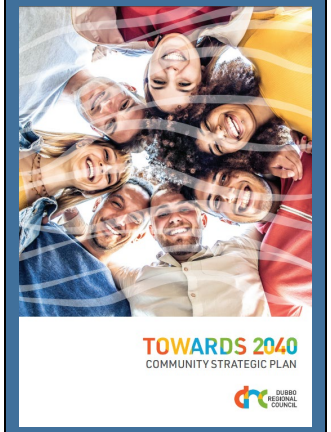
Strategic Plans and Their Relevance to the Project

Plan	Overview and Relevance to the Project
Draft Central West and Orana Regional Plan 2041 (DPIE, 2022) 	Provides a 5-year update to the goals and actions for the Central West and Orana Region, as outlined in the Central West and Orana Regional Plan 2036 (described below). The plan applies to 19 Local Government Areas (LGAs) including the Dubbo Regional LGA, being the host LGA of the Project. The Plan identified the following four (4) themes for the Region: 1. A sustainable and resilient place 2. People, housing and communities 3. Prosperity, productivity and innovation 4. Location specific responses. The following objectives relate specifically to the Aquila Wind Project: - **Objective 2*: Support the State's transition to Net Zero by 2050 and deliver the Central–West Orana Renewable Energy Zone*** - **Objective 9: *Ensure site selection and design embraces and respects the region's landscapes, character and cultural heritage:*** outlines that visual landscapes can be impacted through activities such as infrastructure development and renewable energy projects. - **Objective 16: *Provide accommodation options for seasonal, temporary and key workers:*** Notes that many areas experience high demand associated with the construction of large-scale renewable energy projects. The following action is noted for proponents: Development applications for large-scale projects should be supported by a workforce accommodation strategy that: • Assesses anticipated impacts on the local housing market, including cumulative impacts associated with other large scale projects in the area • Shows how potential employees can access accommodation, without detrimentally affecting existing housing availability and affordability • Illustrates how the project will contribute to the supply of local housing, and support the nearest centre or centres • Allows for the plan to be monitored and updated over the life of the project. - **Objective 18: *Leverage existing industries and employment areas and support new and innovative economic enterprises*:** provides support for economic development, including further investment in the CWO REZ to utilise local employment opportunities.

Plan	Overview and Relevance to the Project
Central West and Orana Regional Plan 2036 (DPIE, 2016) 	Outlines the goals and actions for the Central West and Orana Region to achieve a sustainable future; the plan applies to 19 LGAs including the Dubbo Regional LGA, being the host LGA of the Project. The Plan identifies the following four (4) goals for the Region: 1. A growing and diverse regional economy. 2. A region with strong freight transport and utility infrastructure networks that support economic growth. 3. A region that protects and enhances its productive agricultural land, natural resources, and environmental assets. 4. Strong communities and liveable places that cater for the region's changing population. The Plan also characterises the social locality as being well known for its built heritage, food and wine tourism, and mining. The regional importance of the area is emphasised throughout the plan, with particular reference to supporting the mining and resources sector and associated businesses. Increasing renewable energy generation is a key direction in the Plan, with actions identified to achieve this direction including: • Identify locations with renewable energy generation potential and access to the electricity network. • Facilitate small-scale renewable energy projects using bioenergy, solar, wind, small-scale hydro, geothermal or other innovative storage technologies through local environment plans. • Promote best practice community engagement and maximise community benefits from all utility-scale renewable energy projects. The Plan highlights the need across the region for diverse accommodation options to support mining workforces, as well as other seasonal and itinerant workers (in large-scale infrastructure, renewables and agriculture).
Central Orana Regional Economic Development Strategy 2018 – 2022 (Narromine Shire Council & Dubbo Regional Council)	The Strategy was developed to identify economic development opportunities that capitalise on the Central West's functional economic region. The Strategies principal aims are: • Establish Central Orana as an Agricultural Research Centre of Excellence to underpin the Region's strength in the agricultural sector. • Develop the Logistics cluster to accompany anticipated growth in export-oriented sectors. • Establish Central Orana as an effective and interconnected Business Destination. • Capitalise on the growth potential of the Mining and Construction sectors to boost related clusters in Energy, Manufacturing and transportation. • Develop a mature and diversified tourism sector.

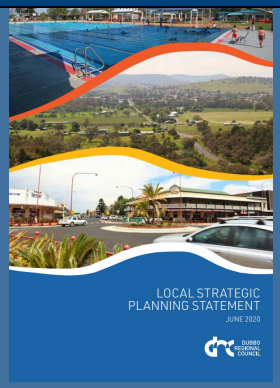
Plan	Overview and Relevance to the Project
	• Of particular relevance to the Project, Strategy 4 states that "supporting renewable energy projects will provide a broad economic base for the construction and manufacturing industry to continue to grow. Where possible projects should incorporate small-scale co-generation measures in the design." The strategy subsequently supports the following activities: o Provide training opportunities suited to the Region's needs. o Develop an incentive scheme to hire and train local staff. o Leverage increased activity in construction and the inland rail to provide growth supporting infrastructure in target industries. o Re-zone areas of the Region to industrial.
Central Orana Regional Economic Development Strategy – 2023 Update 	The Central Orana Regional Economic Development Strategy was updated in 2023 due to the region changing from 2018 with regional NSW has endured shocks including bushfires, floods, COVID-19 and the mouse plague, and significant new economic opportunities have emerged. The objectives of the update are to: 1. Highlight progress: reflect on significant initiatives and investments that have supported progress against the key strategies and actions in the 2. 2018 REDS. 3. Capture major changes: identify and assess the impacts of major changes to regional economies since bushfires, droughts, floods, mouse plagues and the COVID-19 pandemic. 4. Identify strategic opportunities: identify key strategic opportunities and vulnerabilities for engine and emerging industries, as well as any changes to local endowments. 5. Set the foundation for the future: review, affirm and/or adjust the 2018 strategies, including consideration of new strategies to meet emerging priorities, to ensure they remain relevant. 6. Identify key enablers to guide future action: develop a non-exhaustive list of priority enabling actions that will support the 2023 REDS Update strategies. Updates of strategies particular relevance to the Project include: • Grow the region's workforce through developing local skills capacity and enhancing liveability to support workforce attraction and retention. Specifically upskilling local workforces to work in emerging industries and consider current housing supply issues and the impact of major projects and future growth pressures.

Plan	Overview and Relevance to the Project

Dubbo Regional Council Community Strategic Plan 2040
 
	The Dubbo Regional Council's Community Strategic identifies the communities main aspirations and priorities for the future of the region through to 2040. The Vision of the Plan is:
	In 2040 we will be an innovative, resilient and sustainable region with opportunities to grow and a high quality of life.
	This Plan contains six inter-related themes, objectives and supporting strategies that support the communities vision and aspirations for the future
	• Housing – We are a well-designed region that includes a variety of housing types, densities, locations and price points.
	• Infrastructure – We have well-maintained, fit for purpose and new infrastructure that helps our community grow.
	• Economy – We have a strong and diverse local economy that provides employment opportunities for people of all ages and abilities.
	• Leadership – We have leaders who are engaged, transparent, accountable, and represent the best interests of our community.
	• Liveability – We are a diverse, vibrant, safe and healthy region that includes a variety of public spaces and amenities.
	• Environmental Sustainability – We have a healthy natural environment that is resilient to the impacts of climate change and natural hazards.
	• Investment in renewable energy opportunities is encouraged and supported by Council's vision. Community identified needs of relevance to the Project include:
	  ○ Provide for housing choice and housing affordability to meet the needs of our community.
	  ○ Achieve ongoing economic prosperity through a diverse employment base and a visitor economy that makes use of our tourism assets.
	  ○ Key infrastructure and services are provided to further enhance the quality of life of our community and to maintain economic growth.

Dubbo Regional Local Strategic Planning Statement – June 2020 (Dubbo Regional Council)	The LSPS integrates with the 2040 community strategy plan to support the following vision: *"In 2040 we will celebrate our quality of life, the opportunities available for us to grow as a community. We will take advantage of technological innovation to become a smart city while protecting our natural environment and being recognised as the inland capital of regional NSW."* The community, through feedback to Council in preparation of the LSPS have identified the following as key themes: • Provide for housing choice and housing affordability to meet the needs of our community. • Achieve ongoing economic prosperity through a diverse employment base and a visitor economy that makes use of our tourism assets. • Key infrastructure and services are provided to further enhance the quality of life of our community and to maintain economic growth. • A united and cohesive council that provides leadership to our community. • We have access to a range of community, cultural and open space facilities and areas. • We value our unique environment and ensure its protected for future generations.

Plan	Overview and Relevance to the Project

	• The plan identifies that the growth in renewable energy generation in recent times has been transformative for a range of industries and communities. Renewable energy will play a key part in Dubbo's sustainable future, particularly as the Queensland-NSW Interconnector transmission lines are constructed, facilitating energy transfer to the north and south of the LGA.
	• Planning Priority 3: *Promote renewable energy generation*, identifies the following actions to support the growth and development of renewable energy in the region:
	  ○ Work together with neighbouring councils on cross-boundary issues concerning electricity generation and transmission.
	  ○ Collaborate with State agencies and key landowners to deliver key infrastructure projects.
	  ○ Utilise the Department's Large-Scale Energy Guideline to advise proponents on the optimum location of new renewable industries.
	  ○ Investigate and implement VPAs with state significant scale development to mitigate impacts on local services and facilities.
	  ○ Monitor the sterilisation of productive agricultural land as a result of renewable energy development, with an objective of minimising sterilisation.

APPENDIX 4

Proximal Landholder Consultation Update

Aquila Wind

Renewable Energy from ACEN

Surrounding Resident and Community Engagement Plan

Background information

A Pre-Scoping Report briefing meeting with the NSW Department of Planning and Environment (DPE) was conducted on 22 December 2023. At the request of DPE, ACEN Australia (ACEN) has documented the consultation and engagement activities completed to date with residents and community members within 8 km of the proposed Aquila Wind project area. ACEN has also prepared a proposed Engagement Plan for residents and community members surrounding the proposed Project area. This is to ensure that neighbouring residents and the broader community are aware of the Project and have a direct line of contact with ACEN to discuss potential environmental impacts and community benefits of the Project.

ACEN and Umwelt have completed the following to inform the community of Aquila Wind to date:

- Letterbox drop to 2,905 residents
- Local newspaper advertisements
- Radio Advertisements
- Established an Aquila Wind Facebook page
- Published Project updates with local Facebook pages in the surrounding communities
- Hosted a Community Information Session in Stuart Town with 60 attendees
- Social surveys with attendees of the Community Information session
- In-person attendance to all dwelings within 3.35 km of wind turbines to meet with neighbours or conduct letterbox drop where not able to meet

Engagement purpose

The purpose of the engagement is to:

- Establish a dialogue with neighbours and community members
- Provide surrounding communities with a point of contact for any future questions or concerns during the planning and development phase of the project (including a project-specific email address 1800 contact number)
- Discuss any potential environmental, social or construction impacts associated with Aquila Wind
- Discuss the potential opportunities and benefits associated with Aquila Wind.

Targeted Stakeholders

ACEN and Umwelt have identified 311 dwellings within 8km of proposed wind turbines excluding Host Landowners, within the following density bands below:

- 18 dwellings within 2,000m of a turbine
- 47 dwellings within 2,000-3,350m of a turbine
- 171 dwellings within 3,350-4,950m of a turbine
- 75 dwellings within 4,950-8,000m of a turbine

1) Neighbours within 2,000m of proposed project infrastructure

Number of Dwellings	Contacted	Priority
18 x Neighbouring Dwellings	15 neighbours contacted to date (additional 3 potential dwellings ground-truthed as uninhabited structures, in-person letterbox drop undertaken)	**High**

2) Neighbours within 2,000m and 3,350m of proposed project infrastructure

Dwelling Number	Contacted	Priority
47 x Neighbouring Dwellings	24 neighbours contacted to date (additional 7 potential dwellings ground-truthed as uninhabited structures, in-person letterbox drop undertaken to remaining dwellings)	**High**

3) Community memebers within 3,350m and 4,950m of proposed project infrastructure

Dwelling Number	Contacted	Priority
171 x Neighbouring Dwellings	5 neighbours contacted to date	**Medium**

4) Community memebers within 4,950-8,000m of proposed project infrastructure

Dwelling Number	Contacted	Priority
75 x Neighbouring Dwellings	8 Neighbours contacted to date	**Medium**

Approach to consult and engage with targeted stakeholders

1) Door knock campaign:

ACEN Australia intends to engage face-to-face with as many members of the local community as possible. Through one-on-one consultation, community members are can raise any concerns or enthusiasim for the Project directly with ACEN's representatives.

- Objective of Door Knock Campaign:
    - Meet with all neighbours within 3,350 m of a proposed turbine

Residents would also be able to ask questions over the phone or via email correspondance.

A recent campaign was conducted to undertake targeted in-person engagement, through ground-truthing existing residential dwellings and visiting every dwelling within 3,350 m of a proposed turbine. Those that were not able to be meet in-person were left an information card for the project with ACEN contact details. This campaign yielded positive results, with identification of derelict and abandoned dwellings , contacting residents living in dwellings that had no listed addresses/mailboxes, and meeting with members of the community.

2) Letterbox Drop Campaign:

In conjunction with the Door Knock Campaign, if a neighbour or community member is not at home or is unavailable to discuss the project, a project fact sheet (including project email, project 1800 number and project website) was provided or left in their letter box. This ensures that the community have access to an ACEN team member to answer their questions or to be added to the project mailing list for future project information and updates.

- Objective of Letterbox Drop Campaign:
    - Ensure that the 236 x neighbours within 4,950 m of proposed wind turbine have access to project website, project email and project hotline
    - A draft of the Letter can be found at the end of the Engagement Plan

3) Community Information Session

A Community Information Session was hosted on the 30 August 2022, with 60 attendees in Stuart Town.

- Objective of Community Information Session:
    - Inform and consult with the community about the revised project layout (and submisison of the Scoping Report to DPE)
- A second Community Information Session is planned to be held following public submission of the Scoping Report and receival of Project SEARs.

4) Local Council Mailout

ACEN Australia understand that some dwellings owned may not be the landowners primary residence. Door knocking and Letterbox Drop campaigns may not be suitable modes of consultation or engagement for landowners living elsewhere, and would require additional measures to contact neighbouring landowners who are not living near the project.

ACEN understand that Dubbo Regional Council has the rate payer's address on file for dwellings within their LGA. ACEN would request the Council distribute a letter on ACENs behalf to the rate payers address to ensure it is delivered to their primary address (for example if the dwelling owner resides in Sydney).

- Objective of Council Mailout:
    - Contact landowners that ACEN was unable to receive a response from, either through the Door Knock campaign, letterbox drop or who have not been in contact with ACEN at a community information session or via the project email/1800 number.

Letterbox Drop:

Dear resident

Subject: ACEN Australia - Proposed Aquila Wind Project

You may recall I wrote to you in August 2022 about ACEN Australia's Aquila Wind project.

Aquila Wind involves the proposed development of a wind project located near Mount Aquila, south-east of the township of Stuart Town, in Dubbo Regional Council.

We held a community information session at the Stuart Town School on Tuesday 30 August 2022 to discuss the project with the local community.

The project is in the early stages of planning and will be assessed as a State Significant Development under Part 4 of the NSW Environmental Planning and Assessment Act 1979. The NSW Department of Planning and Environment (DPE) is the state planning authority for the project.

As we work through several comprehensive reports, including environmental, social and technical surveys, we wish to continue our consultation with the local community.

The outcome of this consultation and assessment will inform the final plans for the proposed development.

As part of our ongoing consultation, we would welcome the opportunity to meet with you to discuss the proposed development in more detail with you and to hear your thoughts on the project.

If you are unable to meet in person but would like more information, please visit our website at www.aquilawind.com.au. If you would like to speak to a member of the project team, please email the team at info@aquilawind.com.au or call 1800 434 094.

APPENDIX 5

Preliminary Visual Impact Assessment

Preliminary Visual Impact Assessment

Aquila Wind

Prepared for: Umwelt (Australia) Pty. Limited on behalf of ACEN Australia

Project No: **2173** Issue: **Rev N** Date: **25th January 2024**

DOCUMENT HISTORY AND STATUS

Project No: 2173

Project Name: Aquila Wind | Preliminary Visual Impact Assessment

Issue	Submission	Date of Issue	Author	Approved by
A	Draft Issue for Client Review	06.07.2022	MC	AR
B	Issue for Client Review	10.10.2022	AL	DM
C	Issue for Client Review	03.11.2022	AL	DM
D	Final for Submission	18.11.2022	AL	DM
E	Final for Submission	23.11.2022	AL	DM
F	Final for Submission	21.12.2022	SB	DM
G	Final for Submission	16.01.2023	AL	DM
H	Final for Submission	25.01.2023	AL	DM
I	Final for Submission	21.02.2023	AL	DM
J	Minor Updates for review	04.03.2023	SB	-
K	Issue for Client Review	15.11.2023	SB	AR
L	Issue for Client Review	5.12.2023	AL	AR
M	Final for Submission	19.01.2024	AL	MED
N	Final for Submission	25.01.2024	AL	MED

moir landscape architecture

Moir Landscape Architecture Pty Ltd,
Studio 1, 88 Fern Street, PO Box 111, Islington NSW 2296
Ph.(02) 4965 3500 Fax.(02) 4965 3555 admin@moirla.com.au
www.moirla.com.au ACN: 097 558 908 ABN: 48 097 558 908

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A.23 Dwelling R235

A.24 Dwelling R211

A.25 Dwelling R270

Appendix B: Preliminary Public Viewpoint Assessments

VP01: Lake Burrendong Sport & Rec Centre Entry, Tara Road, Mumbil

VP02: Intersection of Railway Parade & Burrendong Way, Mumbil

VP03: Intersection of Burrendong Way & Finns Lane, Mumbil

VP04: Wallaroi Road, Stuart Town

VP05: Trickett Street, Stuart Town

VP06: Molong Street, Stuart Town

VP07: Intersection of Mookerawa Rd & Spring Creek Road, Mookerawa

VP08: Mookerawa Waters Holiday Park, Mookerawa Road, Mookerawa

VP09: 10 Mount Aquila Road, Farnham

VP10A: Mount Aquila Road, Farnham

VP10B: Mount Aquila Road, Farnham

VP11: Mount Muckerwa Road, Mt Aquila

VP12: Mount Aquila Road, Mount Aquila

VP13: Merrimount Road, Stuart Town

VP14: Quirks Loop, Stuart Town

VP15: Burrendong Way, Farnham

VP16: 53 Nubrigyn Street, Euchareena

VP17: Mount Top Road, Euchareena

VP18: Shepherds Creek Road, Euchareena

VP19: Cronga Peak Road, Euchareena

VP20: Eadevale Road, Euchareena

1.0 Introduction

1.1 Introduction

Moir Landscape Architecture (Moir LA) has been commissioned by Umwelt Australia Pty Limited (Umwelt) on behalf of ACEN Australia (the Proponent) to prepare a Preliminary Visual Impact Assessment (PVIA) for the proposed Aquila Wind (the Project).

The PVIA for the Project has been prepared in accordance with the *Wind Energy: Visual Assessment Bulletin December 2016* (the Bulletin). The PVIA forms part of the Scoping Report seeking the Secretary's Environmental Assessment Requirements (SEARs). 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*." (DPE, 2016).

Moir LA is a professional design practice and consultancy specialising in the areas of Landscape Architecture, Landscape Planning and Landscape and Visual Impact Assessment. 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 Bulletin we have developed methodologies to ensure a comprehensive and qualitative assessment of the Project.

Relevant experience includes the preparation of PVIAs and Landscape and Visual Impact Assessments (LVIAs) for the following Wind Energy Projects:

- *Uungula Wind Farm LVIA (Wellington, NSW) - Approved May 2021.*
- *Hills of Gold Wind Farm LVIA (Nundle, NSW) - EIS Submitted November 2020.*
- *Thunderbolt Energy Hub Stage 1 (Kentucky, NSW) - EIS Submitted March 2022.*
- *Valley of the Winds Wind Farm LVIA (Coolah, NSW) - EIS Submitted March 2022.*
- *Barneys Reef Wind Farm PVIA (Gulgong, NSW) - Revised SEARs issued September 2023.*
- *Burrendong Wind Farm PVIA (Burrendong, NSW) - SEARs issued September 2022.*
- *Orana Wind Farm PVIA (Dunedoo, NSW) - SEARs issued June 2023.*
- *Kerrs Creek Wind Farm PVIA (Kerrs Creek, NSW) - SEARs issued October 2023.*

1.0 Introduction

1.3 Overview of Preliminary Visual Impact Assessment

The purpose of this 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 visual assessment process is comprised of two main stages (see ***Figure 1***):

Stage 1: Preliminary Environmental Assessment
Stage 2: Environmental Impact Statement (EIS)

This PVIA forms a part of *Stage 1: Preliminary Environmental Assessment* to be submitted to DPE with the Scoping Report request for SEARs.

The requirements of Stage 1: Preliminary Environmental Assessment are as follows:

At the Preliminary Environmental Assessment stage, a process consisting of community consultation regarding key landscape values and application of the preliminary assessment tools has been developed. The tools include consideration of the potential impact of the proposals on dwellings and key public viewpoints.

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 application.

Proponents will be required to submit, with the request for SEARs, a Preliminary Environmental Assessment that includes a map with key information, results of community consultation and the application of the preliminary assessment tools. This will form the basis for the issue of the SEARs that will identify the matters that must be addressed in the EIS.

***Figure 1** Steps in Visual Assessment Process (Source: Wind Energy Visual Assessment Bulletin, 2016)*

2.0 Study Method

2.1 Study Method

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.
- Identification and assessment of cumulative visual impacts of other proposed wind farms in the broader region through desktop assessment.

Site Inspection:

Photographic surveys were obtained on site inspections undertaken June 2022 in order to carry out a preliminary assessment of the existing landscape character from publicly accessible viewpoints 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 documented in previous studies 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:	
Bulletin Requirements:	**Addressed in report:**
• *Undertake 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.*	**Refer to Section 4.0:** **Community Consultation**
• *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.*	**Refer to Section 5.0 :** **Existing Landscape Character**
• *Results of the preliminary assessment tools for both the visual magnitude and multiple wind turbine parameters.*	**Refer to Section 6.0:** **Preliminary Assessment Tools**
• *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.*	**Appendix A & B** **Preliminary Dwelling and Viewpoint Assessments**
• *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').*	**Refer to Section 7.0:** **Preliminary Zone of Visual Influence**
Summary and Recommendations - Section 10.0	

Table 1 Overview of Report Structure

3.0 Project Overview

3.1 Regional Context

The proposed Project Area is located approximately 30 km southeast of the town of Wellington in central-west NSW. The Project Area sits within Dubbo Regional Council's LGA boundaries adjacent to Cabonne Shire Council to the south and Mid-Western Regional Council to the east.

The Project Area is located within the Central-West Orana Renewable Energy Zone (CWO REZ). The CWO REZ is in its early planning stages and is being planned by Energy Corporation of NSW (EnergyCo). The Project (although not reliant on a REZ based grid connection) is strategically located in a broad area identified as suitable for a renewable energy project.

Central-West NSW has been identified as having high solar and wind renewable energy resource potential. Preliminary wind and solar studies undertaken by the Proponent have guided the development of the preliminary turbine layout for the Project.

The Project would comprise of up to 48 wind turbine generators (WTGs) spread across an area of approximately 6,806 hectares (ha), with a maximum capacity of up to 300 megawatts (MW), and the installation of a single grid-scale battery energy storage system (BESS) to allow for the capture and storage of dispatchable energy. The power generated by the wind farm (i.e., from wind turbines or released from battery storage) will feed into the electricity grid (National Energy Market, NEM) via the Transgrid network. For the purpose of this assessment, the Project Area encompasses all land within and including the Project Boundary as shown in ***Figure 2***.

The Project Area can be accessed via Burrendong Way, Euchareena Road and the Mitchell Highway (refer to ***Figure 3***).

The Proponent proposes to develop the Project to provide reliable and affordable renewable electricity to National Energy Market (NEM) and contribute to reducing greenhouse gas (GHG) emissions associated with energy generation. Umwelt has been engaged by the Proponent to prepare a Scoping Report in support of the Proponent's Request for Secretary Environmental Assessment Requirements (SEARs) for the Project. The Project is in the preliminary stages of design and Moir LA will provide input and recommendations with regard to visual impacts to assist in refining of the design layout. The layout is shown in ***Figure 3*** (as considered in this PVIA).

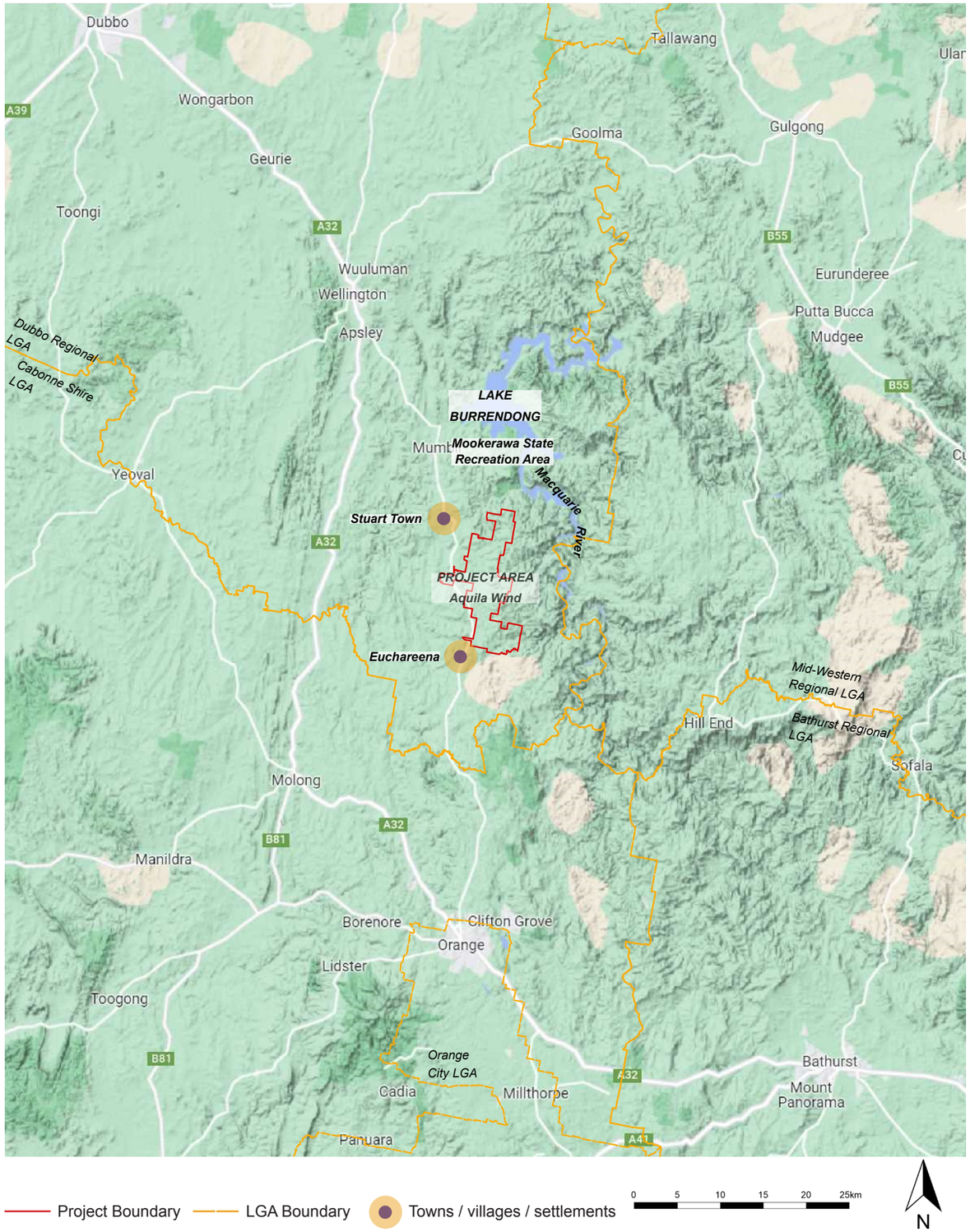


Figure 2 ***The Project Area - Regional Context (Map Source: Google Maps)***

3.0 Project Overview

3.2 The Project Area

The Project Boundary is the maximum spatial extent of potential land access defined by the boundaries of involved landholder property i.e. all agreed Lot/DP owned by involved landholders. Within the Project Boundary, the Proponent has identified 20 private landholdings and the Project Area encompasses an area of approximately 6,806 (ha). These properties are primarily utilised for sheep and cattle grazing activities. The preliminary layout for the Project (refer to ***Figure 3***) will be subject to further review and refinement as the environmental and social impact assessment progresses.

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. The Study Area is generally defined as the land up to 8,000 metres (m) from the nearest turbine. The closest towns are the towns of Mumbil, Stuart town and Euchareena as shown in ***Figure 2***.

3.4 The Project

Aquila Wind includes the construction, operation and decommissioning of up to **48** WTGs within the Project Boundary of 6,806 hectares (ha). ACEN has identified an indicative Development Corridor of approximately 1,497 ha within which all Project infrastructure will be placed. Within this indicative Development Corridor, it is estimated that the actual land disturbance area (based on the current Project layout) would be in the order of 388 ha, or approximately 5-6% of the total Project Area.

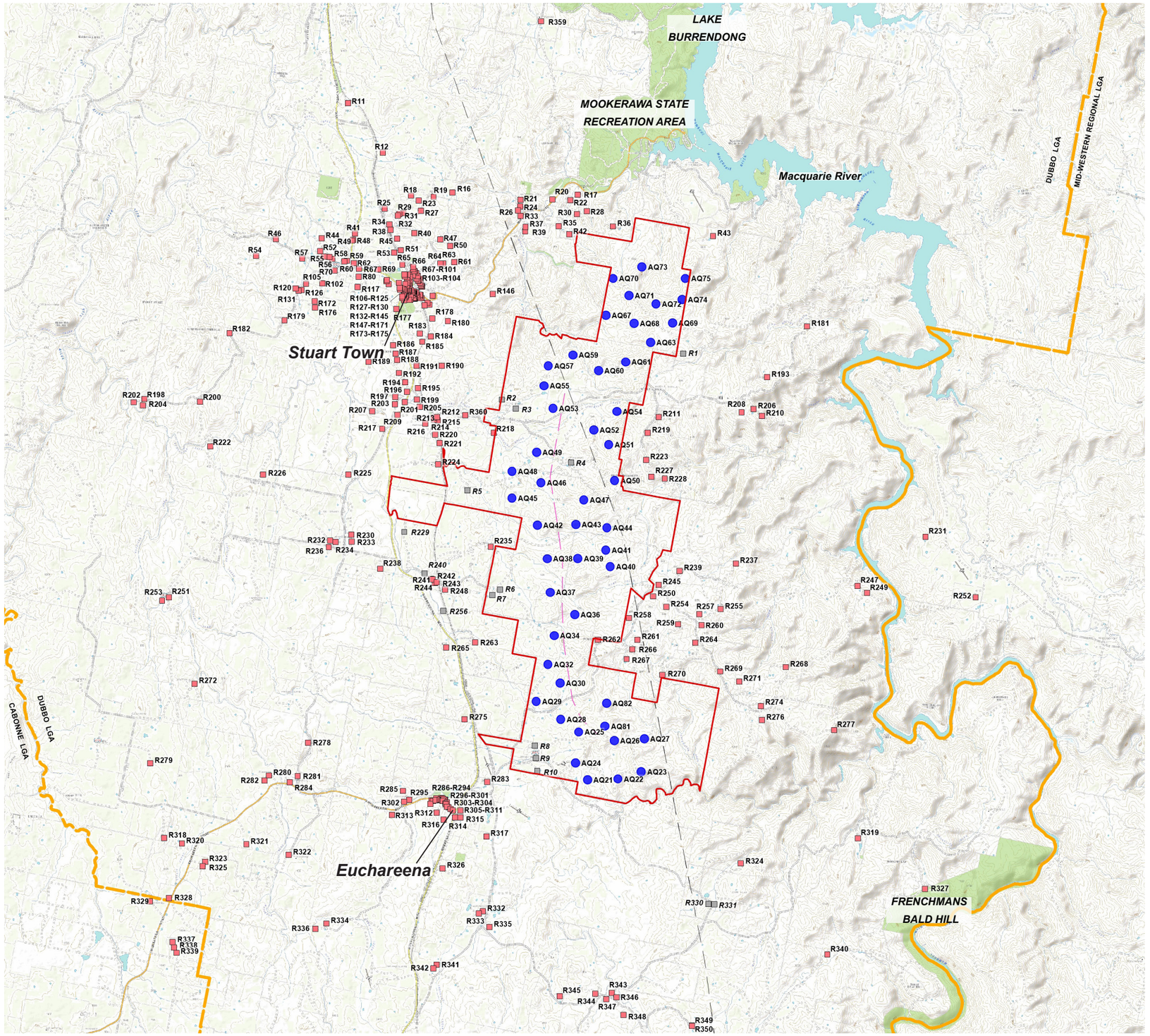
The preliminary layout for the Project (refer to ***Figure 3***) has been designed to locate WTGs within areas identified as having a high wind resource. This preliminary layout will be progressively refined during the EIS phase of the Project, having regard to the physical and environmental constraints of the site and the key landscape values of the Study Area. ***Figure 3*** also includes the locations of involved and non-associated dwellings mapped from aerial photographs. These locations are subject to further ground-truthing.

The Project includes the installation, operation, maintenance and decommissioning of up to **48** WTGs, a BESS, ancillary civil and electricity engineering infrastructure, temporary construction facilities and permanent worker facilities. The key components of the Project include:

- Up to **48** (three blade) WTGs, with a maximum blade-tip height of 250 m above ground level.
- Power infrastructure providing connection to the existing 330 kV transmission line i.e. on site substations/switchyards.
- Internal electrical reticulation network i.e. electrical connections between the proposed wind turbines and substation consisting of a combination of underground cables and overhead powerlines.
- Construction of a new/upgraded site access road, intersection upgrades, and level rail crossing over the Main Western Railway Line.
- Other associated permanent infrastructure including hardstands, new/upgraded farm access tracks, secondary access point/s from public roads, operation and maintenance buildings.
- A BESS (100MW/200MWh).
- Permanent meteorological monitoring masts.
- Temporary construction facilities including:
  - Construction compounds, site office buildings and storage areas.
  - On-site concrete batching plants for use during the construction phase.
  - Laydown areas used for wind turbine installation and storage of wind turbine components.
- Targeted road network upgrades to facilitate delivery of oversize and overmass (OSOM) WTG components to the Project Area as required.
- A permanent operations and maintenance facility for the Project.

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.

3.0 Project Overview



Preliminary Project Layout

Proposed Aquila Wind

LEGEND

- Project Boundary
- Potential 250m Turbine Location
- Involved dwellings
- Non-associated dwellings
- Existing 330kV transmission line
- Proposed 33kV overhead transmission line
- Main Road
- Minor Road
- Recreation Area
- LGA Boundary

***Figure 3** Preliminary Project Layout (Map Source: Six Maps)*

4.0 Community Consultation

4.1 Overview of Community Consultation Process

In accordance with the 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.*" (DPE, 2016).

The purpose of community consultation is to:

- Establish key landscape features;
- Defined areas of scenic quality;
- Identify key public viewpoints valued by the community; and
- Provide input into the Visual Baseline Study.

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 LVIA.

4.2 Results of Community Consultation

Understanding of community perceptions 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 Umwelt. A questionnaire was distributed to involved and non-associated landholders in 2022. A key concern highlighted through community consultation was visual changes to the landscape with an increase in built infrastructure and resulting industrialisation of the landscape. Some respondents highlighted that the Project would interfere with views from their properties, produce shadow flickering and that the structures are contrary to the natural values of the social context.

4.2.1 Landscape Features and Values

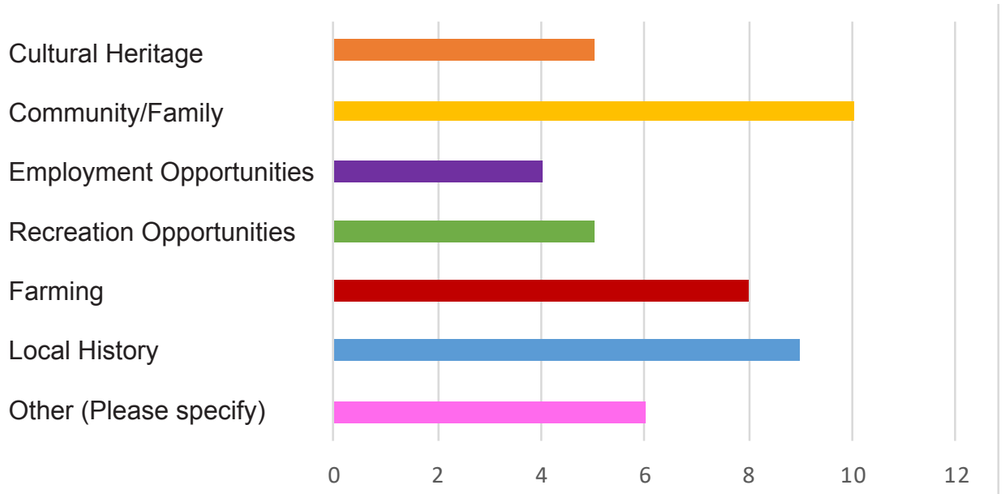
In addition to a review of existing landscape maps and detailed field work undertaken by Moir LA (see **Section 5.0**) the community consultation questionnaire asked respondents to identify key landscape features of importance to them. Responses were received to the question: ***"In your opinion, what are the key landscape features of the area?"***

Key landscape features identified by the community (three respondents) include:

- Approximately 50% of survey responses identified green, rolling hills and undulating countryside as the key landscape feature of the area.
- Approximately 16% of survey responses commented on the agricultural character of the landscape.
- Approximately 16% of survey responses also commented on existing vegetation and wildlife as a key landscape feature.
- The majority of survey responses related to regional scenic values, however, approximately 11% of survey respondents commented on the quality of existing views from their own properties.
- Specific landscape features identified in survey responses included Burrendong Dam and its surrounds (16%), historic Stuart Town (5%) Catombal Range (5%), Mt Arthur and the Bell River (5%).

Landscape values are highly subjective and can differ depending on location, local context and place attachment. The results of specific questions assisted in the identifying key areas of concern and ensuring the LVIA provided comprehensive assessment taking into account landscape values held by the community.

18 respondents provided answers in response to the question ***"What do you value about the local area?"*** The following responses were received from the list of options:



4.0 Community Consultation

Other values specified included:
- ‘Peaceful quiet existence.’
- ‘Visual amenity/landscape.’
- ‘The good community spirit.’
- ‘Cultural sites in the area.’
- ‘Peace, quiet, and natural beauty.’
- ‘Seclusion.’

The highest value was placed on the beauty of community and family (10%), local history (9%) followed by farming (8%).

The landscape values identified throughout the community consultation phase will be considered when preparing the Visual Baseline Study during the EIS Phase.

4.2.2 Key Public Viewpoints

18 responses were received to the question: ***“What do you value most about the existing natural and built environment?”***

Values identified by the community include:

- ‘I love the Common, though it needs attention. The Macquarie River of course for the water it provides for the environment. The little town is cute but could be better cared for.’
- ‘Lake Burrendong, to swim and enjoy relaxing and cool environment. The natural bushland that remains and the diverse wild and birdlife.’
- ‘Other than our beautiful property and surrounding views we love the Mookerawa Dam.’
- ‘The stands of Wattle that line various sections of the road are beautiful.’

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.

18 survey respondents were asked: ***“What are the best lookouts/public viewing areas in the area? If you have a visitor, where do you take them to showcase your local area?”***

Community survey responses are summarised as follows:

• The most common survey responses were Burrendong Dam (26%), Mount Aquila (20%) and specific hilltop locations on the respondents’ own properties (20%) such as German Hill, Peppermills Point, Frenchmans Bald Hill and Chinamans Hill.
• Other survey responses included Stuart Town Common (13%), Mt Arthur and Bell River (6%) which are located approximately 30 km northwest of the Project Area, Bundalah Hill (6%), Harris Lookout near Burrendong Dam (6%), and “ (...) *on Avoca Road above the Railway Station looking over the town to the south, the old town common and Kurrajong Gully* (6%)”.

These locations will be assessed in further detail in the EIS Phase of the Project.

5.0 Existing Landscape Character

5.1 Overview of Bioregions Flora and Fauna

The Project Area is situated within two Bioregions of NSW including, the South Western Slopes Bioregion and the South Eastern Highlands Bioregion (refer to **Figure 4**). Located at the foothills of the Great Dividing Range, it also consists of isolated ranges and inland slopes.

The South Western Slopes Bioregion's topography, especially around the north and eastern region of the Project Area is characterised by steep, rocky granite slopes with inland streams, creeks and rivers that are confined to valleys with terraces and local sedimentation areas. Overall, the soils are shallow and stony, and found on the tops of ridges and hills. Soil profiles around the Project Area showcase limited abilities to adapt to different uses and the soil inherently has very low fertility.

Hilly terrains towards the north and the east are dominated by open woodlands of Grey Box (*Eucalyptus microcarpa*) and White Cypress Pine (*Callitris glaucophylla*). Vegetation communities around valley flats and stream / river banks includes Rough-Barked Apple (*Angophora floribunda*) and River Oak (*Casuarina cunninghammia*). The bioregion supports a vast number and varieties of threatened flora species, of which 13 are endangered, 22 are vulnerable and one is extinct. An endangered plant called the Swainsona recta is also supported by Lake Burrendong.

The South Eastern Highland Bioregion's topography is generally characterised by *plateau remnants, granite basins with prominent ridges formed on contact metamorphic rocks and the western ramp grading to the South Western Slopes* (NPWS, 2003). The bioregion is bounded by the Australian Alps in the south and South Western Slopes to the south and west. Vegetation and soils vary across the bioregion due to altitude, temperature and rainfall. Diverse vegetation communities include Yellow Box (*Eucalyptus melliodora*), Red Box (*E. polyanthemos*) and Blakely's red gum (*Eucalyptus blakelyi*).

In terms of fauna species, the NSW South Western Slopes Bioregion around Lake Burrendong Reservoir especially, hosts a variety of waterbirds that are rare, endangered and vulnerable. ***Image 1*** illustrates the typical character of the landscape within the Study Area.

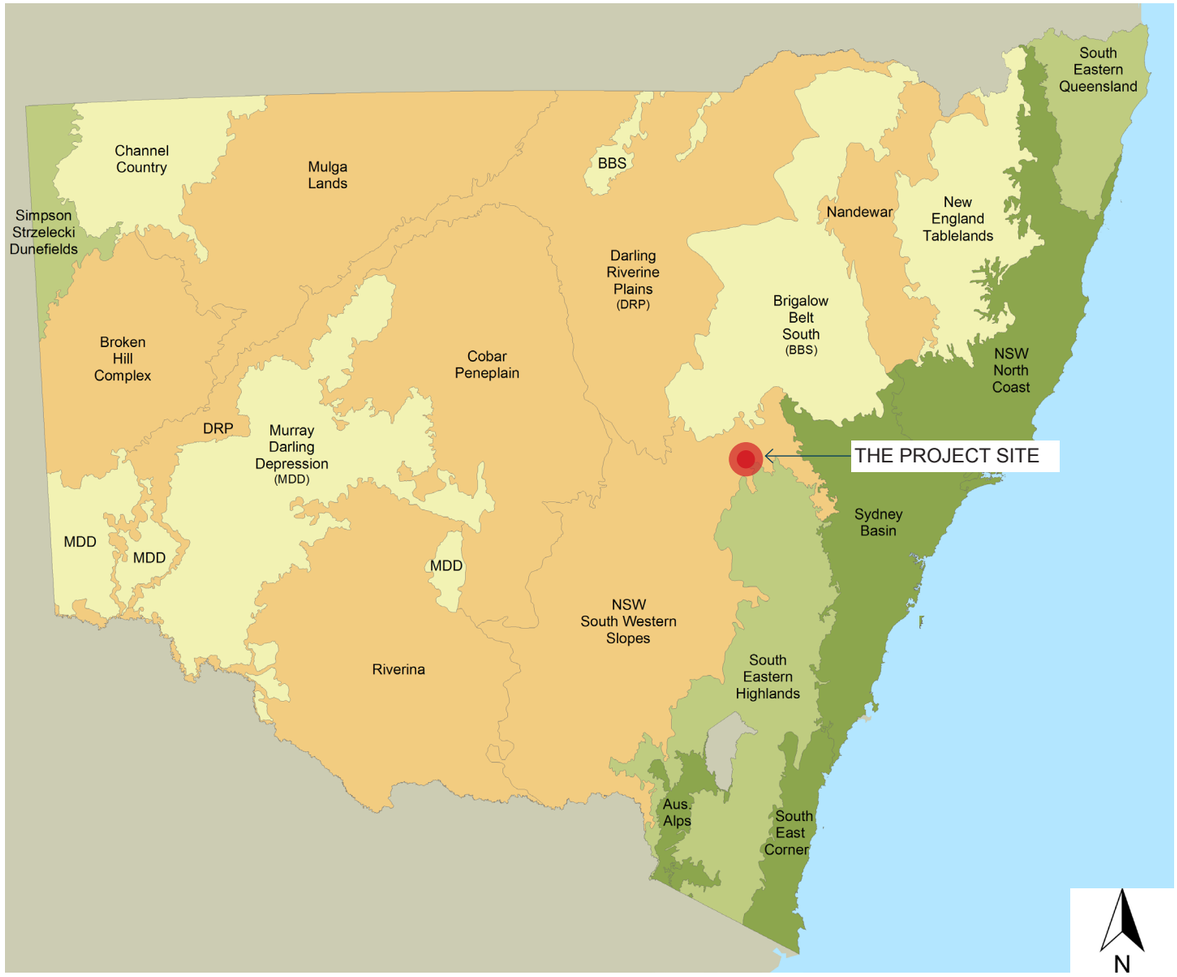


Figure 4 Bioregions of New South Wales (Sources: NPWS 2016)

Image 1 *Typical character around Project: mostly cleared grazing land with stands of remnant vegetation on gently undulating terrain.*

5.0 Existing Landscape Character

5.2 Land Use

5.2.1 Land Use Zoning

The Project Area is zoned *RU1 Primary Production* pursuant to Dubbo Regional Local Environmental Plan 2022 (Dubbo Regional LEP 2022) as is most of the land use surrounding the Project Area. Beyond the north eastern extent of the Project Area, there is a large area of land zoned as *C3 Environmental Management*. Other land use zoning in the vicinity of the Project includes *R5 Large Lot Residential, RU1 Primary Production, RU5 Village and SP2 Infrastructure (Railway)* (refer to ***Figure 5)***. The broader Study Area for the Project includes lands to which the Cabonne Local Environmental Plan 2012 and Mid-Western Regional Local Environmental Plan 2012 apply, as shown in ***Figure 5.***

RU1 - Primary Production

The Project Area and majority of the surrounding land is zoned *RU1 - Primary Production*. Relevant zone objectives for the purposes of visual impact assessment are as follows:

- *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.*

C3 - Environmental Management

Adjacent to part of the north-eastern boundary the land is zoned C3 Environmental Management. This landscape spans across Mookerawa State Recreation Area and Burrendong State Park and is a major inland water tourism/recreation destination. Relevant zoning objectives of the Dubbo Regional LEP 2022 are as follows:

- *To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.*
- *To provide for a limited range of development that does not have an adverse effect on those values.*
- *To recognise the environmental significance of certain areas.*

R5 - Large Lot Residential

A portion of the surrounding land (to the west of the site) is zoned R5 - Large Lot Residential. Generally, the objectives of all LEPs relevant to the Project Area and to visual impact assessment are as follows:

- *To provide residential housing in a rural setting while preserving, and minimising impacts on, environmentally sensitive locations and scenic quality.*

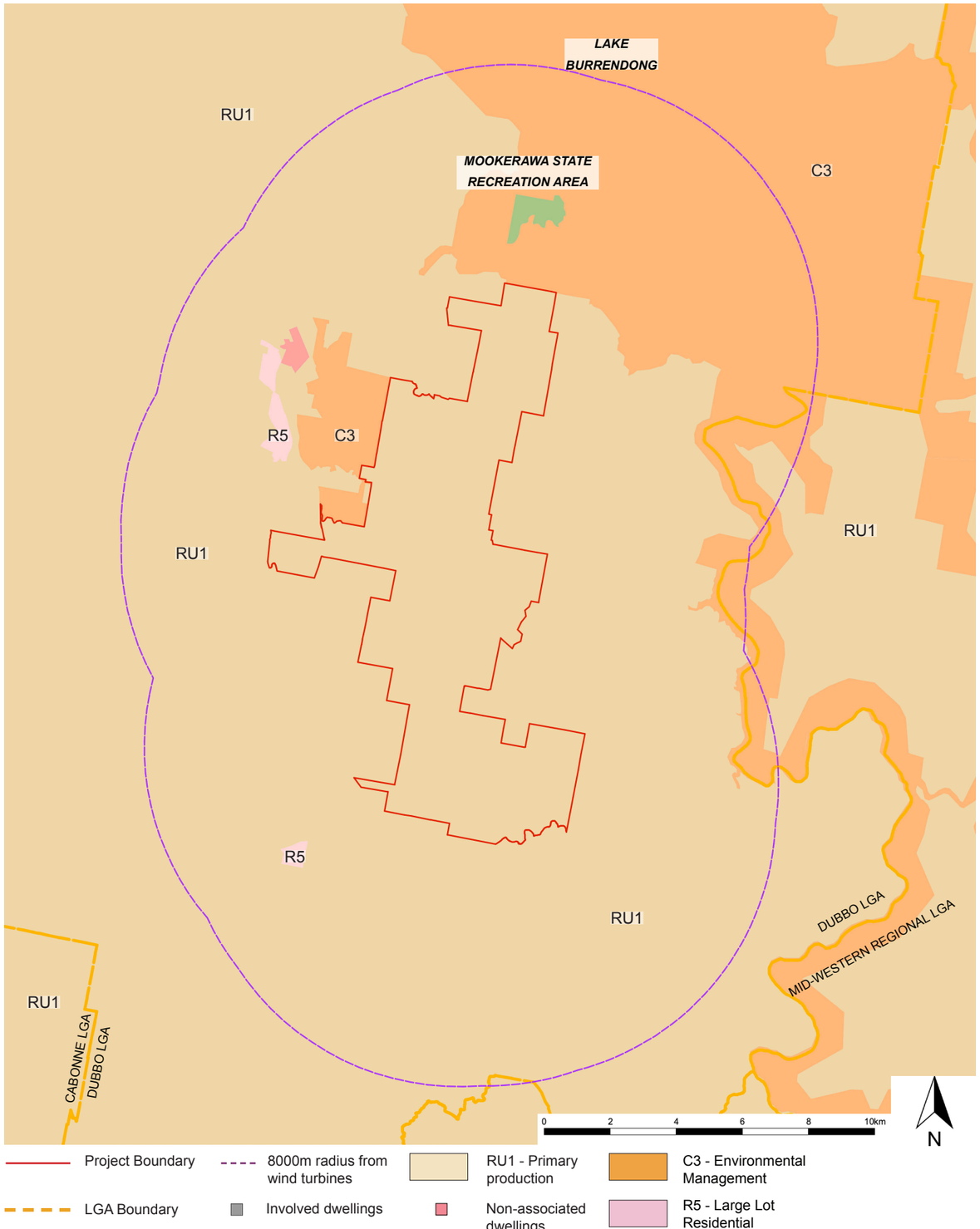


Figure 5 Land Use Zoning
(Sources: NSW Planning Portal, NPWS, Environment NSW 2016)

5.0 Existing Landscape Character

5.2.2 Current Land Use Patterns

Current land use patterns within and around the Project Area are predominantly for general agricultural production and associated rural-residential land uses. Land parcels within the Project Area are partly cleared and used for cropping and livestock grazing pastures amongst stands of native vegetation (see ***Figure 6***). The largest land parcels are predominately used for irrigated cropping, dryland cropping and modified pastures.

Urban, intensive uses and rural residential settlements

The Project Area sits in proximity to towns such as Stuart Town, Euchareena and Farnham. Other towns in the broader area include Wellington, Mumbil and Kerrs Creek. Stuart Town has a population of approximately 241 people, Mumbil 421, Euchareena 170 and Farnham 28 (ABS, 2021). The towns are mostly associated with the predominant agricultural activity in its surrounds or, as in the case of Mumbil, it was originally established in 1950 for the construction of the Burrendong Dam.

Grazing pastures and agricultural land uses

Soil fertility is inherently low in most land parcels around the Project Area. Cleared valleys and gentle slopes that are devoted to agricultural grazing are centred around the areas that lie within the eastern portion of the Project Area. These lands are dominated by introduced pasture species, interspersed with remnant vegetation. Native vegetation tends to cover steeper slopes and ridges where stock access is limited.

Nature Conservation and minimal use

Large areas of land to the north and east of Lake Burrendong are devoted to conserving the existing character of the area. These areas are zoned as C3 Environmental Management. A C3 zoning objective of the Dubbo Regional LEP 2022 is *'to protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values'*, and to *'provide for a limited range of development that does not have an adverse effect on those values.'*

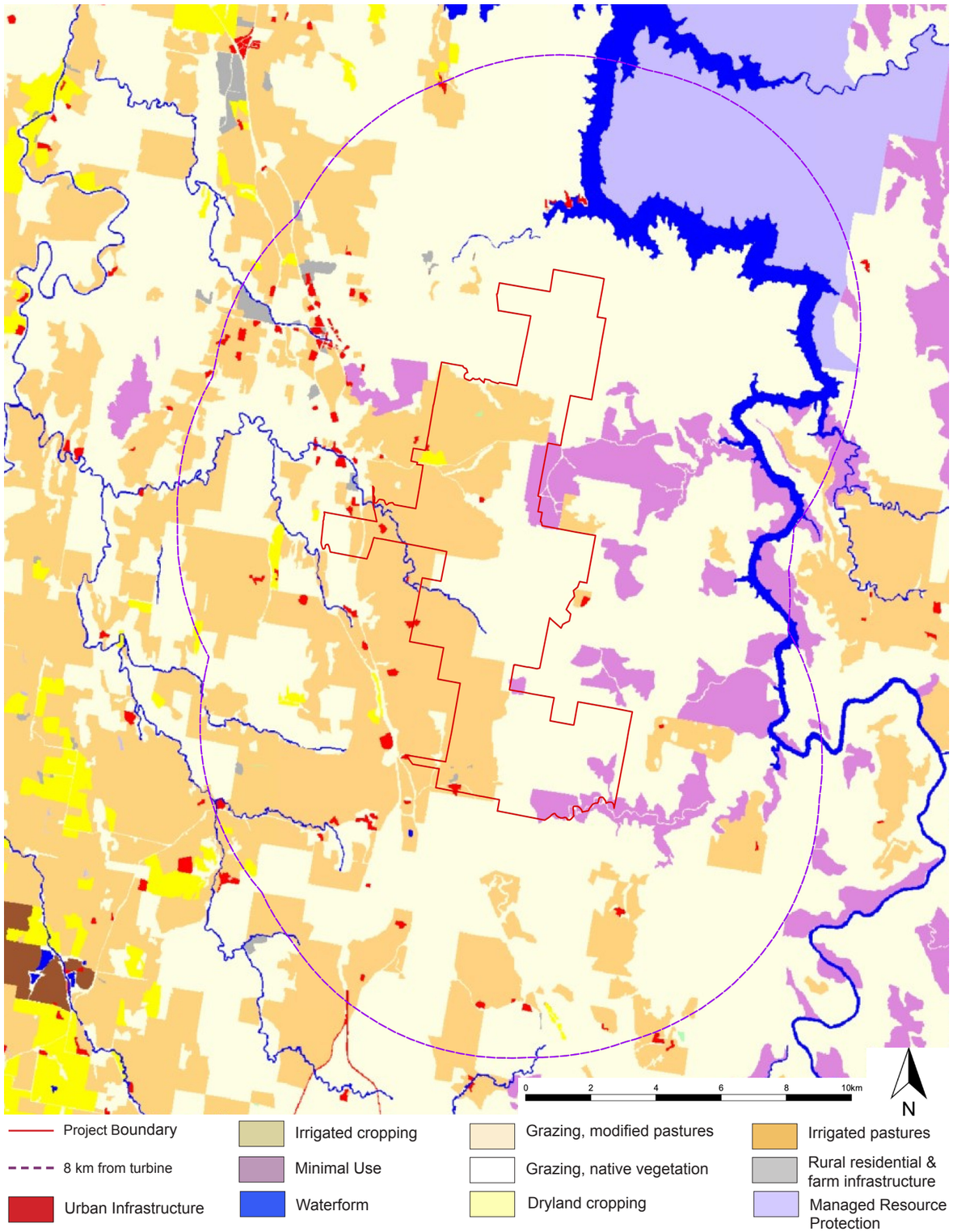


Figure 6 ***Land uses within and around the Project Area (Source: eSpade, 2022)***

5.0 Existing Landscape Character

5.3 Key Landscape Features & Viewpoints

The Bulletin states: "*proponents must identify key landscape features, dwelling locations and key public viewpoints*." (DPE, 2016). The following section provides an overview of the key features identified within and around the Study Area (refer to ***Figure 7***).

Geology and Landform

The Project Area and its surrounds are primarily characterised by undulating, rolling hills to steep, rocky slopes with a gradient ranging from 8-30%. General elevations within the Project Area range from 350-850m above sea level (ASL). River and lake valleys are dominated by rocky cliff edges with shallow soils which are prone to erosion and only suitable for grazing over native pastures. This is prevalent in the eastern parts of the Study Area, and located in proximity of Macquarie River. Elevations range from 450 - 750m ASL.

Western parts of the Study Area comprise of gently undulating and rolling hills that are 350-550m ASL in elevation. These areas are also prone to erosion and are currently used for grazing over extensively cleared lands.

Highpoints identified in the area do not have any recreational associations. These include publicly accessible locations such as Mount Aquila. Other highpoints in the area that are privately accessed include Bundulah Hill, German Hill, Frenchmans Bald Hill, Chinamans Hill and Peppermills Point.

Vegetation

Native vegetation is largely restricted to the steep, rocky hills which are less suitable for agricultural land uses. These areas, therefore, are dominated by remnant native vegetation which include but is not limited to dry sclerophyll forests with grass/shrub understorey. Prominent species include white box, yellow box, Blakely's Red Gum, Red Stringybark, Broad-leaved Peppermint, Red Box and Black Cypress Pine. Rocky cliffs are dominated by Broad-leaved Peppermints and Scribbly Gum communities. Tumbledown Red Gums, Grey Box and Yellow Box can be found on the upper slopes.

Waterforms - Lakes, Rivers and Creeks

The Macquarie River is located within the northeastern parts of the Study Area. The Mookerawa Waters Holiday Park has been identified as a key point of interest associated with the river.

Another prominent water feature is the Burrendong Dam with many inland sports and recreational activities associated with it. The dam's main purpose was to assist with irrigation, livestock and household needs in the Macquarie Valley and to manage flows within the Macquarie Marshes. It is situated on the Macquarie River where it meets Cudgegong River approximately 10 km north of the Project Area.

Throughout the western portion of the Project Area, terrestrial waterlines connect into creeks that feed into the Bell River. These include Gibbers Creek running along the northern edge of Euchareena, Coopers Creek, Nubrigyn Creek and Boduldura Creek.

State Recreation Areas and State Forests

Mookerawa State Recreation Area is located within the extents of the Study Area. Points of interest include the Mookerawa Waters Holiday Park located on the banks of the Macquarie River and within the extents of the State Conservation Area. A preliminary assessment of potential impacts has been included in Appendix B.

No Nature Reserves were identified within the extents of the Study Area. Mullions Range State Forest is the nearest State Forest which is located approximately 10 km south of the Project Area. No other recreational associations have been identified in the Study Area.

Points of Interest

Other points of interest in the area such as the Lake Burrendong Sports and Recreation Centre are located within the extents of the Lake Burrendong State Park. These are located approximately 9.5 km north of the Project Area. The Burrendong Botanic Garden and Arboretum is located approximately 12.5 km north of the Project Area within close proximity of the Lake Burrendong Reflections Holiday Park.

Visitor opportunities allow for land based recreational activities such as bushwalking, birdwatching and picnicking along side water based recreation activities such as kayaking, boating and fishing. Other recreational activities include camping and holiday accommodation located on the Lake Burrendong foreshore.

5.0 Existing Landscape Character

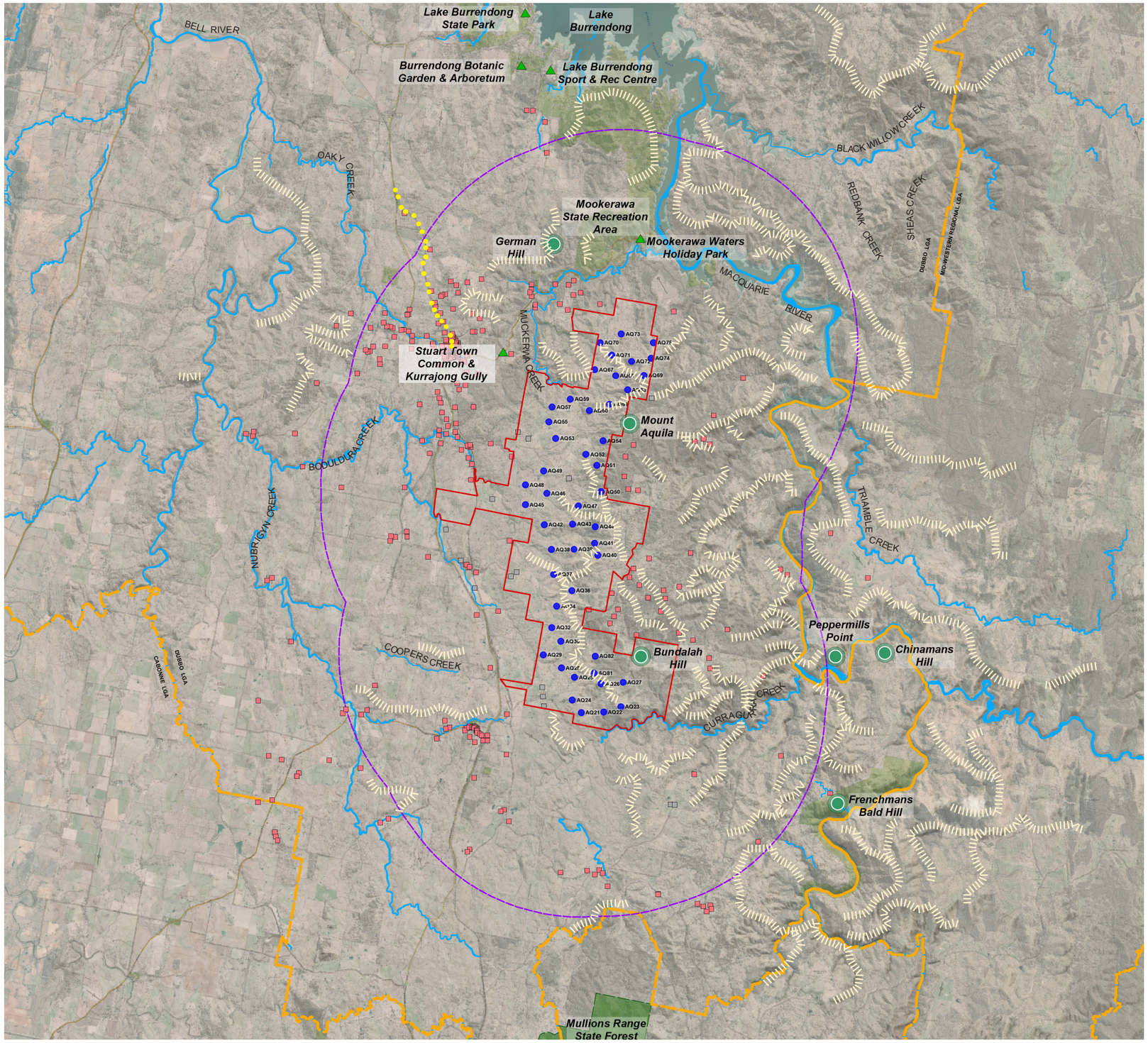


***Figure 7** Existing Landscape Features (Map Source: Six Maps)*

Existing Landscape Features
Proposed Aquila Wind

LEGEND

- Project Boundary
- Potential 250m Turbine Location
- Involved dwellings
- Non-associated dwellings
- Main Road
- Minor Road
- 8000 m from turbines (Study Area)
- State Forest
- Highpoints
- Campgrounds / Recreation Areas / Points of Interest
- Rivers, creeks and channels
- LGA Boundary
- Ridgelines
  NOTE: Ridgelines are indicative and demonstrate the topographical character of the study area
- Scenic route (Avoca Road looking towards Stuart Town and Kurrajong Gully)

N

5.0 Existing Landscape Character

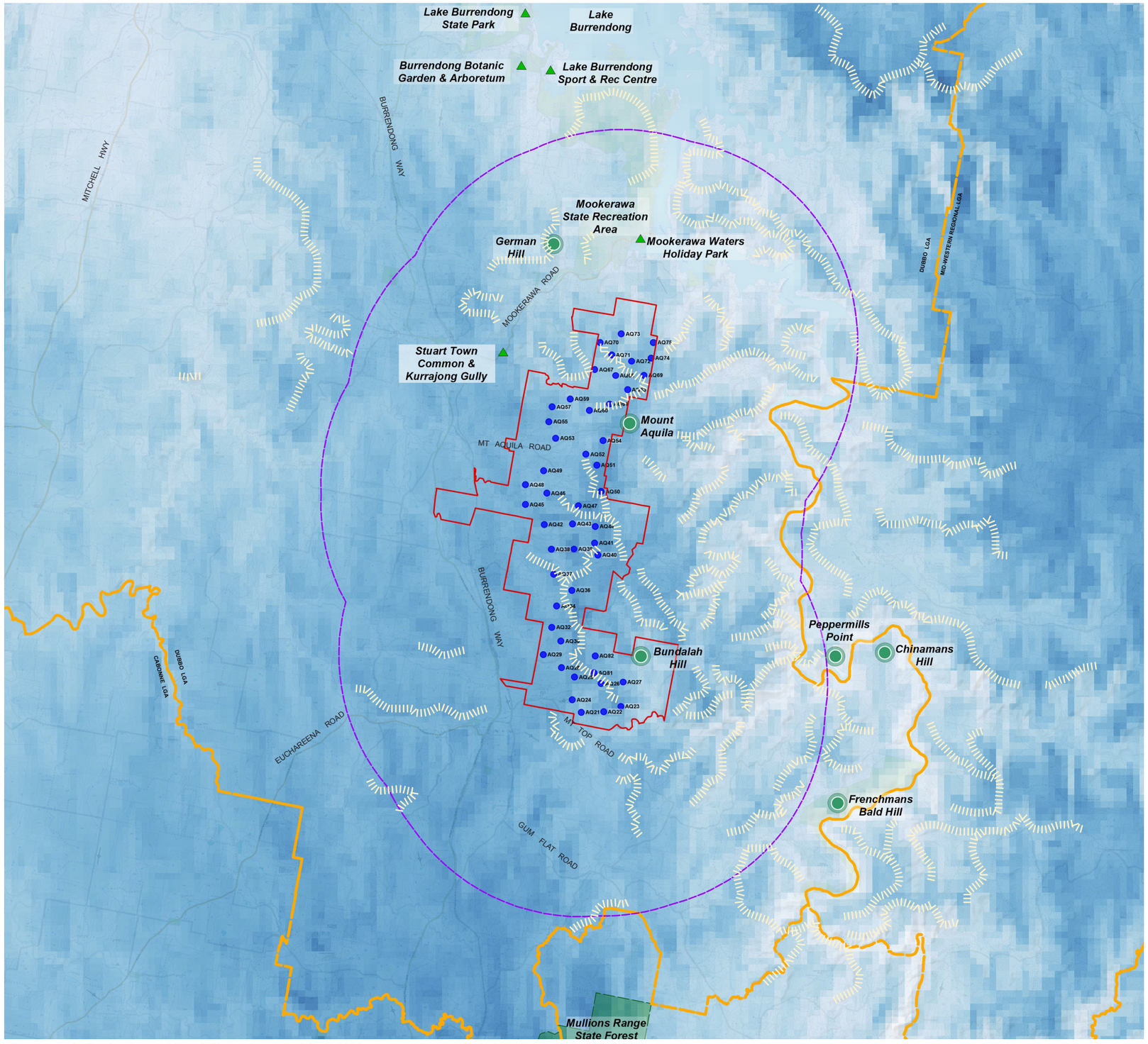


Figure 8 ***Relative Wind Resource Map (Map Source: Badger et. al., 2019)***

Relative Wind Resource Map
Proposed Aquila Wind

LEGEND

- Project Boundary
- Potential 250m Turbine Location
- Roads
- 8000 m from turbines (Study Area)
- State Forest
- Highpoints
- Campgrounds / Recreation Areas / Points of Interest
- LGA Boundary
- Ridgelines
  NOTE: Ridgelines are indicative and demonstrate the topographical character of the study area

Relative Ranges of Average Wind strength in metres per second (m/s) at the height of 250 m

- 2.78 m/s
- 3.56 m/s
- 4.33 m/s
- 5.11 m/s
- 5.89 m/s
- 6.67 m/s
- 7.45 m/s
- 8.16 m/s
- 8.76 m/s

5.0 Existing Landscape Character

5.4 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.*" (DPE, 2016).

In accordance with the Bulletin, a Scenic Quality 'frame of reference' has been formulated by Moir Landscape Architecture (**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 Frame of Reference

5.0 Existing Landscape Character

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 cultural and natural associations of the Mookerawa State Recreation Area and adjoining Lake Burrendong/Burrendong Dam. A number of Landscape Character typologies exist within the Study Area (refer to ***Figure 9***). As part of the Preliminary Landscape Character Assessment, a total of five key landscape typologies referred to hereafter as Landscape Character Units (LCUs) have been identified.

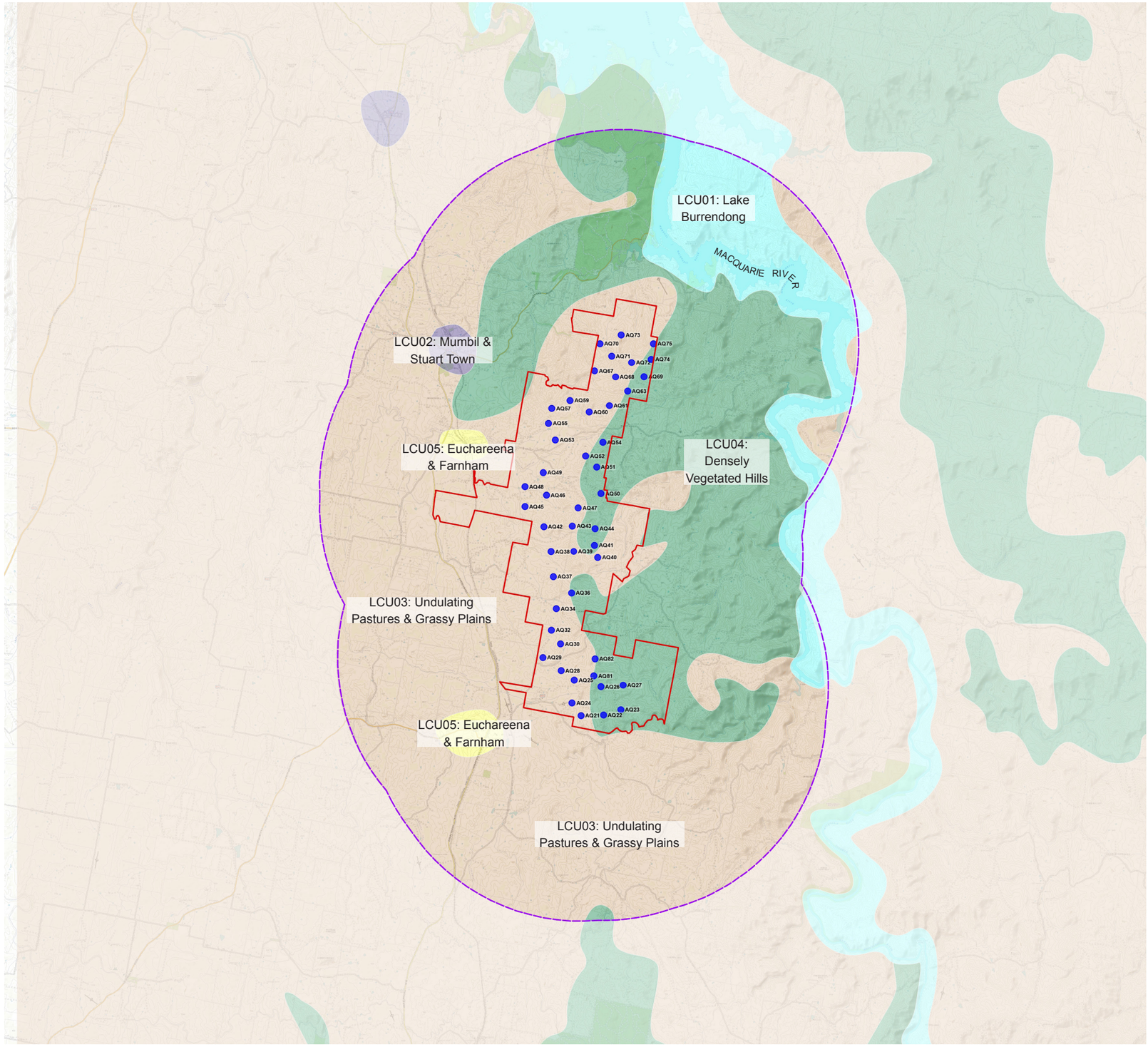
Table 3 provides an overview of the LCUs and preliminary Scenic Quality Ratings applied. These ratings have been developed using a standard frame of reference provided in the Bulletin. The LCUs and Scenic Quality Ratings will be refined in the EIS Phase of the Project to reflect input provided by the community during ongoing consultation.

Table 4 below 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	**Lake Burrendong**	*Lake Burrendong LCU is defined as the waterway and foreshore associated with Lake Burrendong.*	**Moderate**
LCU02	**Mumbil & Stuart Town**	*Small townships with limited topographic changes and clear, open surrounds used for grazing or cropping.*	**Low**
LCU03	**Undulating pastures & Grassy plains**	*Clear and open areas used for grazing or cropping. Land is largely uninhabited with limited tree coverage. Most prominent character of the region.*	**Low**
LCU04	**Densely Vegetated Hills**	*Land to the west of the Lake is predominantly comprised of densely vegetated hills and steep*	**Moderate**
LCU05	**Euchareena & Farnham**	*Small townships with densely vegetated surrounds and changes in localised topography.*	**Low**

Table 3 Overview of Preliminary Landscape Character Units

5.0 Existing Landscape Character



Preliminary Landscape Character Units

Proposed Aquila Wind

LEGEND

- Project Boundary
- Potential 250m Turbine Location
- Main Road
- Minor Road
- 8000 m from turbines (Study Area)
- LCU01: Lake Burrendong
- LCU02: Mumbil & Stuart Town
- LCU03: Undulating Pastures & Grassy Plains
- LCU04: Densely Vegetated Hills
- LCU05: Euchareena & Farnham

0 2 4 6 8 10km

N

***Figure 9** Preliminary Landscape Character Units (Map Source: Six Maps)*

5.0 Existing Landscape Character

LCU01: Lake Burrendong

This LCU is characterised by dense vegetation and the steep topographic changes associated with the valleys and creek lines that lead into the Lake Burrendong Dam. The dam precinct provides significant recreation opportunities through sites such as the Reflections Holiday Park 'Lake Burrendong' and the Mookerawa Waters Holiday Park.

Scenic quality rating: Moderate

See Images 2 and 3.

Image 2

View across Lake Burrendong from the Mookerawa Waters Holiday Park, Mookerawa Rd, Mookerawa.

Image 3

View of dense vegetation along the eastern edge of Lake Burrendong, from the boat ramp located at the Mookerawa Waters Holiday Park.

LCU02: Mumbil & Stuart Town

The Mumbil and Stuart Town LCU is defined by the small townships located northwest and west of the northern portion of the Project Area. Both of the towns comprise clusters of small residential dwellings and associated out buildings located along a main street. Both towns are characterised by undulating topography which form a small valley in which the towns are situated. Tall stands of vegetation associated with roadsides and recreational areas are also a common visual element which characterises the LCU.

Scenic quality rating: Low

See Images 4 and 5.

Image 4

View along the main street (Molong Road) of Stuart Town. The LCU is characterised by sparse residences and commercial buildings in largely flat and open terrain.

Image 5

Views of the southern entry to Mumbil. The LCU is characterised by sparse residences, commercial buildings and school.

5.0 Existing Landscape Character

LCU03: Undulating Pastures & Grassy Plains

The Undulating Pastures & Grassy Plains LCU comprises of flat to gently undulating pastures that predominantly support agricultural activity. Land has been modified to suit agricultural activity. Isolated stands of tree cover are interspersed around the grasslands. Views in the LCU are generally open and expansive due to lack of intervening elements. This LCU defines the region and makes up most of the character for the Project Area.

Scenic quality rating: Low

See Images 6 and 7.

Image 6

Typical view of undulating grazing pastures. Vegetation and topographic character are predominant distinguishing factors of the LCU.

Image 7

Views across undulating grazing pastures within the south western portion of the Project Area. Vegetation is limited to scattered canopy trees.

LCU04: Densely Vegetated Hills

This LCU is characterised by land bounding the edge of the Burrendong Dam catchment and land around the eastern portion of the Project. Land is subjected to minimal use and vegetation consists of dry sclerophyll woodland including White Box, Yellow Box and Blakely's Red Gum on steep hilly topography.

Scenic quality rating: Moderate

See Images 8 and 9.

Image 8

Dense vegetation along the eastern edge of the Project Area where significant topographic changes define the LCU.

Image 9

Views south towards the Project Area from the Burrendong Botanic Gardens & Arboretum lookout across dense vegetation and changing topography.

5.0 Existing Landscape Character

LCU05: Euchareena & Farnham

The Euchareena & Farnham LCU is defined by the small townships located to the southwest and west of the Project Area, respectively. Both of the towns comprise clusters of residential dwellings and associated out buildings located along a main street. Both towns are characterised by tall stands of vegetation and topographic changes are also a common visual element which characterises the LCU.

Scenic quality rating: Low

See Images 10-13.

Image 10

Nubrigyn Street, Euchareena looking north, where clusters of residential dwellings line the main street.

Image 11

A stand of vegetation hugs the area along Gibbers Creek behind the residential dwellings along the main street.

Image 12

The Main Western Railway line runs through the intersection of Farnham Road and Mount Aquila Road.

Image 13

Small residential dwellings in Farnham. The rural residential lots are partially cleared with stands of trees surrounding the dwellings.

5.0 Existing Landscape Character

Landscape Character Units		
LCU:	**Name:**	**Preliminary Visual Impact Assessment**
LCU01	**Lake Burrendong**	Views from within the LCU are likely to be limited due to topographical changes and the dense vegetation cover. The combination of these elements play an important role in limiting views from dwellings that are located in close proximity of this LCU. Recreational sites such as the Reflections Holiday Park 'Lake Burrendong' and the Mookerawa Waters Holiday Park will have limited potential to view the Project due to this LCU's vegetation.
LCU02	**Mumbil & Stuart Town**	Views towards the Project will be available within this LCU because of the undulating topographic character and elevated position of some turbines. Patches of vegetation in some areas may, however, help limit views.
LCU03	**Undulating pastures & Grassy plains**	The Project is located within this LCU. The LCU is also the most prominent character of the Study Area. Isolated dwellings are scattered across grassy plains. Agricultural activities include grazing pastures and dryland cropping and the character is that of a modified agricultural area. Views are likely to be available within this LCU however due to the modified character of the LCU, it has the potential to absorb the change envisaged by the Project.
LCU04	**Densely Vegetated Hills**	The LCU's vegetation character acts as an effective visual barrier. Views from within the LCU are likely to be limited due to topographical changes and the dense vegetation cover. The combination of these elements play an important role in limiting views from dwellings that are located in close proximity of this LCU.
LCU05	**Euchareena & Farnham**	Views towards the Project are likely to be partially available within this LCU. Topographic character will assist in limiting views from certain parts of the town. Vegetation in some areas may help limit views.

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."* (DPE, 2016).

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 *250 m*. The 'black line' is at a distance of *3,350 m* from WTG's and the 'blue line' is at a distance of *4,950 m* from WTGs.

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 upon residences.

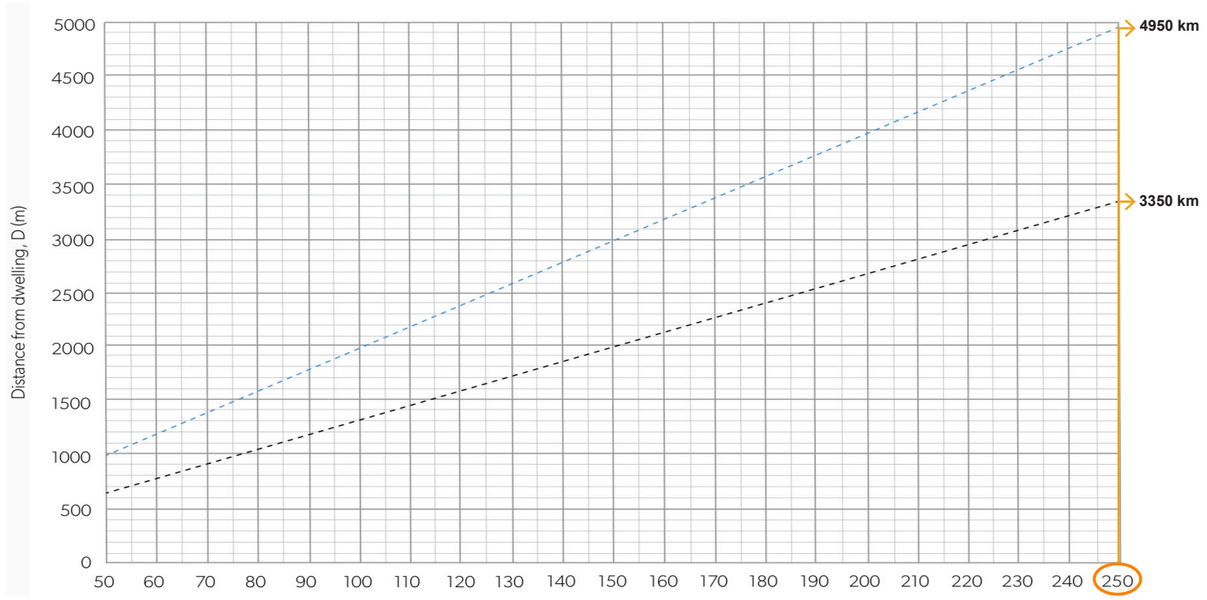


Figure 10 *Visual Magnitude thresholds for Aquila Wind Farm Project Layout (Source: Adapted from the Bulletin (DPE, 2016).*

6.3 Results of Preliminary Assessment Tool 1: Visual Magnitude

Application of the Preliminary Assessment Tools to Aquila Wind identified dwellings which require further assessment in accordance with the Bulletin. Non-associated dwellings identified within 8,000 m of the nearest proposed turbine are shown on ***Figure 11*****.**

- 60 non-associated dwellings and 13 involved dwellings have been identified within 3,350 m of the proposed wind turbine locations (within black line of visual magnitude).
- 157 non-associated dwellings and two (2) involved dwellings have been identified between 3,350 m and 4,950 m of the proposed wind turbine locations (between black and blue line of visual magnitude).
- Additionally, 72 non-associated dwellings are located between 4,950 m and 8,000 m of the proposed turbine locations (between the blue line of visual magnitude and purple line shown in figures).
- In total, there are 304 dwellings (involved and non-associated) within 8,000 m of the proposed turbines.
- Preliminary assessment of 20 representative sensitive receptors within the blue line has been included in **Appendix A**. These assessments illustrate that existing intervening vegetation that surrounds some of these non-associated dwellings is likely to reduce views to the Project. Further detailed assessment and site inspections of sensitive receptors to ground-truth this analysis will be undertaken during the EIS Stage.

6.0 Preliminary Assessment Tools

Visual Magnitude
Proposed Aquila Wind

LEGEND

- Project Boundary
- Potential 250m Turbine Location
- Involved dwellings
- Non-associated dwellings
- Main Road
- Minor Road
- 3350 m from turbines
- 4950 m from turbines
- 8000 m from turbines
- LGA Boundary
- Recreation Area

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 - Aquila Wind (Map Source: Six Maps)*

6.0 Preliminary Assessment Tools

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 8,000 m of each dwelling or key public viewpoint. One key public viewpoint, associated with Mookerawa State Recreation Area, adjoining the Macquarie River was identified within 4,950 m of the nearest turbine. However, Lake Burrendong State Park, located approximately 13 km north of the proposed turbines, has three (3) key public viewpoints. ***Figure 12*** 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." (DPE, 2016).* These turbines will become a focus for assessment in the EIS.

Figure 13 provides an overview of the number of 60º sectors visible from each of the dwellings identified within 8,000 m.

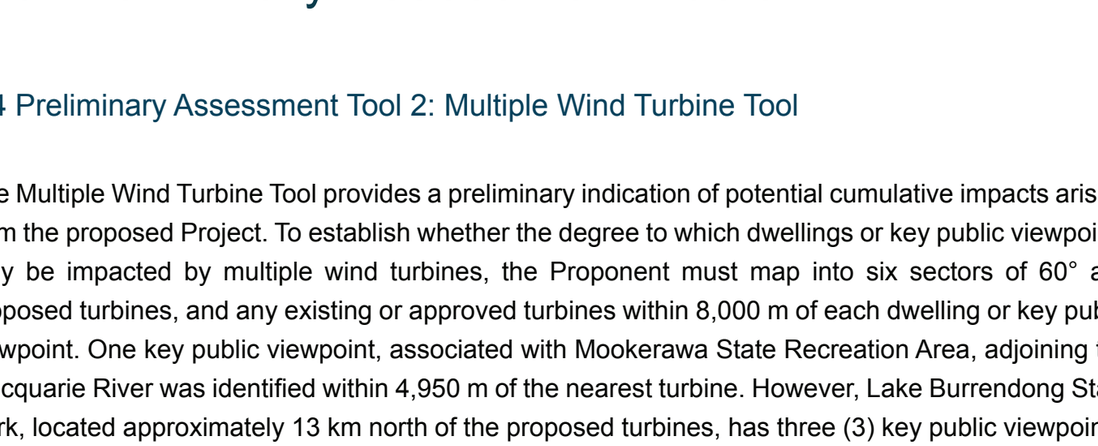


Figure 12 *Preliminary Assessment Tool: Multiple Wind Turbines*
(Source: The Bulletin)

6.5 Results of Preliminary Assessment Tool 2: Multiple Wind Turbine Tool

When applied to the Project, the 2D Multiple Wind Turbine Tool (MWTT) (see ***Figure 13***) identified the following:

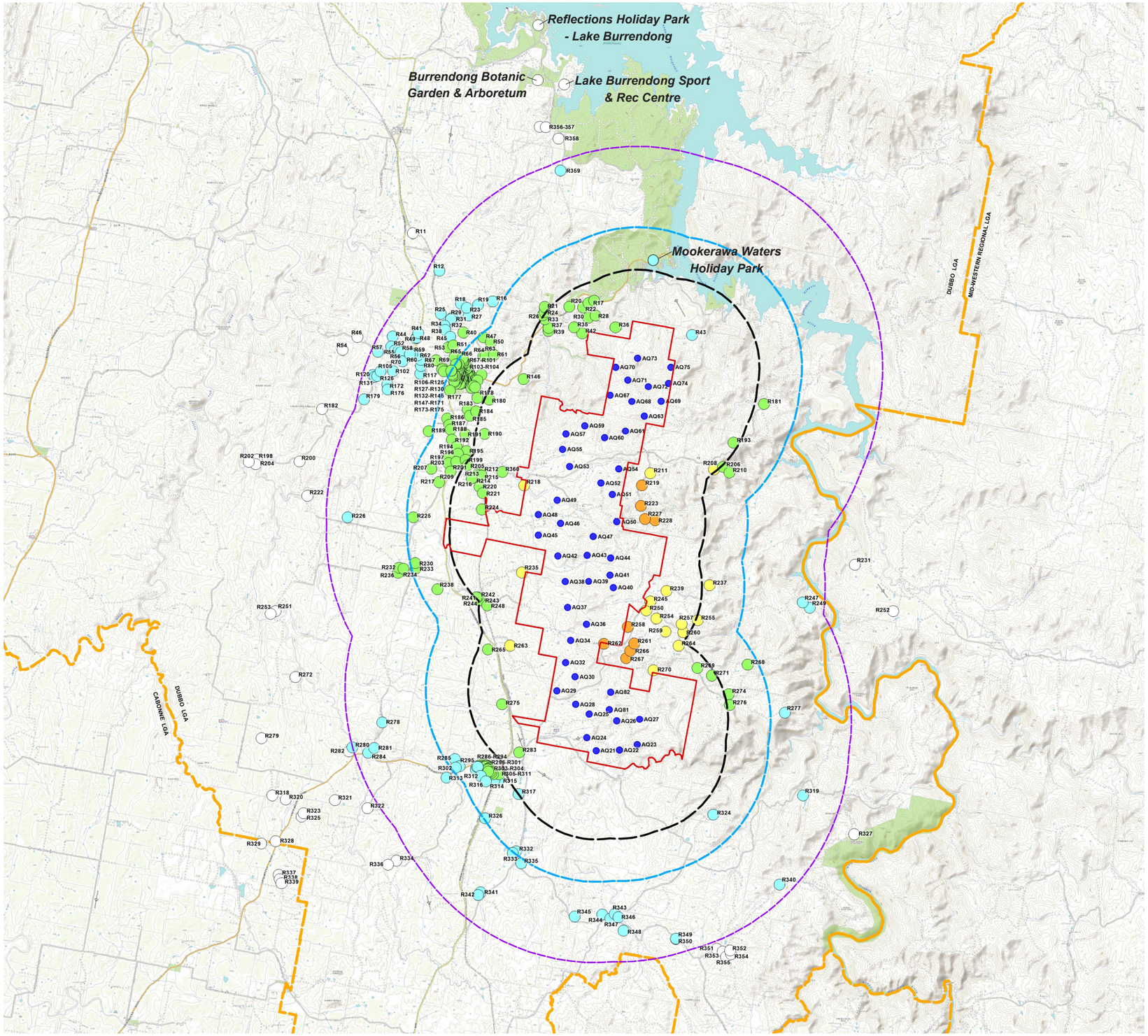
- Nine (9) non-associated dwellings were identified as having turbines within four (4) 60 degree sectors. These include dwellings R219, R223, R227, R228, R258, R261, R262, R266 and R267.
- 16 non-associated dwellings were identified as having turbines within three (3) 60 degree sectors. The dwellings are listed in ***Table 5***.
- 94 non-associated dwellings were identified as having turbines within two (2) 60 degree sectors, and
- 76 non-associated dwellings were identified as having turbines within one (1) 60 degree sector within 8,000 m of the proposed wind turbines.

Further assessment of these dwellings using 3D topographic mapping will be conducted in the EIS phase. Existing screening factors (including vegetation and structures) may reduce visibility of the turbines.

One (1) key public viewpoint was identified within 8,000 m of the nearest turbine, being the Mookerawa Waters Holiday Park located on Mookerawa Road. For the purposes of this preliminary assessment, one viewpoint (VP08) has been identified for the Holiday Park (refer to **Section 8.0**). When applied to VP08, the MWTT identified that turbines will be located in up to one (1) 60 degree sector. This is deemed an acceptable level in accordance with the Bulletin. Detailed assessment of visual impacts from a range of vantage points within the Mookerawa Waters Holiday Park will be undertaken during the EIS phase, having regard to any relevant NSW guidelines then in force.

In addition, three (3) key public viewpoints were identified within the Lake Burrendong State Park. Theoretically, these viewpoints will not have any turbines within any 60° sector as they are located more than 8,000m away from the nearest turbine. An assessment of potential visual impacts on a viewpoint that represents these recreation areas has been discussed in ***Appendix B***.

6.0 Preliminary Assessment Tools



Multiple Wind Turbine Tool
Proposed Aquila Wind

LEGEND

- Project Boundary
- Potential 250m Turbine Location
- Involved dwellings
- Non-associated dwellings
- Main Road
- Minor Road
- 3350 m from turbines
- 4950 m from turbines
- 8000 m from turbines (Study Area)
- LGA Boundary

MWTT Results for Non-associated 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 (240º)

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 2: 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."* (DPE, 2016).

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. ***Figures 14-16*** depict 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 250 m.

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 - i.e. 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 WTGs. 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

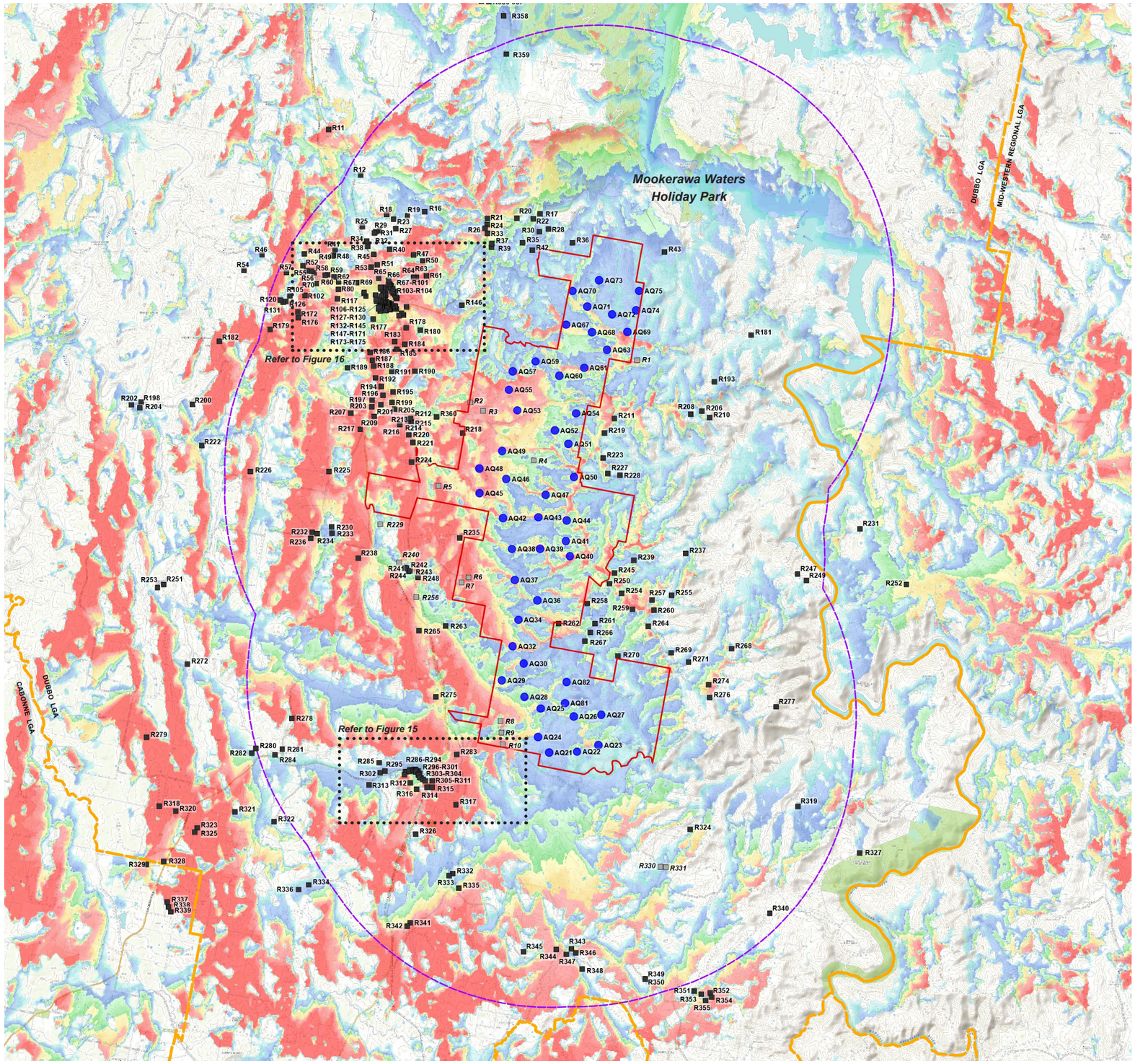
The following provides a summary of the ZVI diagrams prepared for the preliminary layout of Aquila Wind.

- Due to the undulating topography that characterises the landscape, there are large areas of land in the Study Area, from which the Project will be screened by topography, particularly to the east of the Project.
- Views from the majority of non-associated dwellings located in Euchareena are likely to be limited due to the existing topographic character (refer to ***Figure 15***). Some dwellings located on the outskirts and on the southeastern and eastern side of the town are likely to have views towards the majority of the Project.
- Other towns such as Stuart Town (refer to ***Figure 16***), Farnham and Store Creek are likely to view the majority of the Project. Primarily, these towns are located on the western side of the Project Area along Burrendong Way. This assessment, however, is based on topography alone and does not account for other factors such as existing built form, infrastructure and vegetation which defines the character of these towns.
- Views to some of the turbines associated with the Project are likely to be available for all dwellings within 8,000 m of the wind turbines. This assessment is based on a consideration of topography alone and does not consider intervening elements such as vegetation and existing structures.
- The ZVI indicates that views from key recreational locations such as the Mookerawa Holiday Park are limited due to existing topographic differences.

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 (see ***Appendix B***). Preliminary assessment of 20 representative sensitive receptors and viewpoint analysis [from 36 public locations] have 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. Ground-truthing during field work will ascertain potential visibility taking into account structures and vegetation. Based on the preliminary assessments in ***Appendix A*** and ***Appendix B***, it is likely that existing intervening vegetation surrounding non-associated dwellings is likely to reduce views of turbines from a number of locations.

7.0 Preliminary Zone of Visual Influence



Zone of Visual Influence
Blade Tip Height 250 m
Proposed Aquila Wind

LEGEND

- Project Boundary
- Potential 250m Turbine Location
- Non-associated dwellings
- Involved dwellings
- 8000 m from turbines (Study Area)
- LGA Boundary

Number of visible turbines (at tip height)
(Based on topography alone):

- 0
- 1 - <8
- 8 - <18
- 18 - <28
- 28 - <38
- 38 - <=48

Note:

The ZVI is a preliminary assessment tool that represents a bare ground scenario - i.e. 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

***Figure 14** Zone of Visual Influence - Blade tip (250 metres) (Map Source: ESRI Topographic Maps)*

7.0 Preliminary Zone of Visual Influence

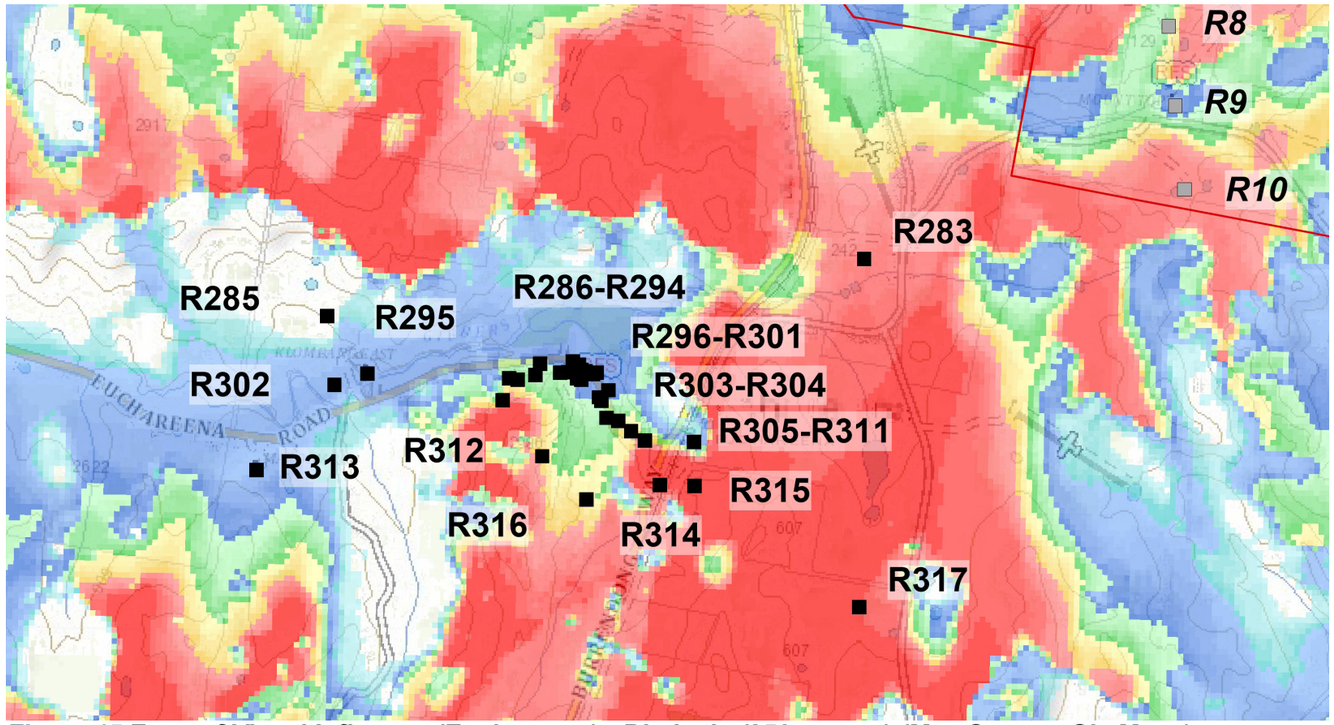


Figure 15 Zone of Visual Influence (Euchareena) - Blade tip (250 metres) (Map Source: Six Maps)

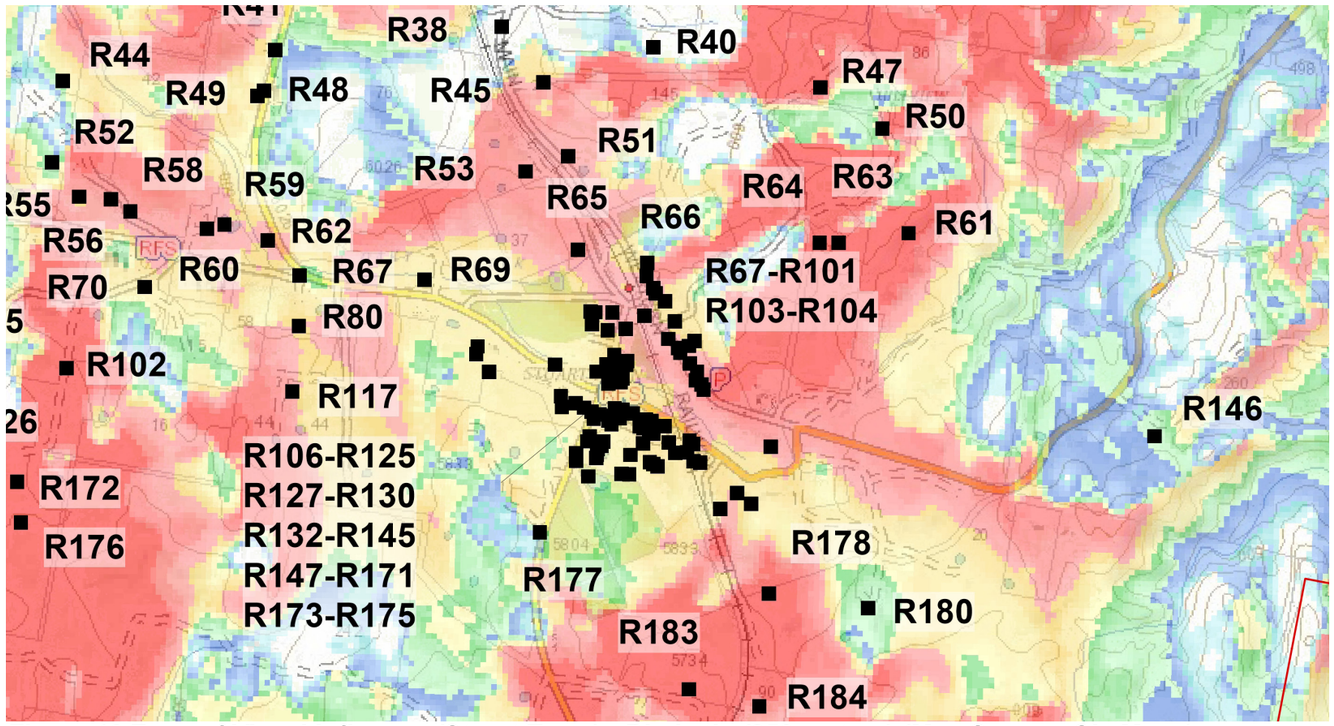


Figure 16 Zone of Visual Influence (Stuart Town) - Blade tip (250 metres) (Map Source: Six Maps)

Zone of Visual Influence Blade Tip Height 250 m (Euchareena and Stuart Town)

Proposed Aquila Wind

LEGEND

- Project Boundary
- Non-associated dwellings
- Involved dwellings
- 8000 m from turbines

Number of visible turbines (at tip height)
(Based on topography alone):

- 0
- 1 - <8
- 8 - <18
- 18 - <28
- 28 - <38
- 38 - <=48

Note:

The ZVI is a preliminary assessment tool that represents a bare ground scenario - i.e. 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 and Viewpoint Assessments

8.1 Preliminary Assessment of Dwellings

Of the 289 non-associated dwellings within 8,000 m of a proposed turbine, examples of the preliminary assessment tools have been applied to 25 representative non-associated dwellings (as shown on ***Figure 17***) within 8,000 m of the nearest turbine have been included in ***Appendix A***.

Due to the scale of the Project and the number of dwellings within the visual catchment, a representative dwelling has been assessed where a cluster of dwellings are within close proximity to one another. This is consistent with the recommendations of the Bulletin which states: *"where relatively close clustering of houses belonging to different landowners or occupants occur, representative viewpoints may be selected and assessed in lieu of every single dwelling., which states the representative non-associated dwellings have been selected and assessed based on the 'worst case scenario' viewpoint for clusters of dwellings."*

These representative dwellings were selected based on a combination of factors including levels of visibility based on the ZVI, proximity to the project, elevation and the presence of intervening vegetation.

The preliminary assessment identifies existing vegetation surrounding many of the dwellings which would reduce the potential visual impacts identified by the preliminary assessment tools and Zone of Visual Influence. A summary of these findings is provided in ***Table 5***.

8.2 Preliminary Assessment of Public Viewpoints

Appendix B provides preliminary assessments from Public Viewpoints. A total of 20 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 17***).

Non-associated dwellings with multiple 60 degree sectors within 8000 m of nearest WTG

Dwelling ID:	Location	Approx distance to nearest WTG (km)	Number of 60º sectors (Based on 2D Assessment)	Approx. number of potentially visible WTGs (Based on ZVI)
Non-associated dwellings				
R219	**Mount Mookerawa Road, Mookerawa**	**1.082 km**	**4**	**38 (31 at hub, 7 at tip)**
	Views likely to be available of proposed turbines to the west. As per aerial imagery existing vegetation in the dwelling's foreground in this direction will help fragment some of the views.			
R223	**Mount Mookerawa Road, Mookerawa**	**1.089 km**	**4**	**27 (18 at hub, 9 at tip)**
	Views towards the majority of the Project are likely to be screened by existing vegetation as per aerial imagery. Existing conditions need to be ground-truthed during EIS phase.			
R227	**Mount Mookerawa Road, Mookerawa**	**1.066 km**	**4**	**24 (16 at hub, 8 at tip)**
	Views towards the majority of the Project are likely to be screened by existing vegetation as per aerial imagery. Existing conditions need to be ground-truthed during EIS phase.			
R228	**Mount Mookerawa Road, Mookerawa**	**1.450 km**	**4**	**13 (6 at hub, 7 at tip)**
	As per aerial imagery, lack of intervening elements such as vegetation and structures may allow views of the Project in the western direction.			
R258	**Bundalah Road, Euchareena**	**1.571 km**	**4**	**28 (23 at hub, 5 at tip)**
	As per aerial imagery, lack of intervening elements such as vegetation and structures may allow views of the Project in the western direction.			
R261	**Bundalah Road, Euchareena**	**1.948 km**	**4**	**24 (13 at hub, 11 at tip)**
	Dwelling is surrounded by dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be limited. Existing conditions need to be ground-truthed during EIS phase.			
R262	**Bundalah Road, Euchareena**	**0.993 km**	**4**	**35 (31 at hub, 4 at tip)**
	Dwelling is surrounded by dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be limited. Existing conditions need to be ground-truthed during EIS phase.			
R266	**Bundalah Road, Euchareena**	**1.725 km**	**4**	**31 (22 at hub,9 at tip)**
	Dwelling is surrounded by patchy to dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be limited. Existing conditions need to be ground-truthed during EIS phase.			
R267	**Bundalah Road, Euchareena**	**1.400 km**	**4**	**11 (10 at hub, 1 at tip)**
	Lack of intervening elements such as vegetation and structures may allow views of the Project in the western direction.			
R211	**Mount Mookerawa Road, Mookerawa**	**1.210 km**	**3**	**20 (14 at hub, 6 at tip)**
	Dwelling is surrounded by dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be limited. Existing conditions need to be ground-truthed during EIS phase.			
R218	**Mount Aquila Road, Mt Aquila**	**1.225 km**	**3**	**38 (All at hub)**
	As per aerial imagery, lack of intervening elements such as vegetation and structures may allow views of the Project in the eastern direction.			

Table 5 *Overview of Preliminary Assessment for non-associated representative dwellings within 8,000 m*

8.0 Preliminary Dwelling and Viewpoint Assessments

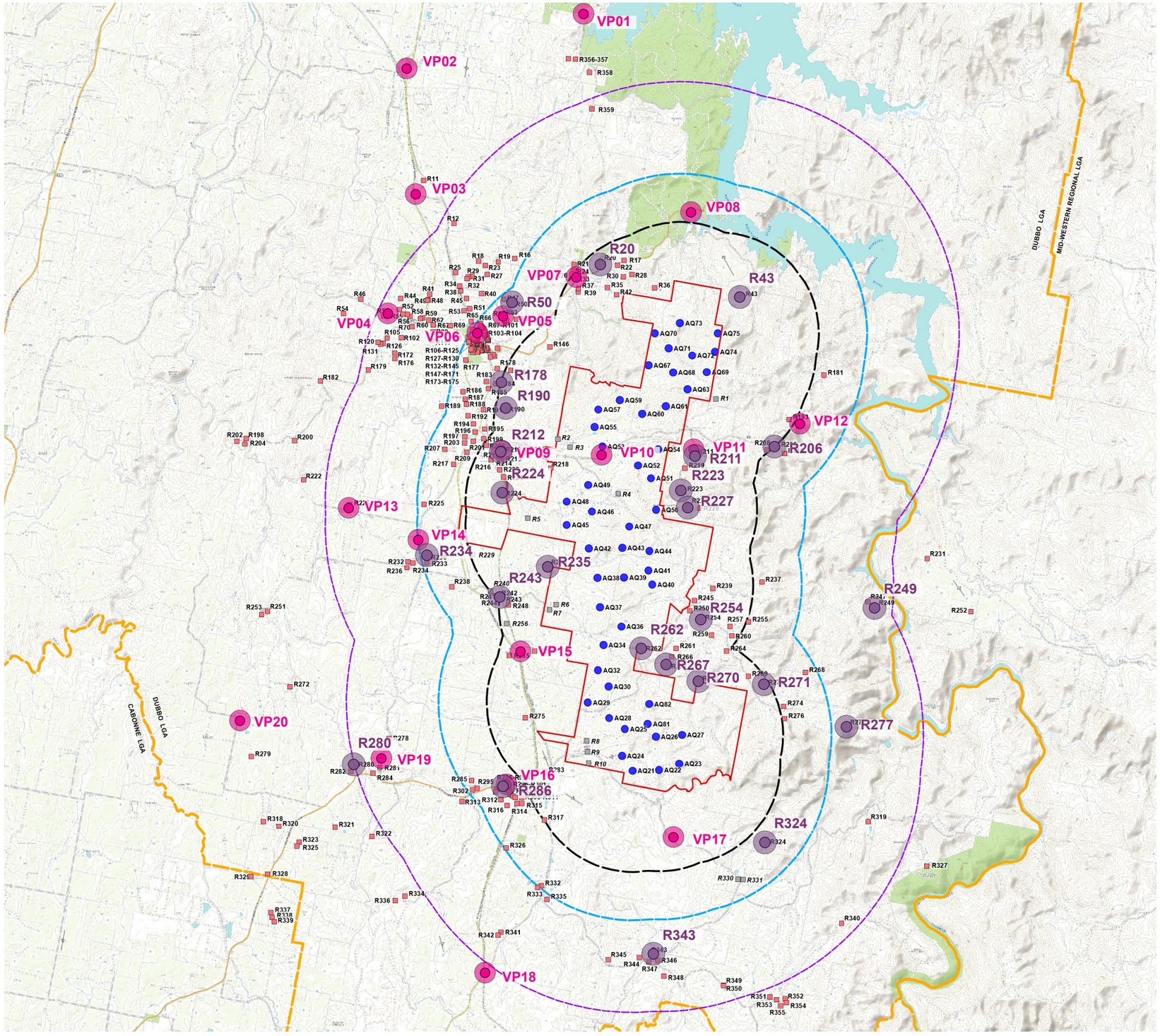
Non-associated dwellings with multiple 60 degree sectors within 8000 m of nearest WTG				
Dwelling ID:	**Location**	**Approx distance to nearest WTG (km)**	**Number of 60º sectors (Based on 2D Assessment)**	**Approx. number of potentially visible WTGs (Based on ZVI)**
Non-associated dwellings				
R208	**Mount Aquila Road, Mt Aquila**	**3.262 km**	**3**	**6 (2 at hub, 8 at tip)**
	Dwelling is surrounded by dense vegetation in all directions per aerial imagery. Views of the Project are likely to be limited. Existing conditions need to be ground-truthed during EIS phase.			
R235	**Glenroy Road, Stuart Town**	**1.490 km**	**3**	**39 (35 at hub, 4 at tip)**
	Dwelling is surrounded by dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be limited. Existing conditions need to be ground-truthed during EIS phase.			
R237	**Corams Road, Euchareena**	**3.632 km**	**3**	**39 (35 at hub, 4 at tip)**
	Dwelling is surrounded by dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be limited. Existing conditions need to be ground-truthed during EIS phase.			
R239	**Corams Road, Euchareena**	**2.008 km**	**3**	**Nil**
	As per aerial imagery, lack of intervening elements such as vegetation and structures may allow views of the Project in the western direction.			
R245	**Corams Road, Euchareena**	**1.494 km**	**3**	**42 (36 at hub, 6 at tip)**
	Dwelling is surrounded by patchy to dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be limited. Existing conditions need to be ground-truthed during EIS phase.			
R250	**Bundalah Road, Euchareena**	**1.514 km**	**3**	**29 (25 at hub, 4 at tip)**
	Dwelling is surrounded by dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be limited. Existing conditions need to be ground-truthed during EIS phase.			
R254	**Bundalah Road, Euchareena**	**2.002 km**	**3**	**36 (30 at hub, 6 at tip)**
	Dwelling is surrounded by patchy to dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be partially limited in the north western direction. Existing conditions need to be ground-truthed during EIS phase.			
R257	**Bundalah Road, Euchareena**	**2.922 km**	**3**	**28 (22 at hub, 6 at tip)**
	Dwelling is surrounded by dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be limited. Existing conditions need to be ground-truthed during EIS phase.			
R255	**Bundalah Road, Euchareena**	**3.421 km**	**3**	**1 (All at tip)**
	As per aerial imagery, lack of intervening elements such as vegetation and structures may allow views of the Project in the north western direction.			

Table 5 *Overview of Preliminary Assessment for non-associated representative dwellings within 8,000 m (Continued)*

Non-associated dwellings with multiple 60 degree sectors within 8000 m of nearest WTG				
Dwelling ID:	**Location**	**Approx distance to nearest WTG (km)**	**Number of 60º sectors (Based on 2D Assessment)**	**Approx. number of potentially visible WTGs (Based on ZVI)**
Non-associated dwellings				
R259	**Bundalah Road, Euchareena**	**2.579 km**	**3**	**33 (27 at hub, 6 at tip)**
	Dwelling is surrounded by dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be limited. Existing conditions need to be ground-truthed during EIS phase.			
R260	**Bundalah Road, Euchareena**	**3.138 km**	**3**	**33 (27 at hub, 6 at tip)**
	Dwelling is surrounded by dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be limited. Existing conditions need to be ground-truthed during EIS phase.			
R264	**Bundalah Road, Euchareena**	**3.103 km**	**3**	**31 (27 at hub, 7 at tip)**
	Dwelling is surrounded by patchy to dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be partially limited in the north western direction. Existing conditions need to be ground-truthed during EIS phase.			
R270	**Bundalah Road, Euchareena**	**1.811 km**	**3**	**7 (2 at hub, 5 at tip)**
	Dwelling is surrounded by patchy to dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be partially limited in the north western direction. Existing conditions need to be ground-truthed during EIS phase.			
R263	**Glencraigie Road, Stuart Town**	**2.194 km**	**3**	**28 (24 at hub, 4 at tip)**
	Dwelling is surrounded by patchy to dense vegetation in all directions as per aerial imagery. Views of the Project are likely to be partially limited in the north western direction. Existing conditions need to be ground-truthed during EIS phase.			

Table 5 *Overview of Preliminary Assessment for non-associated representative dwellings within 8,000 m (Continued)*

8.0 Preliminary Dwelling and Viewpoint Assessments



Preliminary Dwelling & Viewpoint Assessment Locations

Proposed Aquila Wind

LEGEND

- Project Boundary
- Potential 250m Turbine Location
- Involved dwellings
- Non-associated dwellings
- Main Road
- Minor Road
- 3350 m from turbines
- 4950 m from turbines
- 8000 m from turbines
- LGA Boundary
- Recreation Area
- Preliminary Dwelling Assessment locations
  Refer to Appendix A.
- Preliminary Representative Viewpoint Assessment locations
  Refer to Appendix B.

N

0 2 4 6 8 10km

***Figure 17** 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 within the southern portion of the CWO REZ. The CWO REZ has been identified by the NSW Governments Electricity Strategy (refer ***Figure 18***). The CWO REZ is expected to play a vital role in delivery of affordable energy to the community across NSW (Energy NSW, 2021).

The existing landscape character of the region allows for optimum harvest of wind energy due to the undulating terrain and vast expanses of rural landholdings. 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 18*** shows the wind farms that are currently proposed within the extents of the CWO REZ. The majority of these projects are located in the southern parts of the REZ near the towns of Wellington, Orange and Mudgee.

***Figure 18** Central-West Orana Energy Zone*

(Map Source: NSW Government, EnergyCo NSW, 2022)

9.2 Nearby Wind Farm Projects

Currently, eight (8) other wind farm projects have been proposed in the CWO REZ area (refer ***Figure 19***):

- Barneys Reef Wind Farm.
- Bodangora Wind Farm.
- Burrendong Wind Farm.
- Crudine Ridge Wind Farm.
- Kerrs Creek Wind Farm.
- Liverpool Range Wind Farm.
- Uungula Wind Farm.
- Valley of the Winds Wind Farm.
- Spicers Creek Wind Farm.

Barneys Reef Wind Farm:

Barneys Reef Wind Farm's preliminary layout comprises of 63 turbines spread across an area of approximately 7,548 ha. The proposed Project is located to the northeast of Aquila Wind (AW). SEARs were issued for the Barneys Reef Wind Farm Project in September 2021.

Bodangora Wind Farm:

Bodangora Wind Farm is the nearest constructed and operating wind farm to the Project, located to the north. The Project consists of 27 turbines and spans an area of 8,469 ha. The Bodangora Wind Farm Project was approved in December 2017.

Burrendong Wind Farm:

The proposed Burrendong Wind Farm (BWF) is located to the north east of the Project. The nearest BWF turbine is located approximately 7.5 km from the nearest AW turbine and the Project consists of 105 turbines. SEARs were issued for the Burrendong Wind Farm Project in September 2022. There is potential to view BWF and the Project simultaneously and this will be assessed in detail during the EIS Phase.

Crudine Ridge Wind Farm:

Crudine Ridge Wind Farm is a constructed and operating wind farm located to the east of the Project. The Project consists of 77 turbines and spans an area of 5,972 ha. The Crudine Ridge Wind Farm Project was approved in May 2016.

9.0 Cumulative Visual Impact Assessment

Kerrs Creek Wind Farm:

Kerrs Creek Wind Farm (KCWF) is located to the south of the AWF Project. The SEARs for KCWF have been issued and the project is currently in the EIS phase. During the EIS Phase the cumulative impacts with KCWF will be assessed in detail.

Liverpool Range Wind Farm:

The proposed Liverpool Range Wind Farm is located to the north east of the Project and consists of 267 turbines. The Liverpool Range Wind Farm Project was approved in March 2018.

Uungula Wind Farm:

Uungula Wind Farm (UWF) is an approved wind farm located north of the proposed AW. The Project consists of 105 turbines and was approved in May 2021. It is yet to commence construction. It is likely that UWF and the Project will not be visible simultaneously due to the large distance between the projects.

Valley of the Winds Wind Farm:

The proposed Valley of the Winds Wind Farm is located to the northeast of the AW Project. The Project consists of 148 turbines in three clusters. SEARs were issued for the VoW Wind Farm Project in June 2020.

Spicers Creek Wind Farm:

The proposed Spicers Creek Wind Farm is located to the north of the AW Project. The Project consists of 117 turbines and covers an area of 17,937 ha. SEARs were issued for the Spicers Creek Wind Farm Project in May 2022 and it is currently in the Response to Submissions Phase.

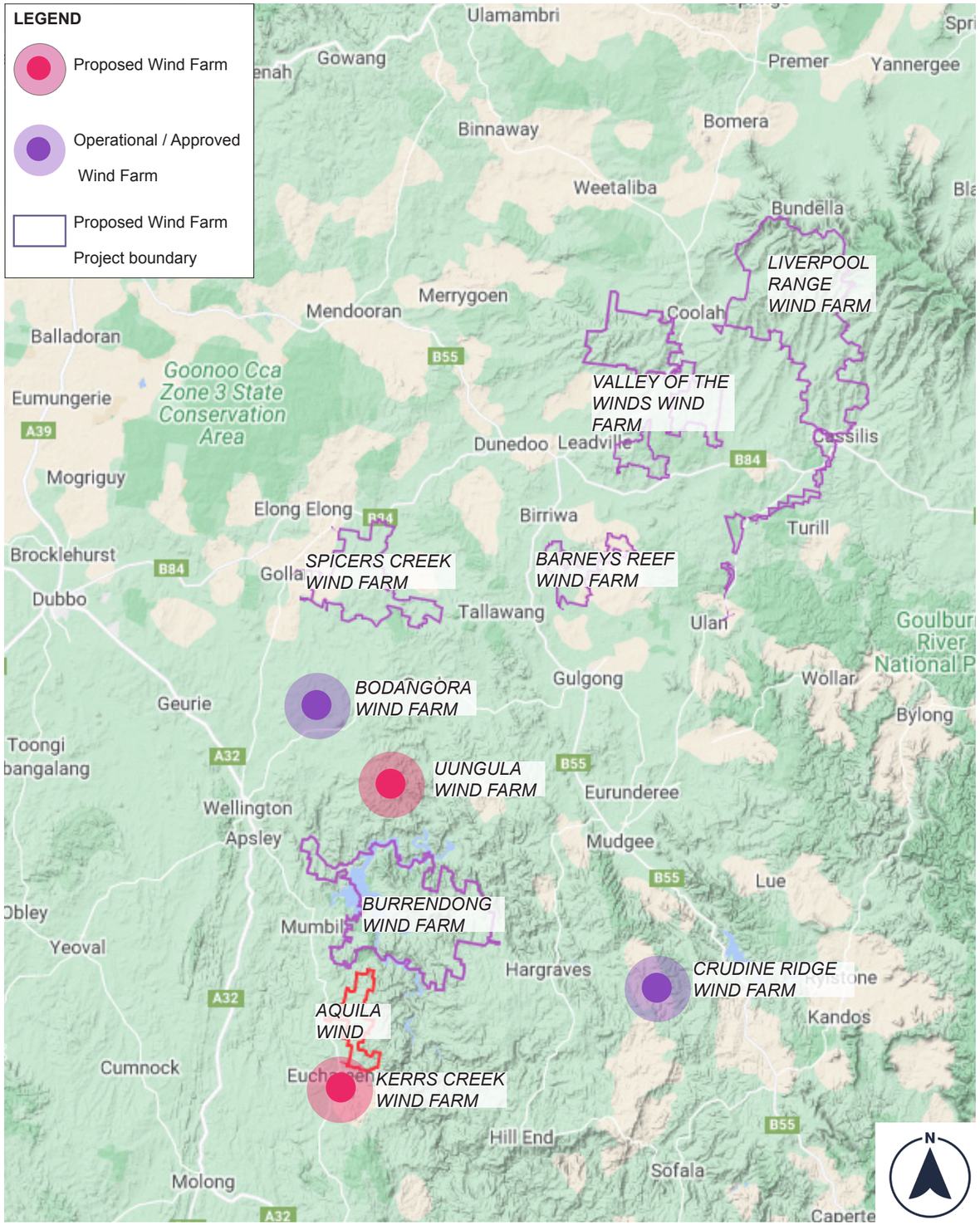


***Figure 19** Nearby Wind Farm Projects (Map Source: Google Maps) (not to scale)*

9.0 Cumulative Visual Impact Assessment

9.3 Application of Cumulative Multiple Wind Turbine Tool

In order to identify the impacts of surrounding wind farm projects, the MWTT was applied at non-associated dwellings identified within 8,000 m of the Project, BWF and KCWF (refer to ***Figure 20***). It was identified that the majority of non-associated dwellings located within these extents would have turbines in up to two (2) 60 degree sectors, which is deemed acceptable in accordance with the Bulletin. When applied to the dwellings within 8,000 m of the Project, KCWF and BWF, the 2D Multiple Wind Turbine Tool (MWTT) (see ***Figure 13***) identified the following:

- Five (5) non-associated dwellings were identified as having turbines associated with KCWF and the Project within five (5) 60 degree sectors. These dwellings are located on the southern side of the town of Euchareena.
- 30 non-associated dwellings were identified as having turbines within four (4) 60 degree sectors. 29 of these dwellings were identified as having turbines associated with KCWF and the Project, and the majority of these are located in the town of Euchareena. One (1) dwelling was identified as having turbines associated with the Project and BWF.
- 21 non-associated dwellings were identified as having turbines within three (3) 60 degree sectors. 19 of these dwellings were identified as having turbines associated with KCWF and the Project, and two (2) non-associated dwellings were identified as having turbines associated with the Project and BWF.
- Five (5) non-associated dwellings and one (1) key viewpoint location, i.e., the Mookerawa Water Holiday Park were identified as having turbines within two (2) 60 degree sectors, and
- Four (4) non-associated dwellings were identified as having turbines within one (1) 60 degree sector.

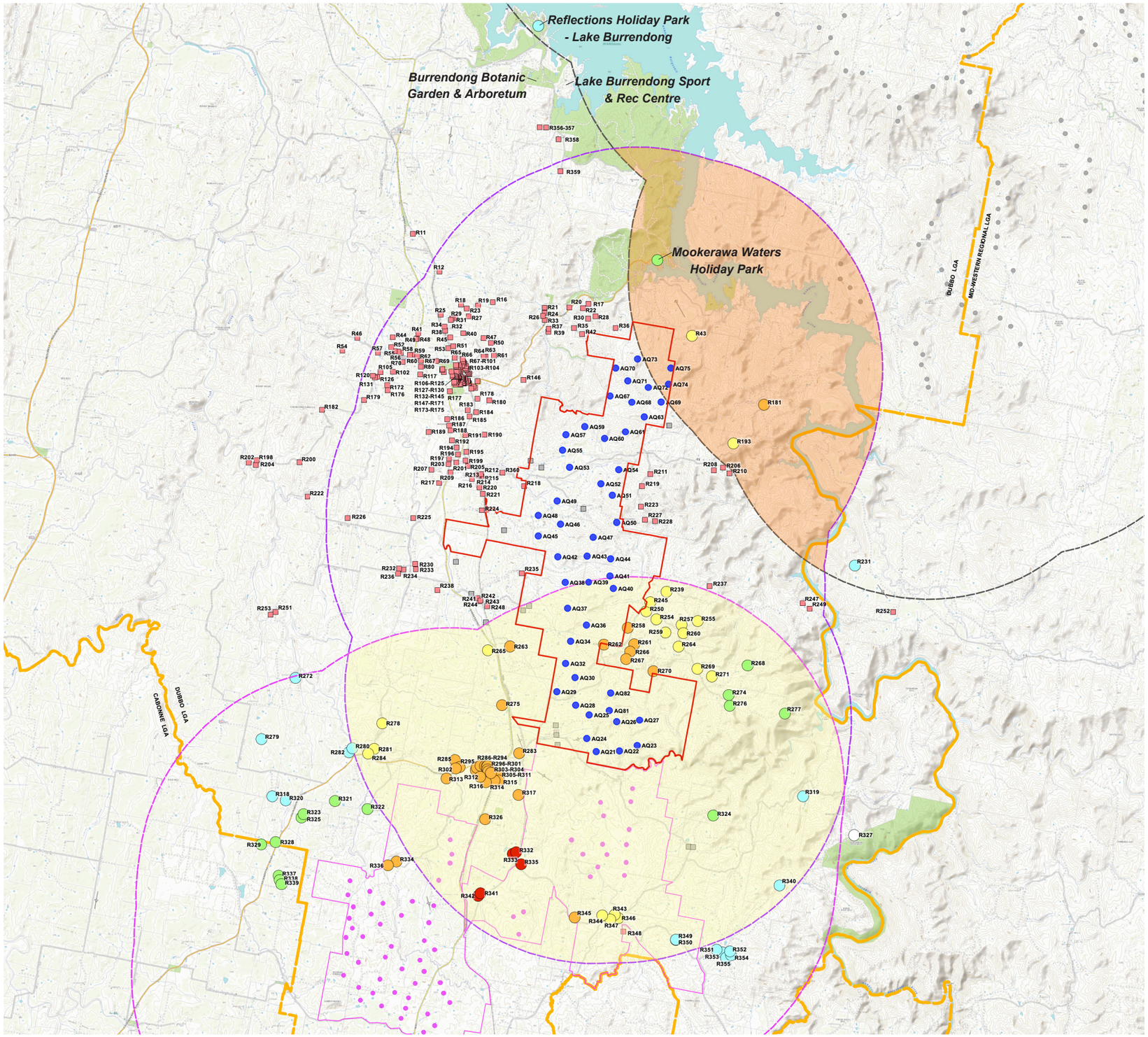
Further assessment of the identified non-associated dwellings will be done during the EIS phase to identify areas that are likely to be impacted by all three wind farm projects.

9.4 Cumulative Impact on Broader Landscape Character

The re-occurrence of wind farms 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 wind farms and other major infrastructure within the region would combine to become the dominant visual element, altering the perception of the general landscape character.

The Project is located on undulating terrain and is surrounded by scattered rural dwellings. Due to the undulating topography of the region, it is likely that there will be some areas with limited visibility of the three wind farm projects. However, further assessment of the potential cumulative visual impacts will be addressed in the EIS phase, along with a description of the mitigation and management measures being employed to reduce impacts.

9.0 Cumulative Visual Impact Assessment



Cumulative Multiple Wind Turbine Tool (CMWTT)

Proposed Aquila Wind

LEGEND

- Project Boundary
- Potential 250m Aquila Wind (AW) Turbine Location
- Proposed Kerrs Creek Wind Farm (KCWF) turbine location (as of November 2023)
- Proposed Burrendong Wind Farm (BWF) turbine location (as of November 2023)
- 8000 m from AW turbines (Study Area)
- 8000 m from KCWF turbines (as of November 2023)
- 8000 m from BWF turbines (as of November 2023)
- Area with dwellings within 8,000m of AW and KCWF
- Area with dwellings within 8,000m of AW and BWF
- Involved dwellings
- Non-associated dwellings
- Main Road
- Minor Road
- LGA Boundary

CMWTT Results for Non-associated Dwellings & key viewpoints within 8 km of nearby wind energy projects:

- 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 (240º)
- Up to five (5) 60º Sectors (240º)
- Up to six (6) 60º Sectors (240º)

Note:

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 20** Cumulative Multiple Wind Turbine Tool (Map Source: Six Maps)*

10.0 Summary and Recommendations

10.1 Summary of Preliminary Visual Impact Assessment

This PVIA report has been undertaken in accordance with the Bulletin, and accompanies the Scoping Report request for SEARs. The following provides a brief summary of the PVIA and outlines the next steps that will be undertaken in the Landscape and Visual Impact Assessment (LVIA) which will be undertaken during the EIS Stage of the Project.

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.
- Identified key public viewpoints valued by that community.

Next Steps:

Community consultation will be ongoing throughout the Project. Ongoing input from the community will assist the preparation of the LVIA.

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.
- Categorised five preliminary Landscape Character Units (LCUs).
- Applied preliminary scenic quality ratings to each of the LCUs ranging from Low - Moderate.
- Provided a brief preliminary overview of the potential visual impacts 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 Bulletin.

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 Visual Magnitude tool was applied to all non-associated dwellings and it was identified that a total of 60 non-associated dwellings within the black line of visual magnitude (3,350 m), 157 non-associated dwellings between the black and blue lines of visual magnitude (3,350 - 4,950 m) and 72 non-associated dwellings between the blue line of visual magnitude and the extent of the Study Area (4,950 - 8,000 m). A total of 289 non-associated dwellings were identified within the extents of the Study Area.
- The Multiple Wind Turbine Tool (MWTT) was applied to all non-associated dwellings within 8000m of the nearest proposed turbine.
- The MWTT identified:
  - Nine (9) non-associated dwellings were identified as having turbines within four (4) 60 degree sectors.
  - 16 non-associated dwellings were identified as having turbines within three (3) 60 degree sectors.
  - 94 non-associated dwellings were identified as having turbines within two (2) 60 degree sectors, which is deemed acceptable in accordance with the Bulletin, and
  - 76 non-associated dwellings were identified as having turbines within one (1) 60 degree sector within 8,000 m of the proposed wind turbines, which is deemed acceptable in accordance with the Bulletin.
- Recreational sites such as the Reflections Holiday Park ‘Lake Burrendong’ and the Mookerawa Waters Holiday Park were identified as key public viewpoints but are located approximately 12.5km & 5.5km north of the Project respectively. An assessment of the potential visual impact on a selection of representative viewpoints is discussed in ***Appendix B***.
- Application of the MWTT on the Mookerawa Waters Holiday Park, located on Mookerawa Road, identified that views of the turbines from this location will be available in one (1) 60° sector which is deemed an acceptable level in accordance with the Bulletin. Further detailed assessment of visual impacts from a range of key vantage points within the Holiday Park will be undertaken during the EIS phase.

10.0 Summary and Recommendations

Next Steps:

- Groundtruthing of all identified non-associated dwellings.
- Undertake site inspection and detailed dwelling assessments at sensitive non-associated 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.

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 250 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 EIS phase.

Cumulative Visual Impacts of Surrounding Wind Farms

The Project is located within the CWO REZ and is potentially in close proximity to Burrendong Wind Farm (BWF) and Kerrs Creek Wind Farm (KCWF) projects. The MWTT was applied to non-associated dwellings identified within 8,000 m of the Project, BWF and KCWF.

Similar results were identified when the tool was applied to non-associated dwellings to identify number of 60 degree sectors associated with the Project only. Further assessment will be done during the EIS phase to identify areas that are likely to be impacted by all three wind farm projects.

It is important that the Project considers potential cumulative effects of surrounding renewable energy projects on the immediate and broader regional context, within the EIS.

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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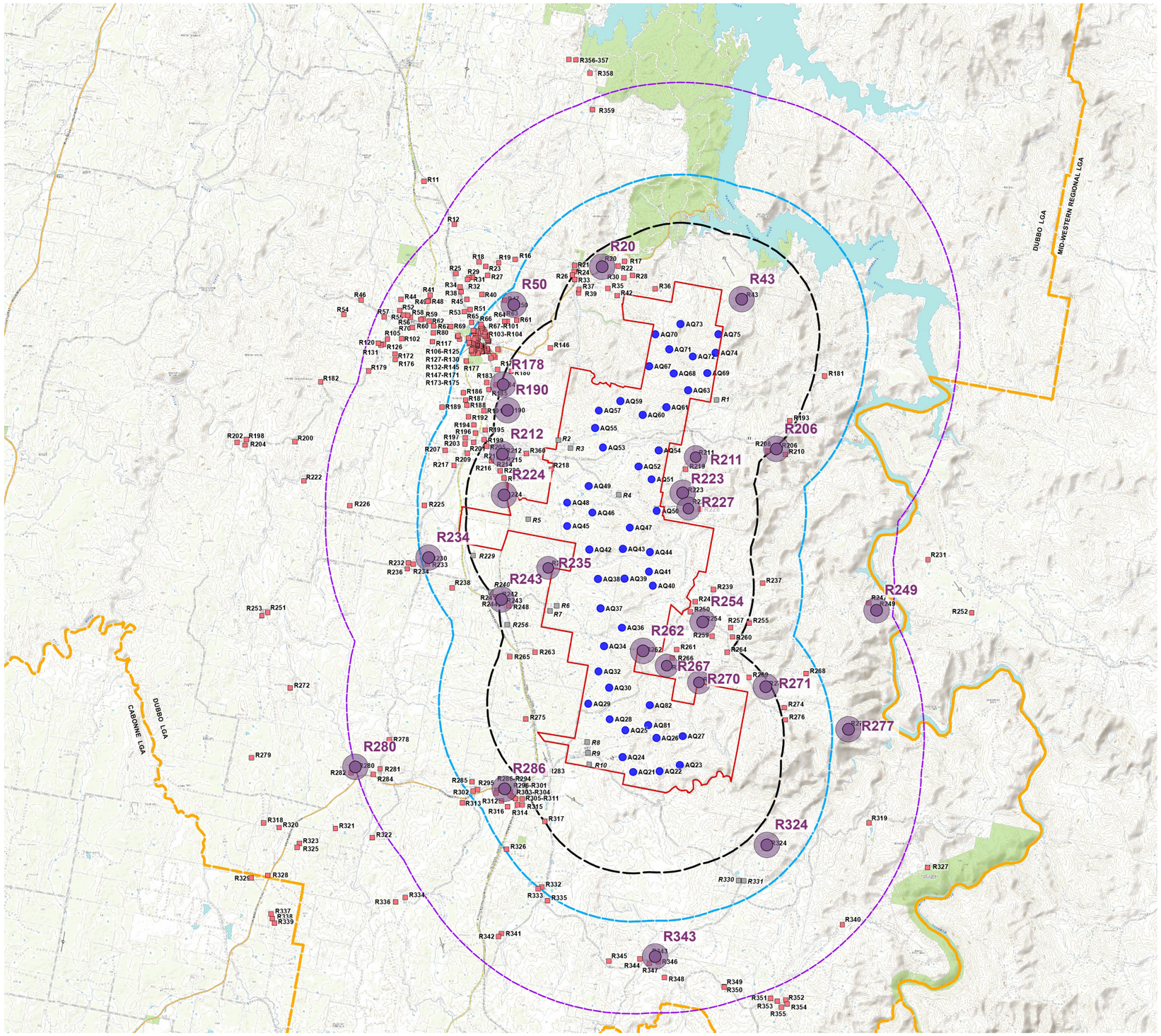
Appendix A

Preliminary Dwelling Assessments

Preliminary Dwelling Assessment Locations



Preliminary Dwelling Assessment Locations

Proposed Aquila Wind

LEGEND

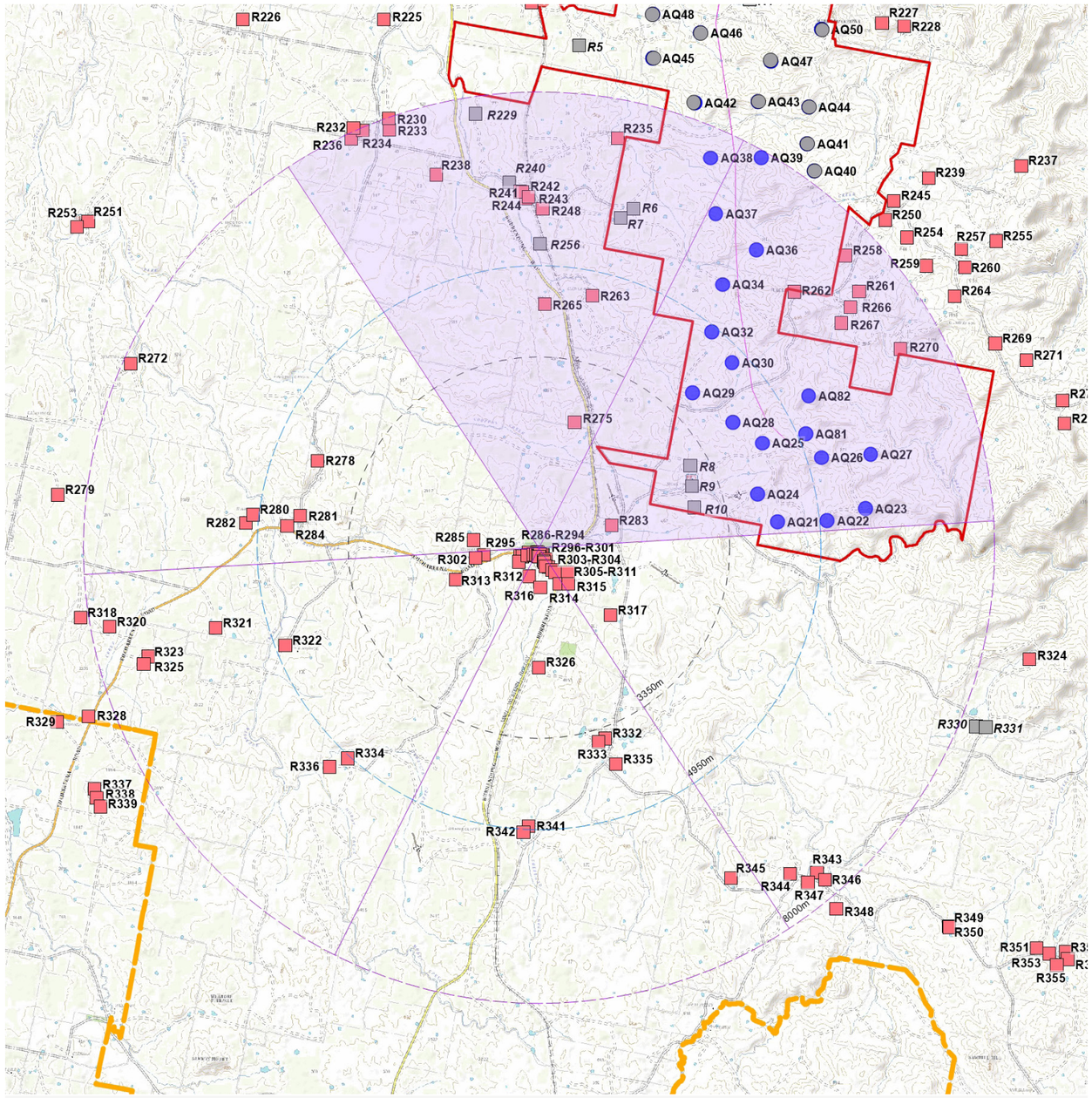
- Project Boundary
- Potential 250m Turbine Location
- Involved dwellings
- Non-associated dwellings
- Main Road
- Minor Road
- 3350 m from turbines
- 4950 m from turbines
- 8000 m from turbines
- Recreation Area
- Preliminary Dwelling Assessment locations

N

0 2 4 6 8 10km

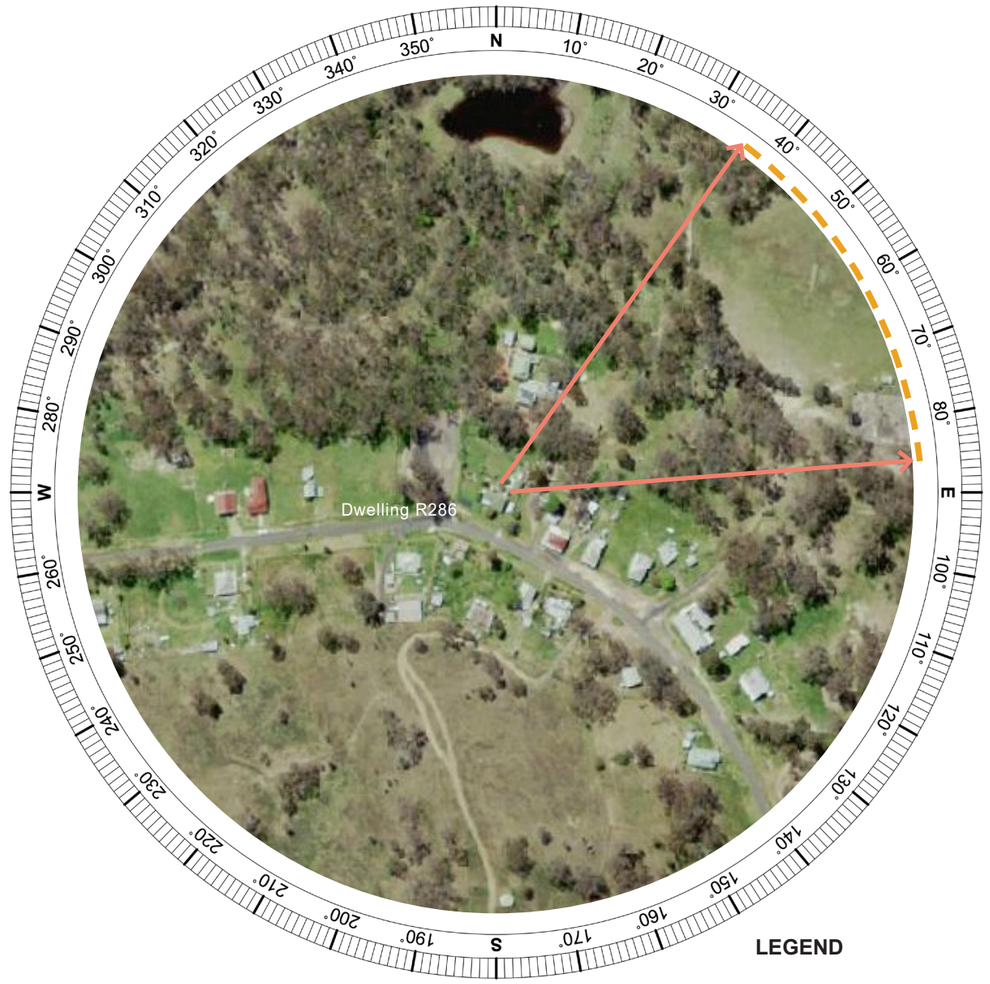
***Figure A** Preliminary Dwelling Assessment Locations (Map Source: Six Maps)*

A.1. Dwelling R286



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



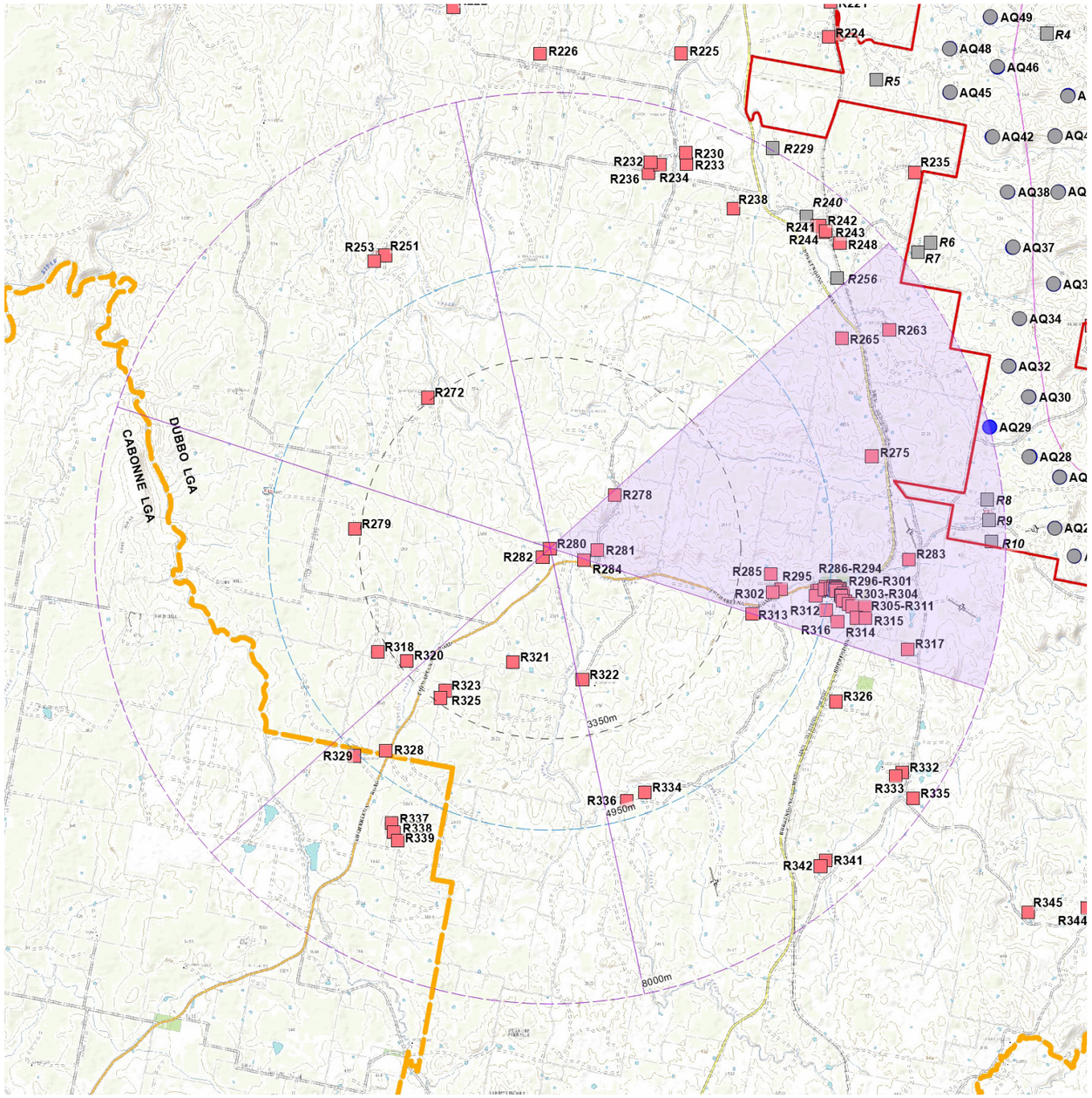
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.1 Aerial Image Dwelling R286 *(Aerial Image Source: SixMaps)*

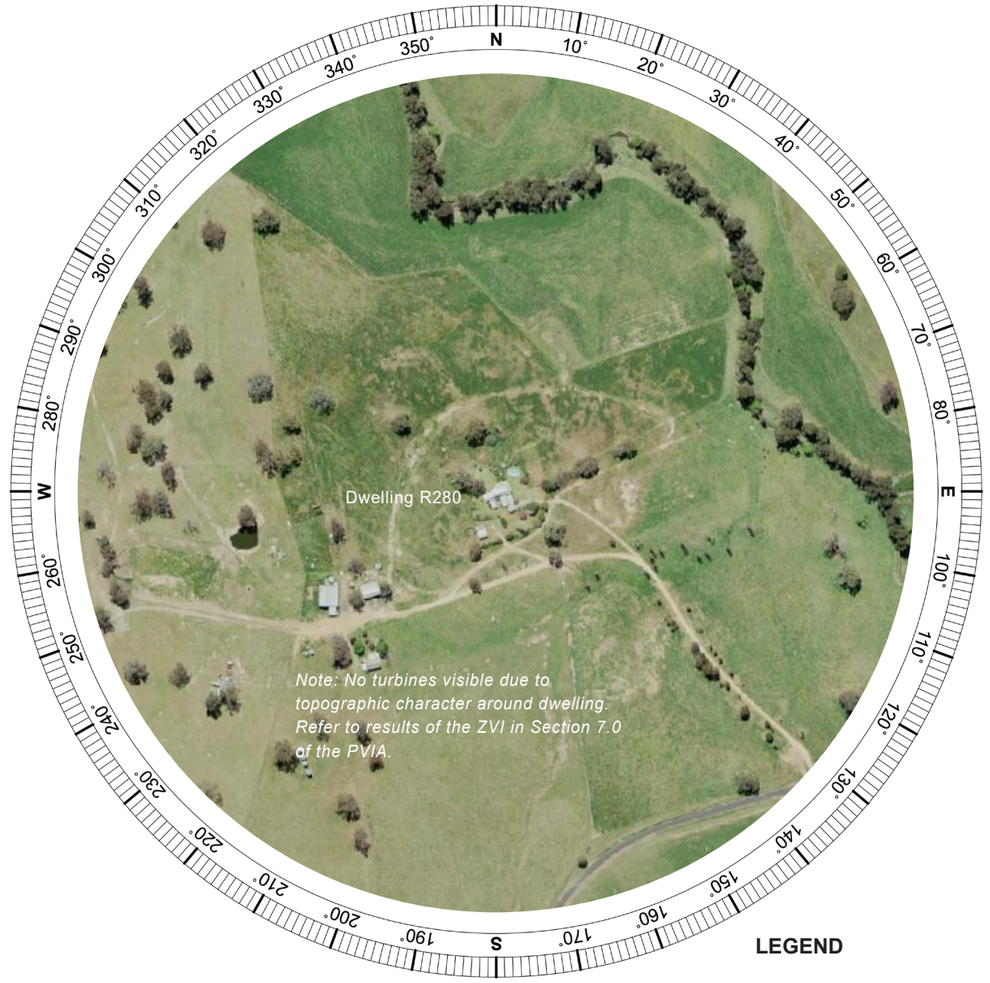
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**3.90 km**
Number of proposed turbines within the blue line (4,950 m) of visual magnitude:	**7**
Number of theoretical 60º sectors (Based on 2D assessment):	**2**
Number of potentially visible turbines within 8,000m (based on topography alone):	**12 Turbines** **10 at hub height** **2 at blade tip**

A.2. Dwelling R280



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



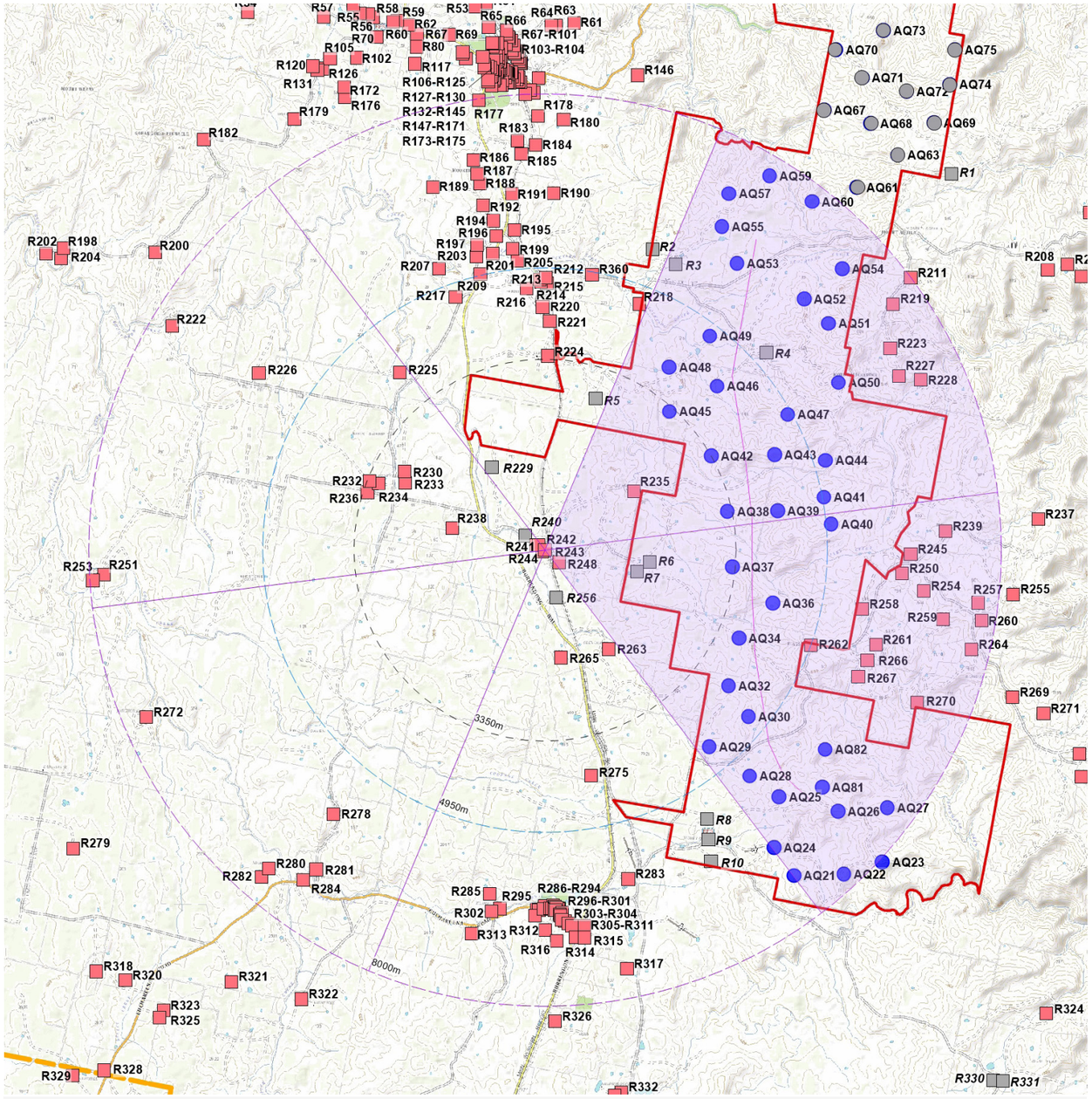
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.2 Aerial Image Dwelling R280 *(Aerial Image Source: SixMaps)*

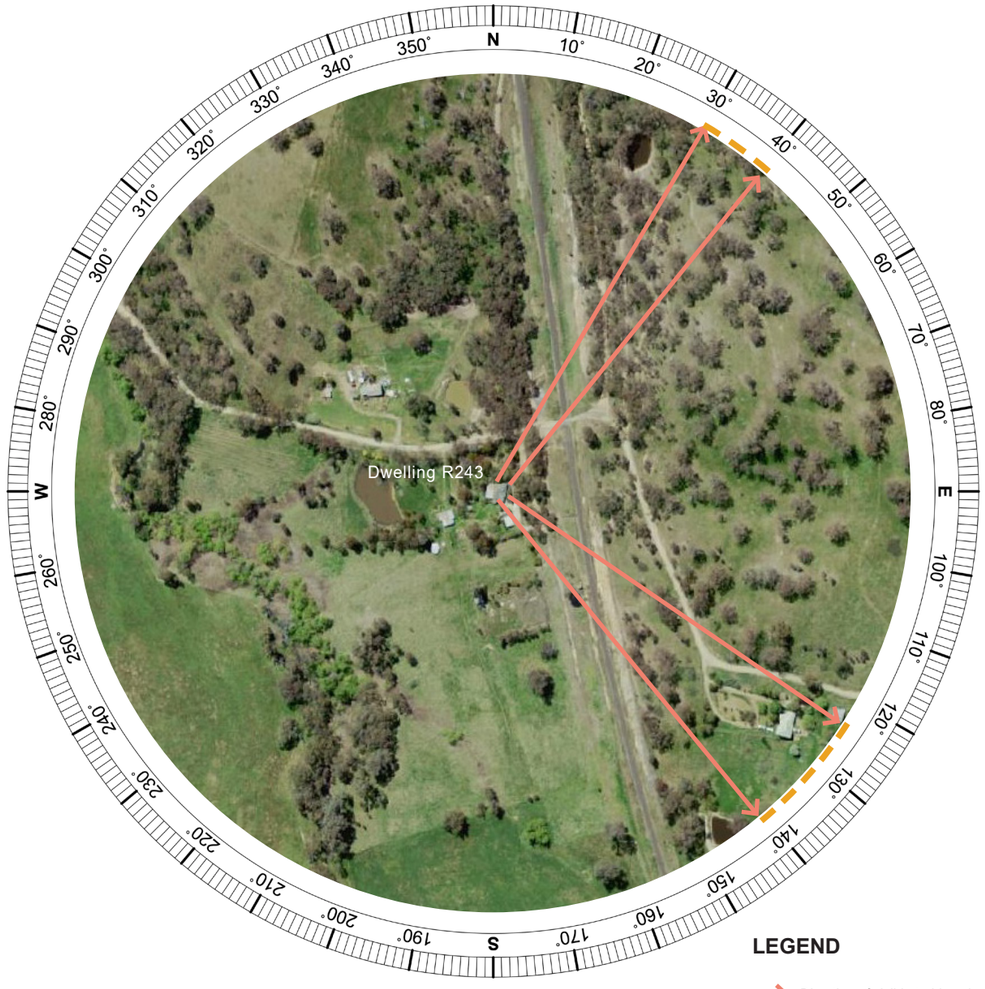
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**8.01 km**
Number of proposed turbines within the purple line (8,000 m) of visual magnitude:	**1**
Number of theoretical 60º sectors (Based on 2D assessment):	**1**
Number of potentially visible turbines within 8,000m (based on topography alone):	**Nil**

A.3. Dwelling R243



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



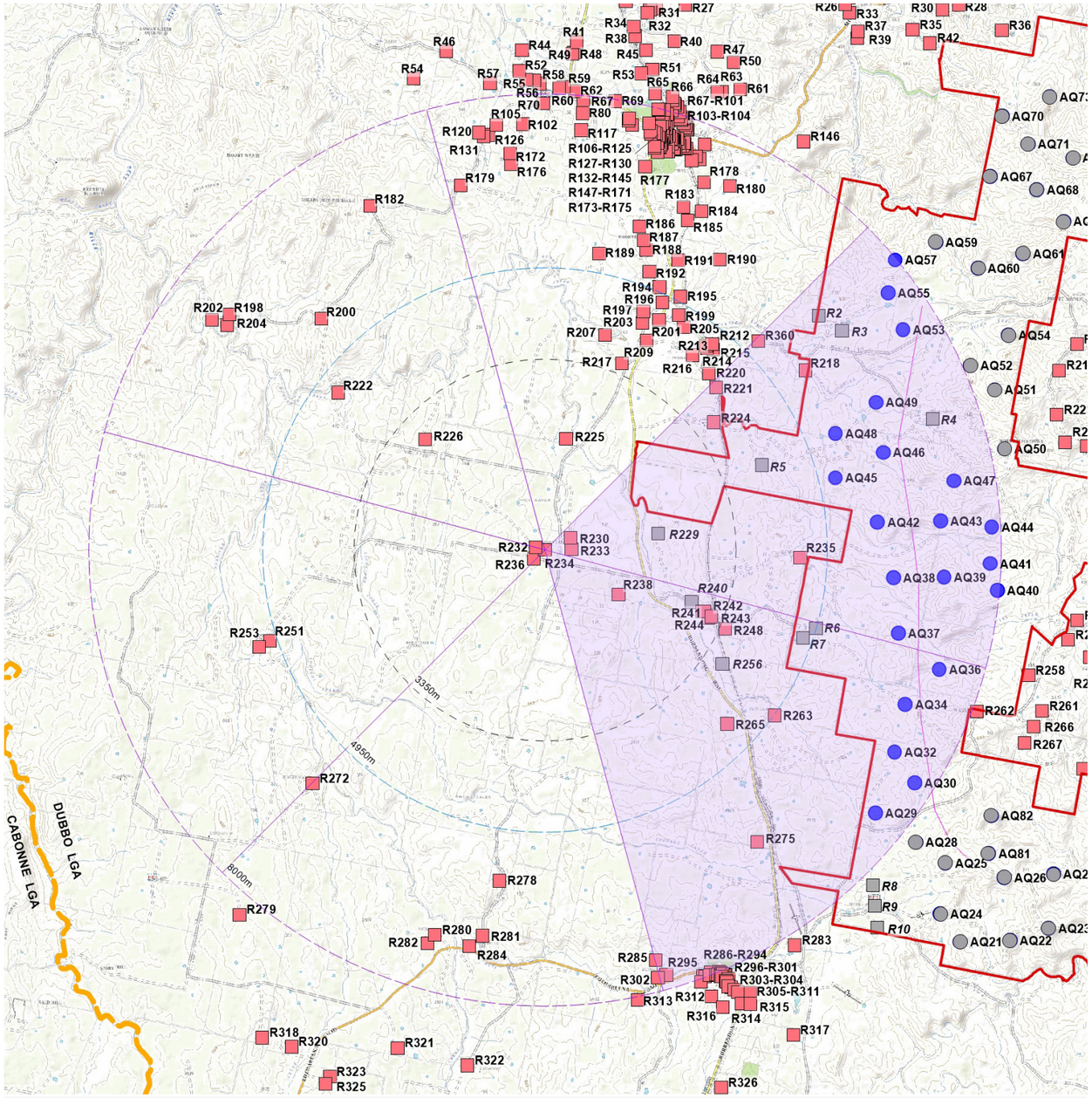
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.3 Aerial Image Dwelling R243 *(Aerial Image Source: SixMaps)*

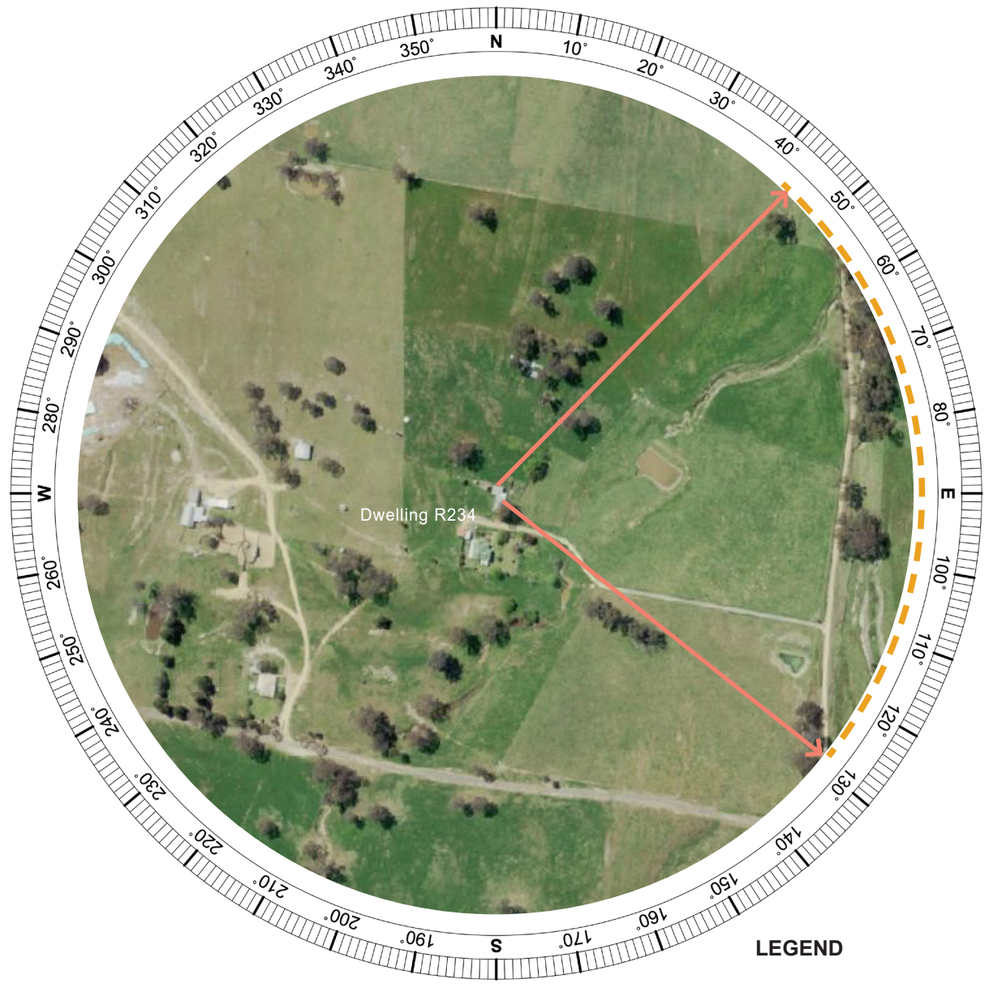
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**3.26 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**2**
Number of theoretical 60º sectors (Based on 2D assessment):	**2**
Number of potentially visible turbines within 8,000m (based on topography alone):	**6 Turbines** **2 at hub height** **4 at blade tip**

A.4. Dwelling R234



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



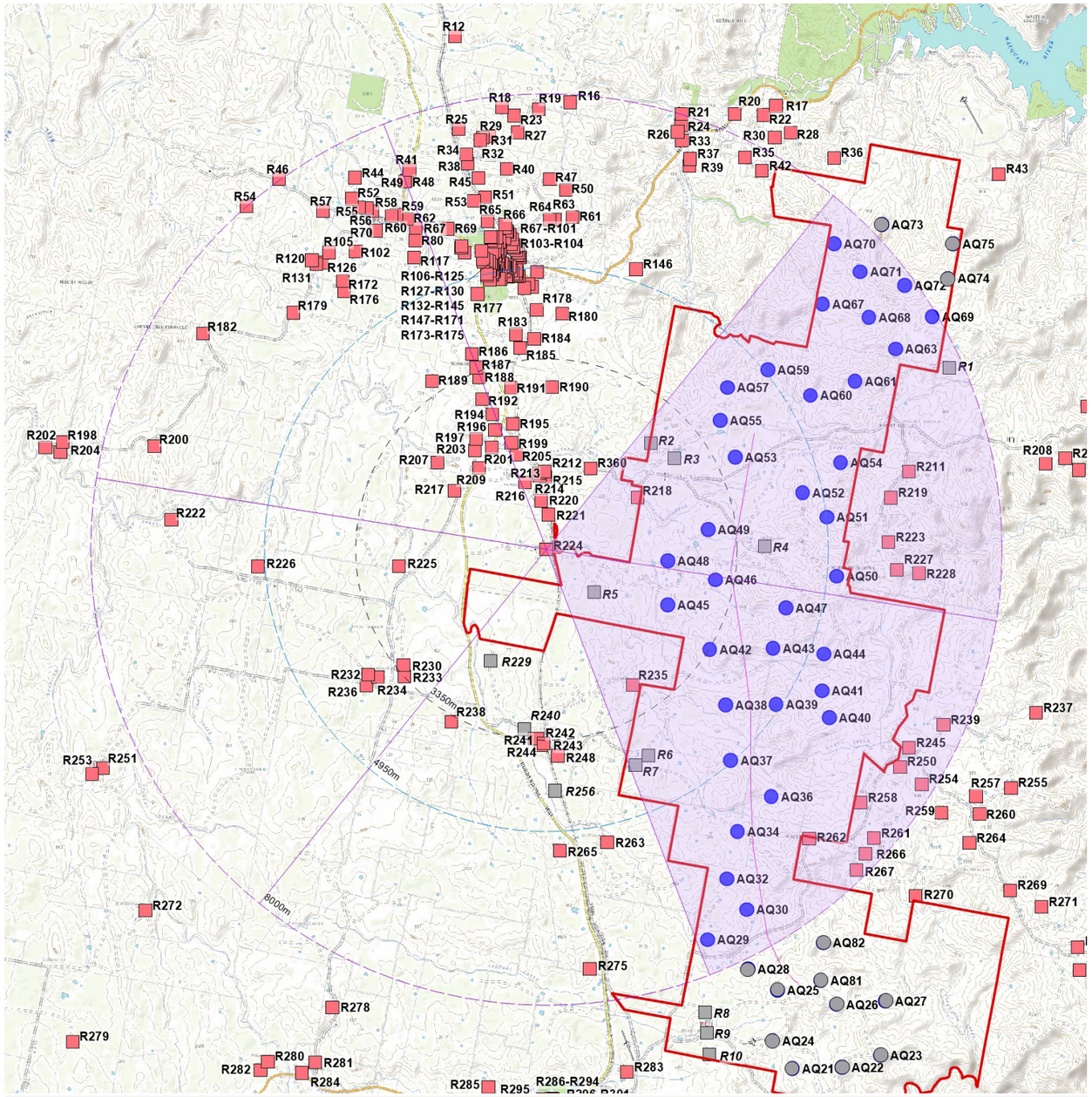
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.4 Aerial Image Dwelling R234 *(Aerial Image Source: SixMaps)*

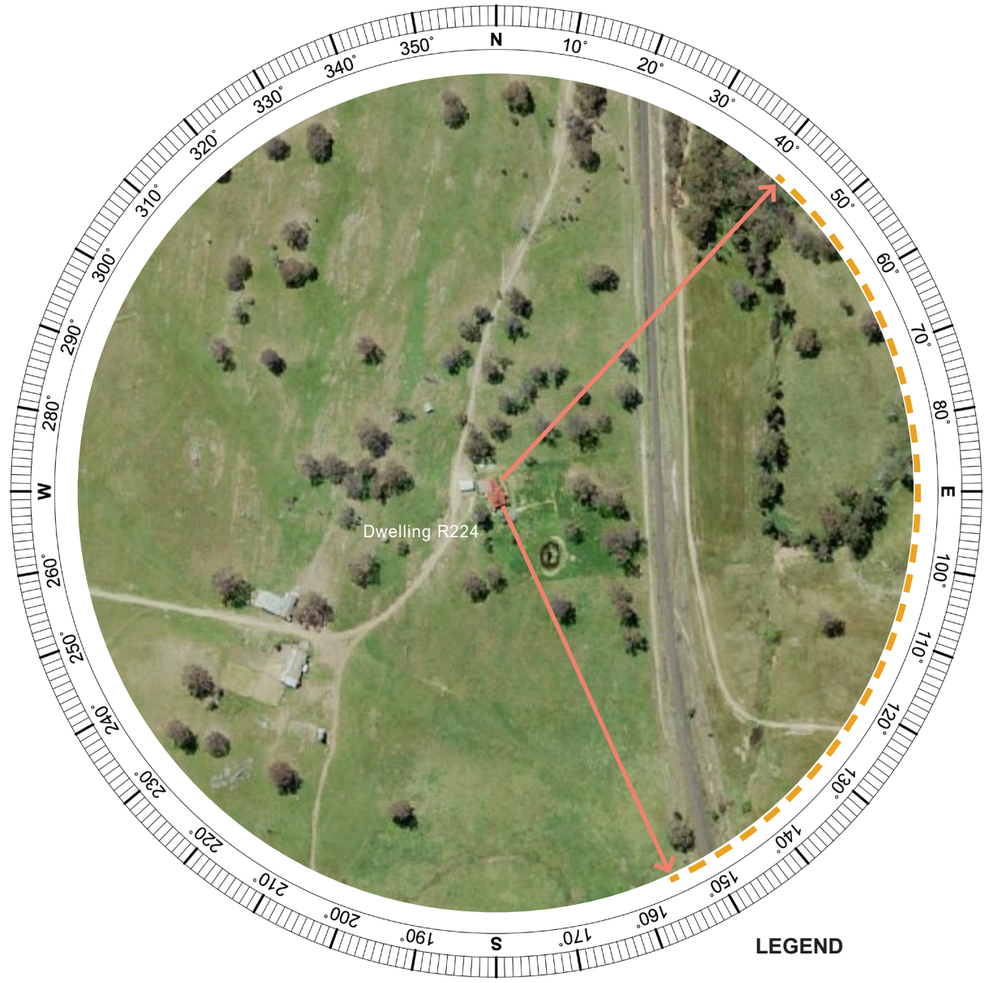
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**5.24 km**
Number of proposed turbines within the purple line (8,000 m) of visual magnitude:	**21**
Number of theoretical 60º sectors (Based on 2D assessment):	**2**
Number of potentially visible turbines within 8,000m (based on topography alone):	**21 Turbines** **18 at hub height** **3 at blade tip**

A.5. Dwelling R224



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



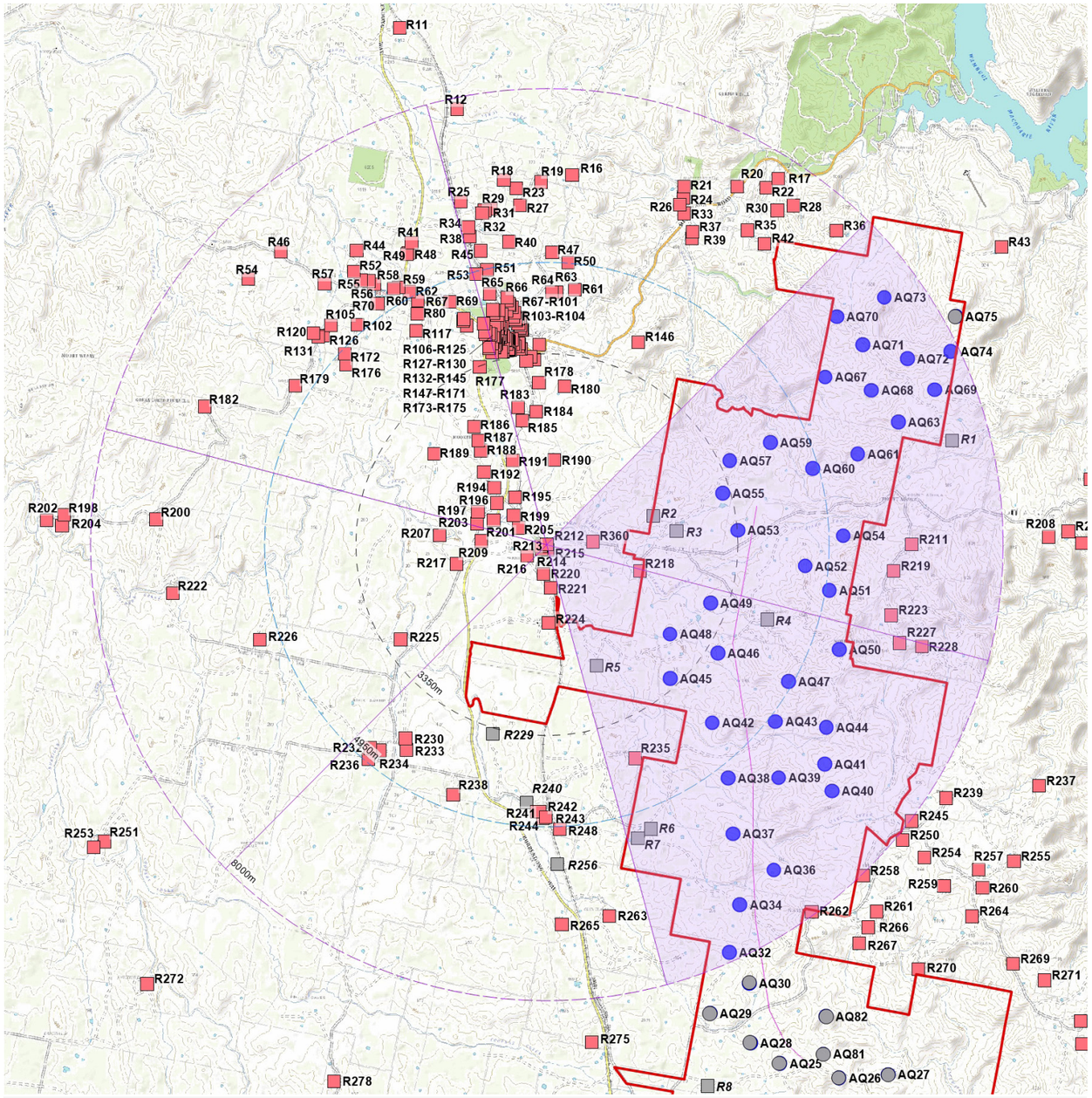
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.5 Aerial Image Dwelling R224 *(Aerial Image Source: SixMaps)*

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**2.13 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**5**
Number of theoretical 60º sectors (Based on 2D assessment):	**2**
Number of potentially visible turbines within 8,000m (based on topography alone):	**35 Turbines** **34 at hub height** **1 at blade tip**

A.6. Dwelling R212



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines

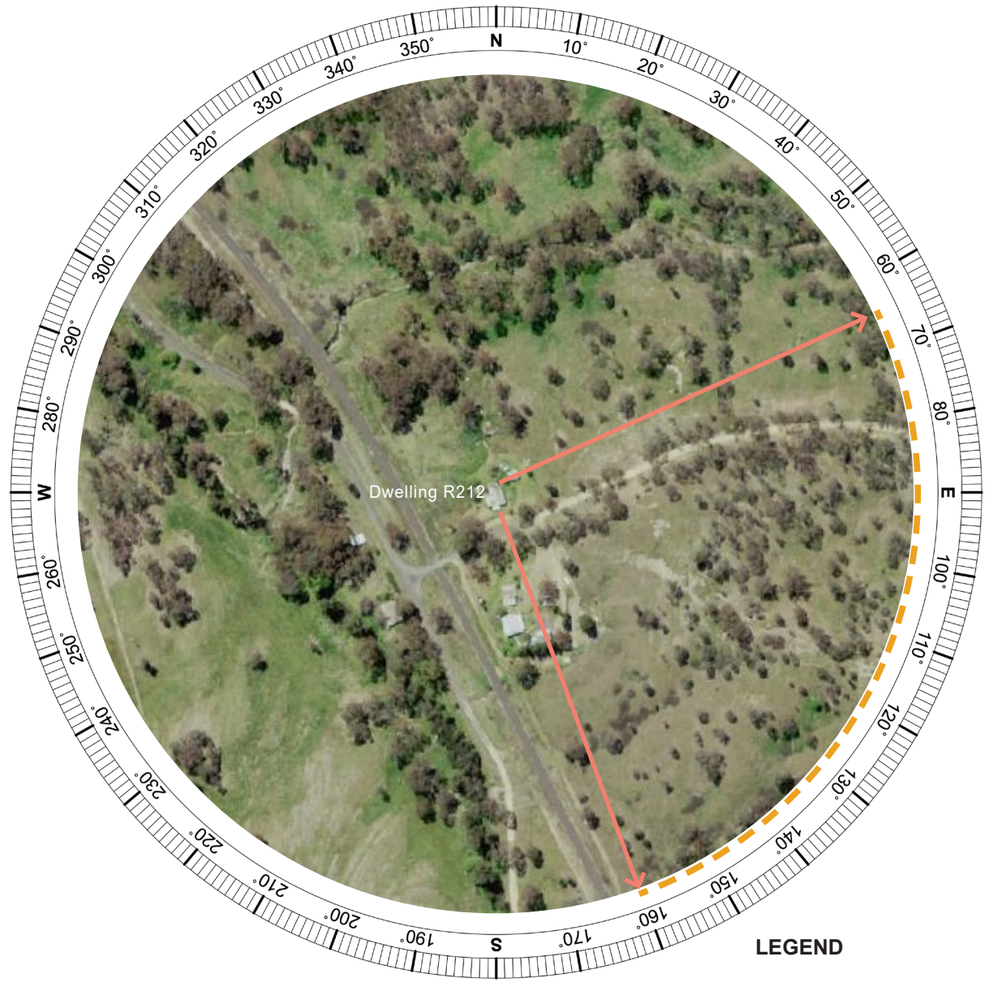
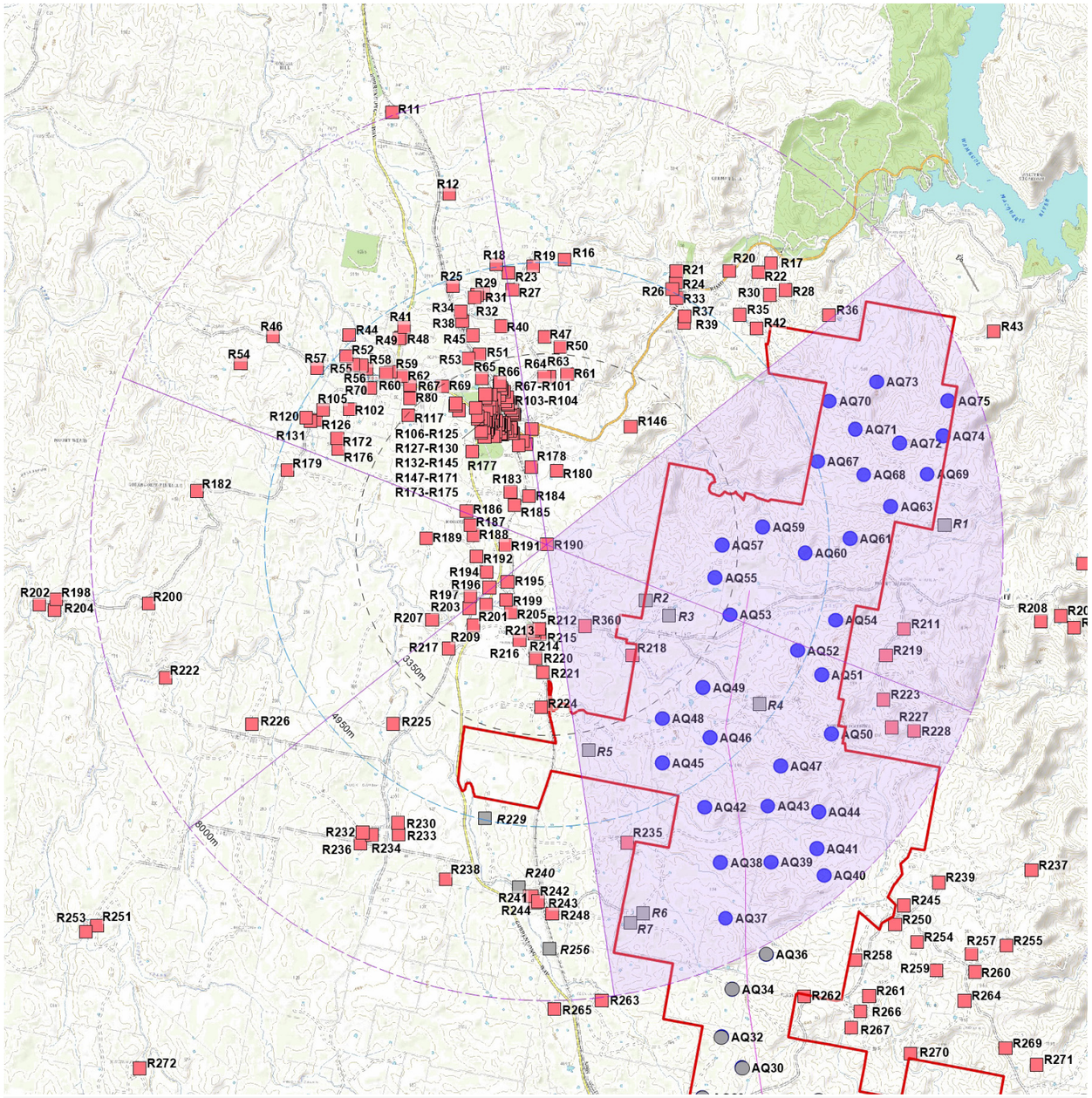


Figure A.6 Aerial Image Dwelling R212 *(Aerial Image Source: SixMaps)*

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**2.66 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**5**
Number of theoretical 60º sectors (Based on 2D assessment):	**2**
Number of potentially visible turbines within 8,000m (based on topography alone):	**31 Turbines** **27 at hub height** **4 at blade tip**

A.7. Dwelling R190



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines

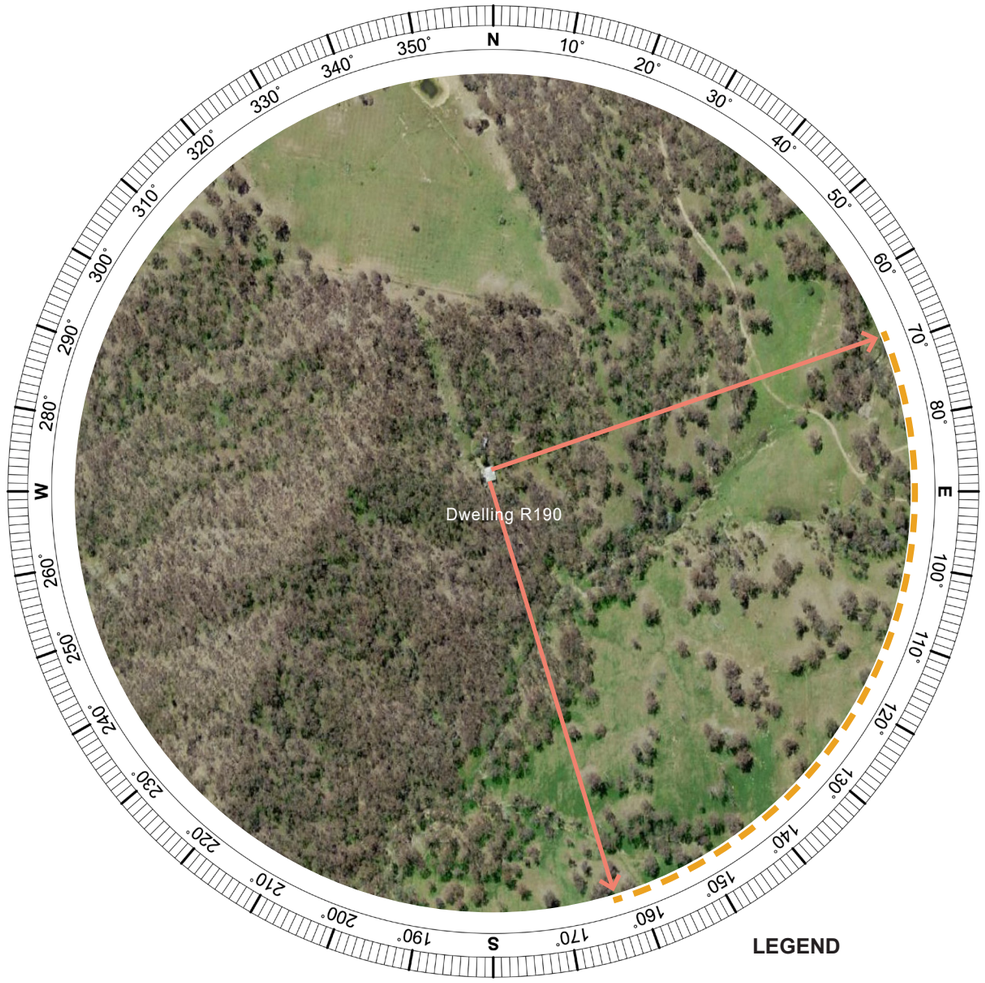
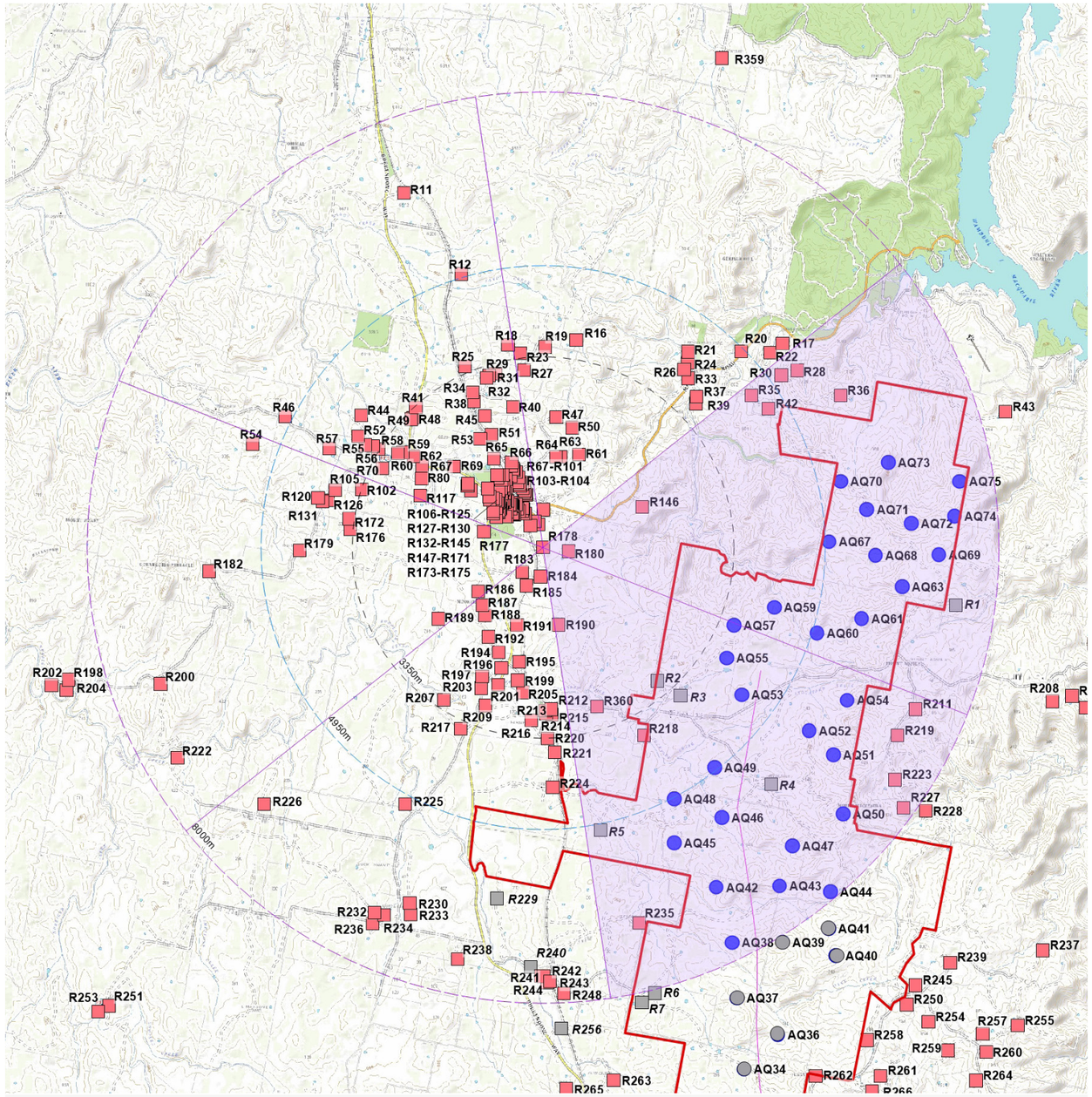


Figure A.7 Aerial Image Dwelling R190 *(Aerial Image Source: SixMaps)*

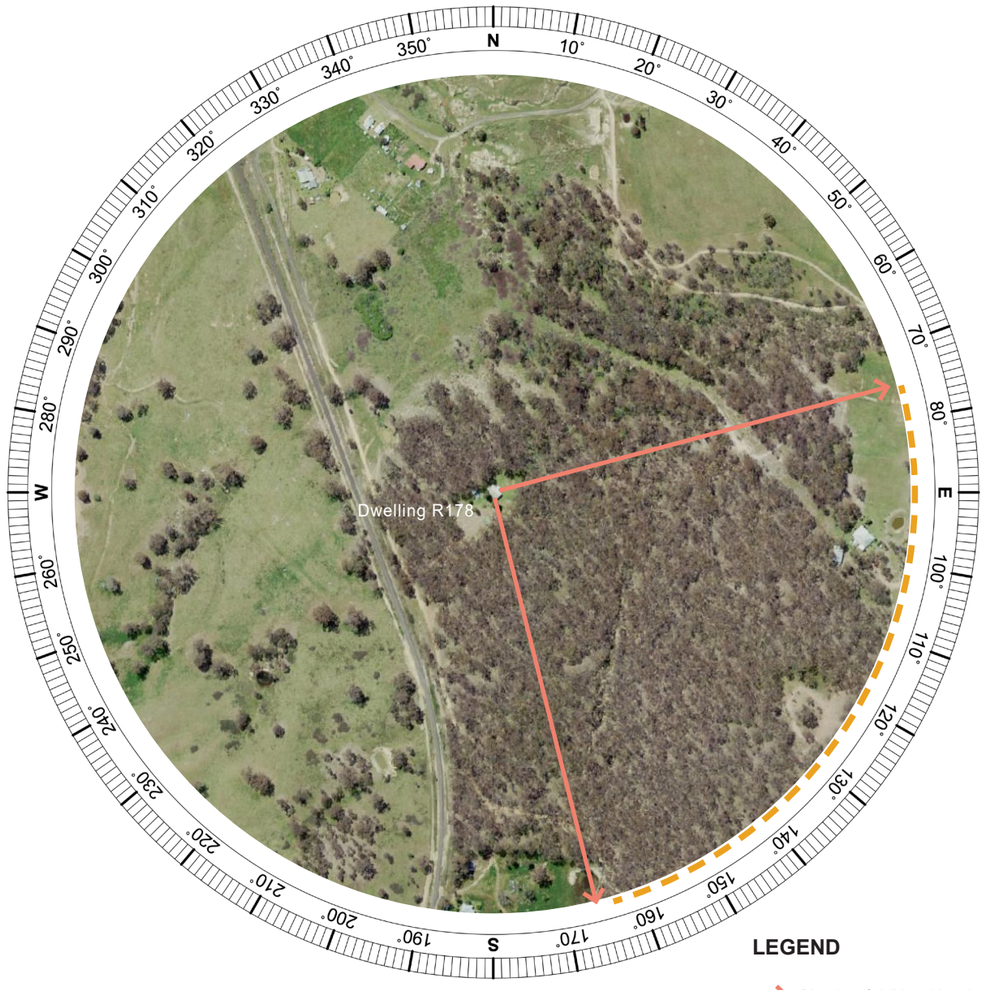
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**3.00 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**2**
Number of theoretical 60º sectors (Based on 2D assessment):	**2**
Number of potentially visible turbines within 8,000m (based on topography alone):	**32 Turbines** **31 at hub height** **1 at blade tip**

A.8. Dwelling R178



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



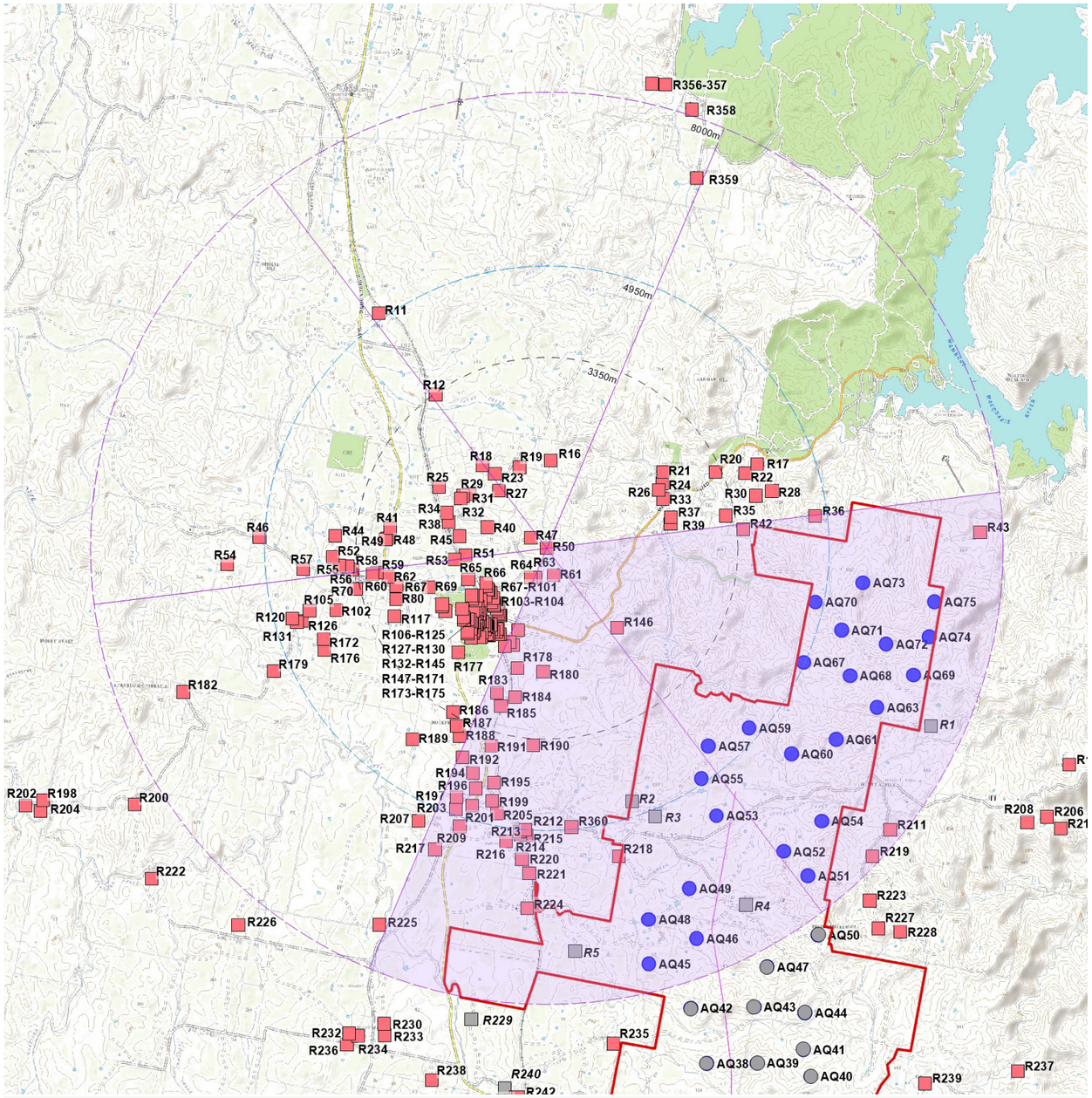
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.8 Aerial Image Dwelling R178 *(Aerial Image Source: SixMaps)*

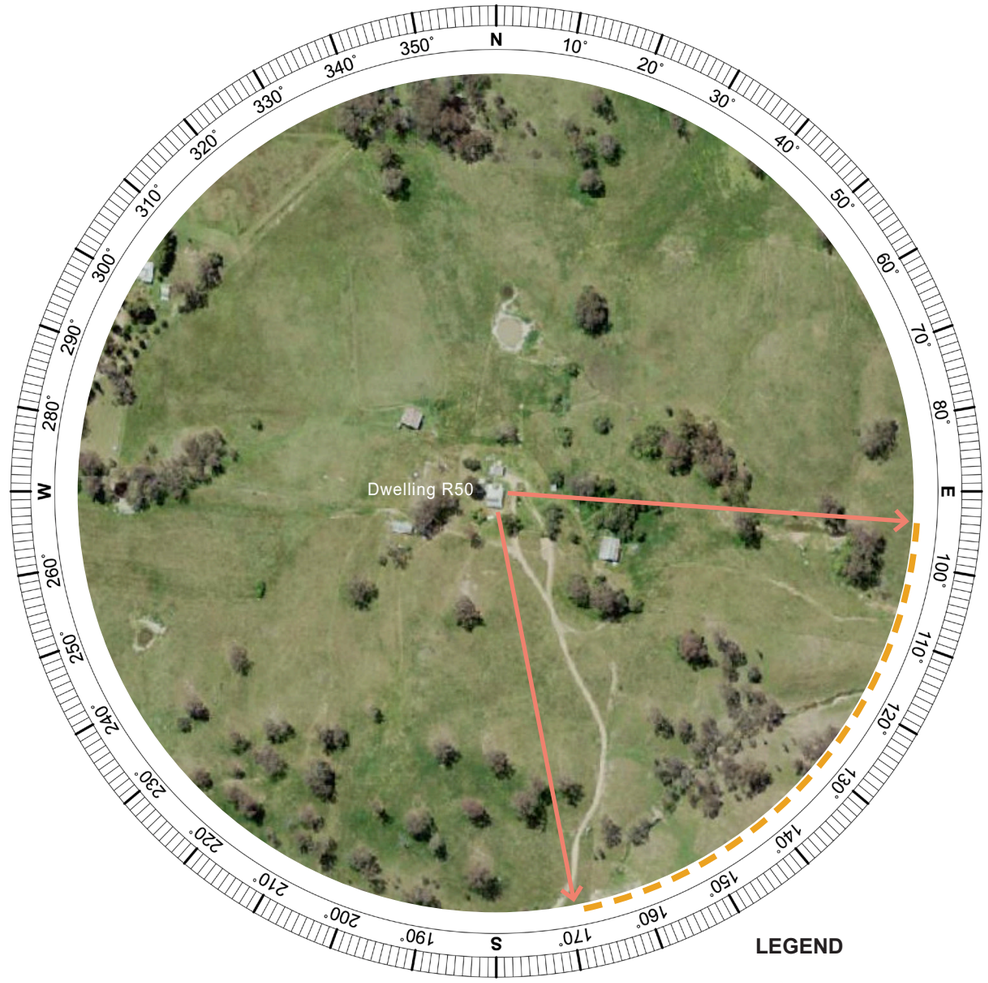
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**3.61 km**
Number of proposed turbines within the blue line (4,950 m) of visual magnitude:	**6**
Number of theoretical 60º sectors (Based on 2D assessment):	**2**
Number of potentially visible turbines within 8,000m (based on topography alone):	**29 Turbines (All at hub height)**

A.9. Dwelling R50



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



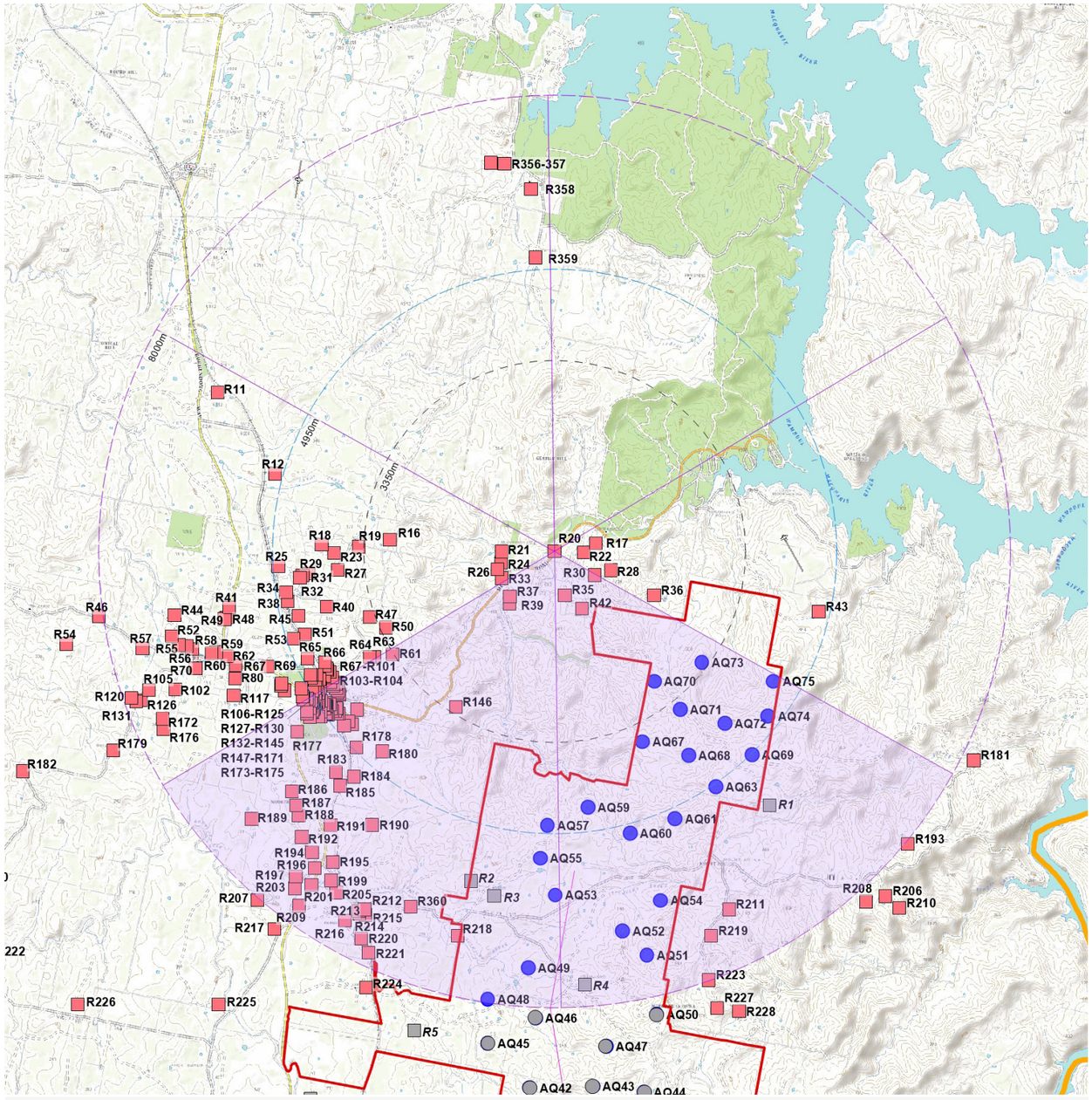
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.9 Aerial Image Dwelling R50 *(Aerial Image Source: SixMaps)*

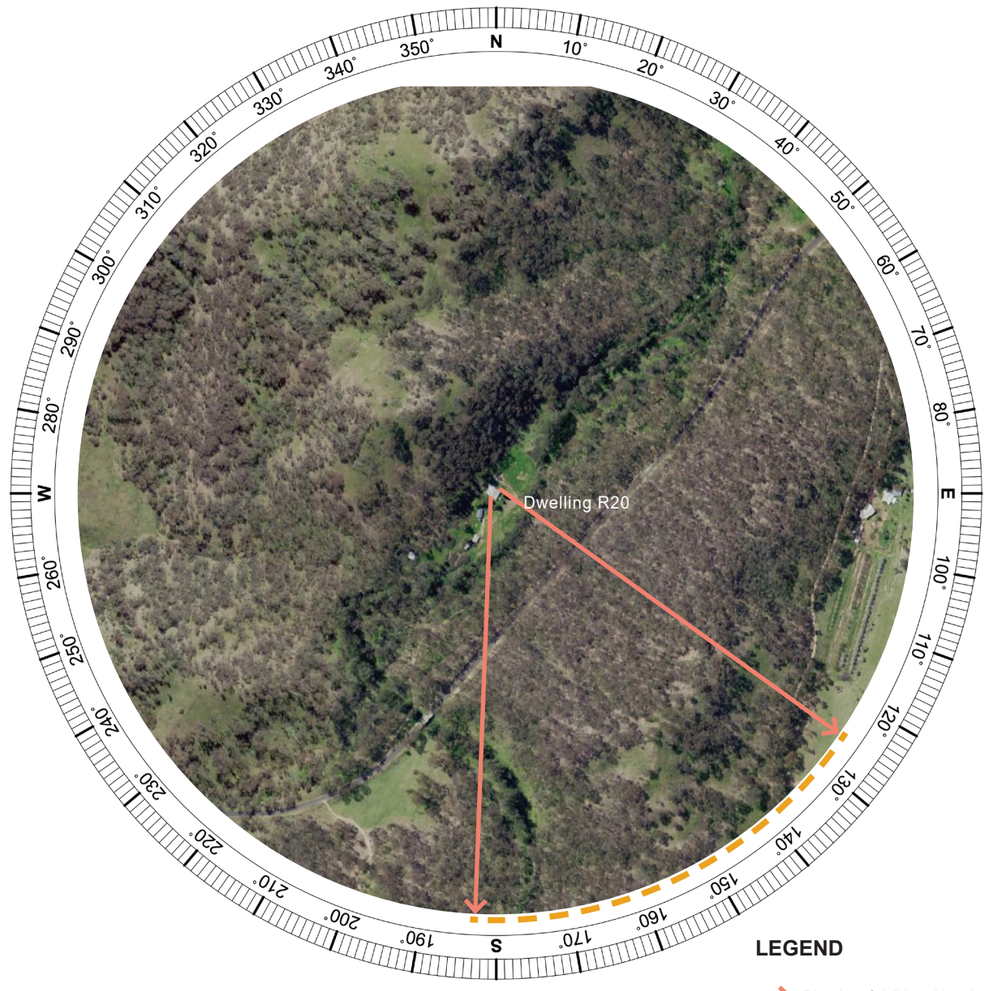
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**4.47 km**
Number of proposed turbines within the blue line (4,950 m) of visual magnitude:	**5**
Number of theoretical 60º sectors (Based on 2D assessment):	**2**
Number of potentially visible turbines within 8,000m (based on topography alone):	**23 Turbines (All at hub height)**

A.10. Dwelling R20



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



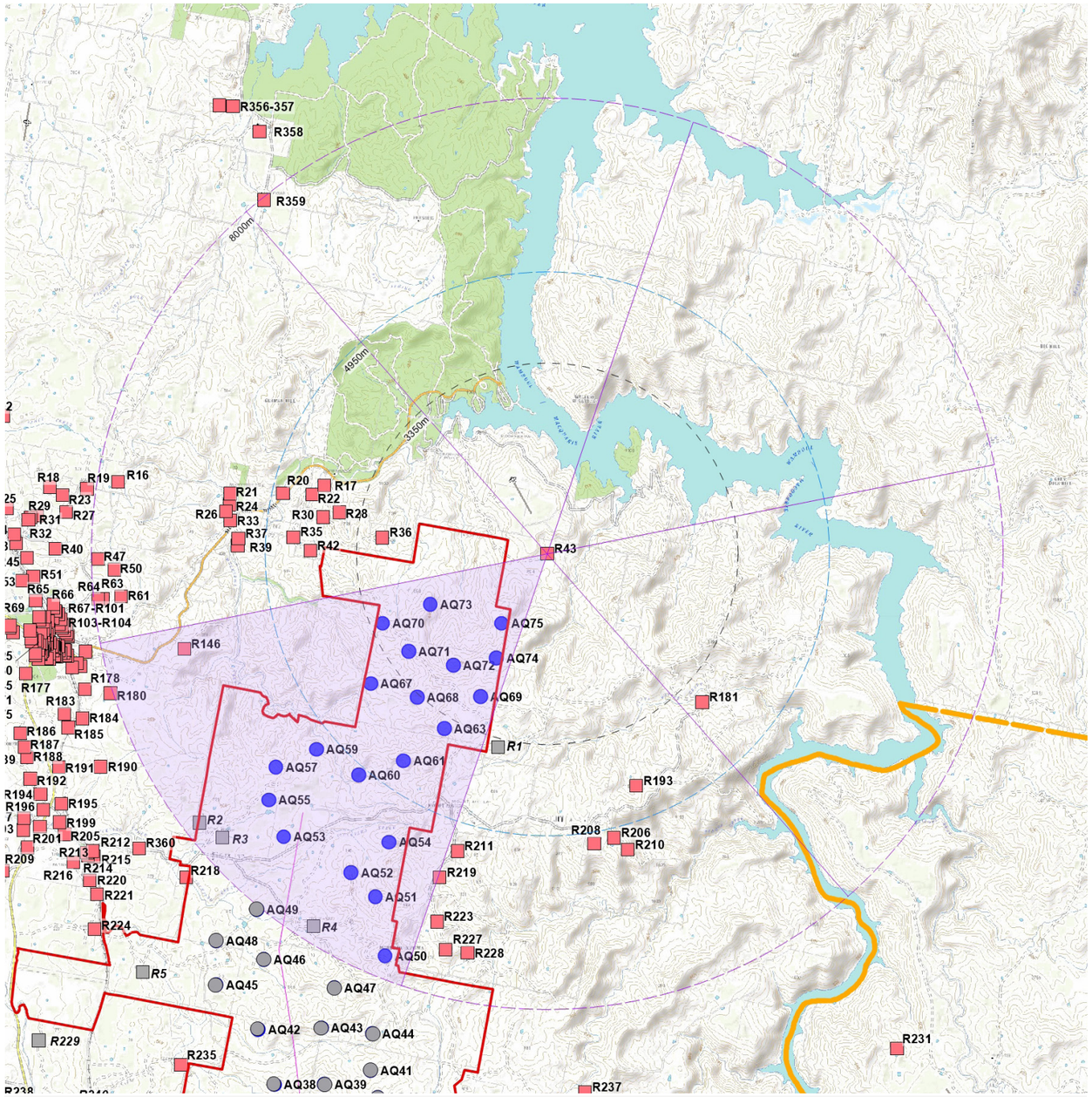
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.10 Aerial Image Dwelling R20 *(Aerial Image Source: SixMaps)*

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**2.87 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**2**
Number of theoretical 60º sectors (Based on 2D assessment):	**2**
Number of potentially visible turbines within 8,000m (based on topography alone):	**18 Turbines** **9 at hub height** **9 at blade tip height**

A.11. Dwelling R43



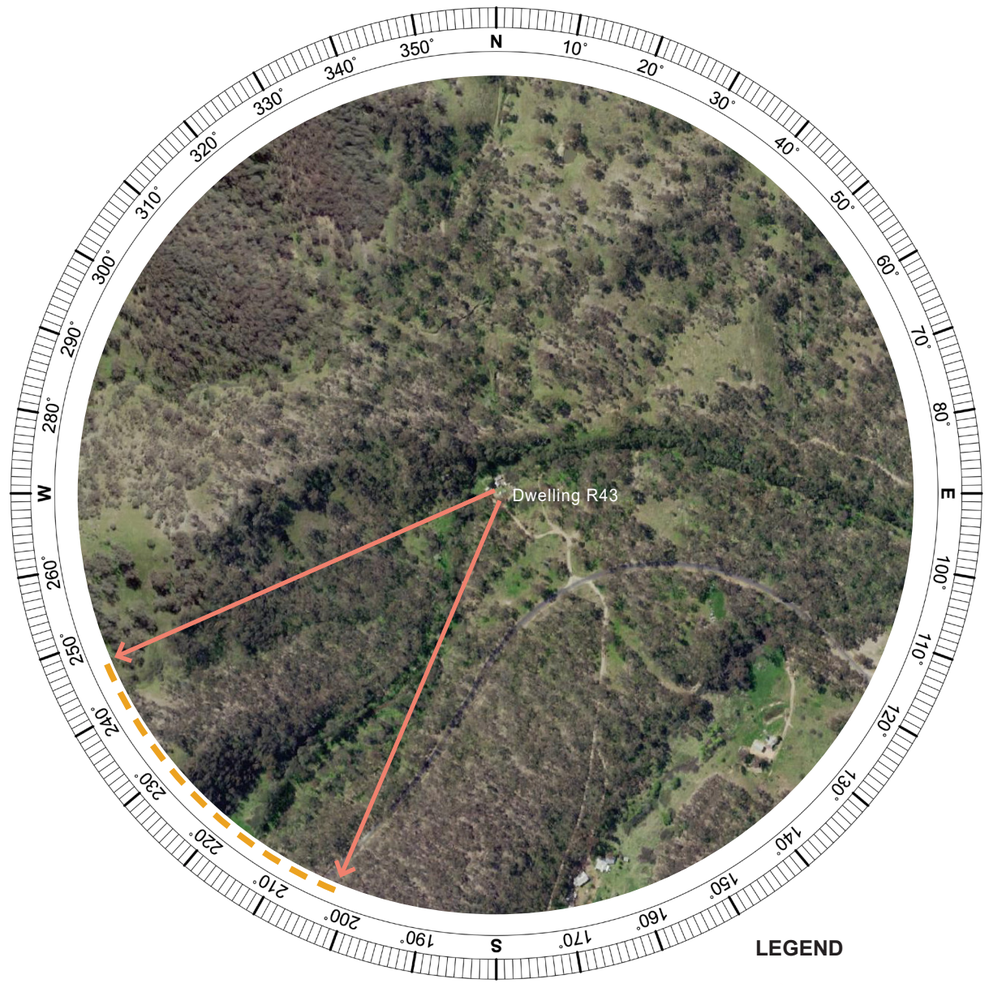
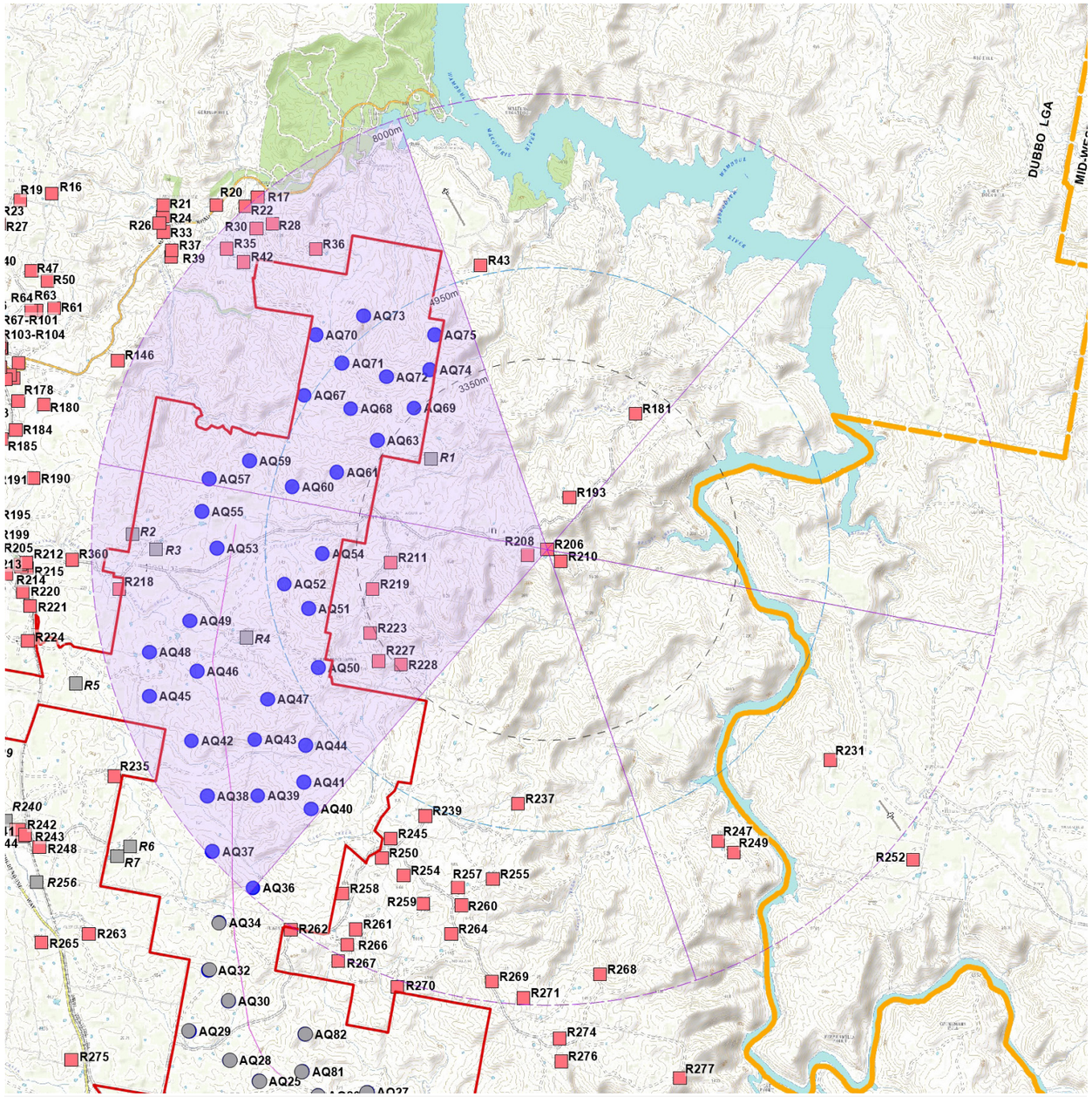


Figure A.11 Aerial Image Dwelling R43 *(Aerial Image Source: SixMaps)*

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**1.45 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**7**
Number of theoretical 60º sectors (Based on 2D assessment):	**1**
Number of potentially visible turbines within 8,000m (based on topography alone):	**9 Turbines** **6 at hub height** **3 at blade tip**

A.12. Dwelling R206



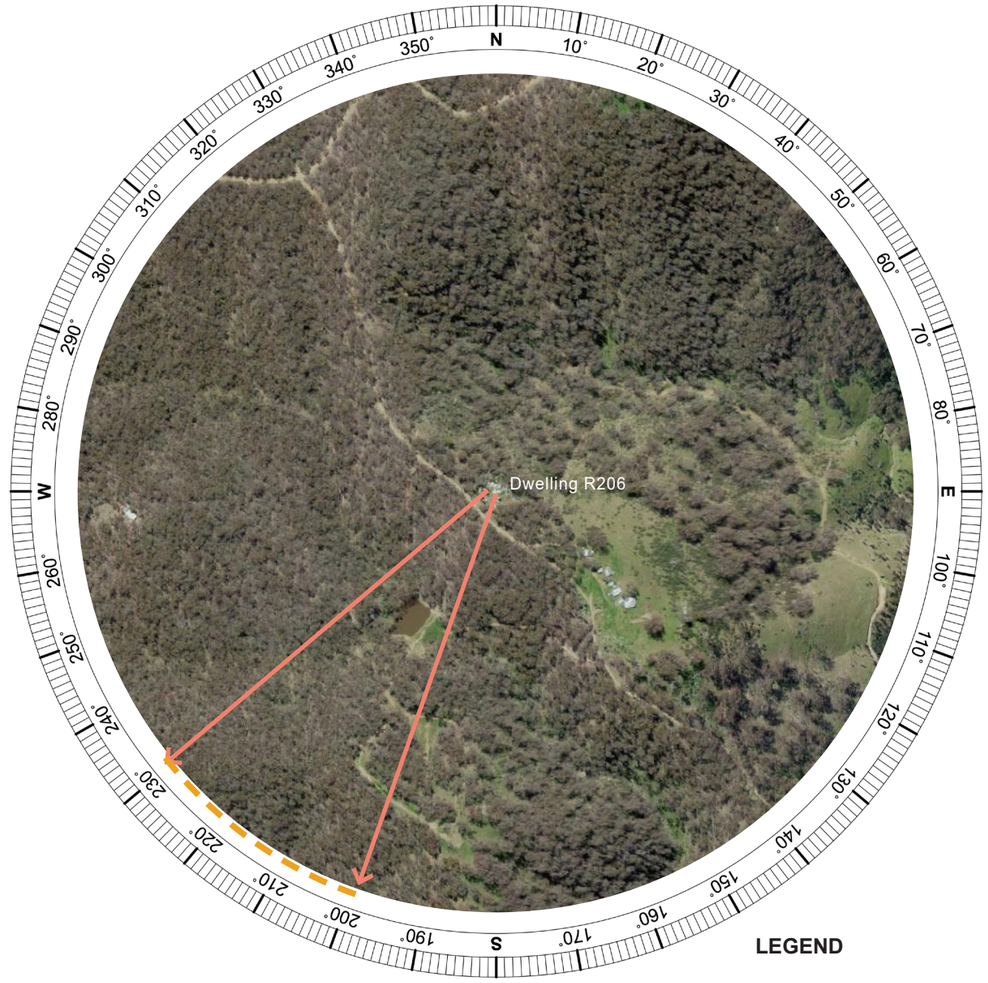
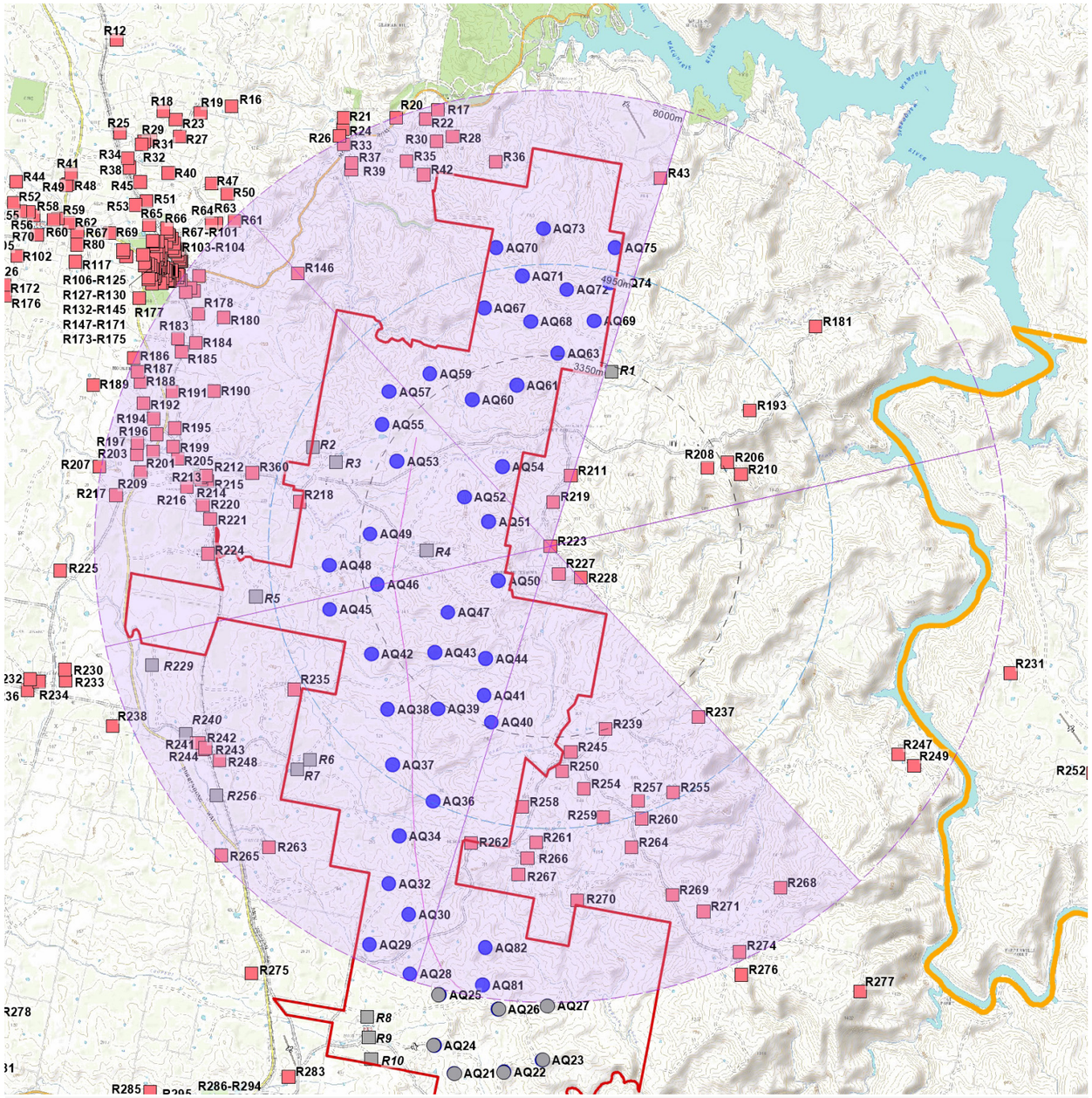


Figure A.12 Aerial Image Dwelling R206 *(Aerial Image Source: SixMaps)*

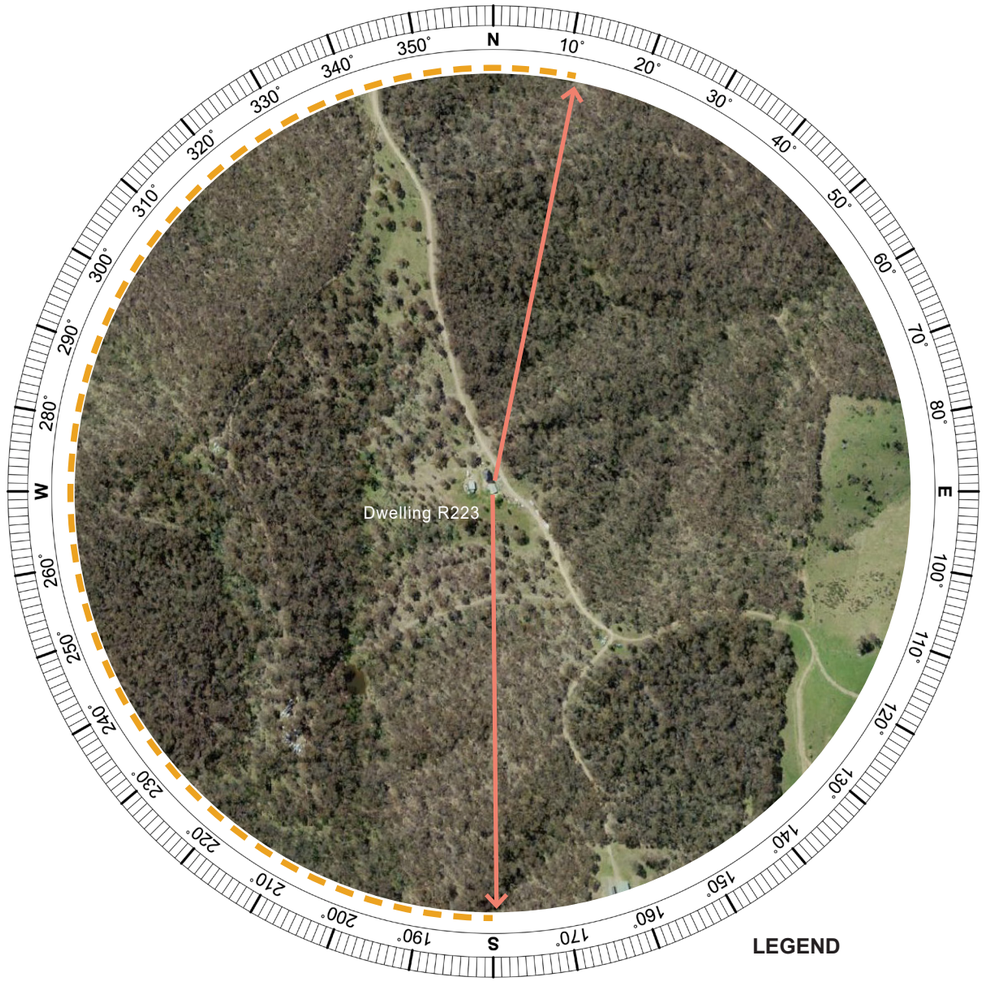
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**3.41 km**
Number of proposed turbines within the blue line (4,950 m) of visual magnitude:	**13**
Number of theoretical 60º sectors (Based on 2D assessment):	**2**
Number of potentially visible turbines within 8,000m (based on topography alone):	**10 Turbines** **5 at hub height** **5 at blade tip height**

A.13. Dwelling R223



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



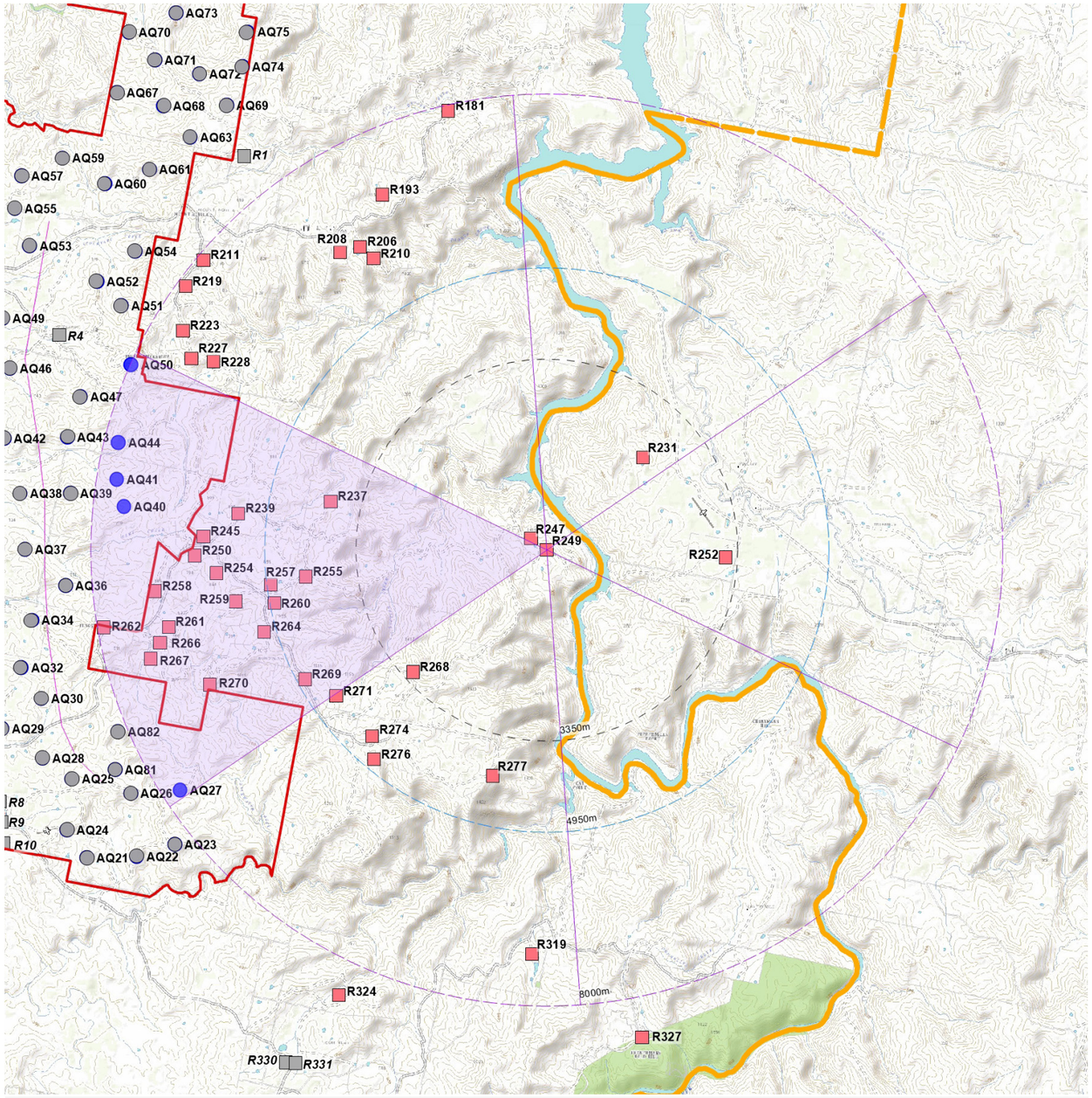
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.13 Aerial Image Dwelling R223 *(Aerial Image Source: SixMaps)*

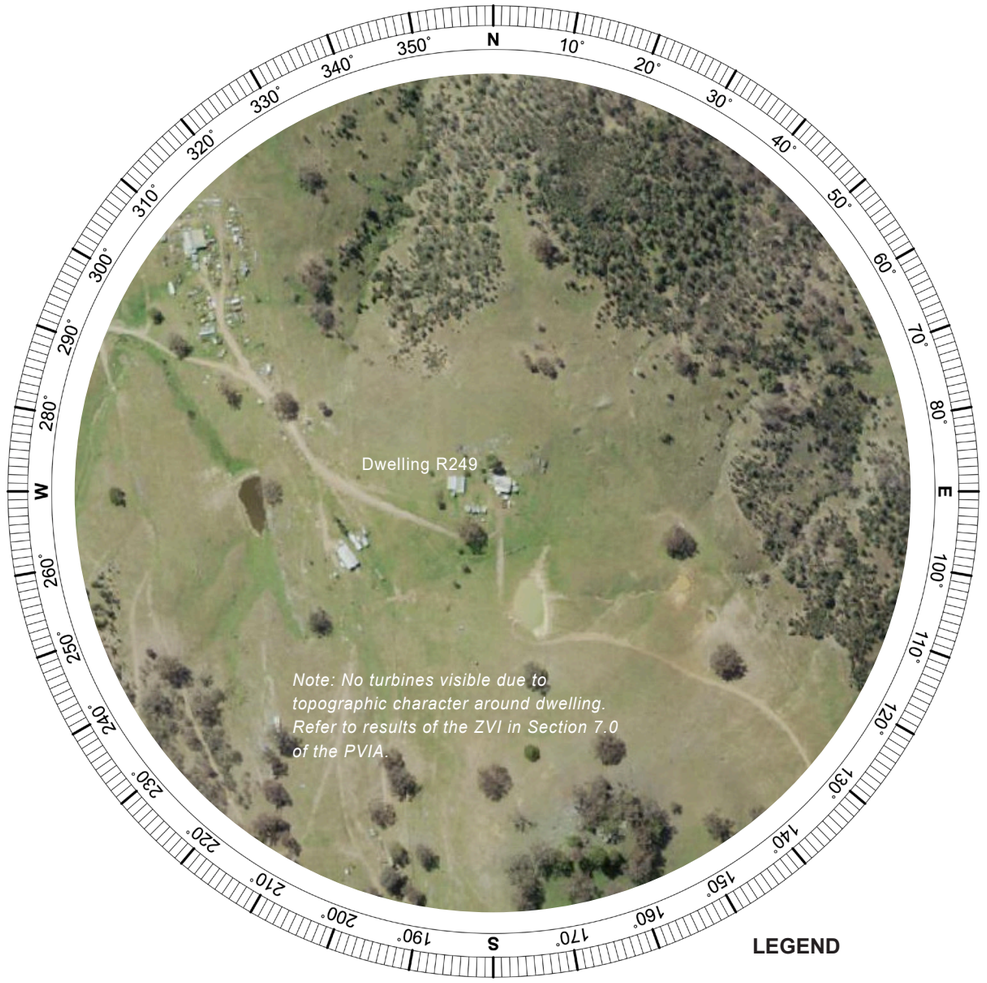
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**1.08 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**14**
Number of theoretical 60º sectors (Based on 2D assessment):	**4**
Number of potentially visible turbines within 8,000m (based on topography alone):	**27 Turbines** **18 at hub height** **9 at blade tip height**

A.14. Dwelling R249



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



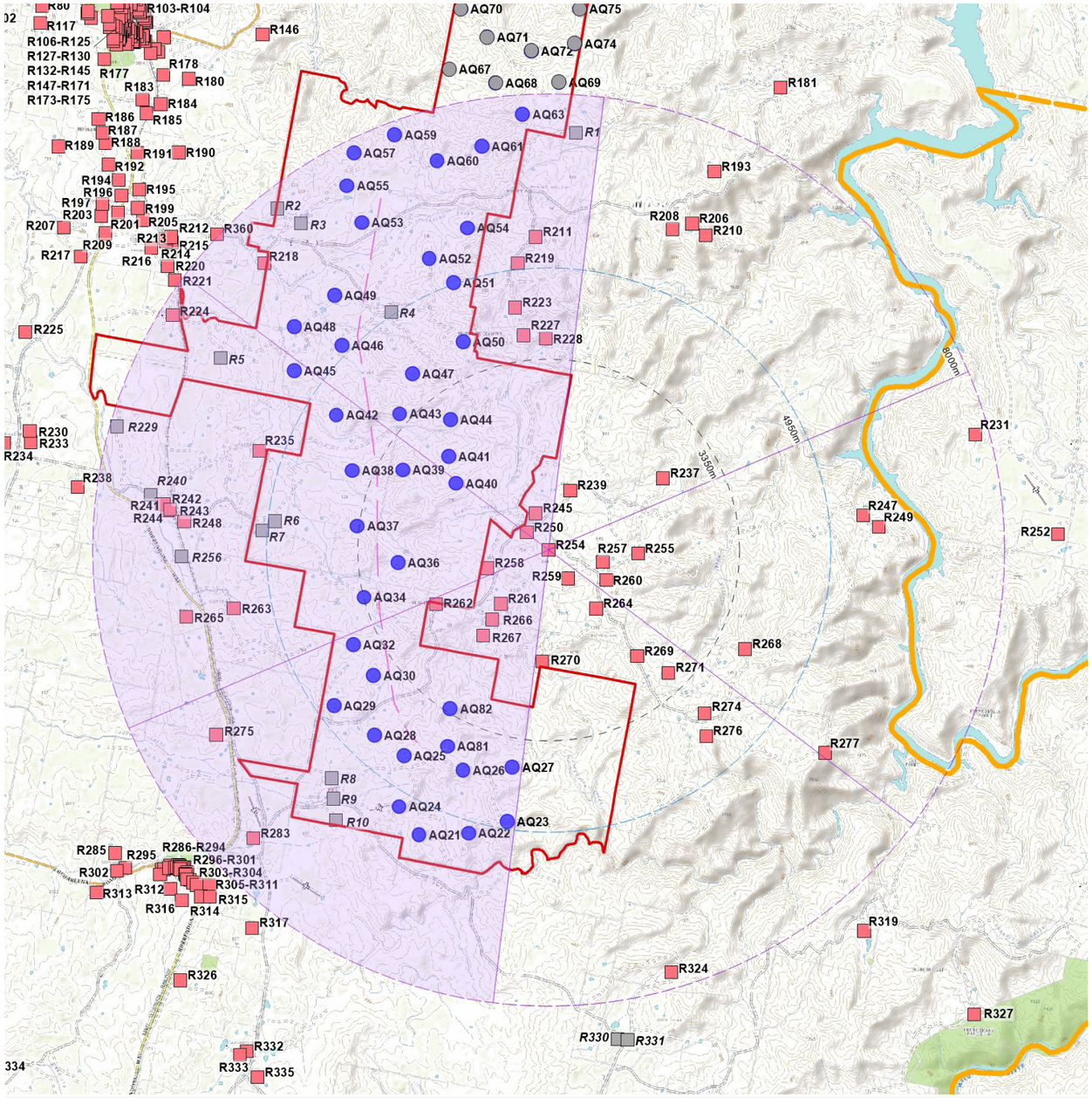
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.14 Aerial Image Dwelling R249 *(Aerial Image Source: SixMaps)*

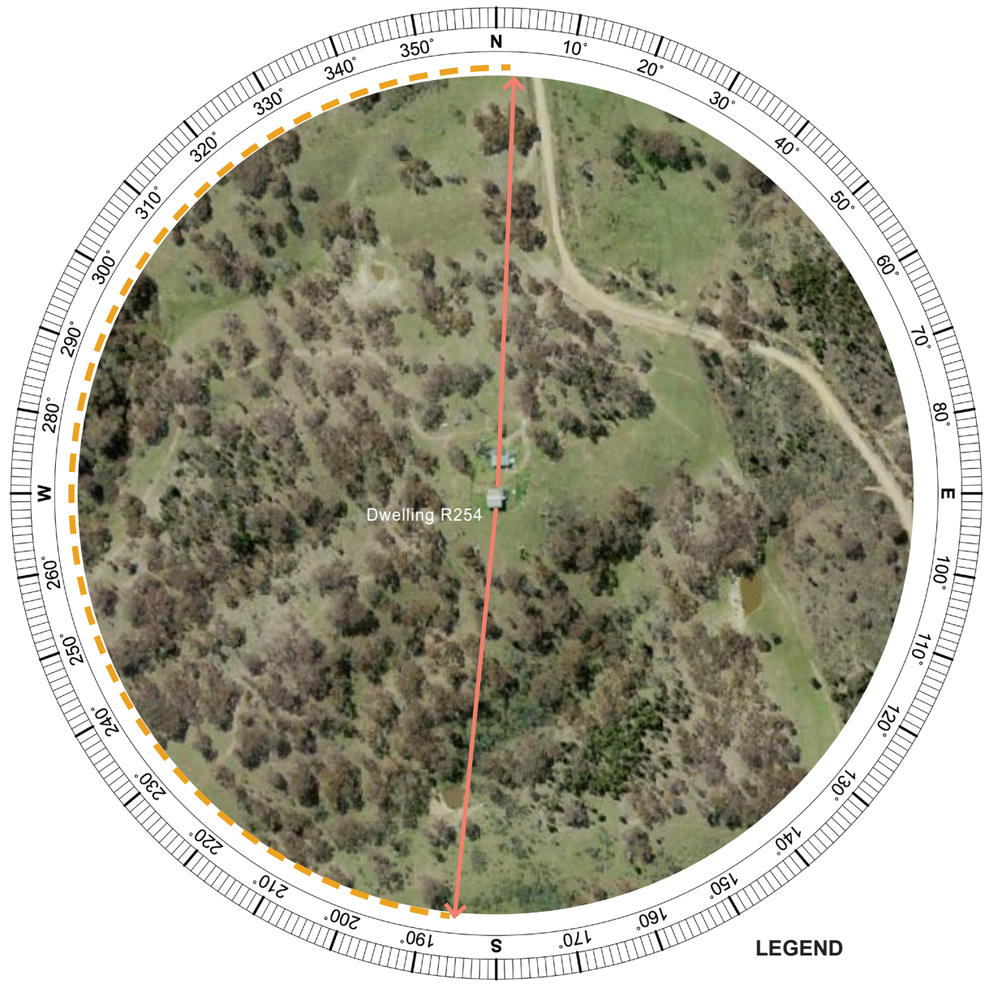
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**7.45 km**
Number of proposed turbines within the purple line (8,000 m) of visual magnitude:	**5**
Number of theoretical 60º sectors (Based on 2D assessment):	**1**
Number of potentially visible turbines within 8,000m (based on topography alone):	**Nil**

A.15. Dwelling R254



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



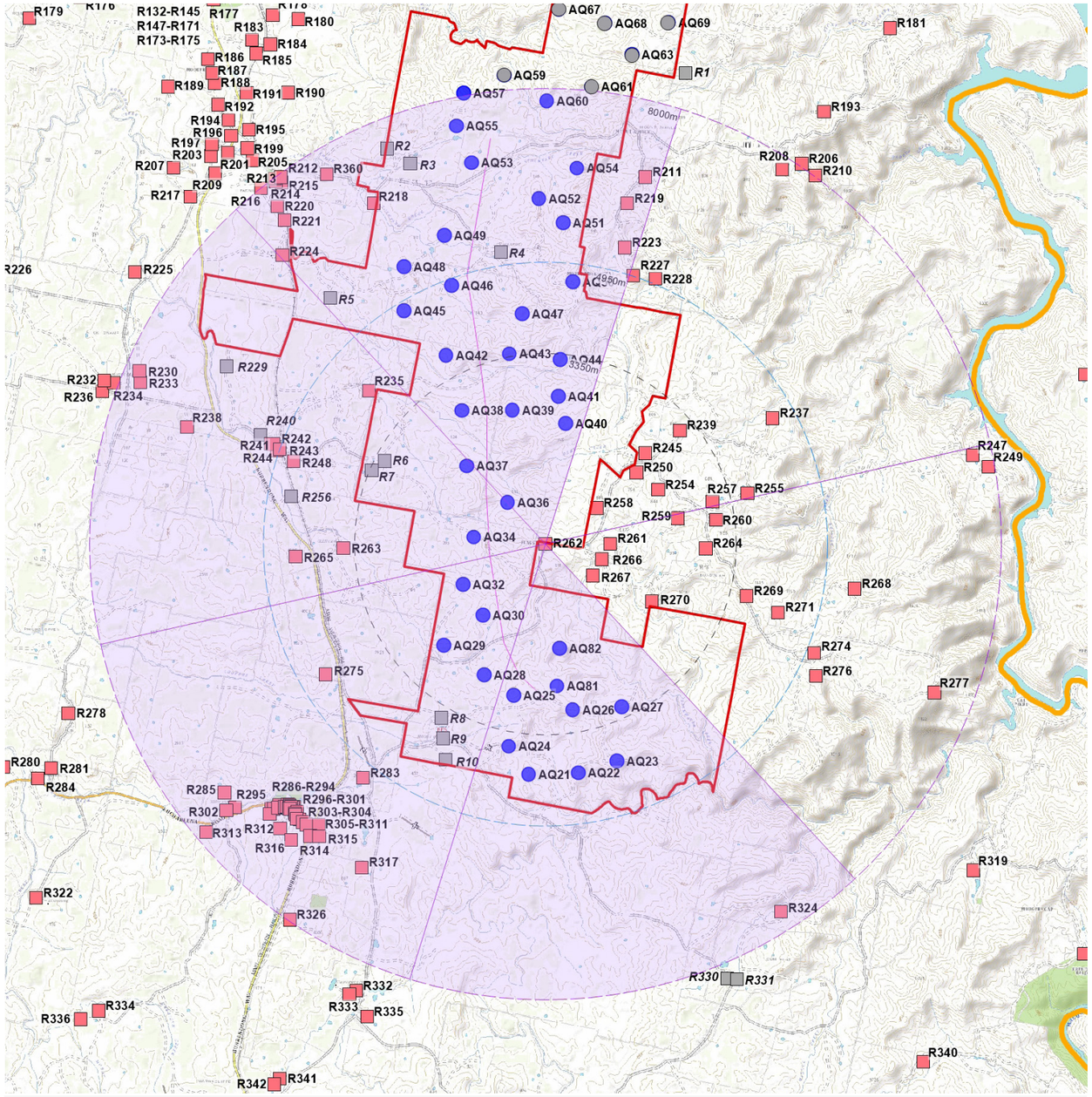
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.15 Aerial Image Dwelling R254 *(Aerial Image Source: SixMaps)*

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**2.00 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**8**
Number of theoretical 60º sectors (Based on 2D assessment):	**3**
Number of potentially visible turbines within 8,000m (based on topography alone):	**36 Turbines** **30 at hub height** **6 at blade tip height**

A.16. Dwelling R262



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines

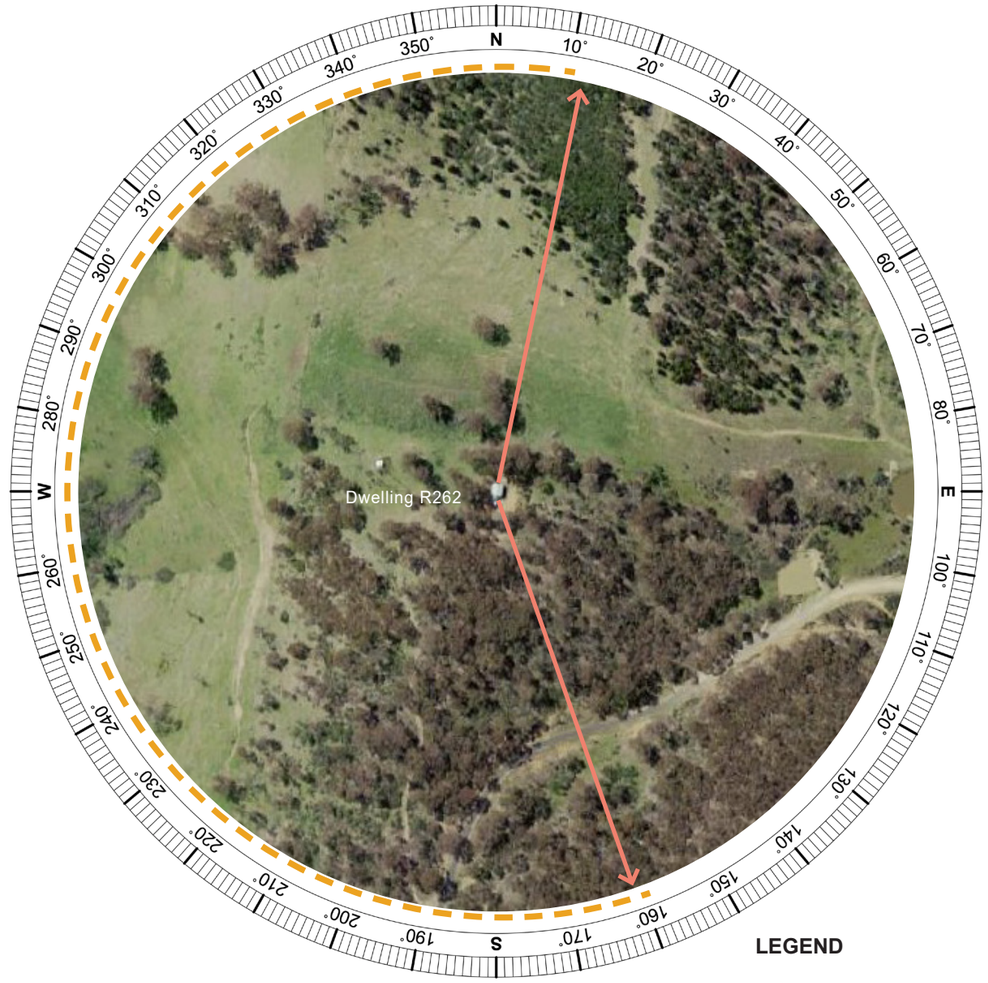
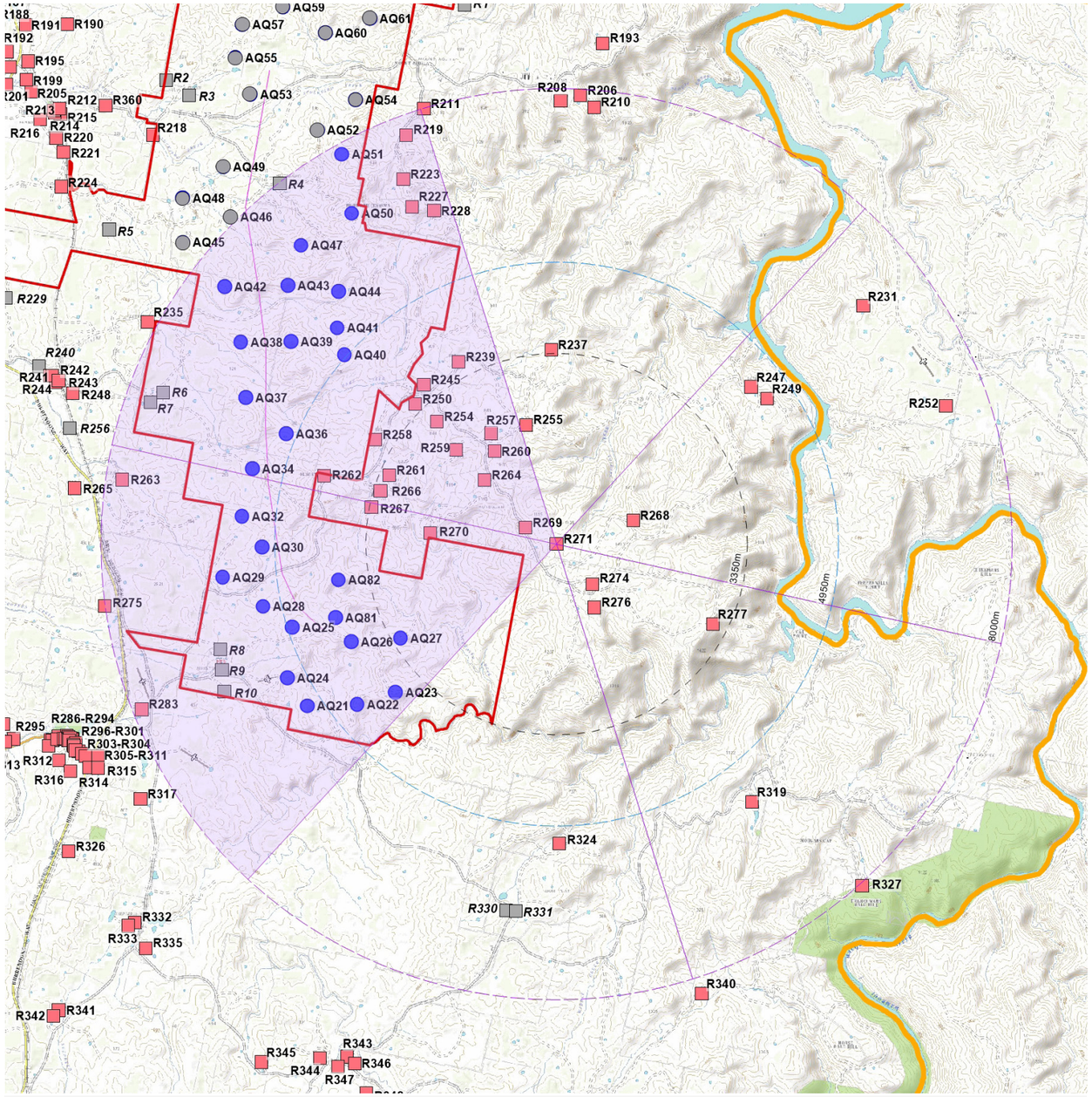


Figure A.16 Aerial Image Dwelling R262 *(Aerial Image Source: SixMaps)*

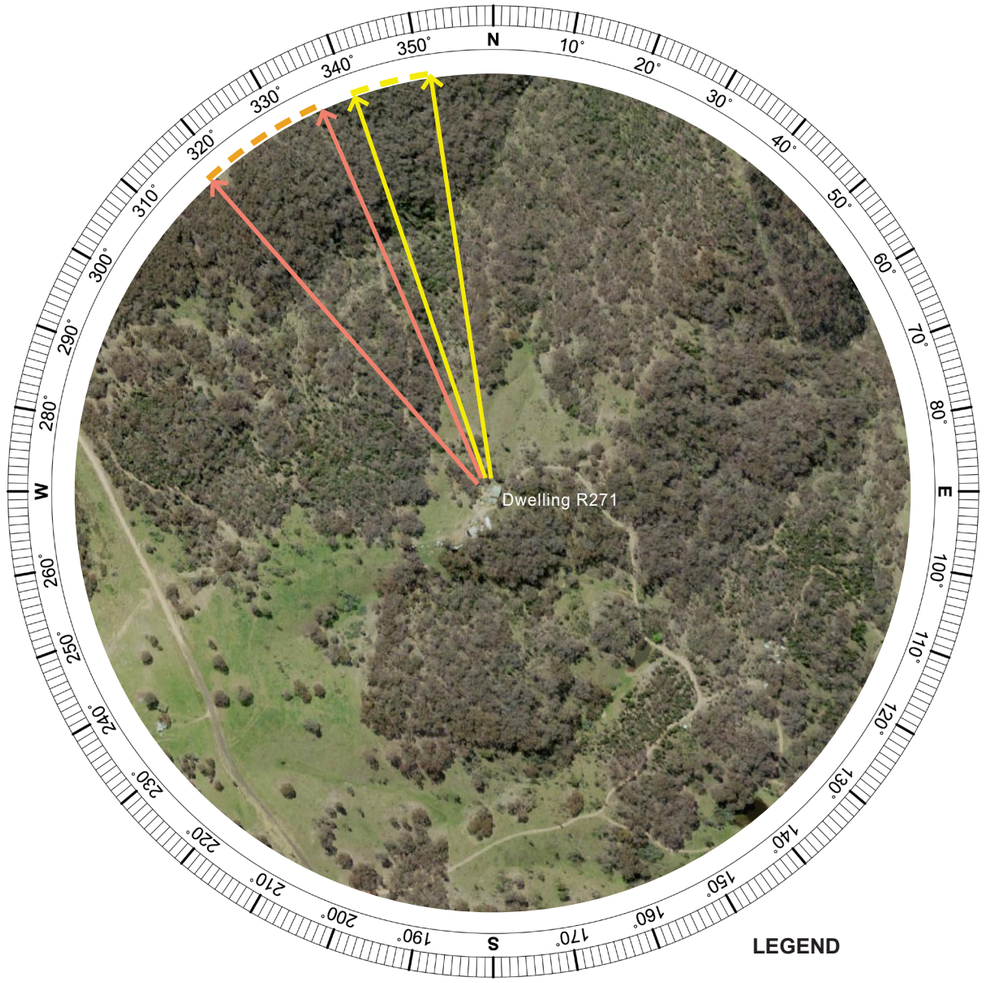
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**0.99 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**17**
Number of theoretical 60º sectors (Based on 2D assessment):	**4**
Number of potentially visible turbines within 8,000m (based on topography alone):	**35 Turbines** **31 at hub height** **4 at blade tip height**

A.17. Dwelling R271



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



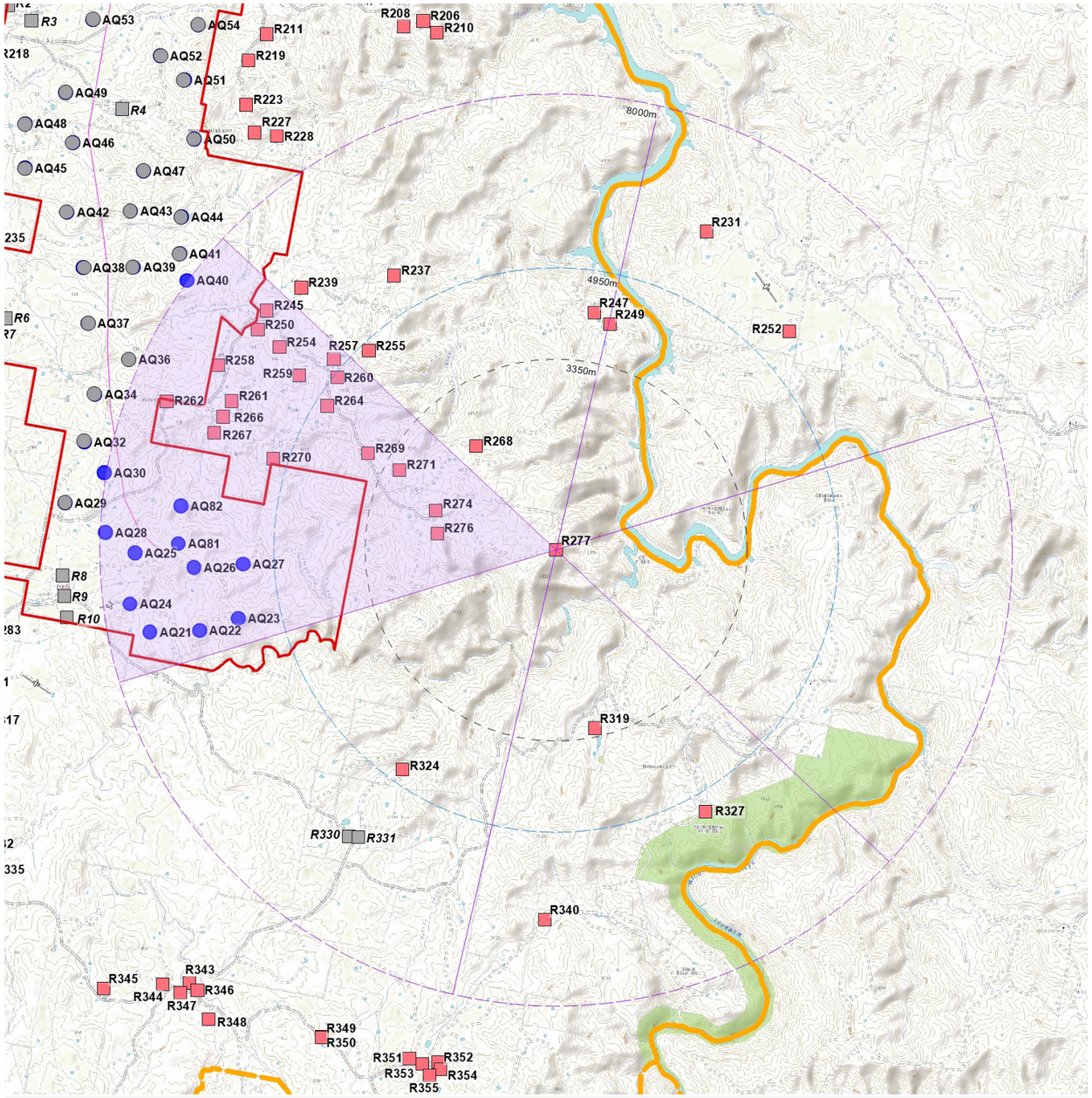
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.17 Aerial Image Dwelling R271 *(Aerial Image Source: SixMaps)*

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**3.19 km**
Number of proposed turbines within the blue line (4,950 m) of visual magnitude:	**7**
Number of theoretical 60º sectors (Based on 2D assessment):	**2**
Number of potentially visible turbines within 8,000m (based on topography alone):	**4 Turbines** **1 at hub height** **3 at blade tip height**

A.18. Dwelling R277



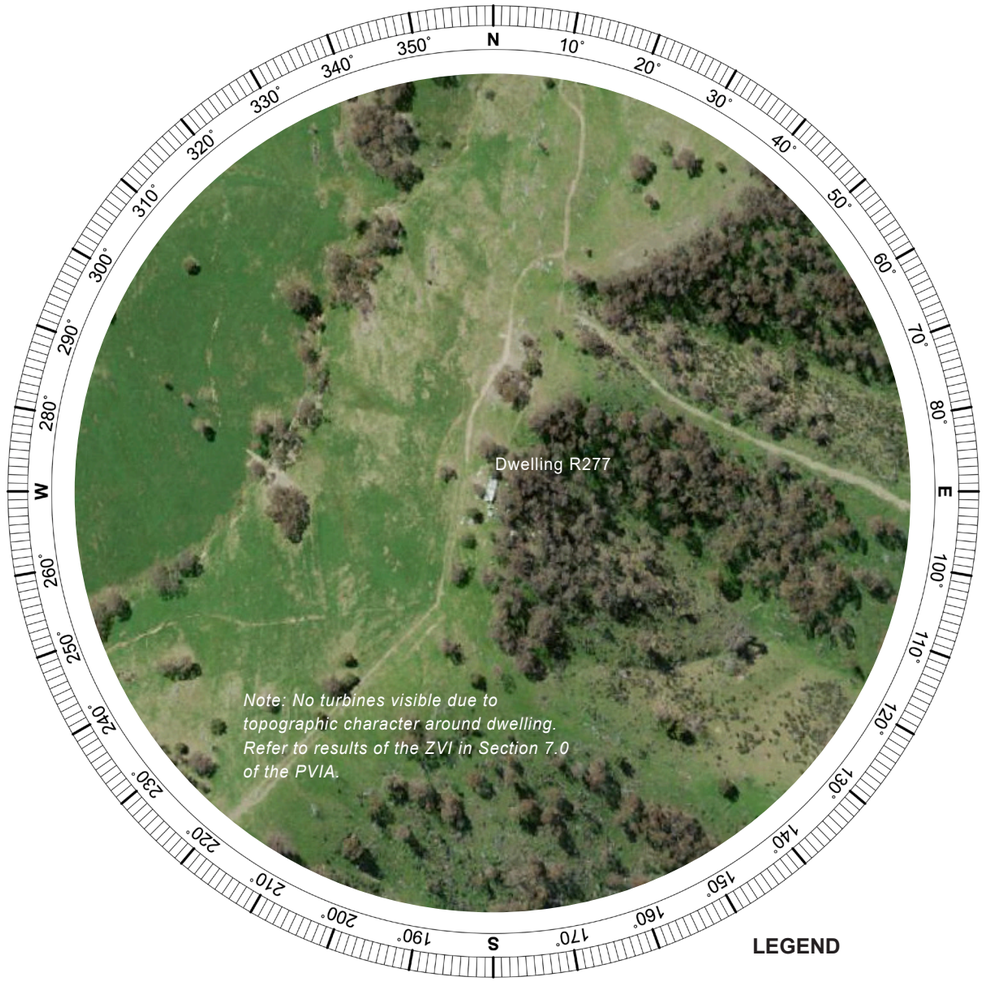
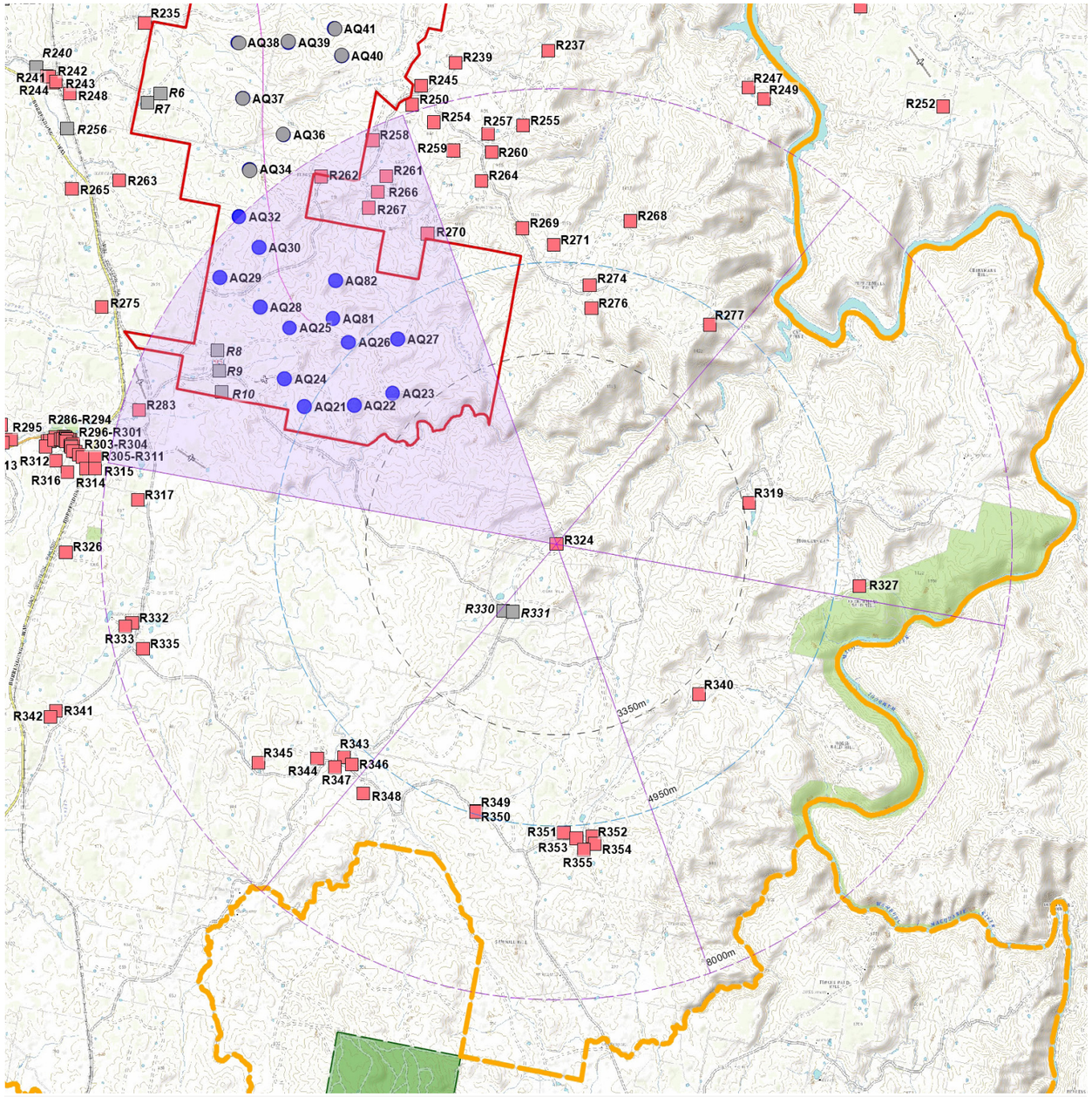


Figure A.18 Aerial Image Dwelling R277 *(Aerial Image Source: SixMaps)*

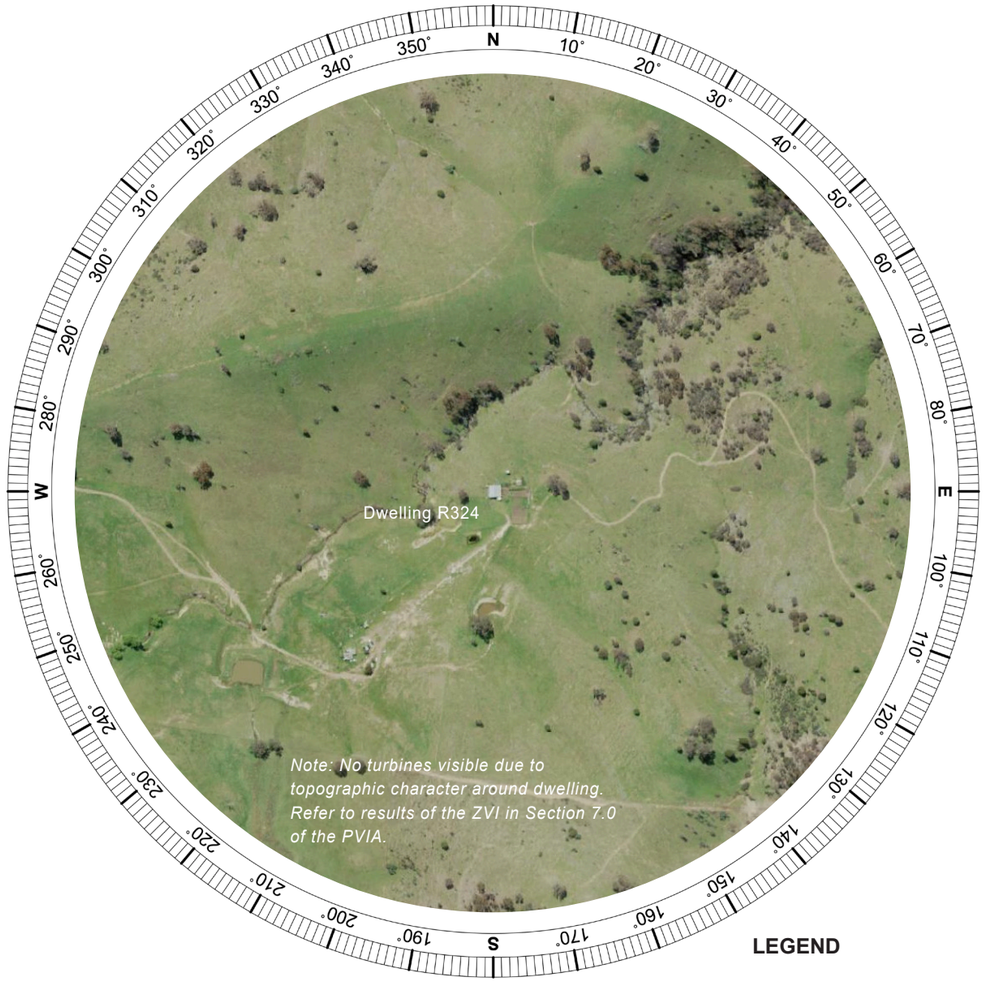
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**5.49 km**
Number of proposed turbines within the purple line (8,000 m) of visual magnitude:	**11**
Number of theoretical 60º sectors (Based on 2D assessment):	**1**
Number of potentially visible turbines within 8,000m (based on topography alone):	**Nil**

A.19. Dwelling R324



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



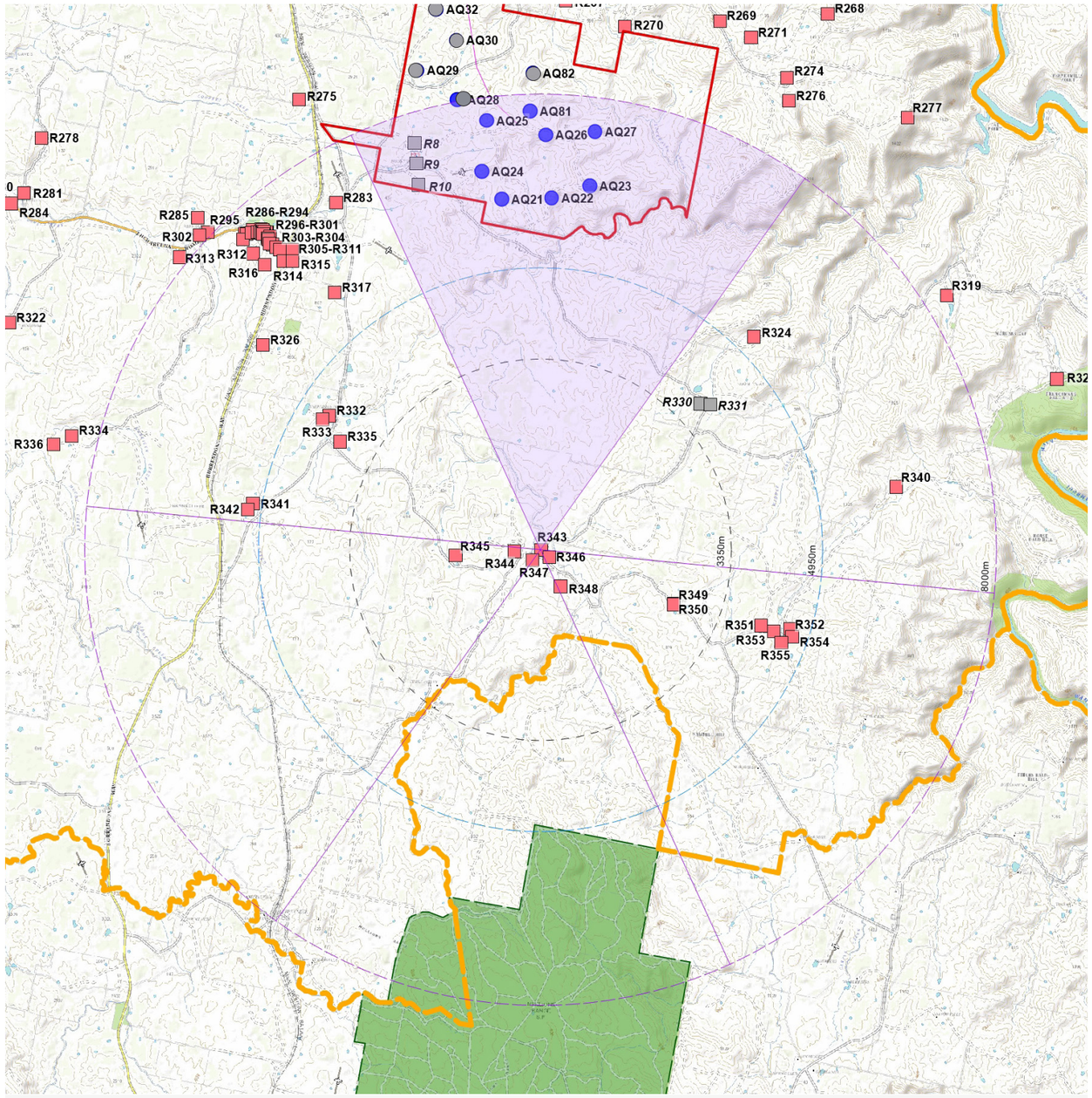
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.19 Aerial Image Dwelling R324 *(Aerial Image Source: SixMaps)*

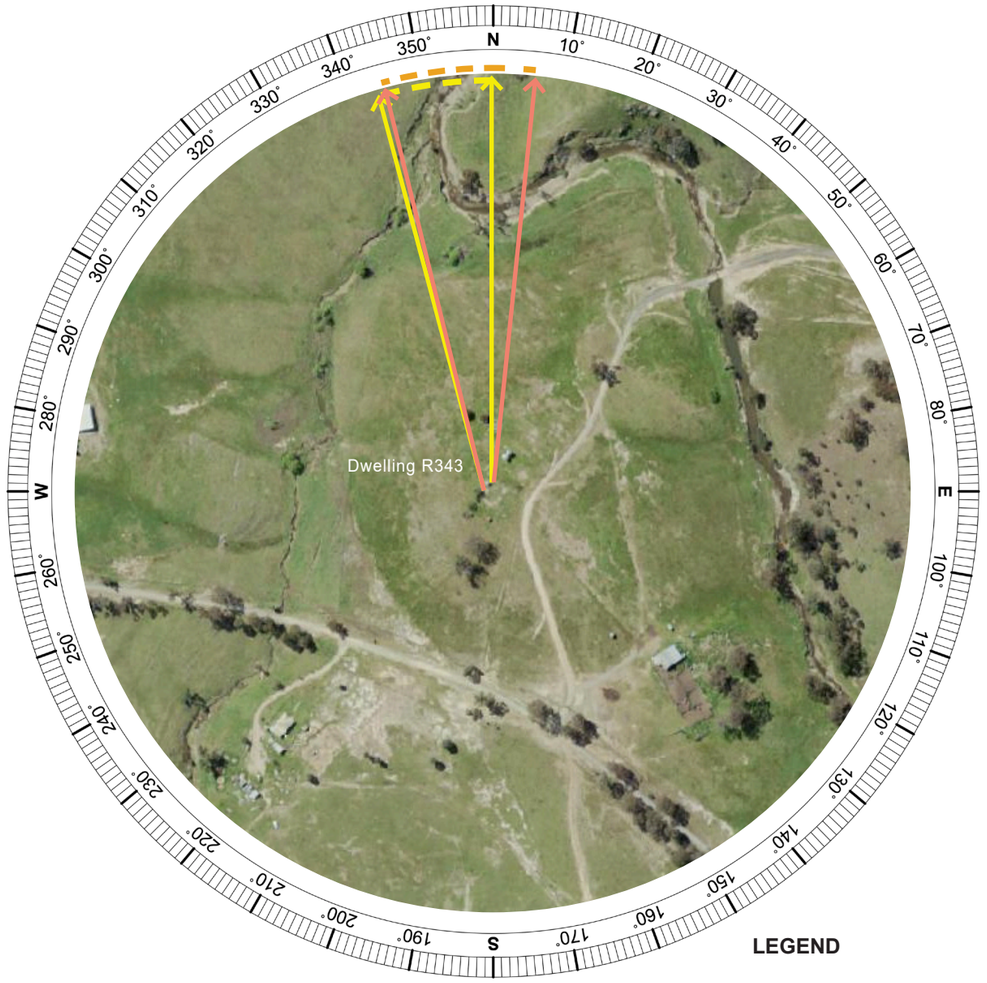
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**3.91 km**
Number of proposed turbines within the blue line (4,950 m) of visual magnitude:	**3**
Number of theoretical 60º sectors (Based on 2D assessment):	**1**
Number of potentially visible turbines within 8,000m (based on topography alone):	**Nil**

A.20. Dwelling R343



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



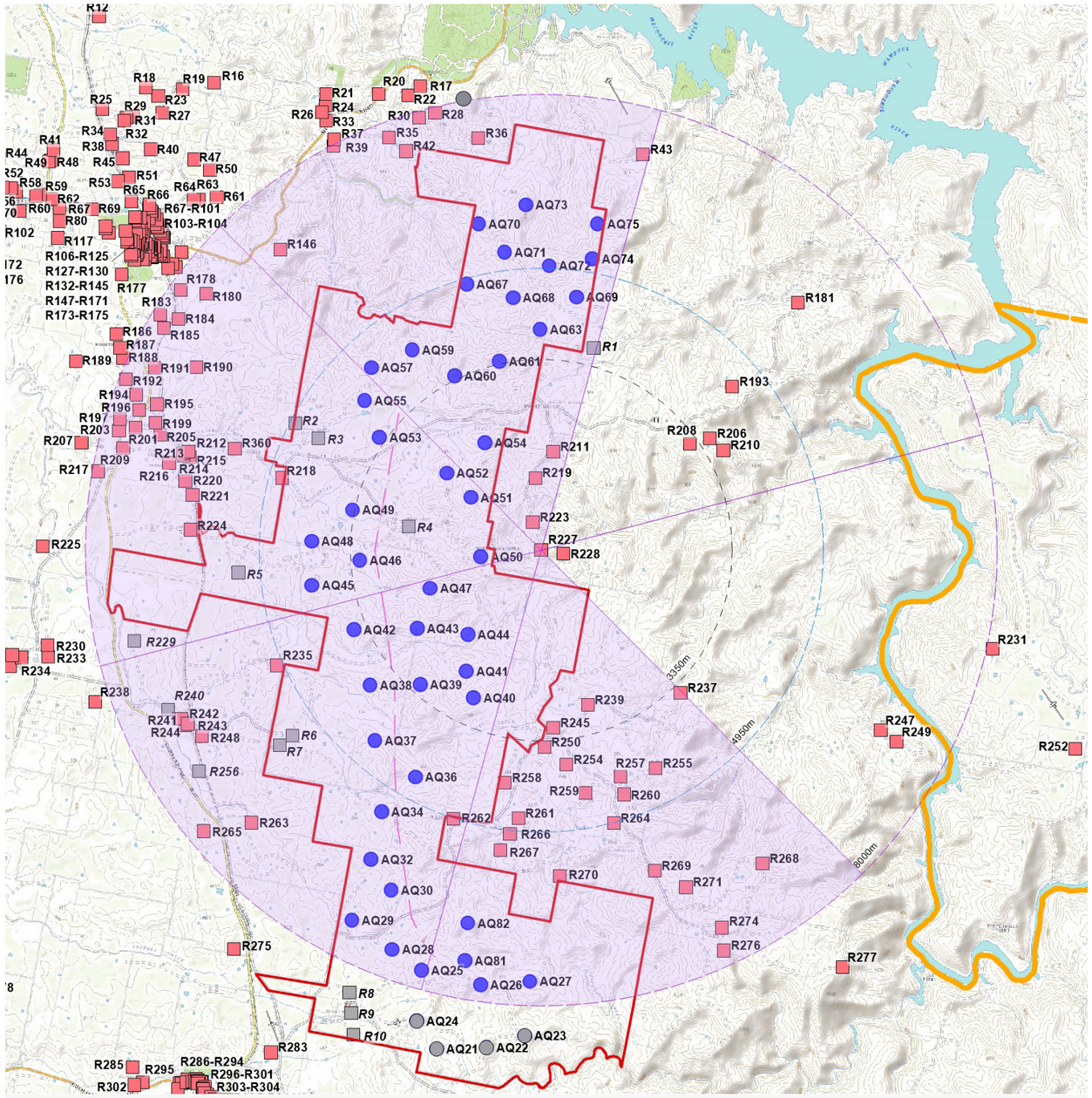
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.20 Aerial Image Dwelling R343 *(Aerial Image Source: SixMaps)*

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**6.18 km**
Number of proposed turbines within the purple line (8,000 m) of visual magnitude:	**8**
Number of theoretical 60º sectors (Based on 2D assessment):	**1**
Number of potentially visible turbines within 8,000m (based on topography alone):	**8 Turbines (all at hub height)**

A.21. Dwelling R227



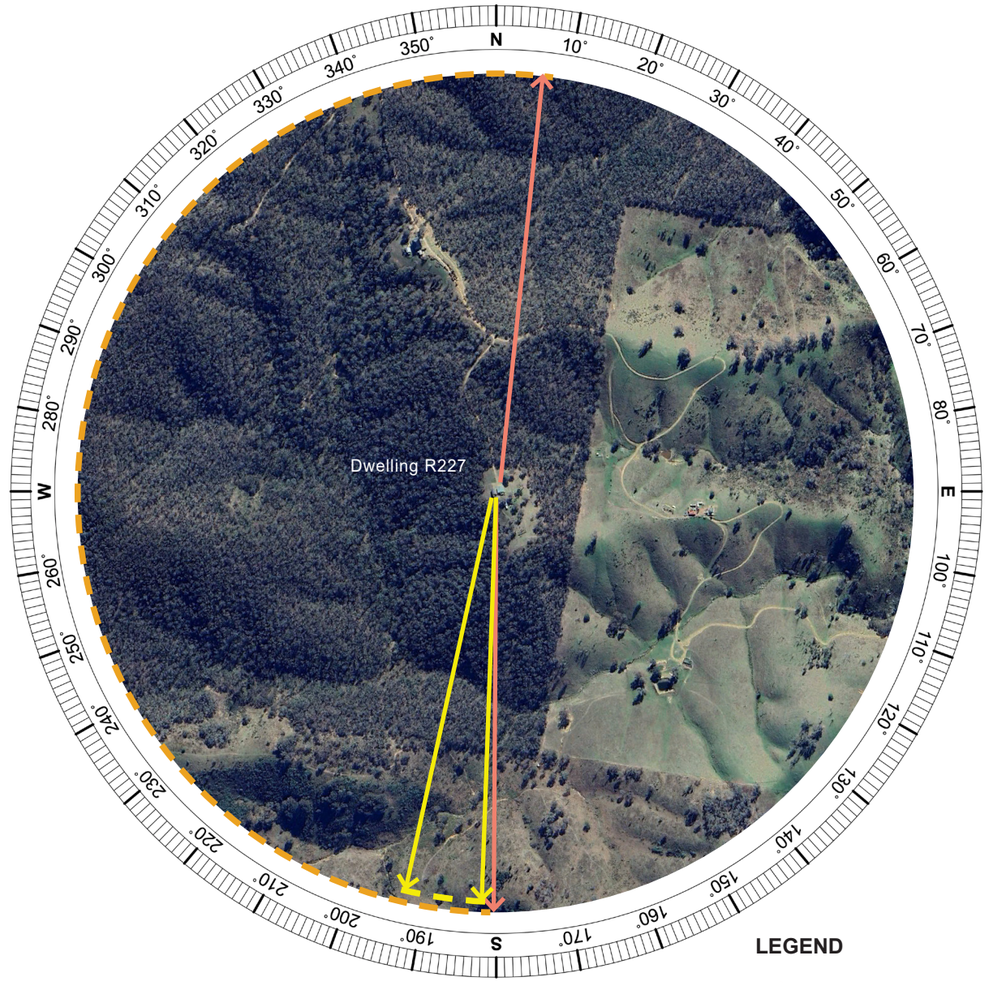
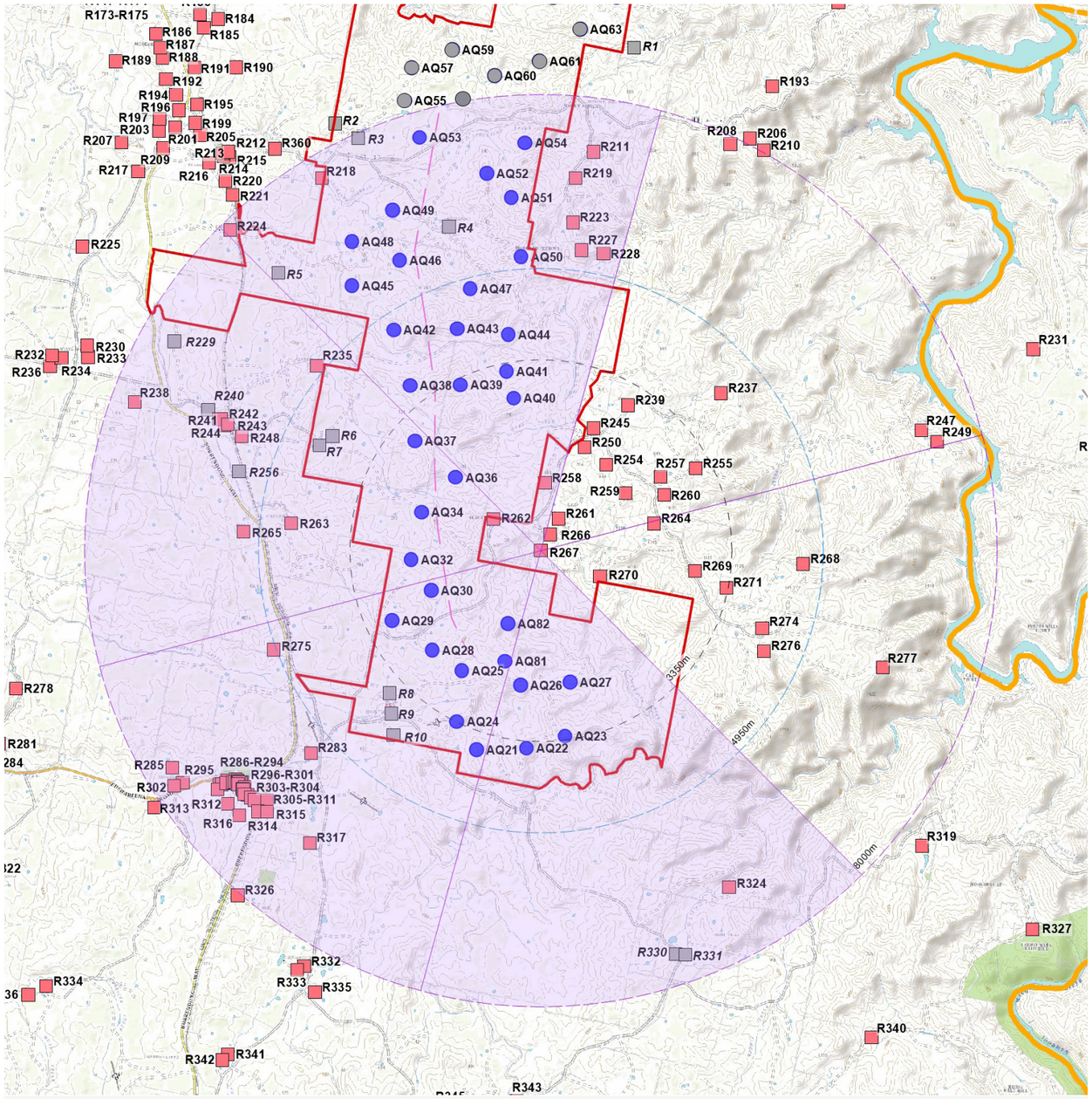


Figure A.21 Aerial Image Dwelling R227 *(Aerial Image Source: SixMaps)*

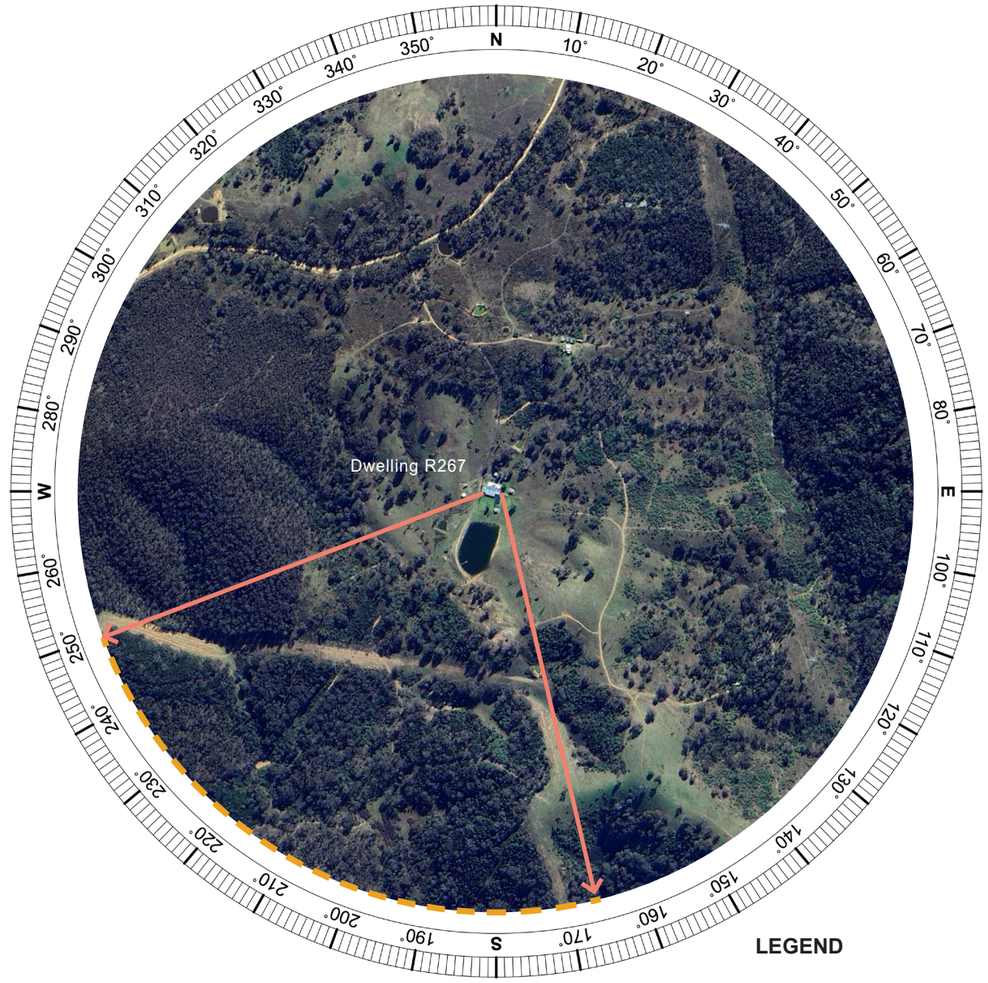
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**1.06 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**11**
Number of theoretical 60º sectors (Based on 2D assessment):	**4**
Number of potentially visible turbines within 8,000m (based on topography alone):	**24 Turbines** **16 at hub height** **8 at blade tip height**

A.22. Dwelling R267



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



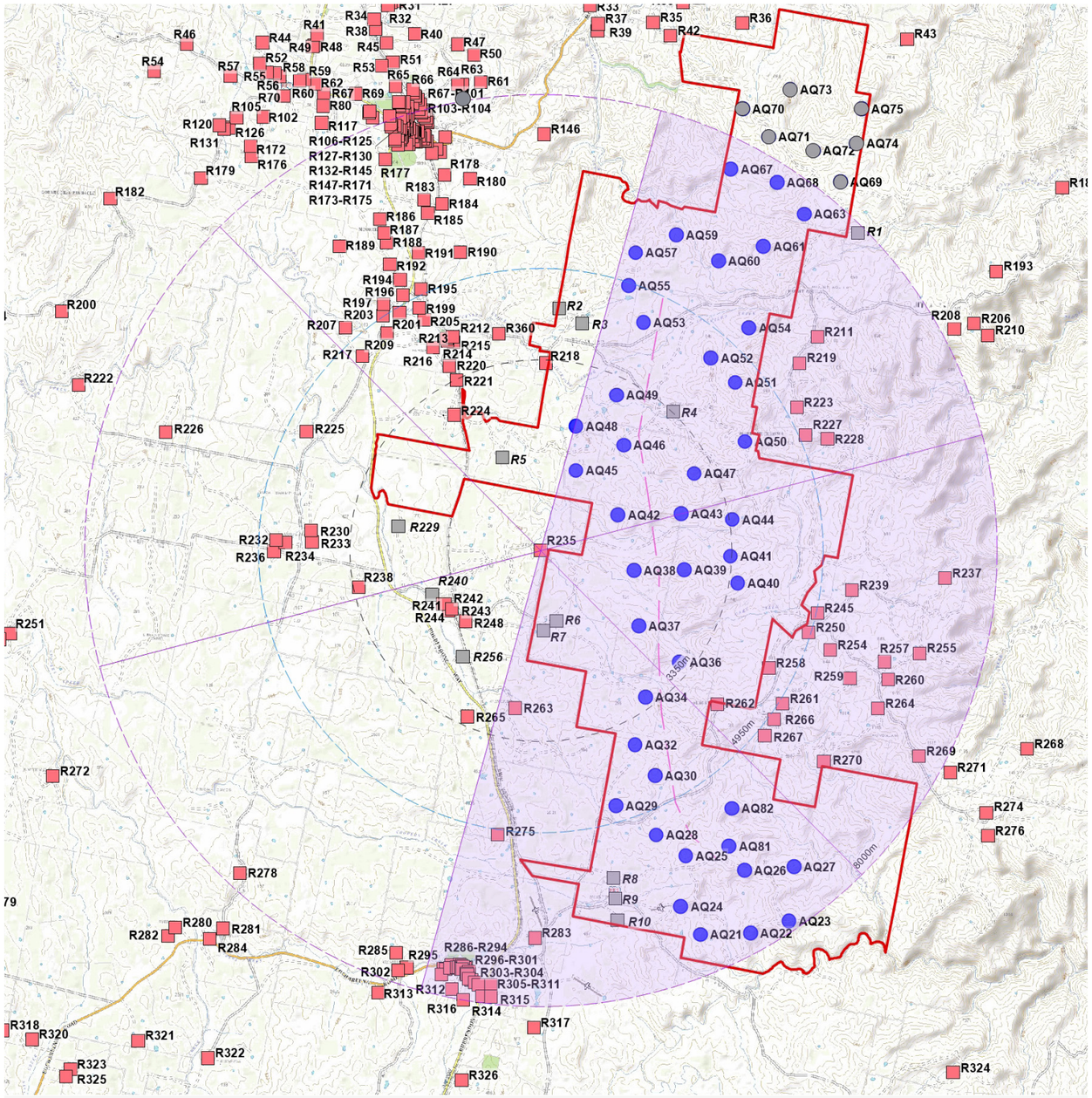
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.22 Aerial Image Dwelling R267 *(Aerial Image Source: SixMaps)*

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**1.40 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**15**
Number of theoretical 60º sectors (Based on 2D assessment):	**4**
Number of potentially visible turbines within 8,000m (based on topography alone):	**11 Turbines** **10 at hub height** **1 at blade tip height**

A.23. Dwelling R235



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines

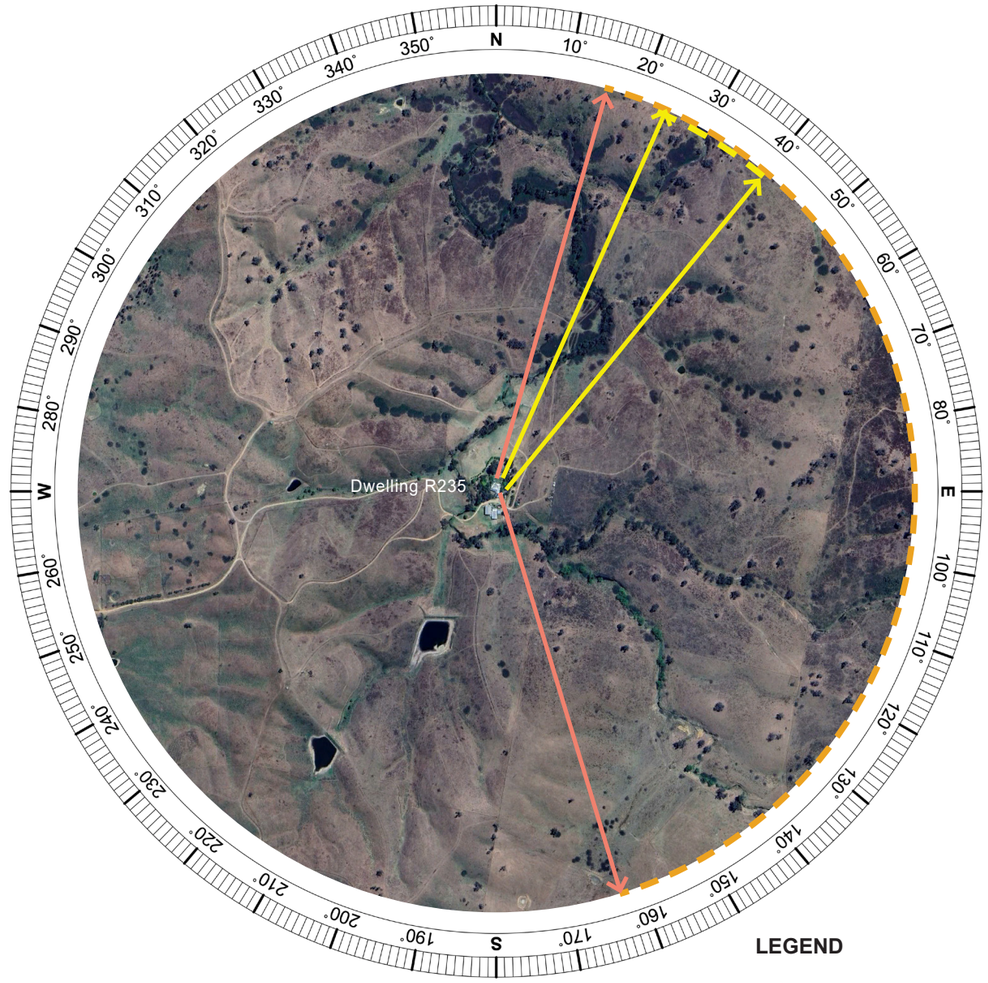
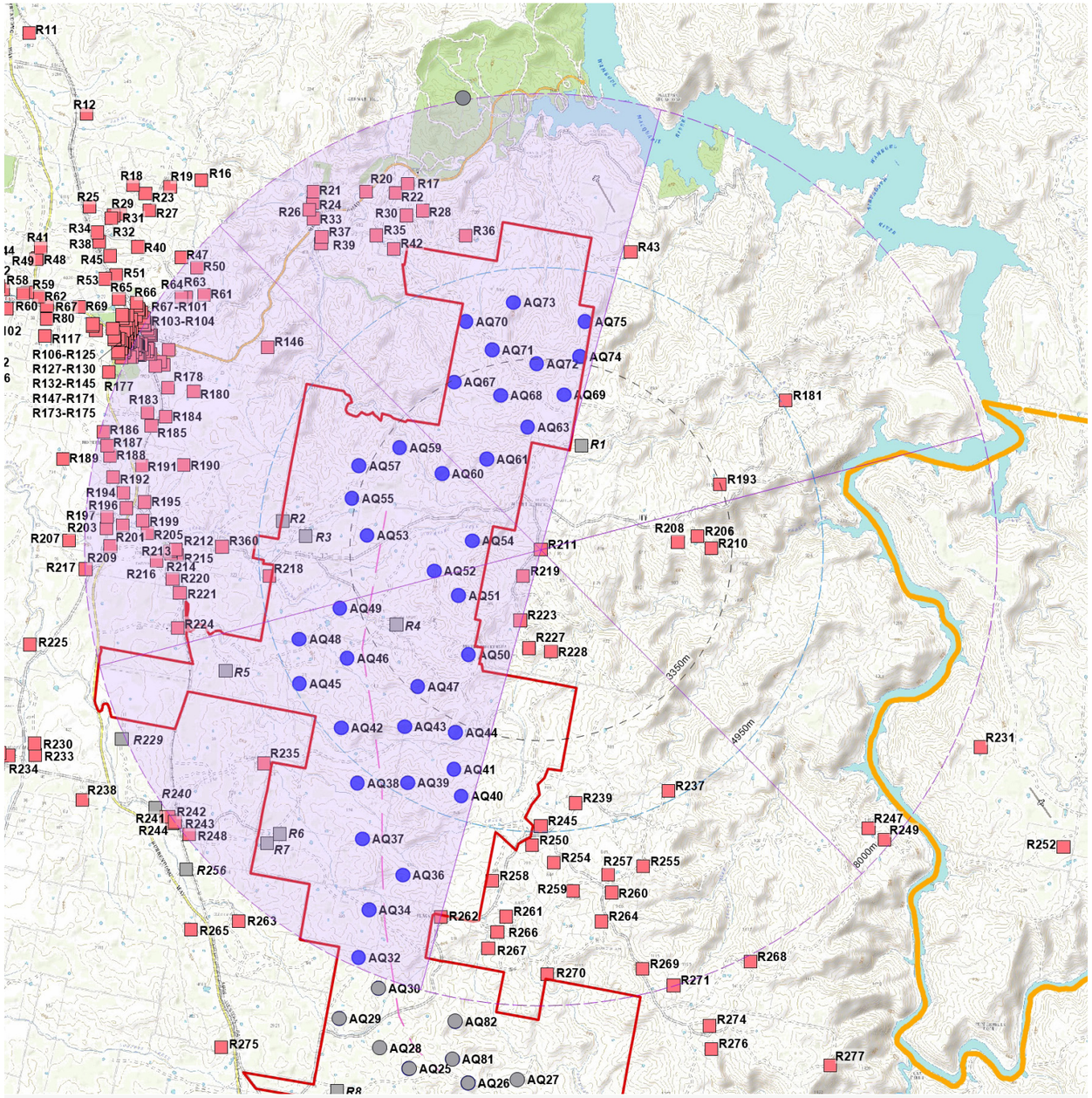


Figure A.23 Aerial Image Dwelling R235 *(Aerial Image Source: SixMaps)*

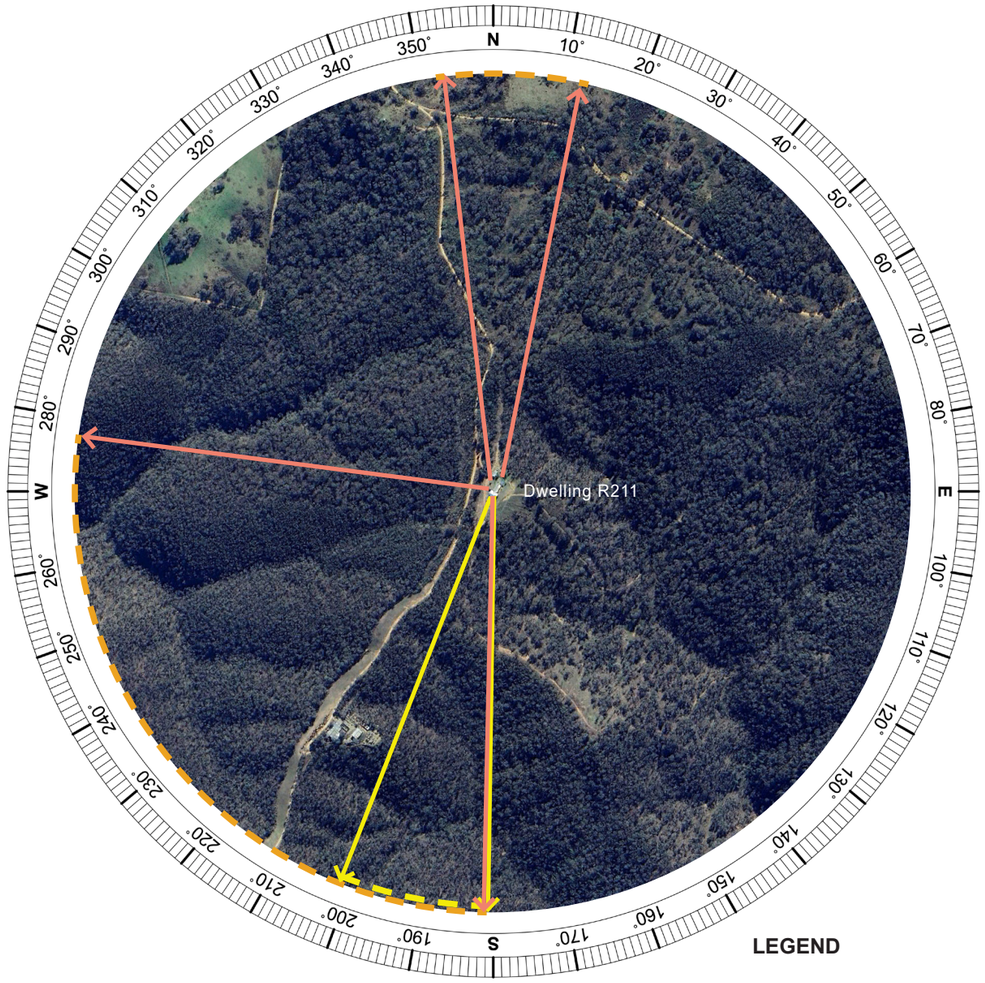
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**1.49 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**13**
Number of theoretical 60º sectors (Based on 2D assessment):	**3**
Number of potentially visible turbines within 8,000m (based on topography alone):	**39 Turbines** **35 at hub height** **4 at blade tip height**

A.24. Dwelling R211



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



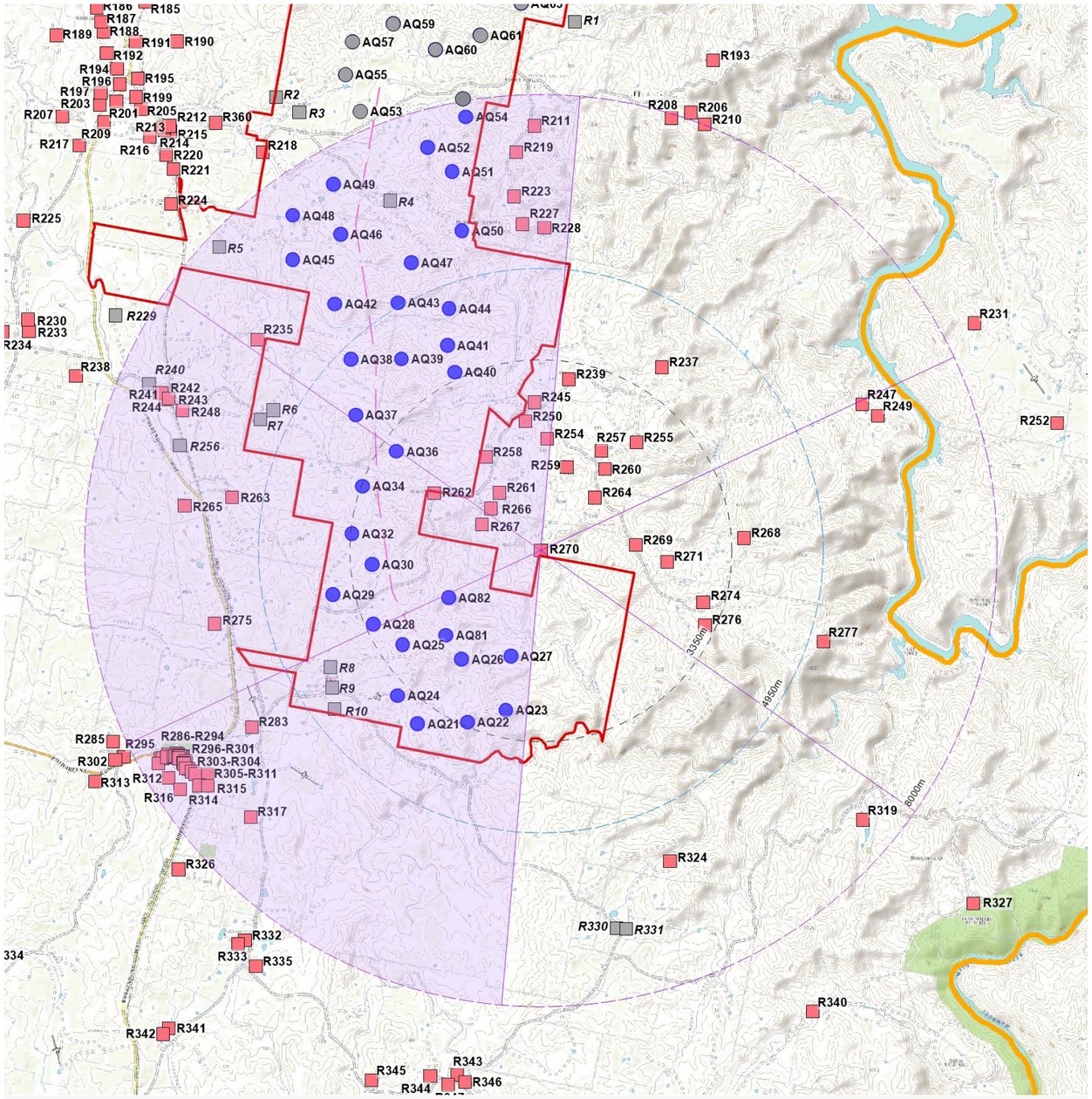
LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

Figure A.24 Aerial Image Dwelling R211 *(Aerial Image Source: SixMaps)*

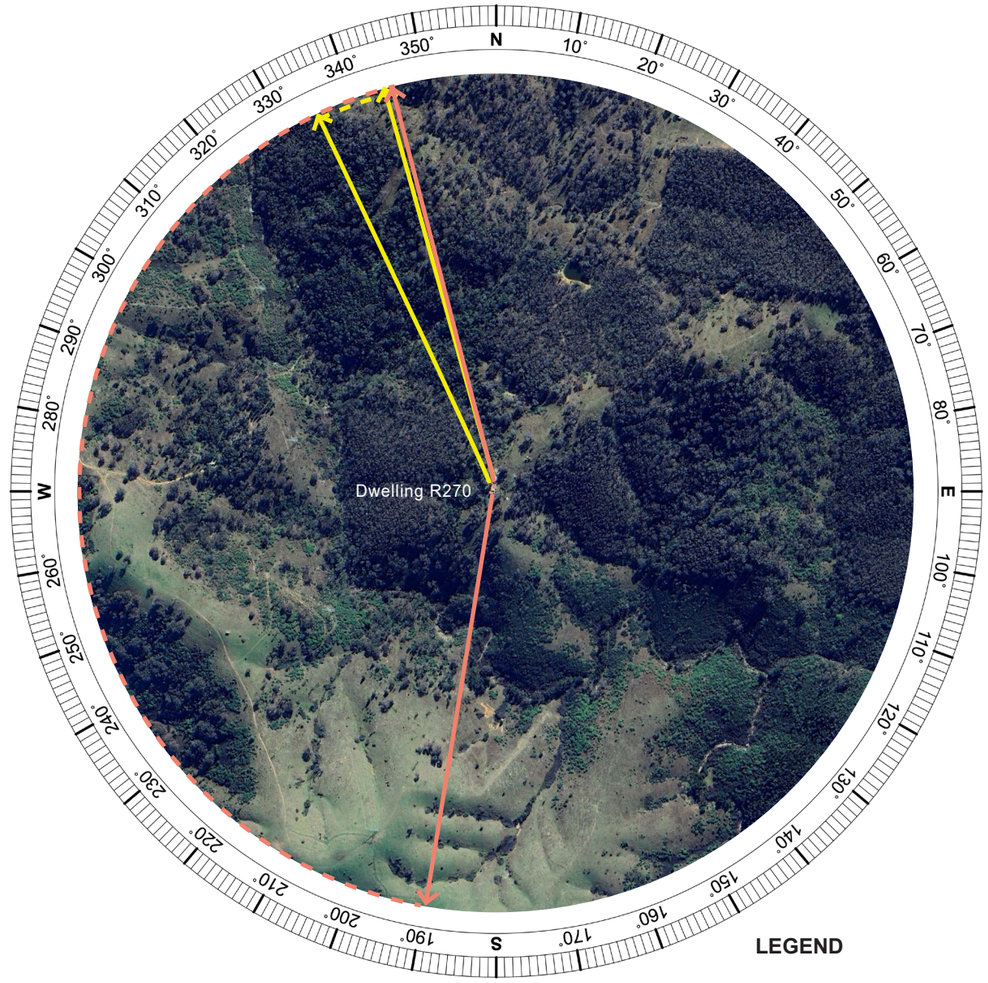
Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**1.21 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**14**
Number of theoretical 60º sectors (Based on 2D assessment):	**3**
Number of potentially visible turbines within 8,000m (based on topography alone):	**20 Turbines** **14 at hub height** **6 at blade tip height**

A.25. Dwelling R270



LEGEND

- Project Area
- Proposed 250 mTurbine Location
- Proposed Turbine in excess of 8000 m from dwelling
- Involved Dwellings
- Non-associated Dwellings
- LGA Boundary
- 3,350 m from nearest turbine (Black Line)
- 4,950 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



LEGEND

- Direction of visible turbines based on topography alone (within 8,000m)
- Extent of visible turbines based on topography alone (within 8,000m)
- Direction of visible turbines based on topography alone (in excess of 8,000m)
- Extent of visible turbines based on topography alone (in excess of 8,000m)

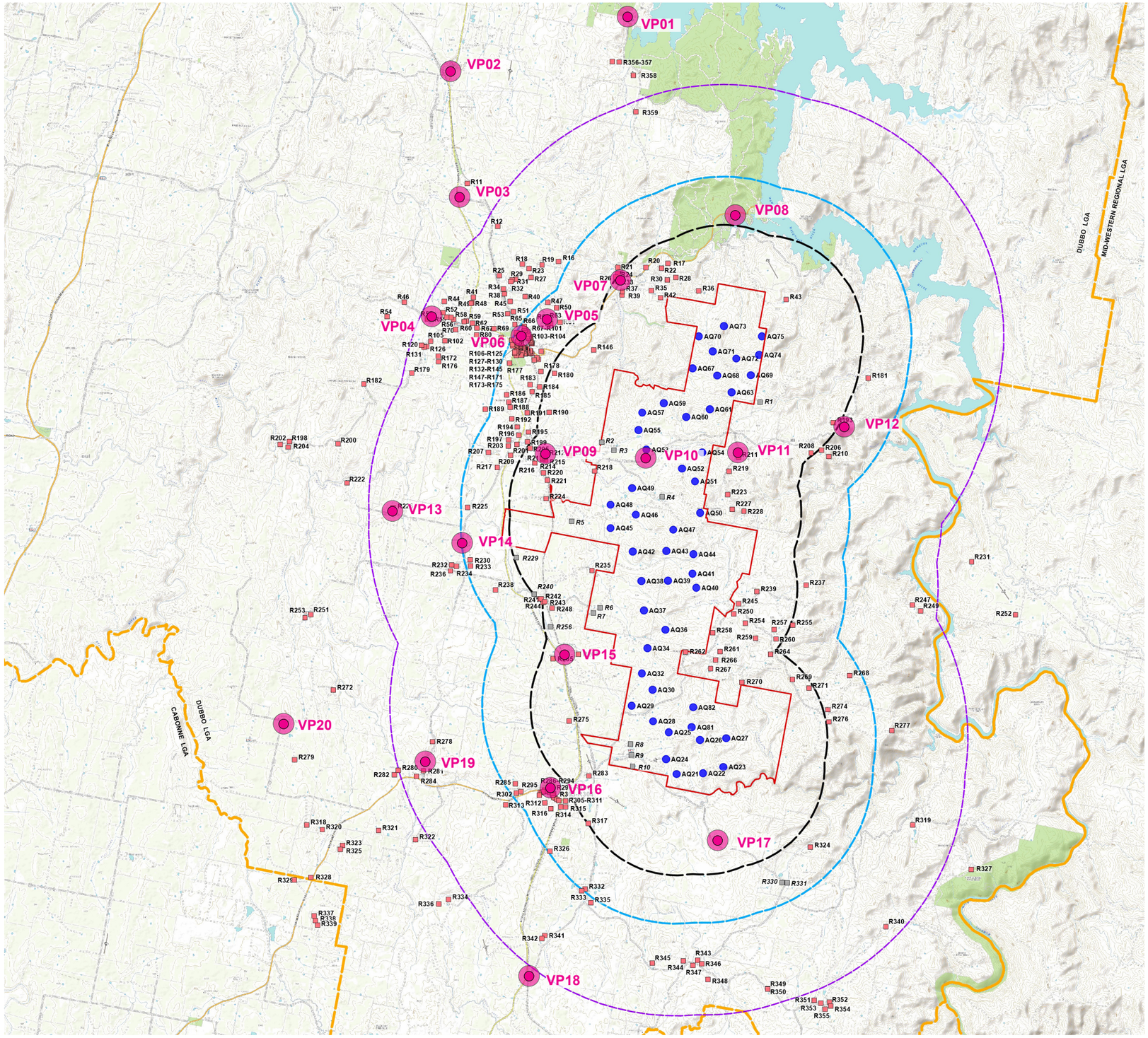
Figure A.25 Aerial Image Dwelling R270 *(Aerial Image Source: SixMaps)*

Summary of Preliminary Assessment Tools:	
Distance to Nearest Turbine:	**1.81 km**
Number of proposed turbines within the black line (3,350 m) of visual magnitude:	**11**
Number of theoretical 60º sectors (Based on 2D assessment):	**3**
Number of potentially visible turbines within 8,000m (based on topography alone):	**26 Turbines** **19 at hub height** **7 at blade tip height**

Appendix B

Preliminary Public Viewpoint Assessment

Preliminary Viewpoint Assessments Locations



Preliminary Viewpoint Assessment Locations

Proposed Aquila Wind

LEGEND

- Project Boundary
- Potential 250m Turbine Location
- Involved dwellings
- Non-associated dwellings
- Main Road
- Minor Road
- 3350 m from turbines
- 4950 m from turbines
- 8000 m from turbines
- LGA Boundary
- Recreation Area
- Preliminary Viewpoint Assessment locations

N

0 2 4 6 8 10km

***Figure B** Preliminary Viewpoint Assessment Locations*

VP01 Lake Burrendong Sport & Rec Centre Entry, Tara Road, Mumbil

Approximate extent of potentially visible turbines

LEGEND

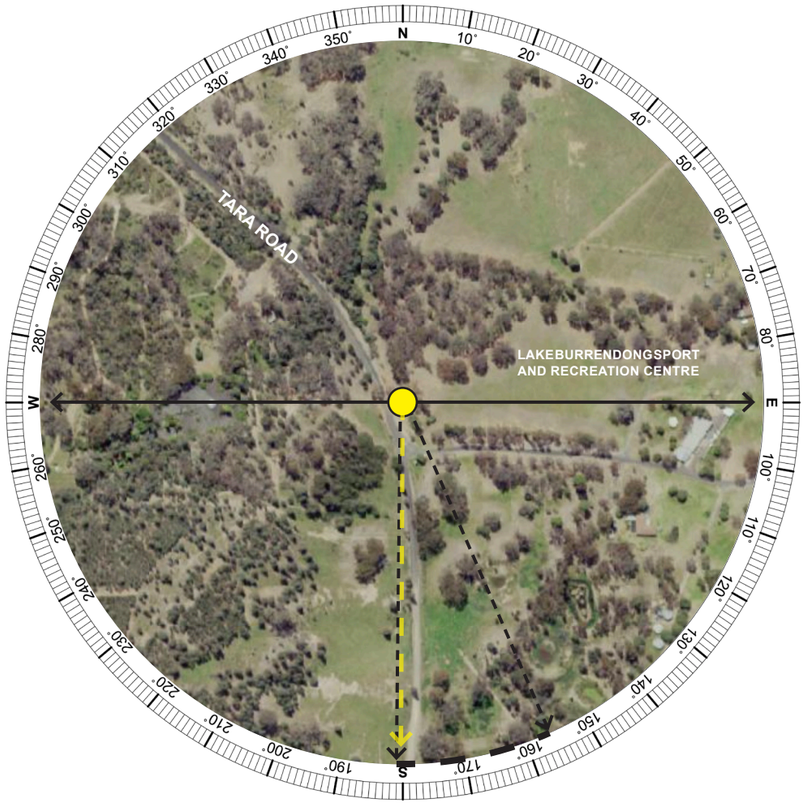
Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines

N



Aerial Image VP01 (Aerial Image Source: Six Maps)

VIEWPOINT VP01

Viewpoint Summary:	
Location:	Elevation:
Lake Burrendong Sport & Rec Centre entry, Tara Rd, Mumbil	384 m
Coordinates:	Viewing Direction:
32°42'25.43"S 149° 6'50.99"E	South
Distance to nearest WTG:	Visibility Distance Zone:
10.65 km	Near Background (NB)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU04: Densely Vegetated Hills	Moderate
Multiple Wind Turbine Tool:	
No turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint was taken from Tara Road, at the entry to the Lake Burrendong Sport & Rec Centre. The vegetation around this viewpoint includes patches of dense vegetation and the topography is undulating, becoming steeper in some sections. General uses include recreation areas associated with the Lake Burrendong foreshore including camping and holiday cabins. At this location, views are contained towards the south by vegetation and rises in topography.

Potential Visual Impact:

The viewpoint is located in excess of 10 km from the Project. Due to the rises in topography, vegetation and distance, views towards the Project to will be screened.

VP02 Intersection of Railway Parade & Burrendong Way, Mumbil

Approximate extent of potentially visible turbines

LEGEND

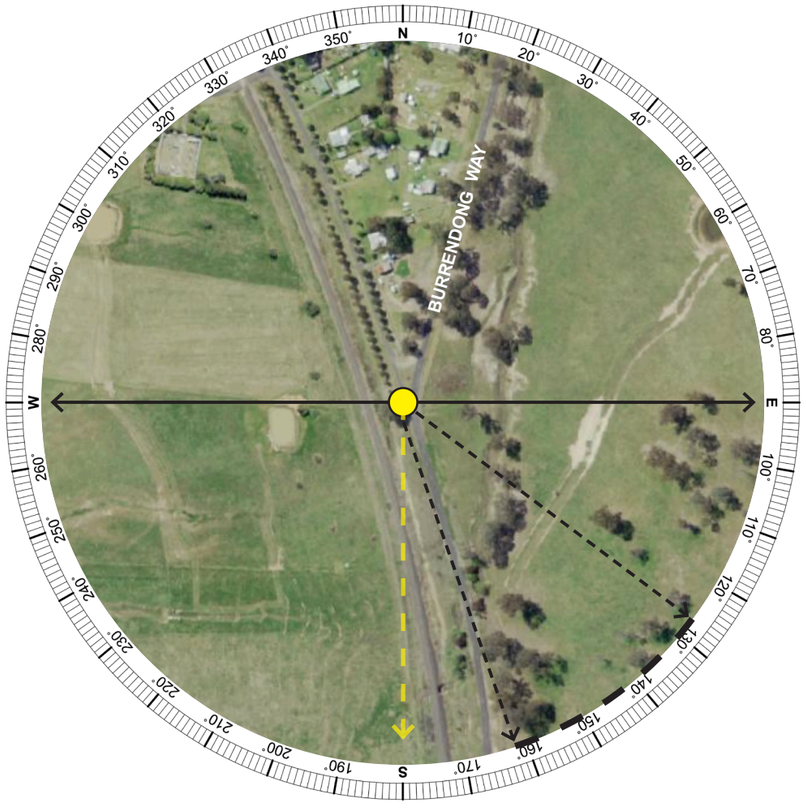
Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines

N



Aerial Image VP02 (Aerial Image Source: Six Maps)

VIEWPOINT VP02

Viewpoint Summary:	
Location:	Elevation:
Int Railway Pde & Burrendong Way, Mumbil	450 m
Coordinates:	Viewing Direction:
32°43'42.19"S 149° 3'3.33"E	South
Distance to nearest WTG:	Visibility Distance Zone:
11.69 km	Near Background (NB)
Land Use:	Viewer Sensitivity Level:
Major Road	Low
LCU:	Scenic Quality Rating:
LCU02: Mumbil & Stuart Town	Low
Multiple Wind Turbine Tool:	
No turbines within 8000 m.	

Existing Landscape Character Description:

This photograph was taken at the intersection of Railway Pde and Burrendong Way, at the township of Mumbil. Burrendong Way runs north to south and serves as an important roadway for traffic between towns such as Stuart Town and Euchareena and more broadly the regional centre of Orange. Land is characterised by flat to gently undulating topography dotted with trees in its immediate vicinity and patches of roadside vegetation. Views are generally contained by the gentle rise in topography to the south, vegetation and distance.

Potential Visual Impact:

From this location, it is likely that a combination of topography, vegetation and distance will screen the views of the Project.

VP03 Intersection of Burrendong Way & Finns Lane, Mumbil

Approximate extent of potentially visible turbines

LEGEND

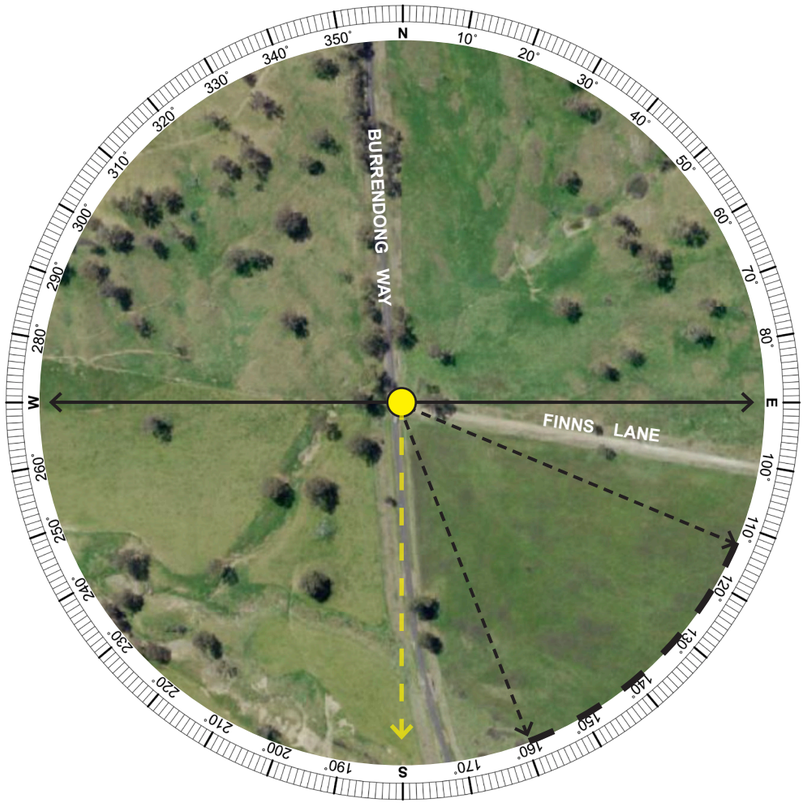
Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines

N



Aerial Image VP03 (Aerial Image Source: Six Maps)

VIEWPOINT VP03

Viewpoint Summary:	
Location:	Elevation:
Int Burrendong Way & Finns Ln, Mumbil	481 m
Coordinates:	Viewing Direction:
32°45'45.40"S 149° 3'18.30"E	South
Distance to nearest WTG:	Visibility Distance Zone:
9.12 km	Near Background (NB)
Land Use:	Viewer Sensitivity Level:
Major Road	Low
LCU:	Scenic Quality Rating:
LCU03: Undulating Pastures & Grassy Plains	Low
Multiple Wind Turbine Tool:	
No turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint was taken from the intersection of Burrendong Way and Finns Lane, looking in a southerly direction. The road runs in a generally north to south direction and provides access to scattered rural dwellings in the area. Land is flat to gently undulating and predominantly cleared with patches of roadside vegetation and riparian vegetation associated with Sandy Creek, as is visible in the foreground of the view. The land has been extensively modified to support agriculture. Existing topographic chracter is gently undulation and gentle undulations are visible in the southeast.

Potential Visual Impact:

Turbines will mostly likely be screened from this location due to the rise in topography to the south.

VP04 Wallaroi Road, Stuart Town

Approximate extent of potentially visible turbines

50° 60° 70° 80° E 100° 110° 120° 130° 140° 150° 160° 170° S 190° 200° 210° 220°

LEGEND

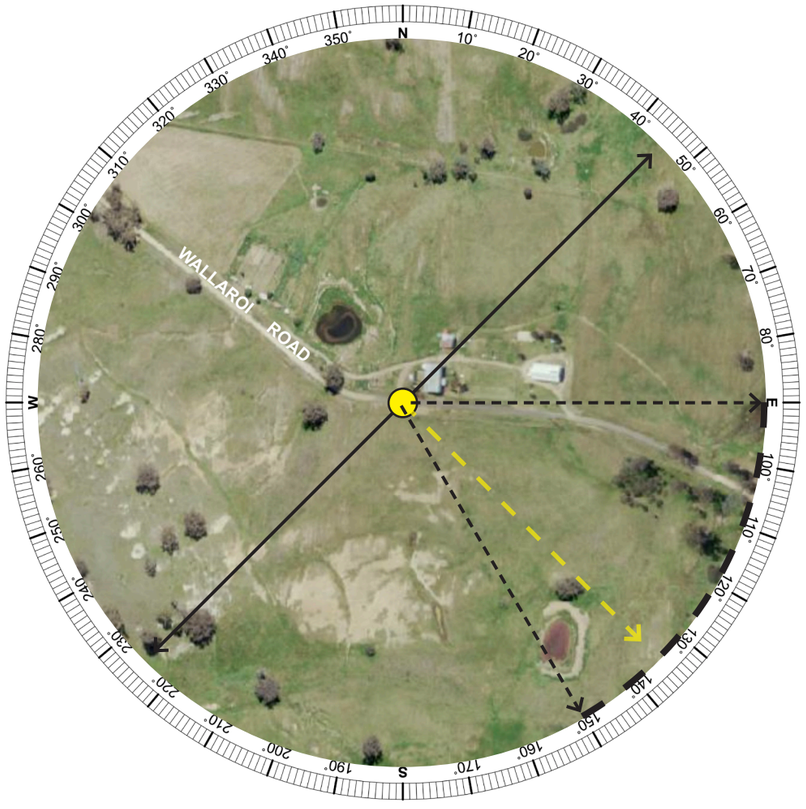
Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines

N



Aerial Image VP04 (Aerial Image Source: Six Maps)

VIEWPOINT VP04

Viewpoint Summary:	
Location:	Elevation:
Wallaroi Rd, Stuart Town	508 m
Coordinates:	Viewing Direction:
32°47'53.39"S 149° 2'41.03"E	South East
Distance to nearest WTG:	Visibility Distance Zone:
7.75 km	Far Middleground (FM)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU03: Undulating Pastures & Grassy Plains	Low
Multiple Wind Turbine Tool:	
One 60º Sector with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint is from Wallaroi Road, which is a local road that provides access to farmlands and rural dwellings. Land is gently undulating with open views. The surrounding cleared landscape contains scattered trees throughout paddocks and riparian vegetation associated with Black Bills Gully, visible in the foreground of the view. The predominant land use of this area is agricultural and is a modified landscape.

Potential Visual Impact:

From this viewpoint, turbines may partially be visible. However, it is likely that the distance to the Project, existing vegetation along Wallaroi Road and topography will limit some views towards the Project.

VP05 Trickett Street, Stuart Town

Approximate extent of potentially visible turbines

50° 60° 70° 80° E 100° 110° 120° 130° 140° 150° 160° 170° S 190° 200° 210° 220°

LEGEND

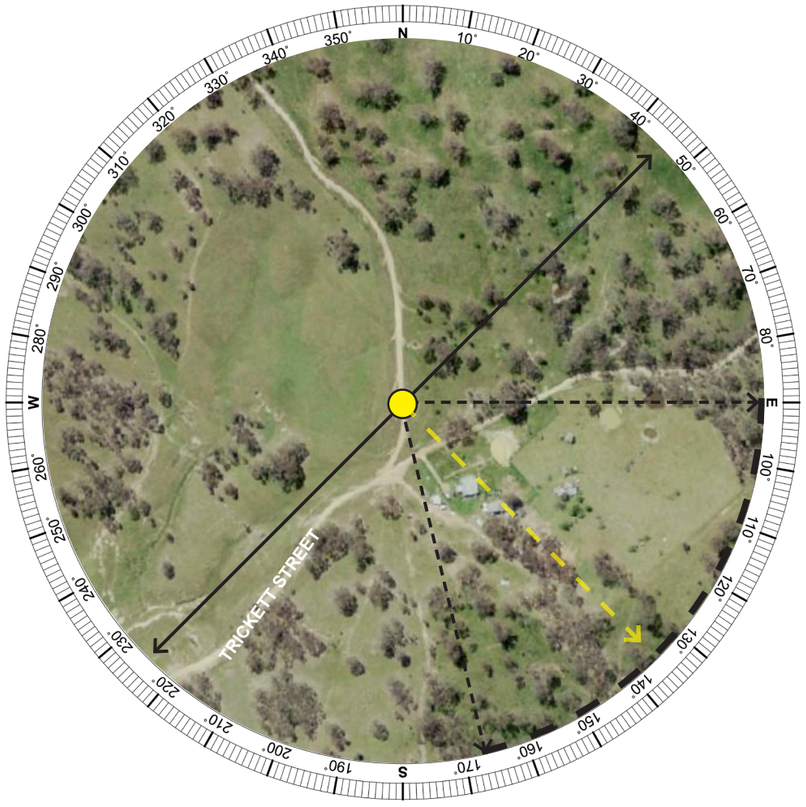
Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines

N



Aerial Image VP05 (Aerial Image Source: Six Maps)

VIEWPOINT VP05

Viewpoint Summary:	
Location:	Elevation:
Trickett St, Stuart Town	598 m
Coordinates:	Viewing Direction:
32°47'52.23"S 149° 5'12.71"E	South east
Distance to nearest WTG:	Visibility Distance Zone:
4.39 km	Far Middleground (FM)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU03: Undulating Pastures & Grassy Plains	Low
Multiple Wind Turbine Tool:	
Two 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint was taken from the Trickett St, which is an unsealed local road that provides access to a small number of rural dwellings. The viewpoint is looking in a generally south-east direction toward towards the Project Area. The vegetation around this viewpoint includes patches of dense vegetation and the topography is undulating. General uses include native and modified grazing pastures.

Potential Visual Impact:

At this location, views are generally filtered by vegetation in the foreground and rise in topography. From this location, the Project may be visible, however views are likely to be filtered by existing vegetation and topography.

VP06 Molong Street, Stuart Town

Approximate extent of potentially visible turbines

50° 60° 70° 80° E 100° 110° 120° 130° 140° 150° 160° 170° S 190° 200° 210° 220°

LEGEND

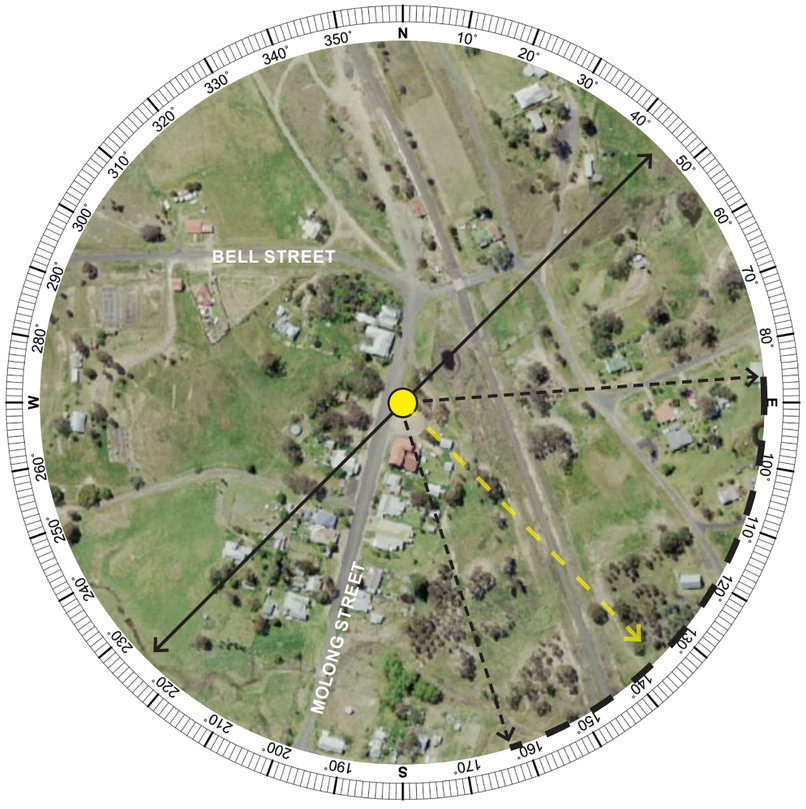
Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines

N



Aerial Image VP06 (Aerial Image Source: Six Maps)

VIEWPOINT VP06

Viewpoint Summary:	
Location:	Elevation:
Molong St, Stuart Town	547 m
Coordinates:	Viewing Direction:
32°48’10.48”S 149° 4’41.81”E	South East
Distance to nearest WTG:	Visibility Distance Zone:
4.70 km	Far Middleground (FM)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU02: Mumbil and Stuart Town	Low
Multiple Wind Turbine Tool:	
Two 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint was taken from Molong Street, at the township of Stuart Town, adjacent to the Ironbark Inn. The viewpoint is looking in a south-easterly direction and is a representation of views from public viewpoints located in Stuart Town. The topography within the township is flat to gently undulating with contained views due to topography and existing buildings. Vegetation within the township is mostly associated with dwellings and street trees as visible in the eastern part of the view.

Potential Visual Impact:

From this location, it is likely that the Project will be visible to the south-east of the view. However, a gentle rise in topography (in the direction of the Project Area), vegetation and existing buildings will screen some views.

VP07 Intersection of Mookerawa Road & Spring Creek Road, Mookerawa

Approximate extent of potentially visible turbines

LEGEND

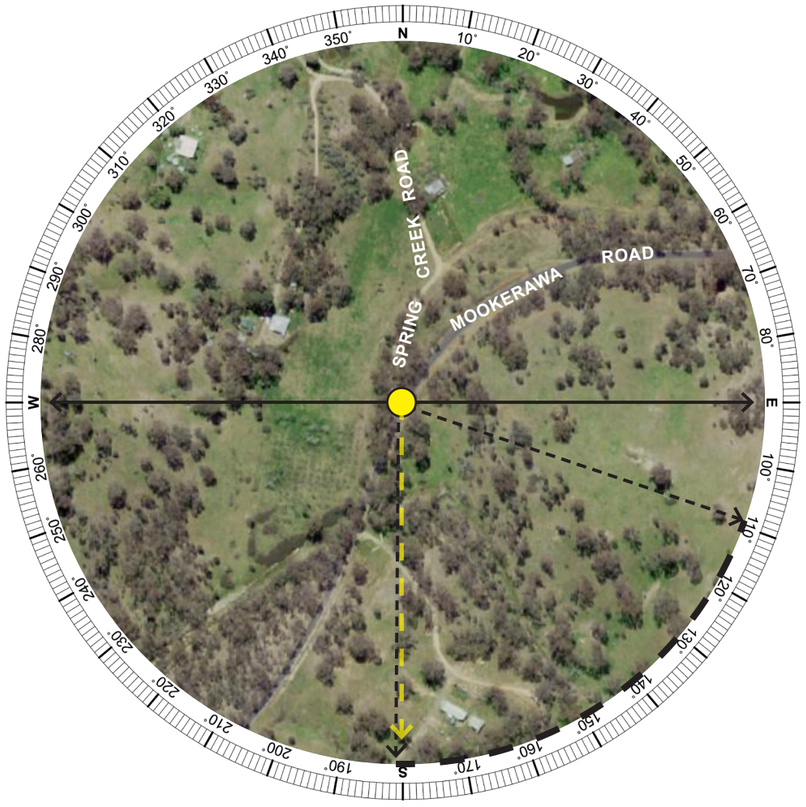
Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines

N



Aerial Image VP07 (Aerial Image Source: Six Maps)

VIEWPOINT VP07

Viewpoint Summary:	
Location:	Elevation:
Int Mookerawa Rd & Spring Creek Rd, Mookerawa	451 m
Coordinates:	Viewing Direction:
32°47'10.76"S 149° 6'46.72"E	South
Distance to nearest WTG:	Visibility Distance Zone:
3.11 km	Near Middleground (NM)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU04: Densely Vegetated Hills	Moderate
Multiple Wind Turbine Tool:	
Two 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint is located at the intersection of Mookerawa Road and Spring Creek Road facing to south. Mookerawa Road is a local road that provides access to rural dwellings and the Mookerawa Reflections Holiday Park to the east. The surrounding landscape is characterised by undulating topography, becoming steeper in the west. Dense vegetation and riparian vegetation associated with Muckerwa Creek are visible in the foreground to the south of the viewpoint.

Potential Visual Impact:

From this location, turbines blade tips may be visible to the south. However, due to the surrounding dense vegetation and topography views towards the Project will be mostly screened.

VP08 Mookerawa Waters Holiday Park, Mookerawa Road, Mookerawa

Approximate extent of potentially visible turbines

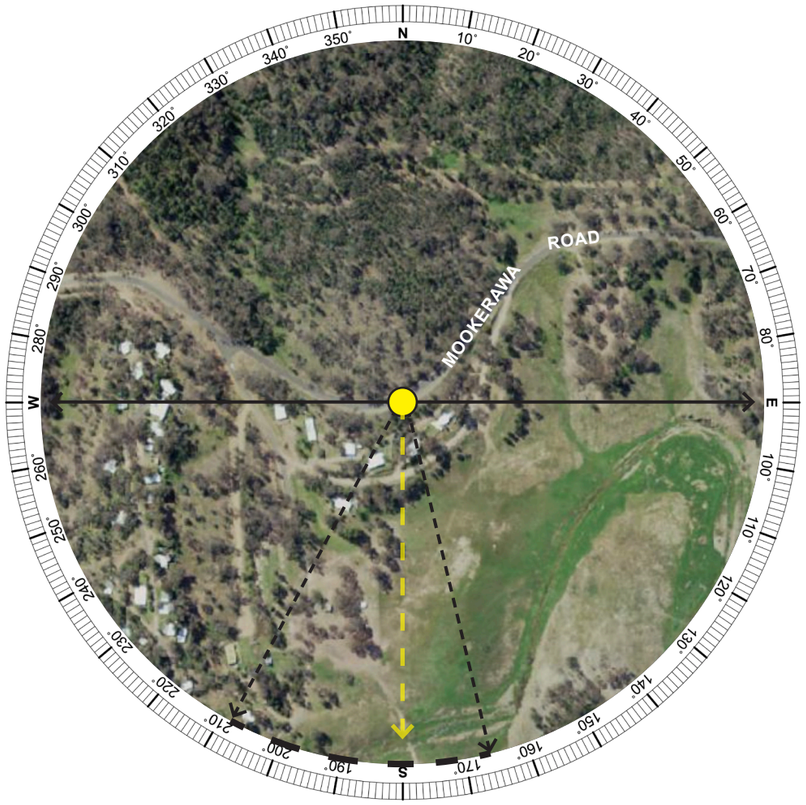
LEGEND

Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines



Aerial Image VP08 (Aerial Image Source: Six Maps)

VIEWPOINT VP08

Viewpoint Summary:	
Location:	Elevation:
Mookerawa Waters Holiday Park, Mookerawa Rd, Mookerawa	336 m
Coordinates:	Viewing Direction:
32°46'0.64"S 149° 9'10.51"E	South
Distance to nearest WTG:	Visibility Distance Zone:
3.50 km	Far Middleground (FM)
Land Use:	Viewer Sensitivity Level:
Recreation Area	High
LCU:	Scenic Quality Rating:
LCU01: Lake Burrendong	Moderate
Multiple Wind Turbine Tool:	
One 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:
This viewpoint was taken from Mookerawa Road at Mookerawa Waters Holiday Park, located within Mookerawa State Recreation Area. This road is a local, sealed no-through road. Land is generally used for recreation associated with the river and holiday accommodation. The topography is undulating to steep in sections that adjoin the lake, with scattered trees visible in the foreground to the south. Muckerwa Creek is visible in the foreground of the view and a portion of the ridgeline associated with the Project.
Potential Visual Impact:
A number of turbines associated with the Project will be visible from this location to the south of the view.

VP09 10 Mount Aquila Road, Farnham

Approximate extent of potentially visible turbines

50° 60° 70° 80° E 100° 110° 120° 130° 140° 150° 160° 170° S 190° 200° 210° 220°

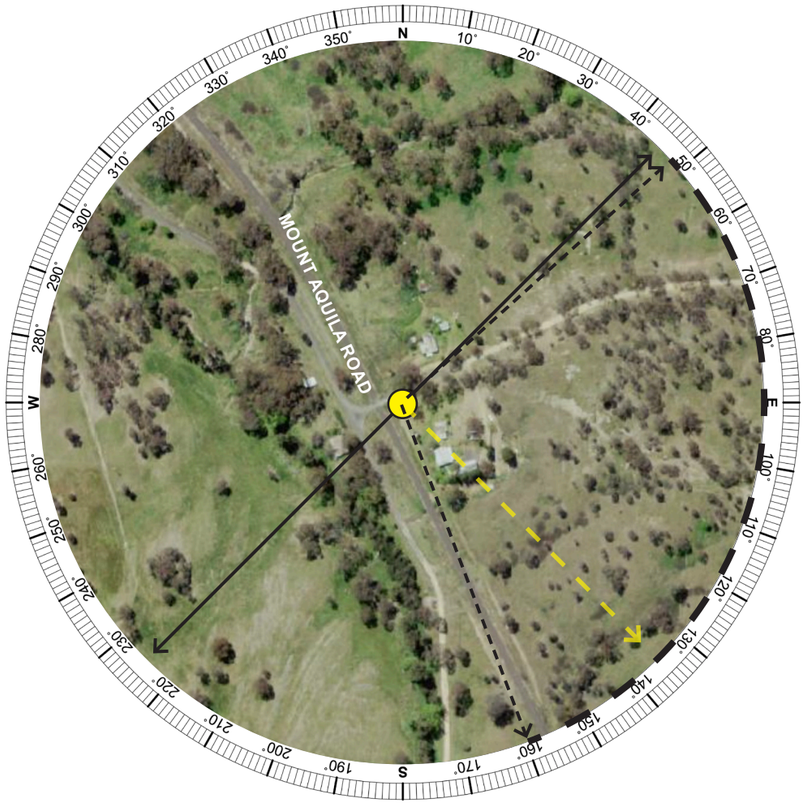
LEGEND

Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines



Aerial Image VP09 (Aerial Image Source: Six Maps)

VIEWPOINT VP09

Viewpoint Summary:	
Location:	Elevation:
10 Mount Aquila Rd, Farnham	525 m
Coordinates:	Viewing Direction:
32°50'20.14"S 149° 5'13.48"E	South East
Distance to nearest WTG:	Visibility Distance Zone:
2.67 km	Near Middleground (NM)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU05: Euchareena & Farnham	Low
Multiple Wind Turbine Tool:	
Two 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint is from Mount Aquila Road, adjacent to the railway line. Mount Aquila Road is a low-use road that runs generally east to west and provides access to rural residential lots. The topography is mostly flat to gently undulating. The landscape consists of scattered vegetation associated with the roadside and riparian vegetation associated with Boduldura Creek to the south.

Potential Visual Impact:

From this viewpoint, the Project may be visible. However, due to a combination of roadside vegetation in the foreground, scattered vegetation in the midground and topography, it is likely views toward the Project will be screened from this location.

VP10A Mount Aquila Road, Farnham

Approximate extent of potentially visible turbines

W 280° 290° 300° 310° 320° 330° 340° 350° N 10° 20° 30° 40° 50° 60° 70° 80° E

LEGEND

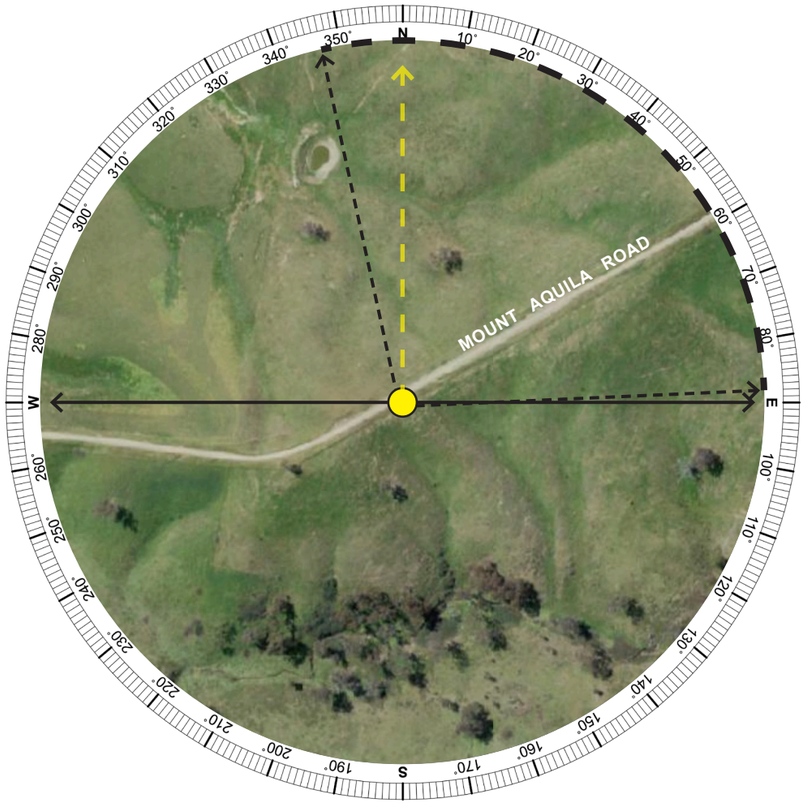
Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines

N



Aerial Image VP10A (Aerial Image Source: Six Maps)

VIEWPOINT VP10A

Viewpoint Summary:	
Location:	Elevation:
Mount Aquila Rd, Farnham	618 m
Coordinates:	Viewing Direction:
32°50’22.97”S 149° 7’19.40”E	North
Distance to nearest WTG:	Visibility Distance Zone:
0.46 km	Near Foreground (NF)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU03: Undulating pastures & Grassy plains	Low
Multiple Wind Turbine Tool:	
Three 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint was taken from Mount Aquila Road looking which is a local road that passes through the Project Area and provides access to farmland and rural dwellings. Land is characterised by undulating topography which is mostly cleared to support agricultural activity. A limited number of scattered trees are dotted throughout the landscape and views are open and expansive.

Potential Visual Impact:

The Project will dominate the visual catchment at this location due to the proximity of the turbines and open, clear views. Turbines will be clearly visible in the north and south.

VP10B Mount Aquila Road, Farnham

Approximate extent of potentially visible turbines

LEGEND

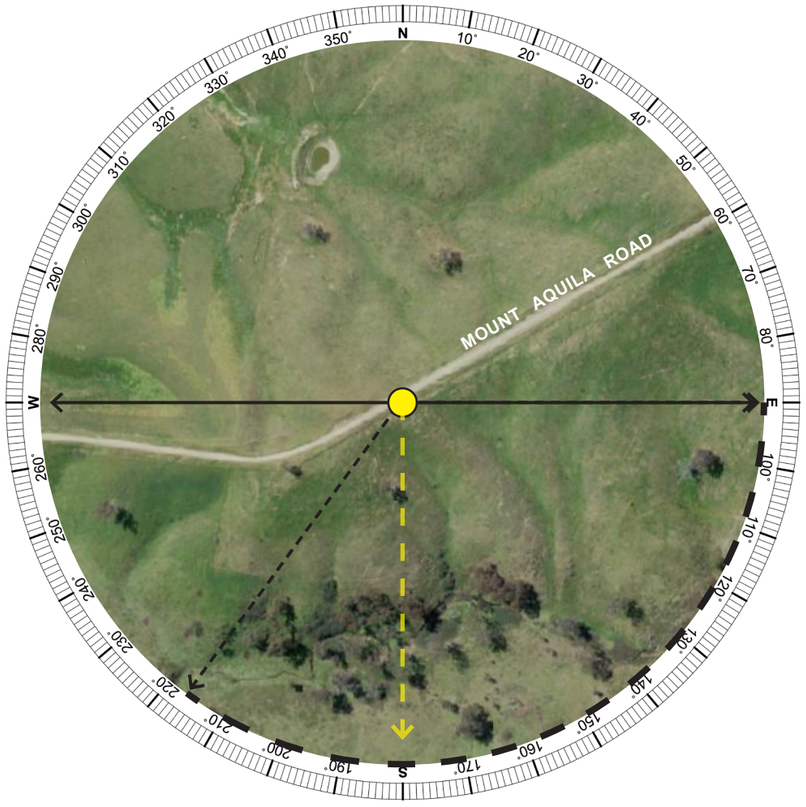
Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines

N



Aerial Image VP10B (Aerial Image Source: Six Maps)

VIEWPOINT VP10B

Viewpoint Summary:	
Location:	Elevation:
Mount Aquila Rd, Farnham	618 m
Coordinates:	Viewing Direction:
32°50’22.97”S 149° 7’19.40”E	South
Distance to nearest WTG:	Visibility Distance Zone:
0.46 km	Near Foreground (NF)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU03: Undulating pastures & Grassy plains	Low
Multiple Wind Turbine Tool:	
Three 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint was taken from Mount Aquila Road looking which is a local road that passes through the Project Area and provides access to farmland and rural dwellings. Land is characterised by undulating topography which is mostly cleared to support agricultural activity. A limited number of scattered trees are dotted throughout the landscape and views are open and expansive.

Potential Visual Impact:

The Project will dominate the visual catchment at this location due to the proximity of the turbines and open, clear views. Turbines will be clearly visible in the north and south.

VP11 Mount Muckerwa Road, Mount Aquila

Approximate extent of potentially visible turbines

S 190° 200° 210° 220° 230° 240° 250° 260° W 280° 290° 300° 310° 320° 330° 340° 350° N

LEGEND

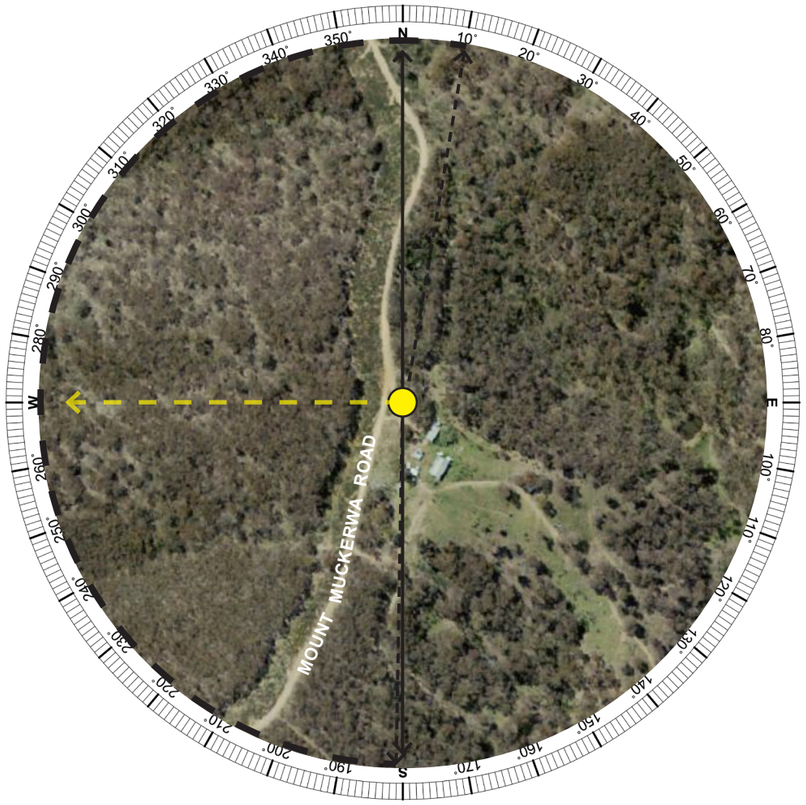
Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines

N



Aerial Image VP11 (Aerial Image Source: Six Maps)

VIEWPOINT VP11

Viewpoint Summary:	
Location:	Elevation:
Mount Muckerwa Rd, Mt Aquila	781 m
Coordinates:	Viewing Direction:
32°50’13.19”S 149° 9’19.31”E	West
Distance to nearest WTG:	Visibility Distance Zone:
1.16 km	Far Foreground (FF)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU04: Densely Vegetated Hills	Moderate
Multiple Wind Turbine Tool:	
Three 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint was taken from Mount Muckerwa Road, looking in a westerly direction. Mount Muckerwa Road is a low use, unsealed road that provides access to a number of isolated rural dwellings. The surrounding area includes densely vegetated in the foreground and undulating land, becoming steeperto the north. Views are largely screened by existing vegetation. A portion of the vegetated ridgeline associated with the Project is visible in the distance to the south.

Potential Visual Impact:

The Project will be visible in the western direction from this location. However, it is likely the gentle rise to the north and existing dense vegetation in foreground will screen views towards the Project, therefore reducing the number of turbines visible from this location.

VP12 Mount Aquila Road, Mount Aquila

Approximate extent of potentially visible turbines

S 190° 200° 210° 220° 230° 240° 250° 260° W 280° 290° 300° 310° 320° 330° 340° 350° N

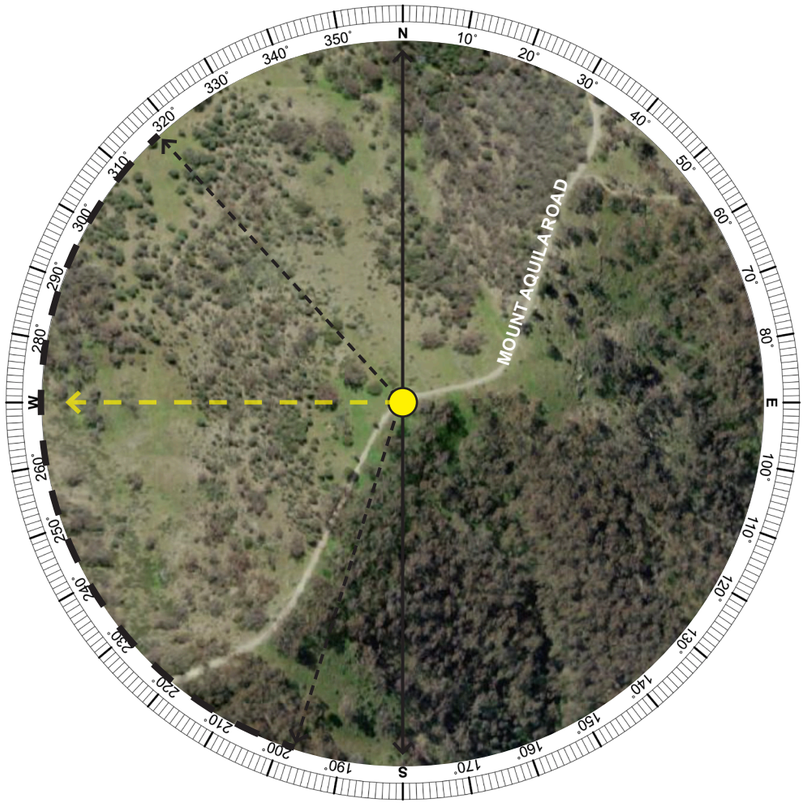
LEGEND

Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines



Aerial Image VP12 (Aerial Image Source: Six Maps)

VIEWPOINT VP12

Viewpoint Summary:	
Location:	Elevation:
Mount Aquila Rd, Mount Aquila	742 m
Coordinates:	Viewing Direction:
32°49'43.86"S 149°11'31.32"E	West
Distance to nearest WTG:	Visibility Distance Zone:
3.52 km	Near Middleground (NM)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU04: Densely Vegetated Hills	Moderate
Multiple Wind Turbine Tool:	
Two 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint was taken from Mount Aquila Road looking in a westerly direction. The surrounding landscape character is steep to undulating topography. Views are open and expansive, due to the elevation of the viewpoint and limited vegetation for screening. This viewpoint is located at a higher elevation that looks onto the ridgeline associated with the Project in the north-western direction.

Potential Visual Impact:

Views of the Project are likely to be available in the north-west, however, topography and vegetation will partially screen views in the western direction.

VP13 Merrimount Road, Stuart Town

Approximate extent of potentially visible turbines

LEGEND

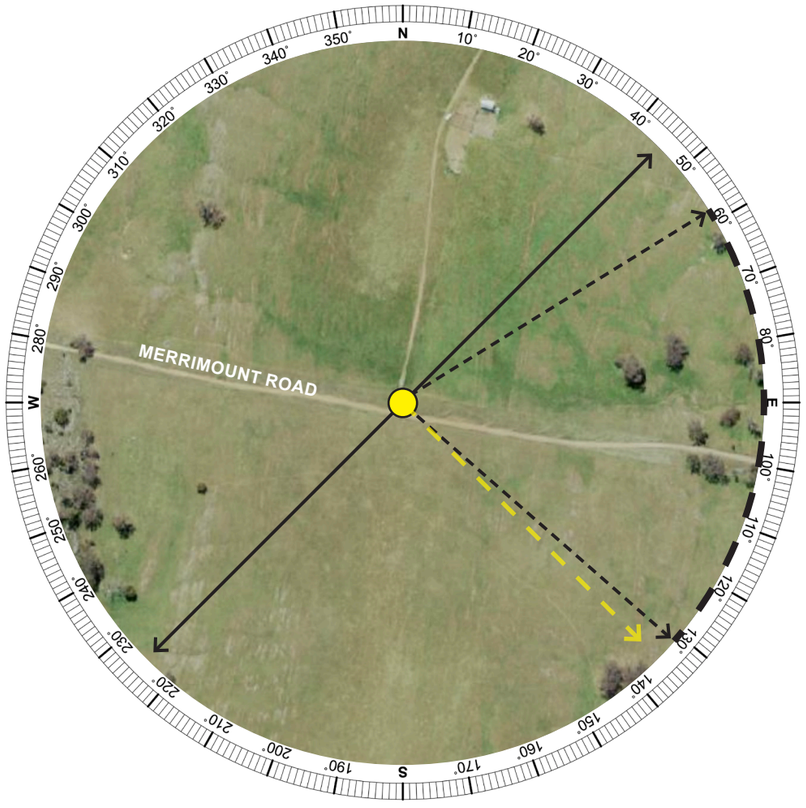
Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines

N



Aerial Image VP13 (Aerial Image Source: Six Maps)

VIEWPOINT VP13

Viewpoint Summary:	
Location:	Elevation:
Merrimount Rd, Stuart Town	516 m
Coordinates:	Viewing Direction:
32°51'24.00"S 149° 1'59.79"E	South East
Distance to nearest WTG:	Visibility Distance Zone:
7.28 km	Near Middleground (NM)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU03: Undulating pastures & Grassy plains	Low
Multiple Wind Turbine Tool:	
Two 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint was taken from Merrimount Road, looking in a generally south-east direction. Merrimount Road is an unsealed, low use road that provides access to farmland and rural dwellings. Surrounding lands are utilised for grazing and are characterised by gently undulating topography. Land is mostly cleared with a limited number of trees dotted through the landscape. Views are open and expansive to the east views available in the background of the view on the ridgeline.

Potential Visual Impact:

Turbines will be clearly visible from this location to the east of the view, however, topography will likely screen some wind turbines and contain views toward the Project.

VP14 Quirks Loop, Stuart Town

Approximate extent of potentially visible turbines

N 10° 20° 30° 40° 50° 60° 70° 80° E 100° 110° 120° 130° 140° 150° 160° 170° S

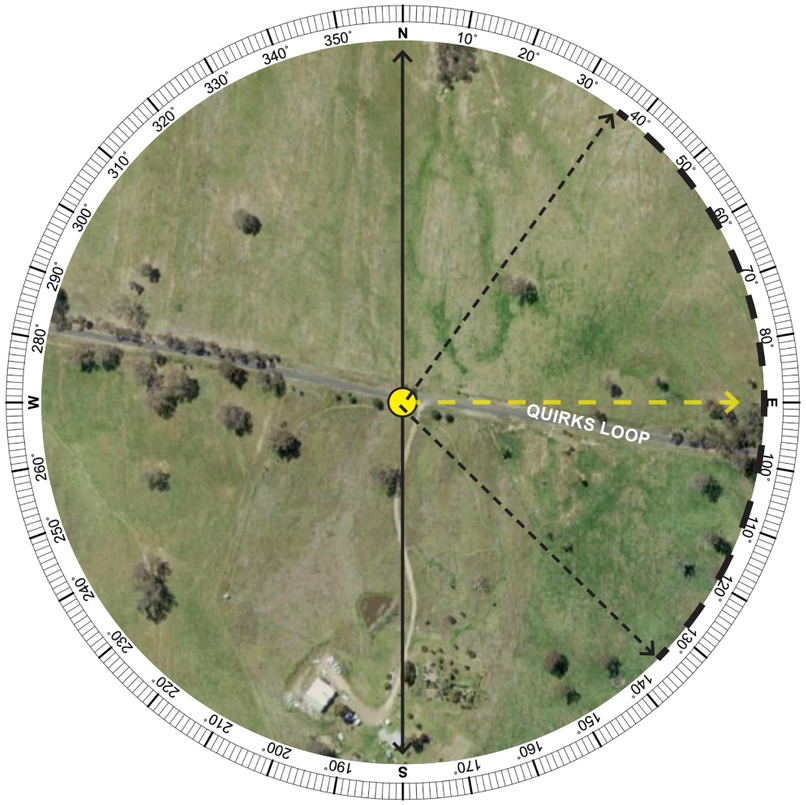
LEGEND

Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines



Aerial Image VP14 (Aerial Image Source: Six Maps)

VIEWPOINT VP14

Viewpoint Summary:	
Location:	Elevation:
Quirks Lp, Stuart Town	581 m
Coordinates:	Viewing Direction:
32°52'32.87"S 149° 4'15.30"E	East
Distance to nearest WTG:	Visibility Distance Zone:
4.18 km	Near Middleground (NM)
Land Use:	Viewer Sensitivity Level:
Major Road	Low
LCU:	Scenic Quality Rating:
LCU03: Undulating pastures & Grassy plains	Low
Multiple Wind Turbine Tool:	
Two 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:
This viewpoint was taken from Quirks Loop and is facing to the east. Surrounding lands are utilised for grazing and are characterised by undulating topography. Land includes patches of scattered vegetation and roadside vegetation. At this location, views are open towards ridgelines associated with the Project.
Potential Visual Impact:
The Project will be part of the visual catchment at this location because of the distance between the viewpoint and the Project.

VP15 Burrendong Way, Farnham

Approximate extent of potentially visible turbines

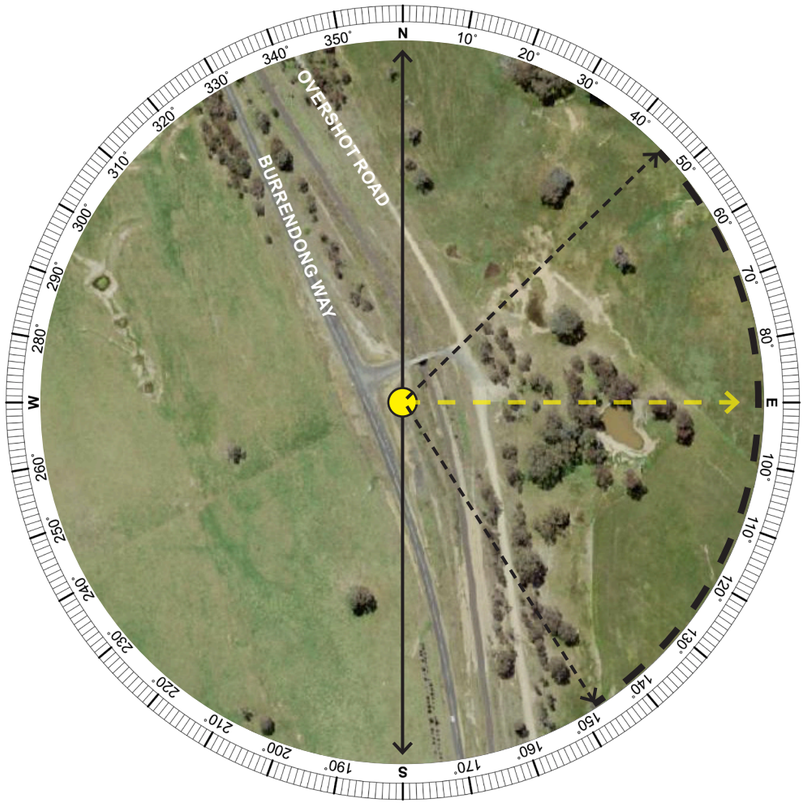
LEGEND

Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines



Aerial Image VP15A (Aerial Image Source: Six Maps)

VIEWPOINT VP15

Viewpoint Summary:	
Location:	Elevation:
Burrendong Way, Farnham	640 m
Coordinates:	Viewing Direction:
32°54'48.87"S 149° 5'59.24"E	East
Distance to nearest WTG:	Visibility Distance Zone:
3.50 km	Far Middleground (FM)
Land Use:	Viewer Sensitivity Level:
Major Road	Low
LCU:	Scenic Quality Rating:
LCU03: Undulating pastures & Grassy plains	Low
Multiple Wind Turbine Tool:	
Two 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint was taken from Burrendong Way near its intersection with Overshot Road, looking in an easterly direction. Burrendong Way is a major road which runs in a generally north-south direction and passes through the Project, connecting to a number of local roads that are used to access rural residences and agricultural lots. The surrounding landscape is characterised by gentle undulations with dense patches of roadside vegetation visible in the foreground. Views from this location are fragmented by the roadside vegetation to the east.

Potential Visual Impact:

From this location, views of the Project are likely to be available in the east. However, roadside vegetation and topography will screen some views.

VP16 53 Nubrigyn St, Euchareena

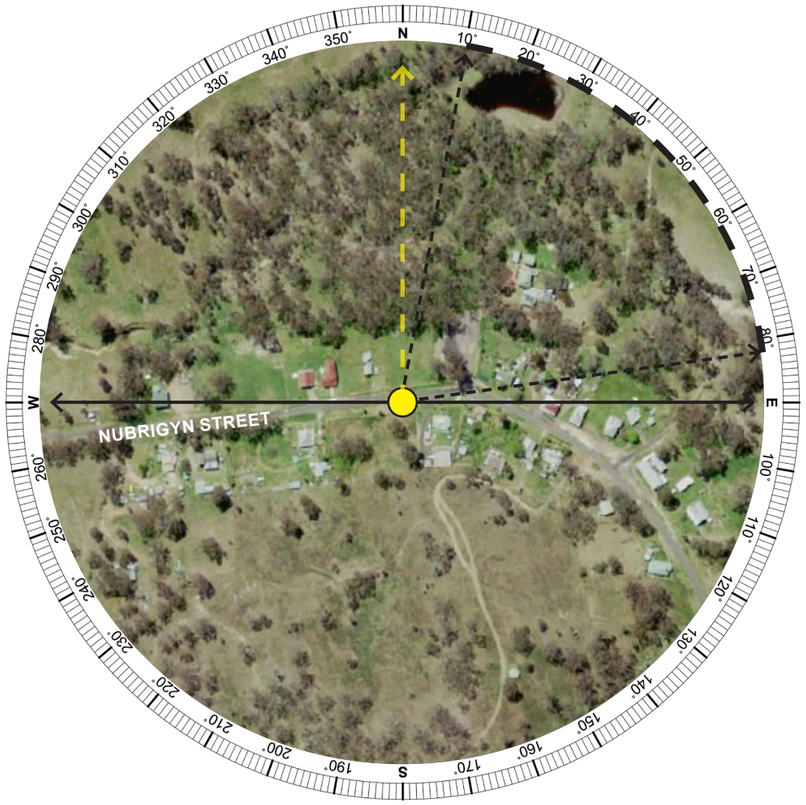
LEGEND

Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines



Aerial Image VP16 (Aerial Image Source: Six Maps)

VIEWPOINT VP16

Viewpoint Summary:	
Location:	Elevation:
53 Nubrigyn St, Euchareena	628 m
Coordinates:	Viewing Direction:
32°56'18.74"S 149° 5'30.92"E	North
Distance to nearest WTG:	Visibility Distance Zone:
3.92 km	Near Middleground (NM)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU05: Euchareena & Farnham	Low
Multiple Wind Turbine Tool:	
Two 60º Sectors with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint was taken from Nubrigyn Street at the township of Euchareena. Nubrigyn Road is a sealed, local road that provides access to the dwellings within the town. The viewpoint is looking in a northerly direction and is a representation of views from public viewpoints located in Euchareena. The surrounding landscape is characterised by gently undulating topography with dense trees associated with dwellings and dense vegetation visible in the foreground. Views from this locations are generally contained by the steep rise in topography to the northwest and also fragmented by the north east.

Potential Visual Impact:

From this location, it is likely that the Project will be visible to the northeast and blade tips may be visible to the north-west. However, due to rises in topography, vegetation and existing buildings, views towards the Project will mostly be screened.

VP17 Mount Top Road, Euchareena

Approximate extent of potentially visible turbines

W 280° 290° 300° 310° 320° 330° 340° 350° N 10° 20° 30° 40° 50° 60° 70° 80° E

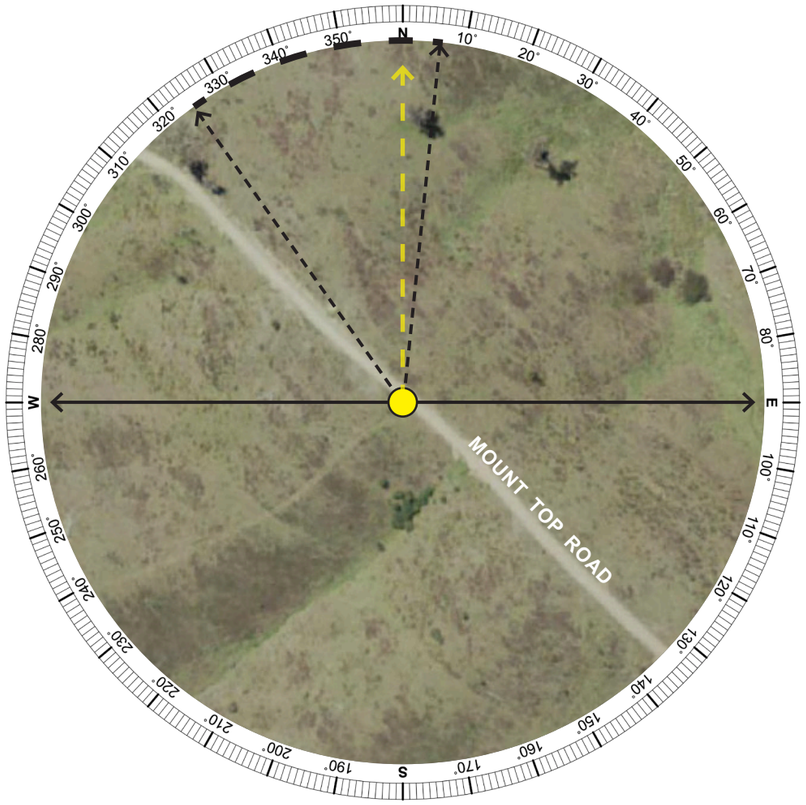
LEGEND

Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines



Aerial Image VP17 (Aerial Image Source: Six Maps)

VIEWPOINT VP17

Viewpoint Summary:	
Location:	Elevation:
Mount Top Rd, Euchareena	643 m
Coordinates:	Viewing Direction:
32°57'8.72"S 149° 9'0.71"E	North
Distance to nearest WTG:	Visibility Distance Zone:
2.32 km	Near Middleground (NM)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU03: Undulating pastures & Grassy plains	Low
Multiple Wind Turbine Tool:	
One 60º Sector with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint was taken at Mount Top Road looking to the north. Mount Top Road is an unsealed, local road which provides access to a small number of rural dwellings and farmland. The character is defined by undulating to steep land that has been extensively cleared for agricultural activities such as grazing. Patches of scattered vegetation along the roadside are visible in the foreground. This viewpoint is located at a higher elevation that looks onto the ridgeline associated with the Project in the northwestern direction. Views from this location are generally open and expansive.

Potential Visual Impact:

Turbines will be clearly visible from this location due to the close proximity and lack of vegetation to the north. A rise in topography to the north-west will screen views, turbine blade tips may be visible in the north.

VP18 Shepherds Creek Rd, Euchareena

Approximate extent of potentially visible turbines

W 280° 290° 300° 310° 320° 330° 340° 350° N 10° 20° 30° 40° 50° 60° 70° 80° E

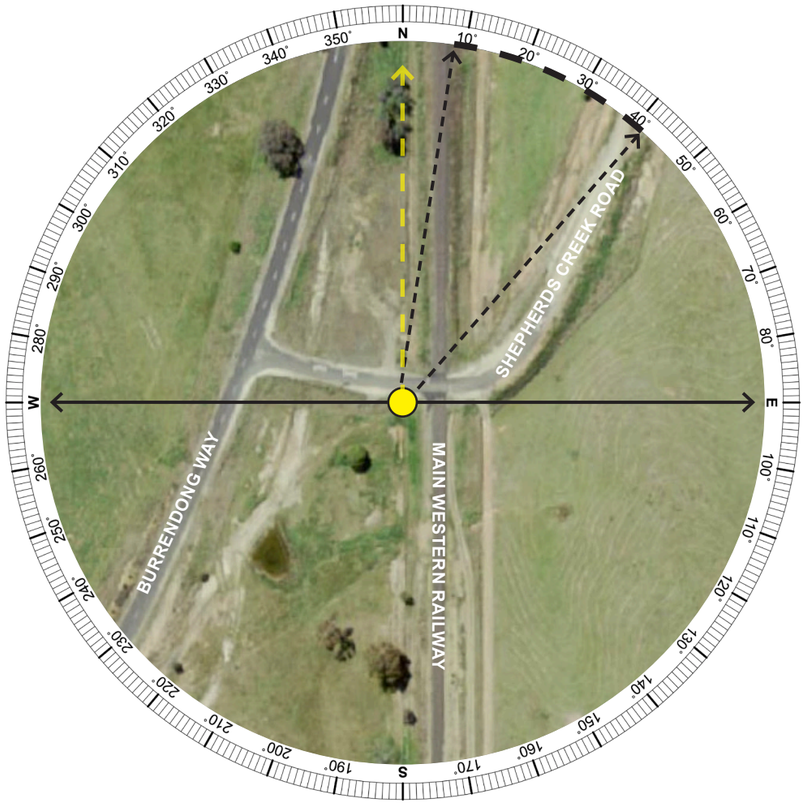
LEGEND

Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines



Aerial Image VP18 (Aerial Image Source: Six Maps)

VIEWPOINT VP18

Viewpoint Summary:	
Location:	Elevation:
Shepherds Creek Rd, Euchareena	730 m
Coordinates:	Viewing Direction:
32°59'39.99"S 149° 5'5.80"E	North
Distance to nearest WTG:	Visibility Distance Zone:
8.39 km	Near Background (NB)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU03: Undulating pastures & Grassy plains	Low
Multiple Wind Turbine Tool:	
No turbines within 8000 m.	

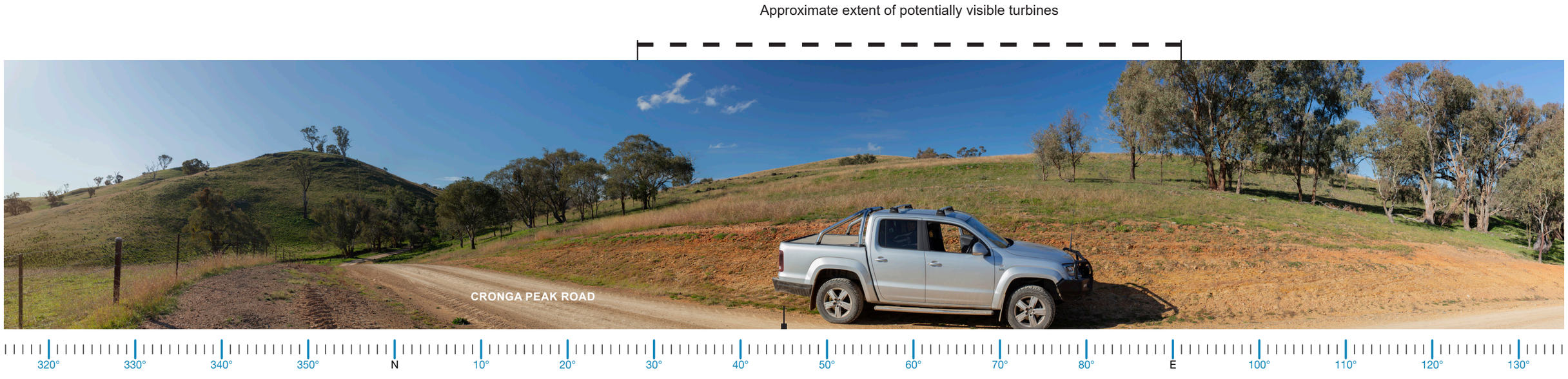
Existing Landscape Character Description:

This photograph was taken at Shepherds Creek Road near its intersection with Burrendong Way, adjacent to the Main Western Railway line. Land is characterised as cleared land that is used for grazing and cropping. The terrain is gently undulating with few scattered trees dotted through the landscape. The railway passes from south-north in the foreground from this viewpoint and views are generally contained by topographic difference in the north west.

Potential Visual Impact:

From this location, the Project will be visible to the northeast of the view. Gentle rises in topography and vegetation will screen some views to the north.

VP19 Cronga Peak Road, Euchareena



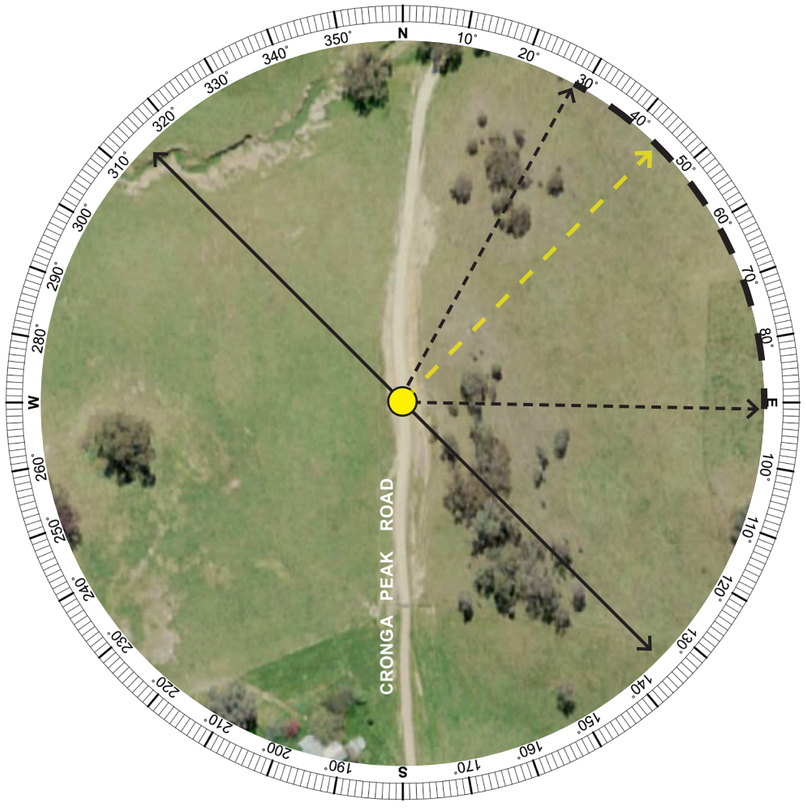
LEGEND

Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines



Aerial Image VP19 (Aerial Image Source: Six Maps)

VIEWPOINT VP19

Viewpoint Summary:	
Location:	Elevation:
Cronga Peak Rd, Euchareena	556 m
Coordinates:	Viewing Direction:
32°55'52.47"S 149° 2'48.97"E	North East
Distance to nearest WTG:	Visibility Distance Zone:
7.13 km	Far Middleground (FM)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU03: Undulating pastures & Grassy plains	Low
Multiple Wind Turbine Tool:	
One 60º Sector with turbines within 8000 m.	

Existing Landscape Character Description:

This viewpoint is from Cronga Peak Road, facing to the northeast. Cronga Peak Road is an unsealed, local road that provides access to low density rural residential lots. The landscape is characterised by undulating to steep topography and surrounding land that is extensively cleared to support grazing and cropping. Patches of roadside vegetation is visible in the foreground. Views from this location are contained by the rising topography towards the east.

Potential Visual Impact:

From this location, it is likely that a combination of topography and vegetation will screen views to the Project in the north east. Turbines blade tips may be visible to the north.

VP20 Eadevale Rd, Euchareena

Approximate extent of potentially visible turbines

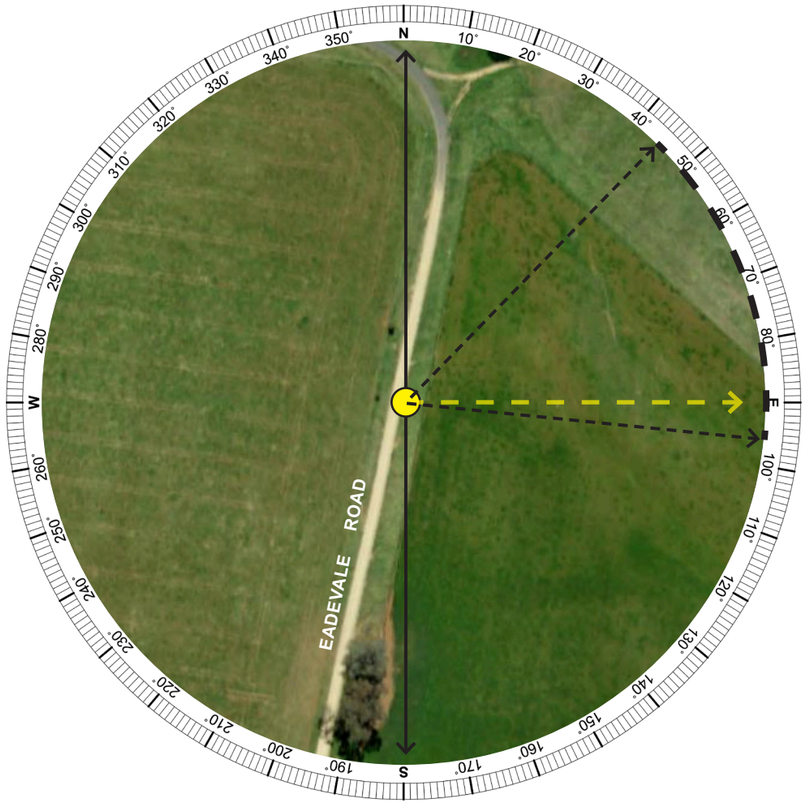
LEGEND

Viewing direction and centre of panorama

Direction of potentially visible turbines

Extent of panorama

Extent of potentially visible turbines



Aerial Image VP20 (Aerial Image Source: Six Maps)

VIEWPOINT VP20

Viewpoint Summary:	
Location:	Elevation:
Eadevale Rd, Euchareena	568 m
Coordinates:	Viewing Direction:
32°55'12.69"S 148°59'46.43"E	East
Distance to nearest WTG:	Visibility Distance Zone:
11.59 km	Near Background (NB)
Land Use:	Viewer Sensitivity Level:
Local Road	Low
LCU:	Scenic Quality Rating:
LCU03: Undulating pastures & Grassy plains	Low
Multiple Wind Turbine Tool:	
No turbines within 8000 m.	

Existing Landscape Character Description:

This photograph was taken from Eadevale Road looking in a generally easterly direction. Eadevale Road is an unsealed, local road that is used to access farmland and rural properties. Land is characterised by flat to gently undulating topography and is predominantly cleared, with patches of dense vegetation visible to the north. Views are generally open to the east and contained by topography to the north-east.

Potential Visual Impact:

Views of the Project are likely to available in an easterly direction. It is likely that views may be partially screened by existing vegetation and topography to the northeast.

APPENDIX 6

Preliminary Noise Impact Assessment

MARSHALL DAY Acoustics

AQUILA WIND
PRELIMINARY NOISE ASSESSMENT

Rp 001 R03 20210890 | 22 January 2024

Marshall Day Acoustics Pty Ltd
ABN: 53 470 077 191
Gadigal Eora Country
C 14, 372 Wattle Street
Ultimo NSW 2007
T: +612 9282 9422
www.marshallday.com

Project: **AQUILA WIND**

Prepared for: **Umwelt (Australia) Pty Limited**
Level 11
213 Miller Street
North Sydney
NSW 2060

Attention: **Nathan Baker**

Report No.: **Rp 001 R03 20210890**

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Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Superseded	-	Issued to client	18 Nov. 2022	O. Wesley-Smith A. Stoker C. Delaire	A. Stoker C. Delaire
Superseded	R01	Reflects updated wind turbine layout and updated dwelling layout	31 Jan. 2023	O. Wesley-Smith A. Stoker C. Delaire	A. Stoker C. Delaire
Superseded	R02	Revised for consistency with wider EIS documentation	8 Feb. 2023	O. Wesley-Smith A. Stoker C. Delaire	A. Stoker C. Delaire
Complete	R03	Reflects updated wind turbine and dwelling layouts	22 Jan. 2024	H. Sah O. Wesley-Smith	A. Stoker

EXECUTIVE SUMMARY

The proposed Aquila Wind Project (the Project) by ACEN Australia (the Proponent) comprises the construction, operation, and decommissioning of a wind farm located approximately 2.5 km southeast of Stuart Town and 2 km northeast of Euchareena, in the Central West region of NSW, within the Dubbo Regional Council Local Government Area (LGA) and the NSW Government's Central-West Orana Renewable Energy Zone (Central-West REZ).

The Project is proposed to have an installed capacity of up to 300 MW of renewable energy and include a Battery Energy Storage System (BESS), ancillary civil and electrical engineering infrastructure, temporary construction facilities, and permanent worker facilities. The power generated from the wind turbines, each with a typical hub height of 165 m above ground level, would feed into the electricity grid through direct connection to the adjacent 330 kV transmission lines. At this early stage, plans for the proposed development comprise up to forty-eight (48) three blade wind turbines, with a maximum blade-tip height of 250 m above ground level.

A preliminary assessment of operational noise for the 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 6.2 MW and typical of the size and type of turbine which is being considered for the site.

The results of the modelling indicate that wind farm noise levels are predicted to be above the base noise limit of 35 dB L_{Aeq} at six (6) non-associated receivers. Potential mitigation strategies would be considered during the Environmental Impact Statement (EIS) stage, in combination with potential negotiated agreements, but following the completion of baseline noise monitoring and wind-speed based noise limits being established.

Based on the wind farm noise modelling conducted to date it is expected 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 would be undertaken to support a subsequent development application to demonstrate how compliance would be achieved for the specific noise matters defined by the SEARs.

This would include background noise monitoring at key receivers around the Project, revised operational wind turbine noise modelling assessment, noise mitigation strategies (where required) and other noise considerations including special noise characteristics, construction, and ancillary infrastructure.

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1.0 INTRODUCTION

The proposed Aquila Wind Project (the Project) comprises the construction, operation and decommissioning of a wind farm in the Central West region of NSW, within the Dubbo Regional Council Local Government Area (LGA). The Project is located approximately 2.5 km southeast of Stuart Town and 2 km northeast of Euchareena, in the Central West region of NSW, within the Dubbo Regional Council Local Government Area (LGA).

Dubbo is situated approximately 70 km northwest of the Project Boundary (the northern most extent). The other regional centres of Mudgee, Wellington and Orange are situated approximately 40 km to the northeast, 30 km to the northwest and 35 km to the south respectively.

The Project area is located within the NSW Government's Central-West Orana Renewable Energy Zone (Central-West REZ).

The Project design incorporates up to forty-eight (48) wind turbines (with a maximum blade-tip height of up to 250 m) with an installed capacity of up to 300 MW, a Battery Energy Storage System (BESS), ancillary civil and electrical engineering infrastructure, temporary construction facilities and permanent worker facilities. The power generated from the wind turbines, each with a typical hub height of 165 m above ground level, would feed into the electricity grid through direct connection to the adjacent 330 kV transmission lines.

This report presents the results 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 proposed site layout comprising of forty-eight (48) multi megawatt wind turbines and a candidate turbine model representative of the size and type of turbine being considered for the site
- A comparison of the predicted noise levels with the base noise limit.

Given the broader development of renewable energy within the Central-West REZ, there is the potential for cumulative impacts of the Project in conjunction with other nearby wind farm developments.

The proposed Burrendong Wind Farm is located to the northeast of the Project with the nearest turbine indicatively located approximately 7.5 km from that of the Project. SEARs were issued for the Burrendong Wind Farm project in September 2022.

The proposed Kerrs Creek Wind Farm is located to the south of the Project with the nearest turbine indicatively located approximately 1 km to 1.5 km from that of the Project. SEARs were issued for the Kerrs Creek Wind Farm project in October 2023.

Potential cumulative noise has not been assessed for the Project at this stage but would however be considered during the Environmental Impact Statement (EIS) stage alongside other noise considerations relating to 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 in this report is presented in Appendix A.

2.0 PROJECT DESCRIPTION

2.1 Overview

The Project adjoins Burrendong Way and straddles the Main Western Railway Line, which runs north to south through the westernmost section of the Project Area.

The Project, if approved, would have an installed capacity of up to 300 MW. At this early stage, plans for the proposed development comprise:

- Up to forty-eight (48) three blade wind turbines, with a maximum blade-tip height of 250 m above ground level
- Power infrastructure providing connection to the existing 330 kV transmission line i.e. on-site substations/switchyards
- Internal electrical reticulation network i.e. electrical connections between the proposed wind turbines and substation consisting of a combination of underground cables and overhead powerlines
- Construction of a new/upgraded site access roads, intersection upgrades, and level rail crossing over the Main Western Railway Line
- Other associated permanent infrastructure including hardstands, new / upgraded farm access tracks, secondary access point(s) from public roads, operation, and maintenance buildings
- A BESS (100 MW / 200 MWh)
- Permanent meteorological monitoring masts
- Temporary construction facilities including:
  - Construction compounds, site office buildings and storage areas
  - On-site concrete batching plants for use during the construction phase
  - Laydown areas used for wind turbine installation and storage of WTG components
- Targeted road network upgrades to facilitate delivery of oversize and overmass (OSOM) turbine components to the Project Area as required
- A permanent operations and maintenance facility for the Project.

The coordinates of the proposed wind turbines have been tabulated in Appendix B.

A total of one hundred and sixty-nine (169) noise sensitive receivers are located within 4.5 km of any proposed wind turbine location. This includes all fifteen (15) receivers associated with the Project. The remainder of the receivers i.e. one hundred and forty-four (154) receivers not associated with the Project, are referred to as non-associated receivers.

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 turbine model to be assessed in detail as part of the development application would 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 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	6.2 MW
Rotor diameter	162 m
Modelled hub height	165 m
Modelled tip height	246 m
Operating mode	Standard
Serrated trailing edge	No

A wind turbine model (or models) with suitable specifications would be used in the EIS, to reflect the candidate wind turbine models under consideration at the time. Accordingly, the noise assessment undertaken for the EIS would reflect any newly proposed wind turbine model or any new or updated noise data for the candidate turbine model used as the basis of this assessment.

2.3 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 wind turbine.

Sound power level data for the candidate wind 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.

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 wind 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 1 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 wind 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 wind turbine was 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 illustrated Figure 2 and corresponds to the highest overall sound power level illustrated in Figure 1, occurring at a hub height wind speed of 10 m/s.

Figure 1: Turbine assessment sound power levels (including +1 dB for test uncertainty), dB L_{WA}

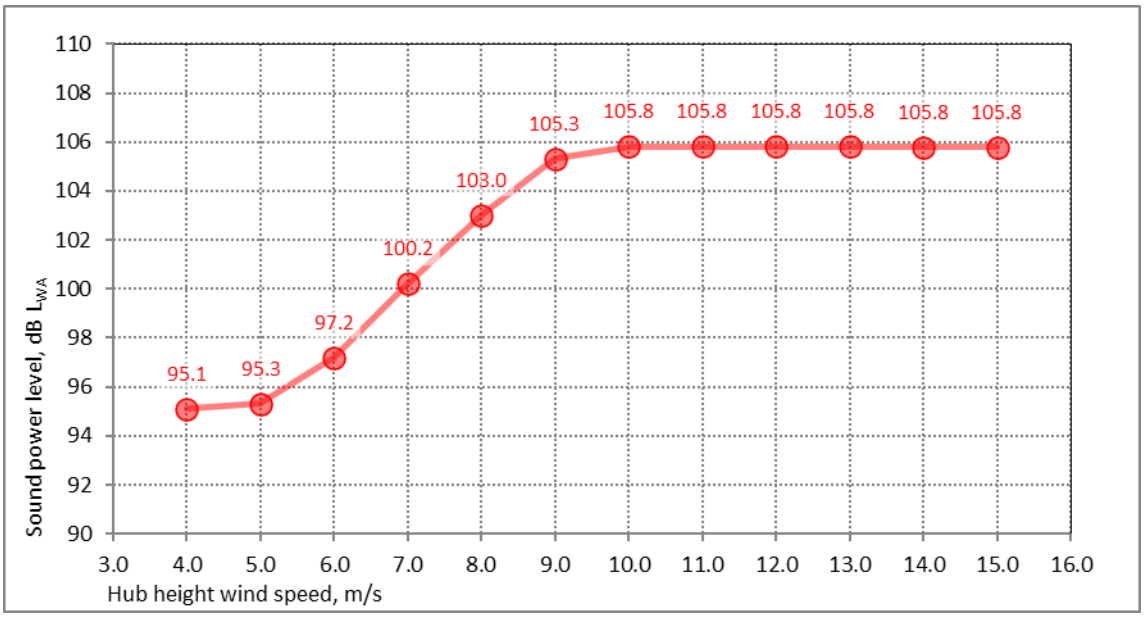
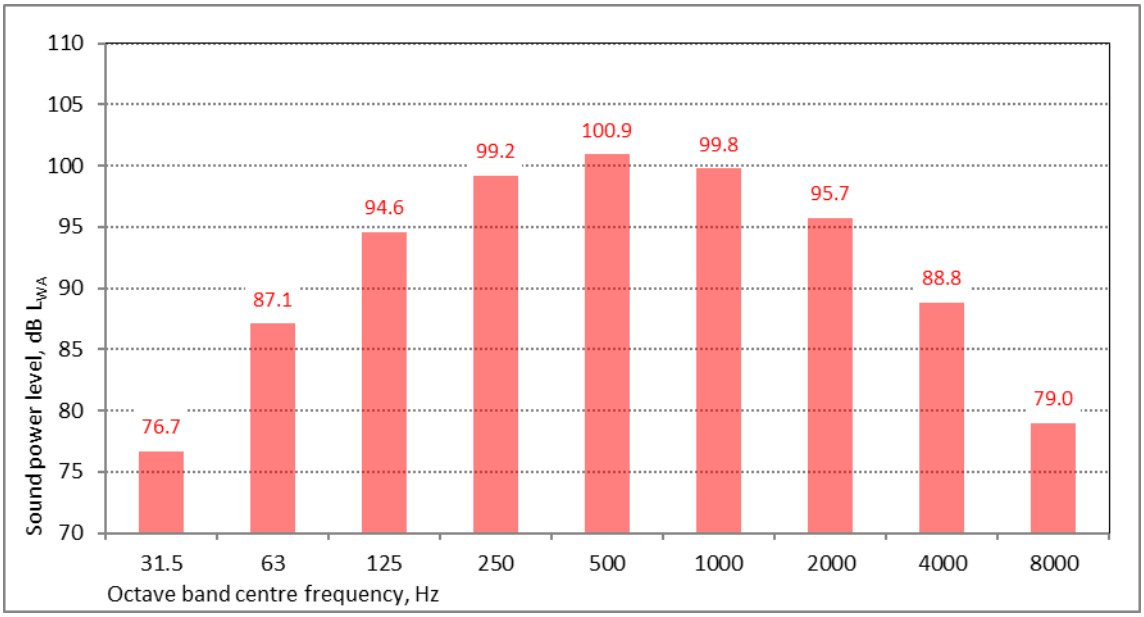


Figure 2: Turbine assessment sound power level spectrum (including +1 dB for test uncertainty), dB L_{WA}



The manufacturer specification for the candidate wind turbine model does not provide information about tonality.

The occurrence of tonality in the noise of contemporary multi-megawatt wind 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 would need to be obtained from the manufacturer concerning tonality.

2.4 Low frequency noise

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.

3.0 ASSESSMENT 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.

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
- 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 would 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 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 participating 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 for *financial stakeholders*. Comparisons between the predicted noise levels and the 45 dB reference level are provided for informative purposes only. Noise levels at these locations would ultimately need to be managed in accordance with the commercial agreements established between the Proponent and the landowners.

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
- 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. Further discussion of terrain screening effects is provided below.
Terrain data	1 arcsecond SRTM digital elevation model data with a vertical resolution of 5 m as 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 flat or moderately upland positions. Receivers are spread across the range of elevation heights throughout the site. These terrain characteristics resulted in moderate application of adjustments to the predicted noise levels for a number of 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 good practice guide 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 °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 conservative 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 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.

5.1.1 Non-associated receivers

The receivers where operational wind farm noise levels are predicted to be higher than 30 dB L_{Aeq} are listed in Table 3 for non-associated receivers. The value of 30 dB is referenced here for informative purposes. The minimum 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 10 m/s) 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 2.3.

Table 3: Highest predicted noise level at non-associated receivers with predicted levels over 30 dB L_{Aeq}

Receiver	dB L_{Aeq}	Distance to the nearest turbine, m	Below the base criterion
R36	33.8	1,446	Yes
R42	31.1	1,807	Yes
R43	31.9	1,469	Yes
R146	31.3	2,626	Yes
R211	**35.4**	**1,222**	**No**
R218	**35.7**	**1,237**	**No**
R219	**36.7**	**1,094**	**No**
R221	30.1	2,250	Yes
R223	**36.6**	**1,102**	**No**
R224	30.5	2,146	Yes
R227	**35.7**	**1,080**	**No**
R228	33.3	1,460	Yes
R235	34.9	1,498	Yes
R239	31.1	2,016	Yes
R245	33.7	1,503	Yes
R250	33.6	1,523	Yes

Receiver	dB L_{Aeq}	Distance to the nearest turbine, m	Below the base criterion
R254	32.2	2,009	Yes
R258	34.7	1,581	Yes
R259	31.2	2,585	Yes
R261	33.5	1,955	Yes
R262	**38.0**	**1,007**	**No**
R263	31.5	2,201	Yes
R264	30.6	3,109	Yes
R266	33.9	1,735	Yes
R267	34.3	1,412	Yes
R270	34.1	1,820	Yes
R275	30.1	2,140	Yes
R360	31.5	2,116	Yes

Predicted noise levels for each integer wind speed are tabulated in Appendix G for receivers where the highest predicted noise level is above 30 dB L_{Aeq}.

It can be seen from Table 3 that wind farm noise levels for six (6) non-associated receivers are predicted to be above the 35 dB L_{Aeq} base noise limit. For all other non-associated receivers, predicted noise levels are below the base noise limit. The extent that predicted values exceed this limit is summarised as follows:

- For three (3) of the non-associated receivers, R211, R218 and R227, the predicted levels are < 1 dB above the 35 dB L_{Aeq} base noise limit
- For two (2) of the non-associated receivers, R219 and R223, the predicted levels are >1 dB < 2 dB above the 35 dB L_{Aeq} base noise limit
- At one (1) of the non-associated receivers, R262, the most affected receiver near the wind farm, the predicted level is 3 dB above the 35 dB L_{Aeq} base noise limit.

Potential mitigation strategies would be considered during the EIS, in combination with potential negotiated agreements, but following the completion of baseline noise monitoring and wind-speed based noise limits being established.

5.1.2 Associated receivers

Predicted noise levels at associated receivers is provided in Table 4, for information.

Table 4: Highest predicted noise level at associated receivers with predicted levels over 30 dB L_{Aeq}

Receiver	dB L_{Aeq}	Distance to the nearest turbine, m	Below the 45 dB reference level
R1	38.1	959	Yes
R2	35.7	1,290	Yes
R3	37.5	1,059	Yes
R4	39.9	1,049	Yes
R5	34.5	1,318	Yes
R6	34.8	1,456	Yes
R7	33.7	1,678	Yes
R8	37.4	1,078	Yes
R9	36.5	1,168	Yes
R10	35.8	1,144	Yes

It can be seen from Table 4 that the predicted noise levels from the proposed Project are below the 45 dB L_{Aeq} reference level for all associated receivers.

5.1.3 Predicted noise contours

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.

Figure 3: Highest predicted noise levels (corresponding to hub height wind speeds of 10 m/s or greater)

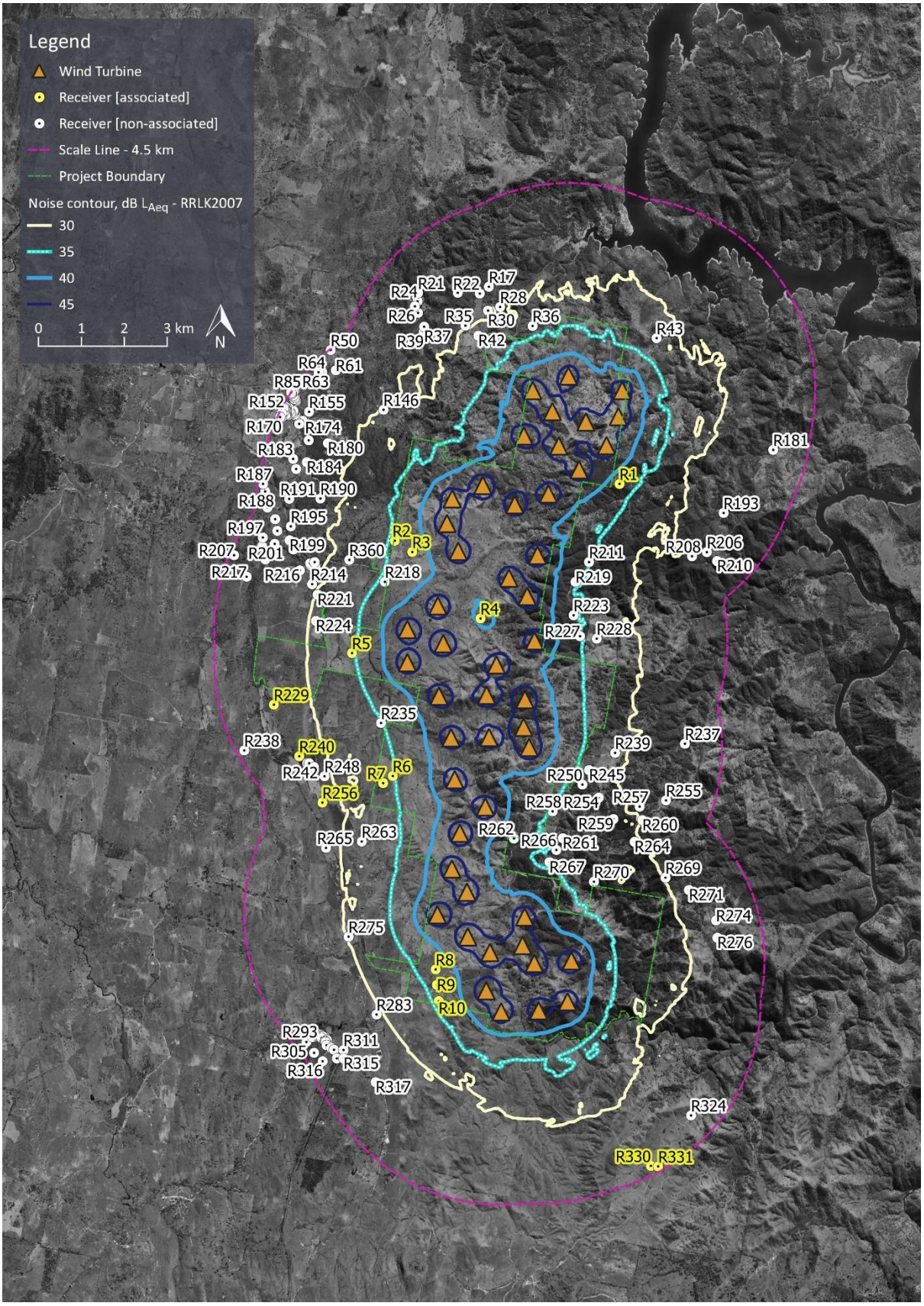
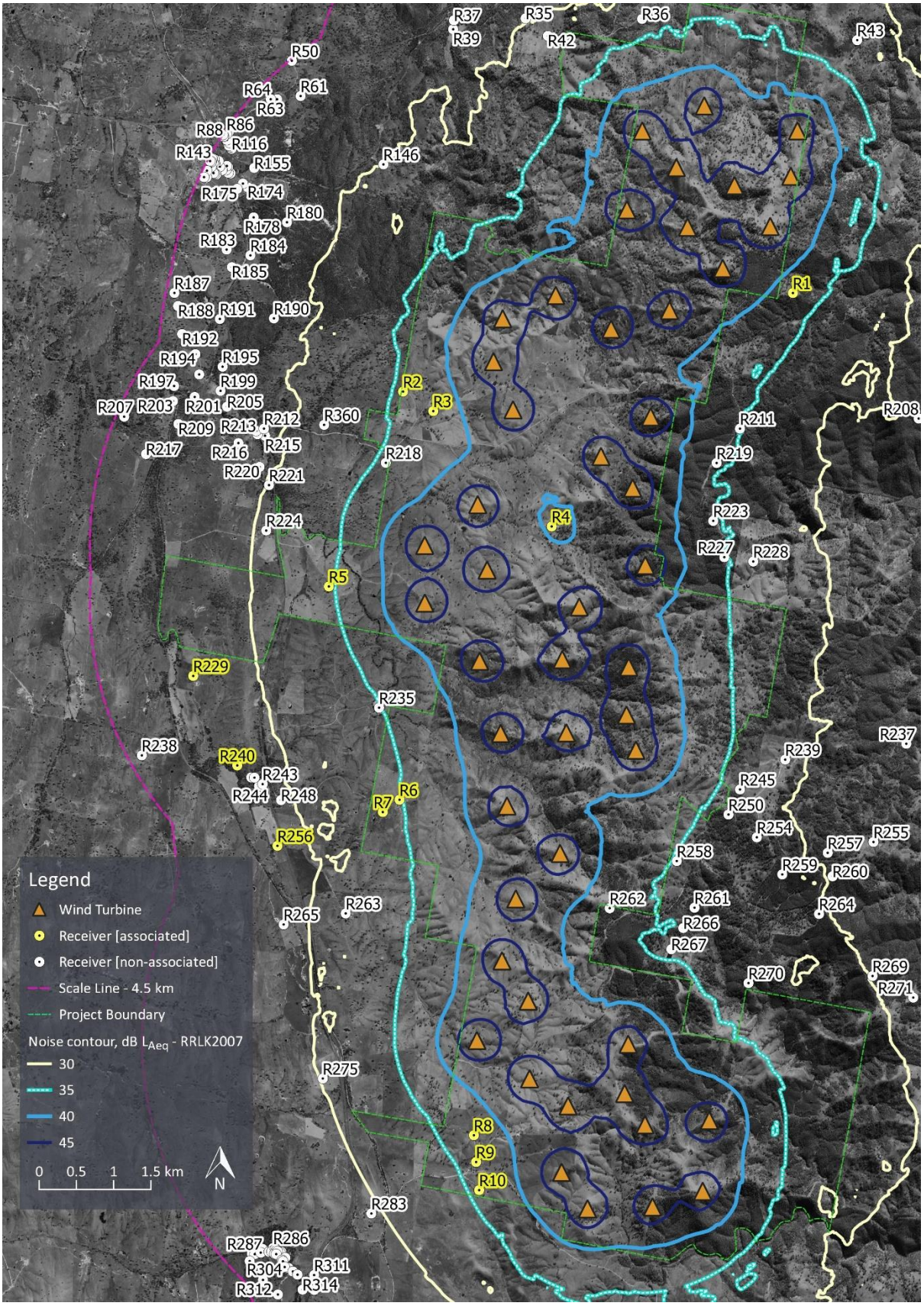


Figure 4: Highest predicted noise levels (corresponding to hub height wind speeds of 10 m/s or greater) - Zoomed



5.2 Low-frequency noise

A risk assessment provided in Appendix H indicates calculated low frequency noise levels below the applicable threshold at all receivers. It is noted that the margin between the predicted levels and the threshold is of a comparable magnitude to the uncertainty associated with C-weighted predictions.

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 at EIS stage and as part of the post-construction compliance assessment.

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
- Construction vibration.

Environmental noise considerations relating to construction and ancillary infrastructure would be addressed at the development application 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 development application 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 development application 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 forty-eight (48) multi-megawatt turbines within the wind farm site.

Noise modelling was carried out based on a candidate turbine model as nominated by the Proponent, typical of the size and type of turbine which is being considered for the site. 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 indicate that wind farm noise levels are predicted to be above the base noise limit of 35 dB L_{Aeq} at six (6) non-associated receivers. Potential mitigation strategies would be considered during the Environmental Impact Statement stage, in combination with potential negotiated agreements, but following the completion of baseline noise monitoring and wind-speed based noise limits being established.

Based on the wind farm noise modelling conducted to date it is expected that 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 would be undertaken to support a subsequent development application to demonstrate how compliance would be achieved for the specific noise matters defined by the SEARs.

This would include background noise monitoring at key receivers around the Project, revised operational wind turbine noise modelling assessment, noise mitigation strategies (where required) 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 L_A 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 TURBINE COORDINATES

The following table sets out the coordinates of the current proposed turbine layout supplied by the Proponent.

Table 5: Turbine coordinates – GDA2020 MGA zone 55

Turbine	Easting, m	Northing, m	Terrain elevation, m
AQ21	699,723	6,354,203	831
AQ22	700,597	6,354,228	849
AQ23	701,271	6,354,438	898
AQ24	699,375	6,354,693	865
AQ25	699,462	6,355,585	875
AQ26	700,496	6,355,332	889
AQ27	701,360	6,355,390	830
AQ28	698,945	6,355,950	822
AQ29	698,237	6,356,465	805
AQ30	698,926	6,356,994	864
AQ32	698,574	6,357,534	850
AQ34	698,760	6,358,367	831
AQ36	699,354	6,358,978	851
AQ37	698,641	6,359,615	847
AQ38	698,555	6,360,590	830
AQ39	699,439	6,360,598	937
AQ40	700,374	6,360,365	915
AQ41	700,247	6,360,837	884
AQ42	698,274	6,361,561	810
AQ43	699,384	6,361,583	878
AQ44	700,277	6,361,482	914
AQ45	697,537	6,362,342	783
AQ46	698,374	6,362,785	772
AQ47	699,612	6,362,289	879
AQ48	697,536	6,363,116	772
AQ49	698,248	6,363,665	772
AQ50	700,500	6,362,848	931
AQ51	700,330	6,363,886	868
AQ52	699,904	6,364,311	863
AQ53	698,722	6,364,938	773

Turbine	Easting, m	Northing, m	Terrain elevation, m
AQ54	700,571	6,364,843	863
AQ55	698,460	6,365,585	772
AQ57	698,583	6,366,162	790
AQ59	699,296	6,366,475	747
AQ60	700,040	6,366,022	811
AQ61	700,825	6,366,274	880
AQ63	701,540	6,366,838	922
AQ67	700,253	6,367,626	783
AQ68	701,067	6,367,392	819
AQ69	702,178	6,367,402	953
AQ70	700,459	6,368,685	752
AQ71	700,917	6,368,193	820
AQ72	701,698	6,367,951	868
AQ73	701,292	6,369,022	774
AQ74	702,455	6,368,076	884
AQ75	702,544	6,368,686	830
AQ81	700,222	6,355,752	914
AQ82	700,270	6,356,414	934

APPENDIX C RECEIVER LOCATIONS

The following table sets out the one hundred and sixty-nine (169) noise sensitive receivers located within 4.5 km of the proposed Project and considered in the preliminary noise assessment, together with their respective distance to the nearest turbine. Data has been provided by the Proponent.

Table 6: Receiver locations – GDA2020 MGA zone 55

Receiver ID	Easting, m	Northing, m	Terrain elevation, m	Distance to the nearest turbine, m
Associated receivers				
R1	702,483	6,366,508	768	959
R2	697,245	6,365,183	606	1,290
R3	697,651	6,364,921	569	1,059
R4	699,242	6,363,371	631	1,049
R5	696,248	6,362,565	583	1,318
R6	697,197	6,359,699	625	1,456
R7	696,973	6,359,534	625	1,678
R8	698,197	6,355,191	670	1,078
R9	698,227	6,354,831	650	1,168
R10	698,268	6,354,453	664	1,144
R229	694,426	6,361,362	543	3,266
R240	695,017	6,360,160	567	3,337
R256	695,557	6,359,080	573	3,134
R330	703,213	6,350,612	678	4,294
R331	703,384	6,350,600	666	4,384
Non-associated receivers				
R17	699,437	6,371,103	417	2,630
R20	698,711	6,370,963	418	2,876
R21	697,785	6,370,961	440	3,515
R22	699,225	6,370,944	419	2,579
R24	697,775	6,370,764	446	3,399
R26	697,712	6,370,647	462	3,380
R28	699,698	6,370,632	420	2,097
R30	699,418	6,370,547	448	2,139
R33	697,786	6,370,494	452	3,232
R35	698,891	6,370,197	452	2,184
R36	700,456	6,370,190	490	1,446

Receiver ID	Easting, m	Northing, m	Terrain elevation, m	Distance to the nearest turbine, m
R37	697,928	6,370,171	439	2,940
R39	697,918	6,370,051	437	2,890
R42	699,191	6,369,962	446	1,807
R43	703,347	6,369,905	489	1,469
R50	695,750	6,369,627	574	4,479
R61	695,868	6,369,154	584	4,044
R63	695,553	6,369,111	591	4,232
R64	695,466	6,369,111	594	4,294
R85	694,900	6,368,667	560	4,458
R86	694,874	6,368,644	559	4,466
R90	694,835	6,368,612	556	4,481
R96	694,878	6,368,564	556	4,419
R107	694,912	6,368,527	556	4,370
R112	694,906	6,368,488	552	4,354
R115	694,932	6,368,470	554	4,323
R116	694,941	6,368,446	553	4,302
R135	694,680	6,368,312	540	4,459
R137	694,706	6,368,304	540	4,433
R140	694,765	6,368,281	541	4,370
R141	694,652	6,368,280	541	4,469
R143	694,669	6,368,271	541	4,449
R144	694,694	6,368,256	542	4,420
R145	694,714	6,368,248	543	4,399
R146	696,981	6,368,236	571	2,626
R148	694,878	6,368,215	543	4,239
R151	694,783	6,368,206	544	4,318
R152	694,667	6,368,203	543	4,419
R153	694,894	6,368,200	543	4,218
R155	695,245	6,368,188	553	3,909
R157	694,867	6,368,162	545	4,224
R158	694,813	6,368,160	545	4,270
R161	694,610	6,368,151	543	4,446
R164	694,896	6,368,122	545	4,179

Receiver ID	Easting, m	Northing, m	Terrain elevation, m	Distance to the nearest turbine, m
R165	694,698	6,368,119	545	4,353
R166	694,925	6,368,115	544	4,150
R167	694,713	6,368,109	545	4,336
R168	694,733	6,368,100	546	4,314
R169	694,570	6,368,064	546	4,444
R170	694,605	6,368,062	547	4,412
R173	695,093	6,367,978	548	3,938
R174	695,156	6,367,929	549	3,860
R175	695,016	6,367,907	552	3,975
R178	695,237	6,367,523	567	3,616
R180	695,685	6,367,457	569	3,179
R181	706,066	6,367,300	492	3,697
R183	694,874	6,367,090	586	3,827
R184	695,193	6,367,013	573	3,499
R185	694,944	6,366,855	588	3,708
R187	694,173	6,366,509	581	4,388
R188	694,222	6,366,333	585	4,307
R190	695,510	6,366,167	574	3,011
R191	694,783	6,366,159	551	3,725
R192	694,276	6,365,956	579	4,204
R193	704,909	6,365,831	652	3,155
R194	694,456	6,365,686	551	4,009
R195	694,820	6,365,518	533	3,629
R196	694,505	6,365,413	520	3,807
R197	694,169	6,365,258	509	3,994
R199	694,792	6,365,193	519	3,445
R201	694,445	6,365,111	511	3,683
R203	694,154	6,365,055	513	3,902
R205	694,880	6,364,980	519	3,249
R206	704,518	6,364,917	716	3,417
R207	693,498	6,364,846	501	4,396
R208	704,173	6,364,821	742	3,266
R209	694,226	6,364,748	522	3,694

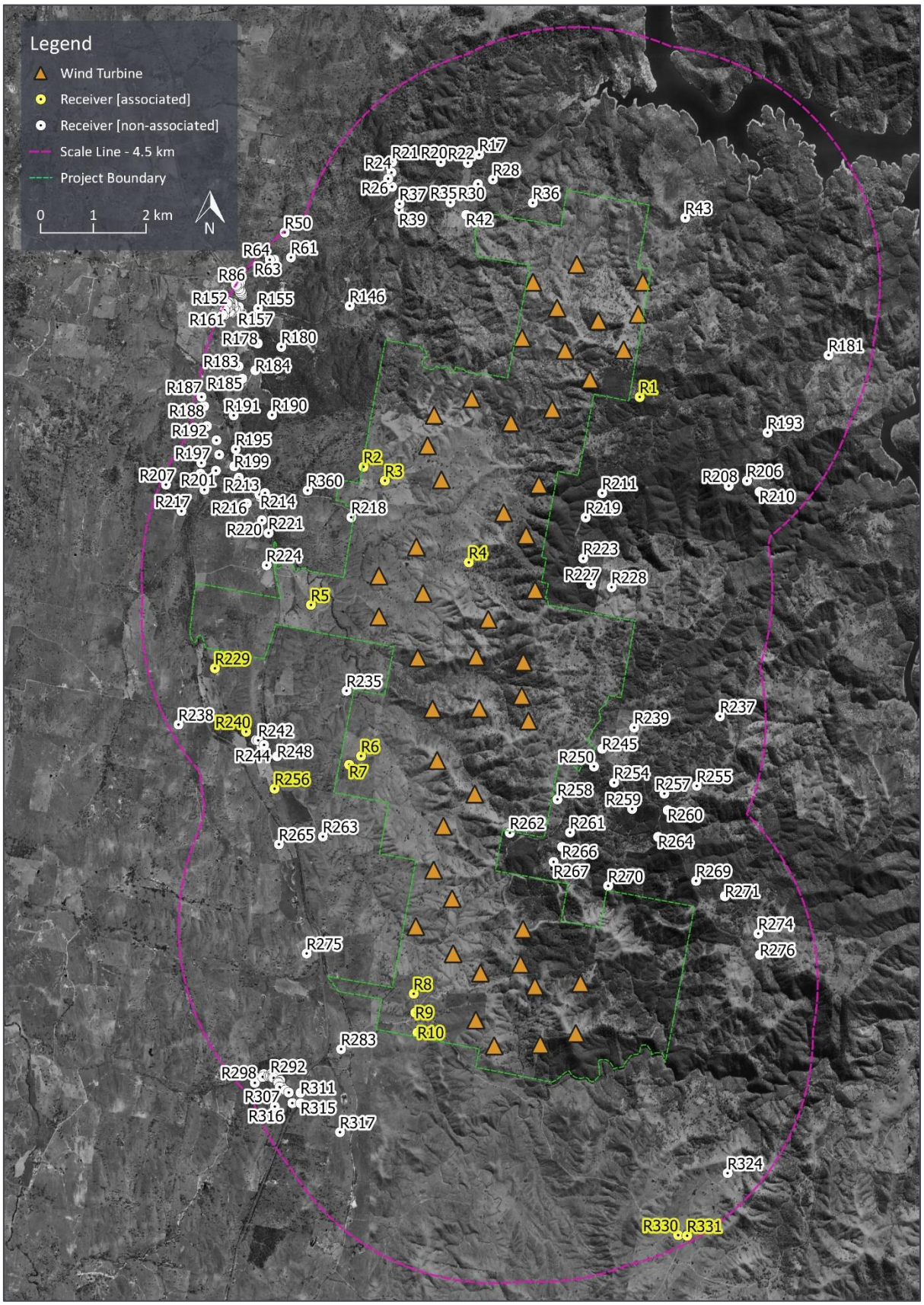
Receiver ID	Easting, m	Northing, m	Terrain elevation, m	Distance to the nearest turbine, m
R210	704,758	6,364,709	703	3,733
R211	701,772	6,364,685	771	1,222
R212	695,376	6,364,685	525	2,675
R213	695,272	6,364,655	521	2,742
R214	695,289	6,364,610	521	2,703
R215	695,390	6,364,590	525	2,609
R216	695,032	6,364,491	527	2,861
R217	693,791	6,364,344	517	3,945
R218	697,013	6,364,225	560	1,237
R219	701,458	6,364,223	752	1,094
R220	695,317	6,364,171	522	2,462
R221	695,443	6,363,926	528	2,250
R223	701,412	6,363,445	758	1,102
R224	695,406	6,363,316	548	2,146
R227	701,562	6,362,958	753	1,080
R228	701,950	6,362,900	704	1,460
R235	696,923	6,360,935	583	1,498
R237	704,006	6,360,451	685	3,637
R238	693,735	6,360,295	568	4,321
R239	702,379	6,360,238	759	2,016
R241	695,205	6,359,999	566	3,310
R242	695,247	6,359,996	565	3,282
R243	695,358	6,359,909	564	3,270
R244	695,309	6,359,883	562	3,322
R245	701,772	6,359,837	800	1,503
R248	695,605	6,359,694	582	3,041
R250	701,617	6,359,500	786	1,523
R254	701,998	6,359,194	790	2,009
R255	703,566	6,359,131	769	3,426
R257	702,951	6,358,986	812	2,927
R258	700,923	6,358,875	779	1,581
R259	702,340	6,358,695	792	2,585
R260	703,015	6,358,670	817	3,142

Receiver ID	Easting, m	Northing, m	Terrain elevation, m	Distance to the nearest turbine, m
R261	701,161	6,358,249	744	1,955
R262	700,021	6,358,242	800	1,007
R263	696,474	6,358,171	597	2,201
R264	702,834	6,358,165	796	3,109
R265	695,640	6,358,023	593	2,979
R266	701,010	6,357,975	744	1,735
R267	700,850	6,357,691	714	1,412
R269	703,553	6,357,331	813	2,933
R270	701,886	6,357,235	720	1,820
R271	704,100	6,357,041	770	3,203
R274	704,733	6,356,331	780	3,506
R275	696,166	6,355,953	634	2,140
R276	704,763	6,355,929	766	3,449
R283	696,819	6,354,140	640	2,620
R286	695,501	6,353,676	620	3,910
R287	695,354	6,353,665	613	4,022
R288	695,528	6,353,661	620	3,902
R289	695,539	6,353,637	621	3,912
R291	695,559	6,353,631	620	3,903
R292	695,480	6,353,627	621	3,960
R293	695,444	6,353,625	622	3,987
R294	695,609	6,353,625	620	3,873
R296	695,592	6,353,618	620	3,889
R297	695,333	6,353,614	614	4,073
R298	695,214	6,353,600	613	4,168
R299	695,519	6,353,599	623	3,953
R300	695,252	6,353,594	613	4,145
R301	695,540	6,353,593	623	3,943
R303	695,662	6,353,545	620	3,890
R304	695,620	6,353,514	628	3,939
R305	695,183	6,353,500	619	4,260
R306	695,631	6,353,497	626	3,934
R307	695,654	6,353,420	627	3,936

Receiver ID	Easting, m	Northing, m	Terrain elevation, m	Distance to the nearest turbine, m
R308	695,706	6,353,407	624	3,891
R309	695,765	6,353,360	622	3,852
R310	695,827	6,353,318	625	3,809
R311	696,050	6,353,312	633	3,604
R312	695,362	6,353,247	672	4,269
R314	695,894	6,353,116	630	3,825
R315	696,052	6,353,113	645	3,683
R316	695,563	6,353,051	639	4,154
R317	696,797	6,352,564	659	3,347
R324	704,150	6,351,787	641	3,917
R360	696,184	6,364,736	538	2,116

APPENDIX D SITE LAYOUT PLAN

Figure 5: Proposed turbine locations and 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 receptor 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
- 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 ^{o}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 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.

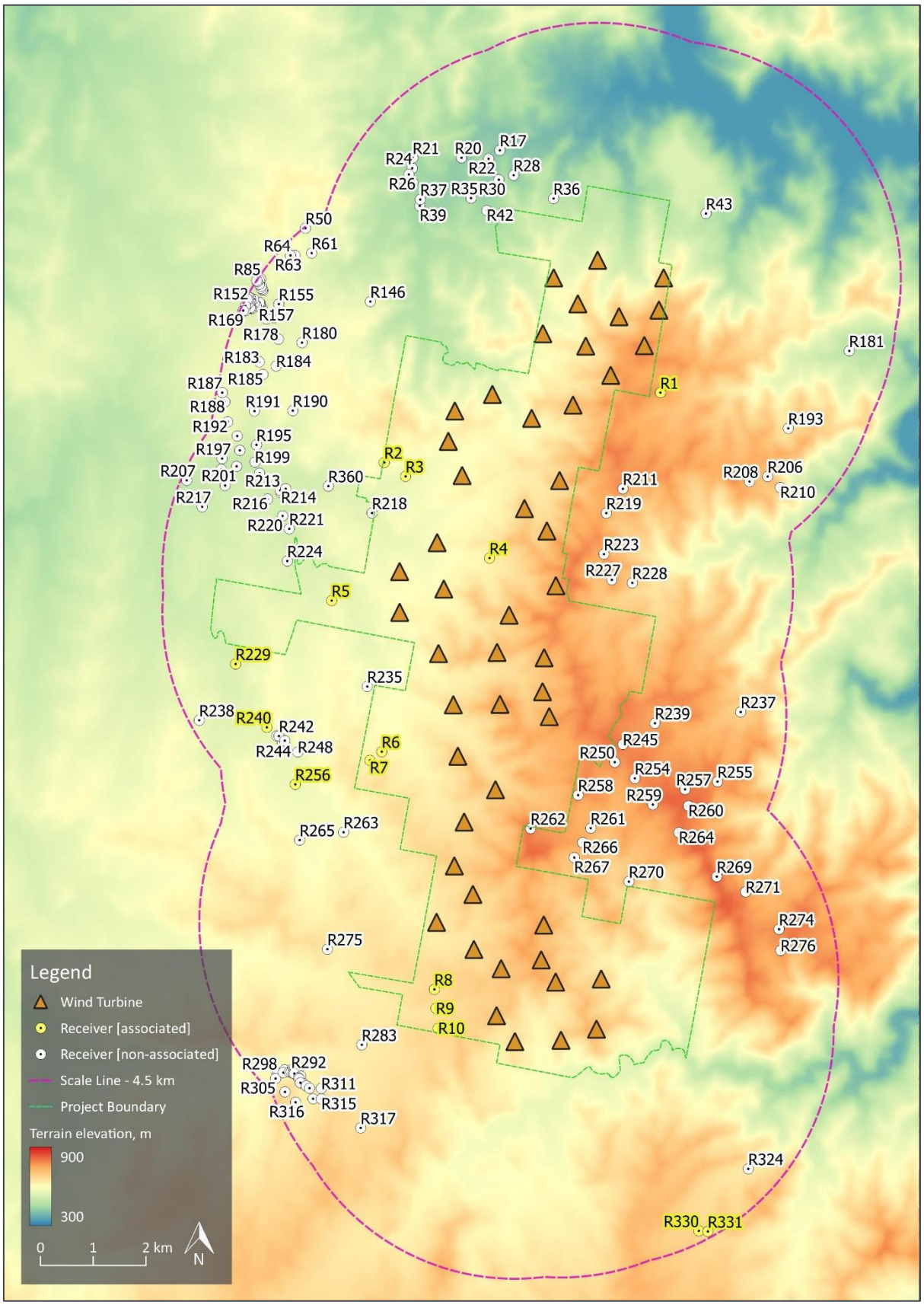
In addition to the choice of ground factor referred to above, adjustments to the ISO 9613-2 standard for screening and valleys effects are applied based on recommendations of the Joule Report, UK IOA 2009 joint agreement and the UK IOA Good Practice Guide. The following adjustments are applied to the 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 7: Predicted noise levels, dB L_{Aeq} (includes +1 dB allowance for measurement uncertainty) for receivers with predicted levels over 30 dB L_{Aeq}

Receiver	Hub-height wind speed (m/s)						
	4	5	6	7	8	9	≥10
Associated receivers							
R1	27.4	27.6	29.5	32.5	35.3	37.6	38.1
R2	25.0	25.2	27.1	30.1	32.9	35.2	35.7
R3	26.8	27.0	28.9	31.9	34.7	37.0	37.5
R4	29.2	29.4	31.3	34.3	37.1	39.4	39.9
R5	23.8	24.0	25.9	28.9	31.7	34.0	34.5
R6	24.1	24.3	26.2	29.2	32.0	34.3	34.8
R7	23.0	23.2	25.1	28.1	30.9	33.2	33.7
R8	26.7	26.9	28.8	31.8	34.6	36.9	37.4
R9	25.8	26.0	27.9	30.9	33.7	36.0	36.5
R10	25.1	25.3	27.2	30.2	33.0	35.3	35.8
Non-associated receivers							
R36	23.1	23.3	25.2	28.2	31.0	33.3	33.8
R42	20.4	20.6	22.5	25.5	28.3	30.6	31.1
R43	21.2	21.4	23.3	26.3	29.1	31.4	31.9
R146	20.6	20.8	22.7	25.7	28.5	30.8	31.3
R211	24.7	24.9	26.8	29.8	32.6	34.9	35.4
R218	25.0	25.2	27.1	30.1	32.9	35.2	35.7
R219	26.0	26.2	28.1	31.1	33.9	36.2	36.7
R221	19.4	19.6	21.5	24.5	27.3	29.6	30.1
R223	25.9	26.1	28.0	31.0	33.8	36.1	36.6
R224	19.8	20.0	21.9	24.9	27.7	30.0	30.5
R227	25.0	25.2	27.1	30.1	32.9	35.2	35.7
R228	22.6	22.8	24.7	27.7	30.5	32.8	33.3
R235	24.2	24.4	26.3	29.3	32.1	34.4	34.9
R239	20.4	20.6	22.5	25.5	28.3	30.6	31.1
R245	23.0	23.2	25.1	28.1	30.9	33.2	33.7
R250	22.9	23.1	25.0	28.0	30.8	33.1	33.6
R254	21.5	21.7	23.6	26.6	29.4	31.7	32.2

Receiver	Hub-height wind speed (m/s)						
	4	5	6	7	8	9	≥10
R258	24.0	24.2	26.1	29.1	31.9	34.2	34.7
R259	20.5	20.7	22.6	25.6	28.4	30.7	31.2
R261	22.8	23.0	24.9	27.9	30.7	33.0	33.5
R262	27.3	27.5	29.4	32.4	35.2	37.5	38.0
R263	20.8	21.0	22.9	25.9	28.7	31.0	31.5
R264	19.9	20.1	22.0	25.0	27.8	30.1	30.6
R266	23.2	23.4	25.3	28.3	31.1	33.4	33.9
R267	23.6	23.8	25.7	28.7	31.5	33.8	34.3
R270	23.4	23.6	25.5	28.5	31.3	33.6	34.1
R275	19.4	19.6	21.5	24.5	27.3	29.6	30.1
R360	20.8	21.0	22.9	25.9	28.7	31.0	31.5

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 receptor locations.

In this case, the C-weighted noise levels at receptor locations have been estimated using a simplified approach based on 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 10 m/s.

H4 Results

Table 8 presents the results of the preliminary C-weighted noise predictions to align with the receivers detailed in Appendix G.

Table 8: Predicted C-weighted noise levels

Receiver ID	dB L_{Ceq}
Associated receivers	
R1	57.8
R2	56.3
R3	57.5
R4	59.4
R5	55.4
R6	55.8
R7	55.0
R8	57.2
R9	56.5
R10	56.1
Non-associated receivers	
R36	54.2
R42	52.7
R43	52.9
R146	52.9
R211	56.0
R218	56.2
R219	56.8
R221	52.7
R223	56.8
R224	53.0
R227	56.2
R228	54.5
R235	55.8
R239	53.1
R245	55.1
R250	54.8
R254	54.1

Receiver ID	dB L_{Ceq}
R258	55.7
R259	53.3
R261	54.9
R262	57.8
R263	53.5
R264	52.8
R266	55.1
R267	55.2
R270	54.8
R275	52.5
R360	53.5

APPENDIX 7

Biodiversity Constraints Assessment

umwelt
Environmental & Social Consultants

ACEN | Australia

AQUILA WIND

Biodiversity Constraints Assessment

FINAL

January 2024

AQUILA WIND

Biodiversity Constraints Assessment

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
ACEN Australia

Project Director: Nathan Baker
Project Manager: Lauren Evans
Report No. 21793/R05
Date: January 2024

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.

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
01	Rachel Musgrave	17 October 2022	Nathan Baker	18 October 2022
02	Rachel Musgrave	03 November 2022	Nathan Baker	03 November 2022
03	Lauren Evans	23 November 2022	Nathan Baker	23 November 2022
04	Lauren Evans	09 February 2023	Nathan Baker	10 February 2023
05	Lauren Evans	20 February 2023	Nathan Baker	20 February 2023
06	Lauren Evans	07 December 2023	Nathan Baker	07 December 2023
07	Lauren Evans	19 January 2024	Nathan Baker	19 January 2024
08	Lauren Evans	25 January 2024	Nathan Baker	25 January 2024

Abbreviations

Abbreviation	Definition
ACEN	ACEN Australia
AEMO	Australian Energy Market Operator
AGL	Above Ground Level
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Calculator
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
BoM	Bureau of Meteorology
BVMTT	Biodiversity Values Map Threshold Tool
DCCEEW	Department of Climate Change, Energy, the Environment and Water (current)
DoEWHA	Department of the Environment, Water, Heritage and the Arts (superseded)
DoSEWPC	Department of Sustainability, Environment, Water, Population and Communities (superseded)
DPE	NSW Department of Planning and Environment (current)
DPIE	NSW Department of Planning, Industry and Environment (superseded)
EAH	Environment Agency Head
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning & Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
FM Act	*Fisheries Management Act 1994* (NSW)
FTE	Full Time Equivalent
GDE	Groundwater Dependent Ecosystem
GHG	Greenhouse Gas Emissions
GW	Gigawatt
IBRA	Interim Biogeographic Regionalisation for Australia
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
LLS Act	*Local Land Services Act 2013* (NSW)
LLS Regulation	Local Land Services Regulation 2014 (NSW)
MNES	Matters of National Environmental Significance
MW	Megawatt

Abbreviation	Definition
MWh	Megawatt hour
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
NVMP	Native Vegetation (Multi Attribute)
NVR	Native Vegetation Regulatory
PAH	Planning Agency Head
PCT	Plant Community Type
PMST	Protected Matters Search Tool
REZ	Renewable Energy Zone
SAII	Serious and Irreversible Impacts
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
SVTM	State Vegetation Type Map
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
TSC Act	*Threatened Species Conservation Act 1995* (NSW)
Umwelt	Umwelt (Australia) Pty Limited

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Appendices

Appendix A Protected Matters (PMST) Report

1.0 Introduction

1.1 Background

ACEN Australia (ACEN) proposes to develop Aquila Wind (the Project) to supply renewable electricity to the National Electricity Market (NEM) and reduce Australia's greenhouse gas (GHG) emissions through the generation of renewable electricity powered by wind, as an alternative to the burning of fossil fuels.

The Project is located approximately 2.5 km southeast of Stuart Town and 2 km northeast of Euchareena, in the Central West region of NSW, within the Dubbo Regional Council Local Government Area (LGA) (refer to **Figure 1.1** and **Figure 1.2**) and on the lands of the Wiradjuri Nation. Dubbo is situated approximately 70 km northwest of the Project Boundary[1] (the northern most extent). The other regional centres of Mudgee, Wellington and Orange are situated approximately 40 km to the northeast, 30 km to the northwest and 35 km to the south respectively (refer to **Figure 1.2**). Lake Burrendong is located approximately 8 km north of the Project Boundary. The Project Area[2] is traversed by the Main Western Railway and is located approximately 14 km east of the Mitchell Highway.

The Project design includes up to 48 x 6.2 megawatt (MW) Wind Turbine Generators (WTGs) (each with a blade-tip height of up to 250 m) comprising an installed capacity of up to 300 MW, a Battery Energy Storage System (BESS) approximately 100 MW (2-hr), temporary and permanent meteorological masts, vegetation removal, earthworks, ancillary civil and electrical engineering infrastructure, temporary construction facilities and temporary concrete batching plants, and permanent worker facilities. The Project will create employment opportunities for approximately 300 temporary workers during the 2-year construction phase plus 15 permanent workers during the operational phase.

Umwelt (Australia) Pty Limited (Umwelt) has been engaged by ACEN to prepare this Scoping Report in support of the Proponent's State Significant Development application and request for the Secretary's Environmental Assessment Requirements (SEARs) for the Project.

1.2 Purpose and Objectives

This Biodiversity Constraints Assessment (BCA) Report has been prepared to document the outcomes of preliminary desktop and field-based ecology investigations conducted for the Project. Consistent with the requirements of Division 2 of the NSW *Environmental Planning and Assessment Regulation 2021*, it aims to support the Scoping Report prepared by Umwelt, and more broadly the proponent's request for SEARs.

The BCA presents vegetation mapping and other biodiversity constraints mapping established via searches of existing and publicly available resources and databases, and other environmental information accessible at the time the investigations were completed. These 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 a preliminary site survey effort conducted by two Umwelt ecologists over three days during 11–13 July 2022.

[1] The Project Boundary is the maximum spatial extent of potential land access defined by the boundaries of the Host landholder properties (i.e. all agreed lots owned by Host landholders). The Project Boundary is outlined in red in the supporting figures throughout this BCA.

[2] The Project Area encompasses all land within and including the Project Boundary.

The BCA 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 are preliminary only and any guidance is limited to potential impacts, any anticipated biodiversity assessment requirements and compliance obligations.

Accordingly, this report is not intended to fulfil the other the legislative and statutory requirements of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), NSW *Biodiversity Conservation Act 2016* (BC Act), Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and other relevant legislation (refer **Section 1.4** of this report), however these requirements would be fulfilled in the future with the implementation of the recommendations documented herein, and confirmation of these requirements following receipt of the SEARs.

1.2.1 Contributing Authors

This report was prepared by the following contributing authors:

- Gemma Hopkins – Environmental Consultant.
- Joel Callaghan – Ecologist.
- Lachlan Laurie – Senior Ecologist.
- Larissa Abbott – Senior Ecologist.
- Rachel Musgrave – Principal Ecologist.
- Nathan Baker – Principal Environmental Consultant.

1.3 Project Overview

The Project Area is located near Mount Aquila, approximately 2.5 km southeast of Stuart Town and approximately 2 km northeast of Euchareena. Beyond these smaller townships, isolated rural residential properties surround the site (refer to **Figure 1.3**).

The Project Area is zoned RU1 Primary Production pursuant to *Dubbo Regional Local Environmental Plan 2022* (Dubbo Regional LEP 2022). Land surrounding the Project Boundary is zoned part C3 Environmental Management and part RU1 Primary Production. Other land use zones further afield in and around Stuart Town include R5 Large Lot Residential, RE1 Public Recreation, RE2 Private Recreation RU1 Primary Production, RU5 Village, SP2 Infrastructure and W1 Natural Waterways. Land zoning is shown in **Figure 1.4**.

The 'Main Western Railway' extends north to south and passes through the westernmost portion of the Project Area for approximately 500 m, between Store Creek and Farnham.

The Project Boundary comprises an area of approximately 6,806 ha. ACEN has identified an indicative Development Corridor of approximately 1,497 ha within which all Project infrastructure will be placed. Within this indicative Development Corridor, it is estimated that the actual land disturbance area (based on the current Project layout) would be in the order of 388 ha, or approximately 5–6% of the total Project Area.

The Project Area (all land within and including the Project Boundary) is situated at an elevation of approximately 600 to 800 m above sea level (ASL) (refer to **Figure 1.5**) and comprises a complex terrain, with steep arid hills to the eastern Project Boundary and rolling ridge lines to the west that are dominated by improved pasture used for grazing.

1.3.1 Indicative Design

The Project includes the installation, operation, maintenance and decommissioning of up to 48 WTGs, a BESS, ancillary civil and electrical engineering infrastructure, temporary construction facilities and permanent worker facilities. The key components of the Project include:

- Up to 48 (three blade) WTGs, with a maximum blade-tip height of 250 m above ground level.
- Power infrastructure providing connection to the existing 330 kV transmission line i.e. on-site substations/switchyards.
- Internal electrical reticulation network i.e. electrical connections between the proposed wind turbines and substation consisting of a combination of underground cables and overhead powerlines.
- Construction of a new/upgraded site access roads, intersection upgrades, and level rail crossing over the Main Western Railway Line.
- Other associated permanent infrastructure including hardstands, new/upgraded farm access tracks, secondary access point/s from public roads, operation and maintenance buildings.
- A BESS (100 MW/200 MWh).
- Permanent meteorological monitoring masts.
- Temporary construction facilities including:
    - Construction compounds, site office buildings and storage areas.
    - On-site concrete batching plants for use during the construction phase.
    - Laydown areas used for wind turbine installation and storage of WTG components.
- Targeted road network upgrades to facilitate delivery of oversize and overmass (OSOM) WTG components to the Project Area as required.
- A permanent operations and maintenance facility for the Project.

Other Wind Farm Projects

The approved Uungula Wind Farm is located approximately 20 km northeast of the Project. Burrendong Wind Farm (being developed by Epuron) is situated approximately 15 km northeast of the Project and Kerrs Creek Wind Farm (being developed by Renewable Energy Systems (RES)) is situated directly south of the Project Boundary. The above-mentioned wind farm developments are situated within the Central-West Orana Renewable Energy Zone (CWO REZ) (refer to **Figure 1.1**).

The Project's regional context, indicative layout, land-use zoning, elevations and other relevant features are identified in **Figure 1.2** to **Figure 1.5**.

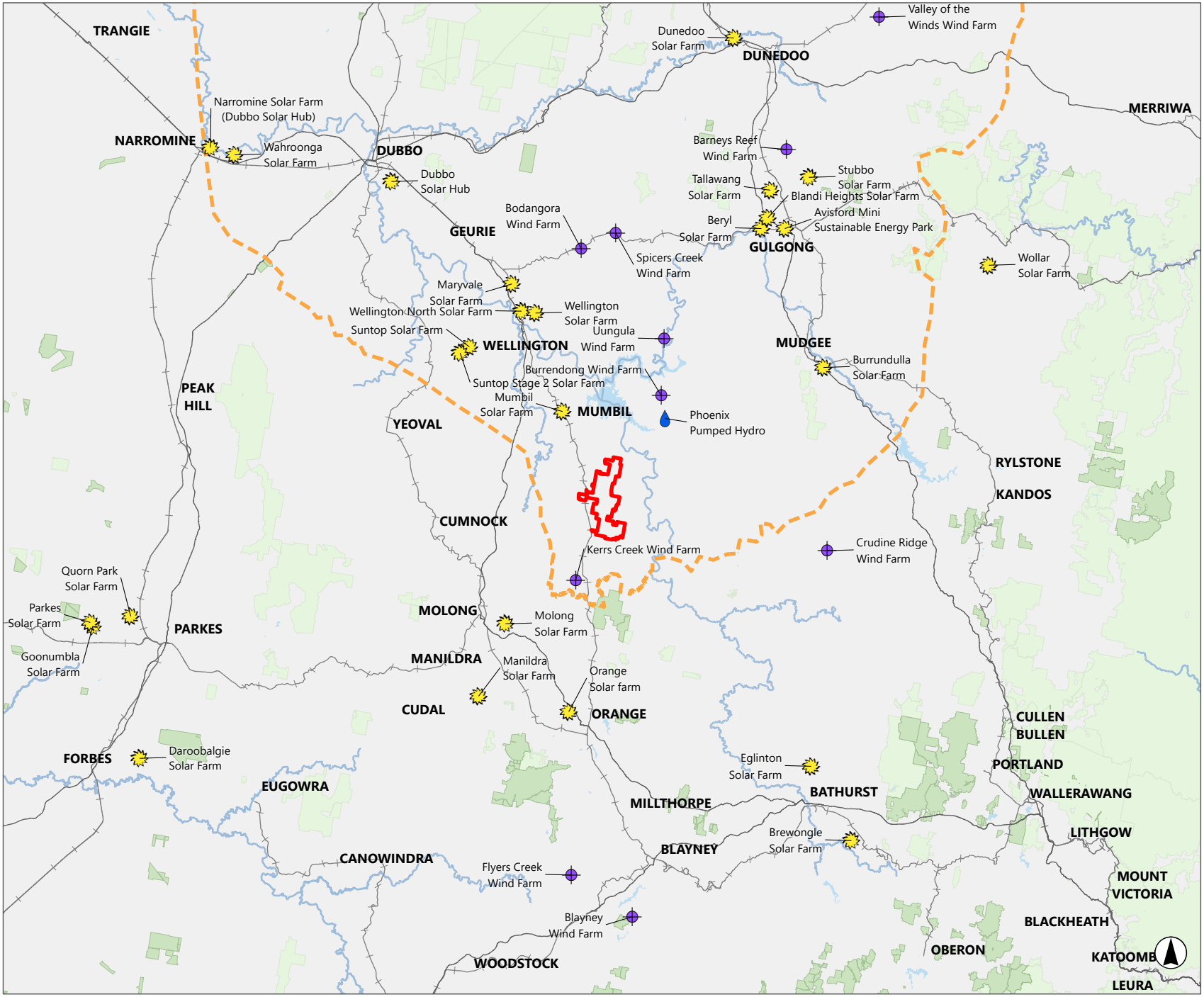


FIGURE 1.1

Central- West Orana Renewable Energy Zone

Legend

- Indicative Central West Orana Renewable Energy Zone Boundary

Other Renewable Projects

- Solar
- Wind
- Pumped Hydro
- Project Boundary
- State Forest
- NPWS Estate
- Roads
- Railway
- Major Watercourse
- Waterbodies

0 20 40
Kilometres

Scale 1:1,100,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

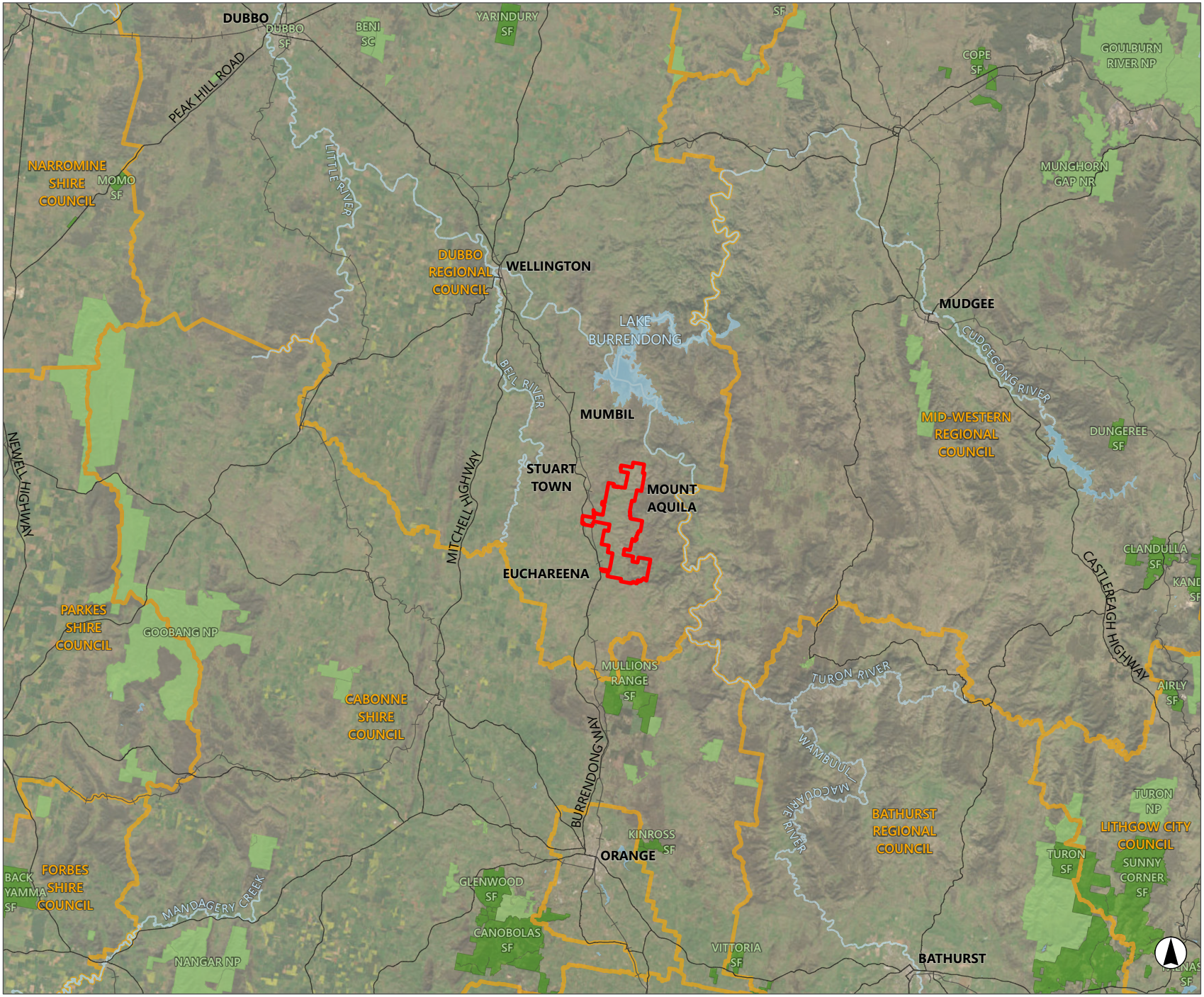
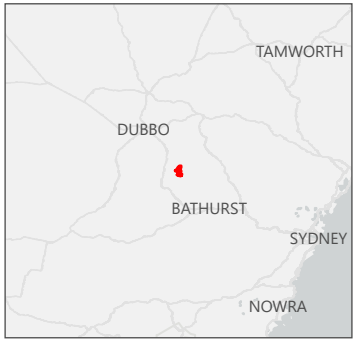


FIGURE 1.2

Regional Context

Legend

- Project Boundary
- Local Government Area Boundary
- State Forest
- NPWS Estate
- Waterbodies
- Roads
- Railway
- Major Watercourse



0 10 20
Kilometres

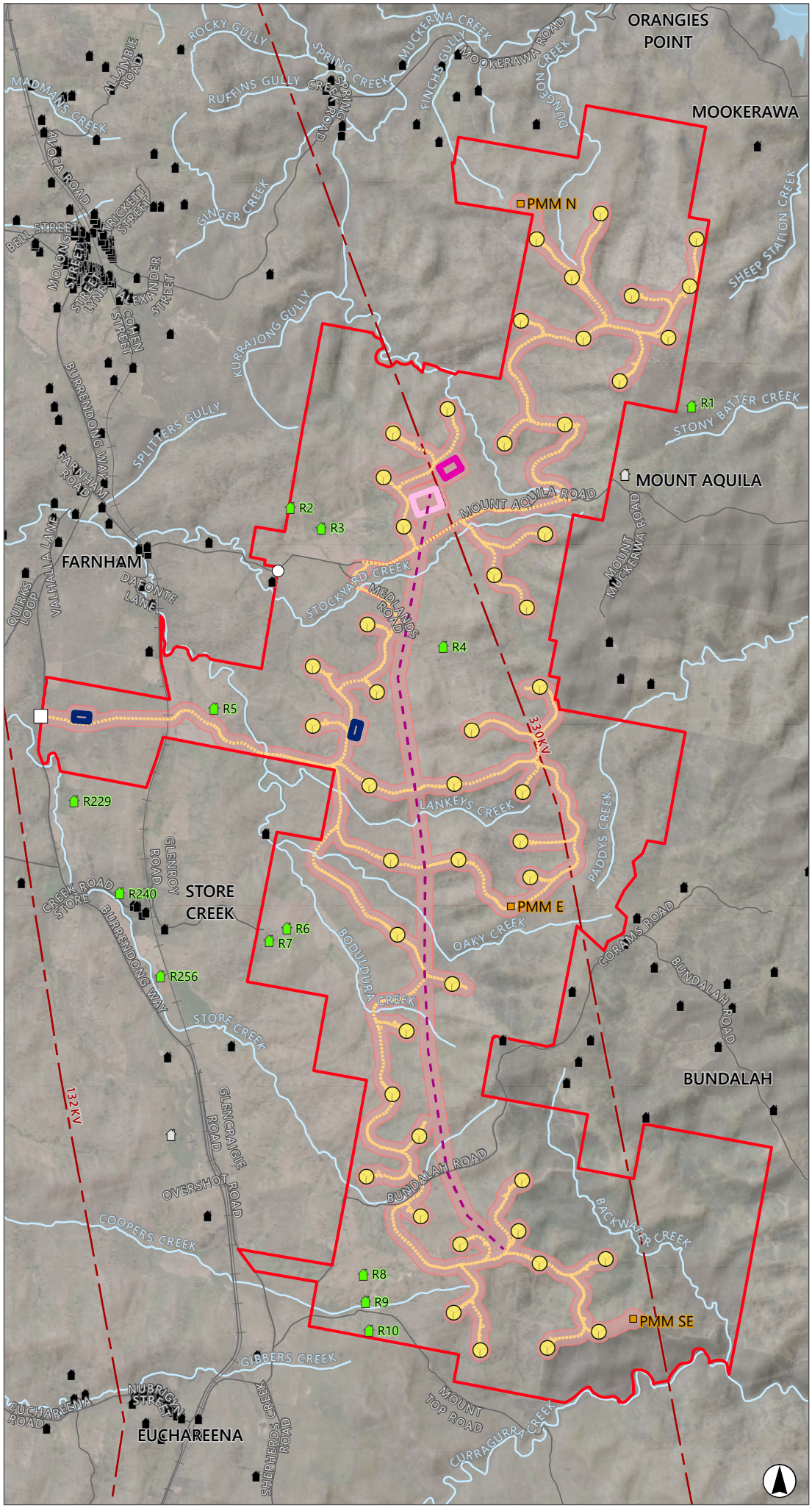
Scale 1:750,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

C:\USERS\CMISKELL\UMWELT (AUSTRALIA) PTY LTD\21793 - 03 S&W F_R05\21793_R05_BIODIVERSITYCONSTRAINTS_V4.APRX - 21793_R05_0102_REGIONALCONTEXT

FIGURE 2.1

Indicative Project Layout



Legend

- Project Boundary
- Development Corridor
- Proposed BESS
- Proposed Compounds
- Proposed Substation
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Primary Access Point
- Secondary Access Point
- Proposed Transmission Lines

- Existing Electricity Transmission Line
- Railway Line
- Waterbody
- Named Watercourse

Existing Dwellings

- Host Dwelling (labelled with R#)
- Non-associated Dwelling

Proposed Dwelling

- Potential Future Dwelling

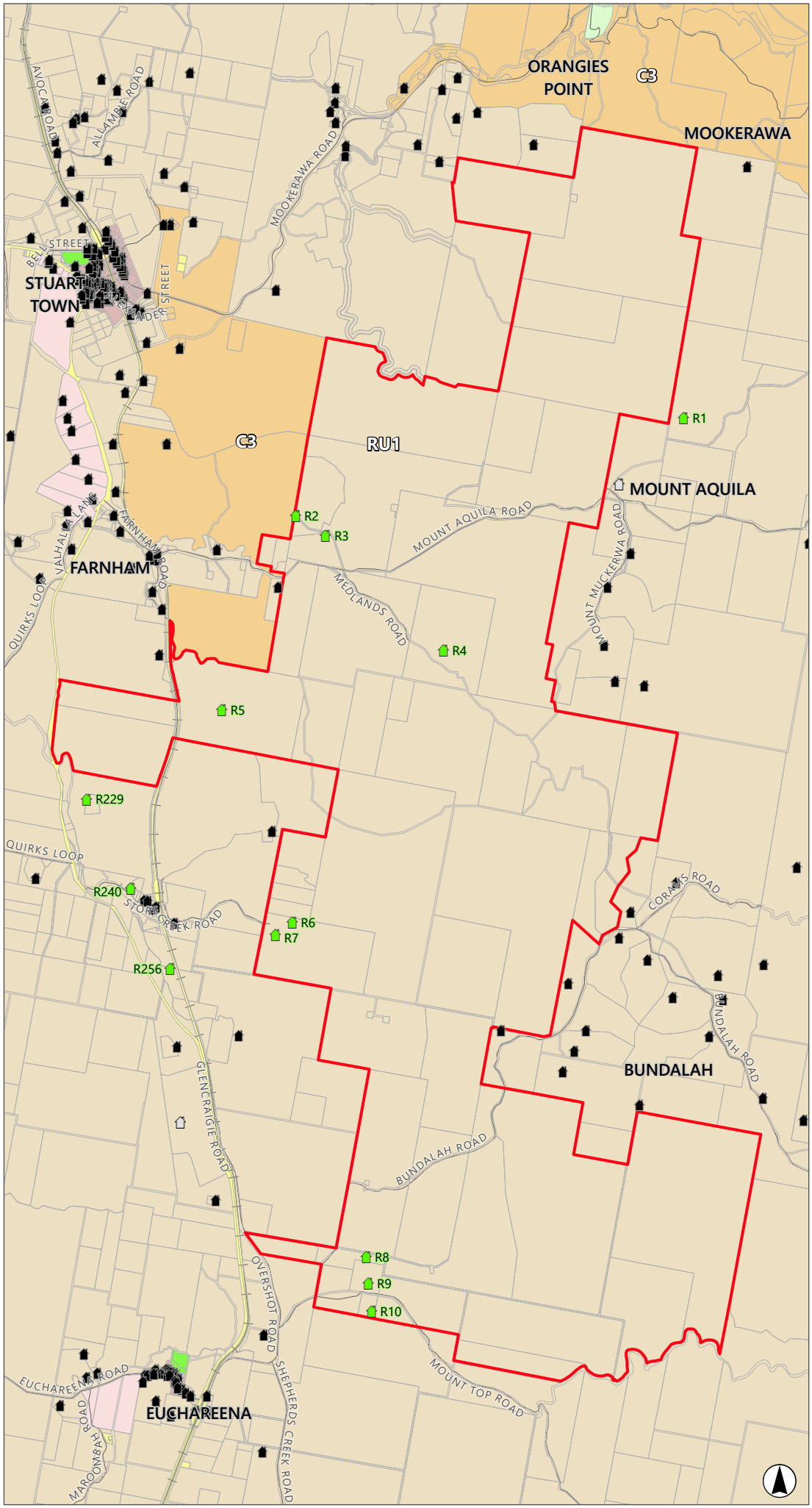
0 1 2
Kilometres

Scale 1:72,500 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

FIGURE 1.4

Land Zoning



Legend

- Project Boundary
- Lot Boundary
- Road
- Railway Line

Proposed Dwelling

- Potential Future Dwelling

Existing Dwellings

- Host Dwelling (labelled with R#)
- Non-associated Dwelling

Land Zones

- C3 Environmental Management
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU5 Village
- SP2 Infrastructure

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); NSW DPE (2022); ACEN (2022)

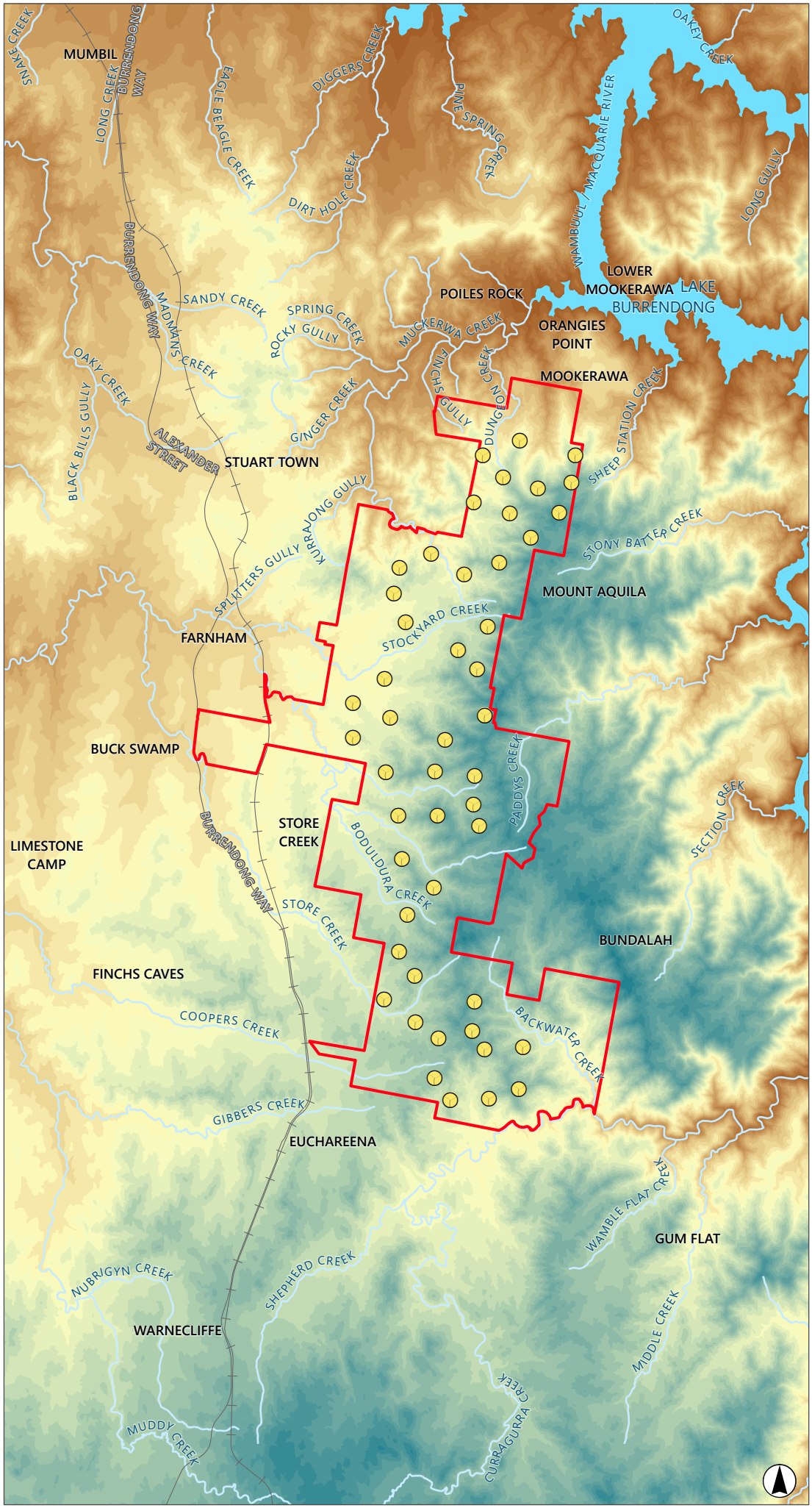


FIGURE 1.5

Elevations

Legend

- Project Boundary
- Waterbody
- Indicative Turbine Locations
- Road
- Railway Line
- Named Watercourse

Elevation (m)

- 320 - 340
- 340 - 360
- 360 - 380
- 380 - 400
- 400 - 420
- 420 - 440
- 440 - 460
- 460 - 480
- 480 - 500
- 500 - 520
- 520 - 540
- 540 - 560
- 560 - 580
- 580 - 600
- 600 - 620
- 620 - 640
- 640 - 660
- 660 - 680
- 680 - 700
- 700 - 720
- 720 - 740
- 740 - 760
- 760 - 780
- 780 - 800
- 800 - 820
- 820 - 840

0 2 4
Kilometres

Scale 1:125,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

1.4 Statutory Considerations

Commonwealth and State Legislation relevant to this BCA 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 – Department of Climate Change, Energy, the Environment and Water (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	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), unless Planning Agency Head (PAH) and the Environment Agency Head (EAH) determine that the proposed development is not likely to have any significant impact on biodiversity values. The potential impacts associated with the Project are such that the PAH and EAH will likely consider them significant, and a BDAR be required.
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 or in close proximity to the Project Area. 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.
Local Land Services Act 2013 (LLS Act)	Local Land Services	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, and Native Vegetation Regulatory (NVR) map showing the extent of categorised land in NSW is to be published by the 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.

Relevant Legislation	Governing Agency	Summary
		Currently, various map categories have been released under staged transitional arrangements. The online NVR map viewer currently displays a) Excluded Land, b) Category 2 – Vulnerable Land and c) Category 2 – Sensitive Land. Category 1 – Exempt Land and Category 2 – Regulated Land maps have not yet been publicly released. The unpublished Transitional Native Vegetation Regulatory (NVR) map layer can be requested from the Biodiversity Conservation Division (BCD) to inform land categorisation mapping for BAM assessments. Proponents that obtain the NVR map layer may either adopt the mapping or undertake surveys to determine their own mapping. The unpublished NVR map layer can be used to inform land categorisation mapping for the project.
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 impose any specific obligations in respect to 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

2.1 Desktop Assessment

A review of relevant public databases and literature was undertaken to identify threatened and migratory species, endangered populations, threatened ecological communities (TECs) and their habitats that have previously been recorded within the locality (a 30 km radius around the Project Area). Threatened species, migratory species, endangered populations and TECs (listed under BC Act and EPBC Act) that have the potential to occur within the locality were also considered based on the type of habitat present and the NSW bioregions within which the Project Area occurs.

Databases and literature reviewed as part of this BCA include:

- A search of the Department of Planning and Environment (DPE) BioNet Atlas based on a 30 km radius around the Project Area.
- A search of the DCCEEW Protected Matters Search Tool (PMST) based on a 30 km radius around the Project Area.
- BioNet Threatened Biodiversity Data Collection (TBDC).
- BioNet Vegetation Classification.
- The Biodiversity Values Map Threshold Tool (BVMTT).
- DPE's Important Habitat Mapping.
- A search of the National Flying-fox monitoring viewer accessed by the DCCEEW Interactive Flying-fox Web Viewer.
- eSpade 2.1 spatial viewer system (eSpade 2022).

2.2 Vegetation Mapping

The Department of Planning and Environment's new NSW State Vegetation Type Map (STVM) – Edition C1.1.M1 (DPE 2022) was used to inform the assessment of vegetation communities present within the Project Area.

The NSW SVTM Edition C1.1.M1 (DPE 2022) provides updated Plant Community Type (PCT) mapping for all of NSW. The NSW SVTM Edition C1.1.M1 (DPE 2022) mapping includes new PCTs for the eastern NSW IBRA subregions, with the existing PCTs covering the western subregions being incorporated into the new mapping. The Project Area occurs across both the eastern set of IBRA subregions and the Central/Western IBRA subregions therefore supporting both new and existing PCTs.

2.3 Site Visit

The site visit was conducted by two Umwelt ecologists over three days during 11–13 July 2022. Each of the survey days were approximately ten hours in duration, resulting in approximately 60 hours of survey effort.

The ecologists inspected the Project Area to verify the baseline vegetation mapping and record observations of any TECs and any threatened and migratory species habitat. Incidentally observed threatened species and general ecological features – such as waterbodies – were also recorded.

Rapid data assessments were undertaken across the Project Area to:

- Record the flora species occurring and to capture the structural variation in vegetation communities.
- Record the variation in species diversity.
- Define changes in abiotic conditions (the occurrence of creek lines and past disturbances).

The presence of fauna habitat within the Project Area was also noted. Specific attention was paid to the potential occurrence of semi-permanent waterbodies, creek lines, rocky outcrops and presence of hollow bearing trees.

2.3.1 Limitations and Constraints

Land Access

During the site survey, access to portions of the Project Area was not available e.g. based on host landholder preferences at the time. Consequently, properties without access could not be surveyed. Information obtained in the desktop assessment was therefore used to assess properties where access was not available. Properties with/without access are shown in **Figure 2.1**.

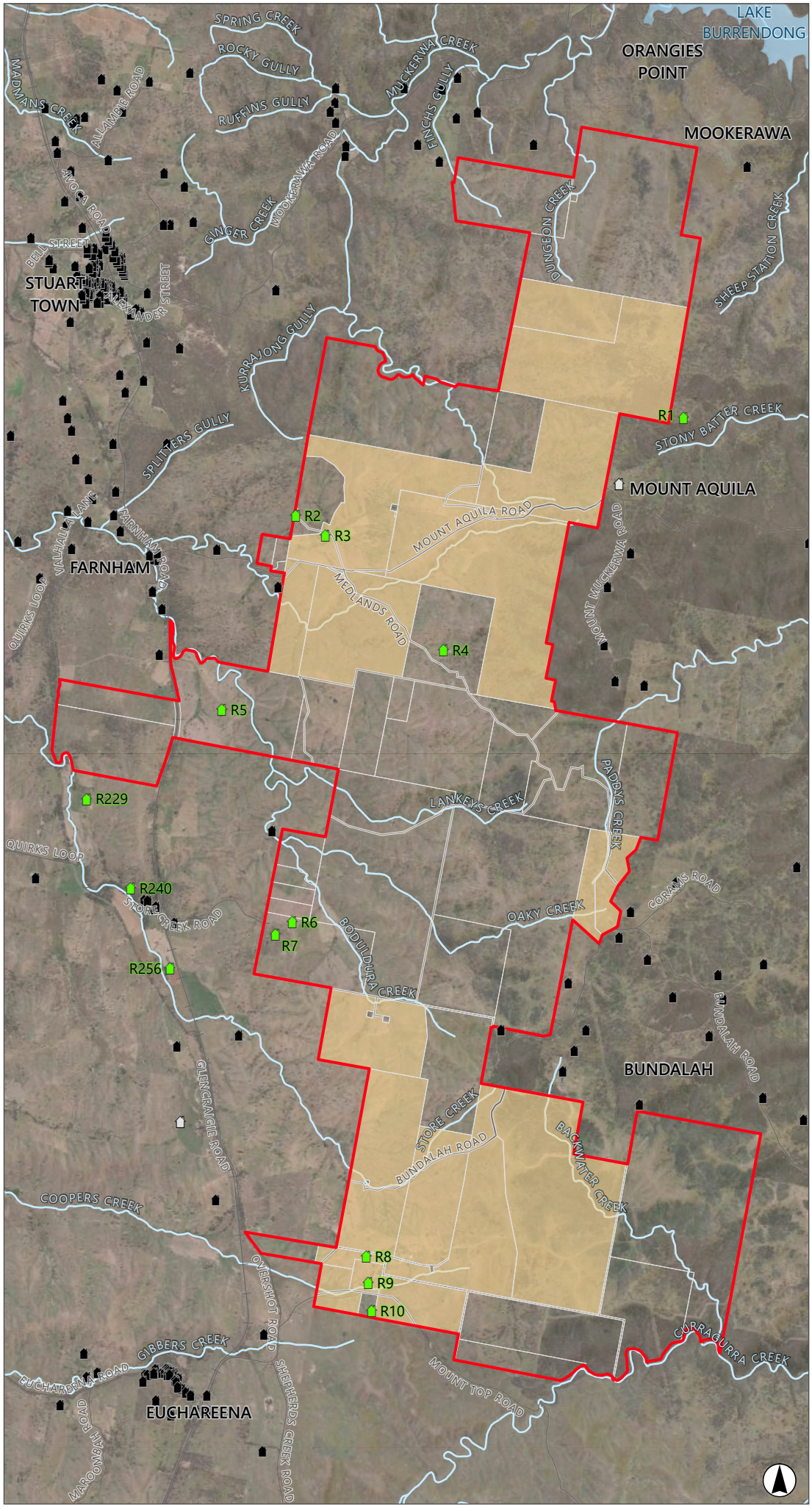
Grassland Assessment

The NSW SVTM does not map areas of derived native grassland. In context of the Project Area, all grassland has been mapped as non-native by the NSW STVM. Rapid data assessments and anecdotal observations of grasslands throughout the Project Area do not support the NSW SVTM, with large areas of grassland appearing to support a predominantly native species assemblage.

Due to the scale of the Project Area, not all grassland could be assessed. Based on the limited assessment at the time of writing this report we have precautionarily mapped all Category 2 grassland as native. Further assessment, informed by the unpublished Transitional Native Vegetation Regulatory (NVR) map layer, will be able to refine the extent of native grassland and inform the land categorisation of the Project Area.

FIGURE 2.1

Project Area Access



Legend

- Project Boundary
- Lot boundaries within Project Area
- Lots Accessed During Constraints Assessment
- Waterbody
- Named Watercourse
- Road
- Railway Line

Existing Dwellings

- Host Dwelling (labelled with R#)
- Non-associated Dwelling

Proposed Dwelling

- Potential Future Dwelling

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

3.0 Existing Environment

3.1 Landscape Context

The landscape context which describes attributes that are potentially relevant to the biodiversity occurring in the Project Area is outlined in **Table 3.1** and shown on **Figure 3.1** and **Figure 3.2** below.

Table 3.1 Landscape Features of the Project Area

Landscape Features	Landscape Context
IBRA region and subregion	IBRA Region: • South Western Slopes Bioregion. • South Eastern Highlands Bioregion. IBRA Sub-region: • Inland Slopes Sub-region. • Hill End Sub-region. Further detail is provided in **Section 3.2** below.
NSW (Mitchell) Landscapes	• Mullion Slopes. • Ophir – Hargraves Plateau.
Land tenure, parks and reserves	• Private freehold. • Crown land. • Public roads and infrastructure.
Rivers, stream and estuaries	The following named waterways occur in the Project Area, as well as several smaller unnamed creeks and estuaries: • Backwater Creek. • Boduldura Creek. • Coopers Creek. • Curragurra Creek. • Dungeon Creek. • Finchs Gully. • Gibbers Creek. • Kurrajong Gully. • Lankeys Creek. • Muckerwa Creek. • Nubrigyn Creek. • Oaky Creek. • Paddys Creek. • Stockyard Creek. • Store Creek.

Landscape Features	Landscape Context
	The Macquarie River is located approximately 1.5 km from the northern boundary and 5 km from the eastern boundary (refer to **Figure 3.3**). Lake Burrendong is located approximately 8 km north of the Project Boundary.
Wetlands (within, adjacent to and downstream)	The Commonwealth Government's PMST does not identify any wetlands of international importance within 200 km of the Project Area. The Lake Burrendong Reservoir, located 1.5 km north and 5 km east of the Project, has been identified as a wetland of significance for the South Western Slopes Bioregion, which is in good condition and is able to support over 32,000 waterbirds.
Areas of geological significance or soil hazard features	The Project is situated predominately within the Hill End Trough. The parent rocks include quartz rich greywacke and slates, quartzite like greywacke and slate, siltstone, acid volcanics, felspathic and lithic greywacke and tuff, conglomerate, tuff, calcareous greywacke, greywacke conglomerate and shale. The soil landscape within the Project Boundary is predominately Mookerawa (SI5504mk), with areas of Mullion Creek (SI5504mu) and Nubrygyn (SI5504ng). No mapped areas of acid sulfate soil risk occur within the Project Area.
Connectivity	There are large patches of White Box - Blakelys Red Gum that traverses the Project Area, as well as several creeks and unnamed waterways, which may provide connectivity between fragmented terrestrial habitat and aquatic habitat.

3.2 IBRA Region and Sub-Region

The Project Area falls across two Interim Biogeographic Regionalisation for Australia (IBRA) Bioregions and associated IBRA Sub-regions (refer to **Figure 3.2** below). The western portion of the Project Area falls within the NSW South Western Slopes Bioregion and the Inland Slopes Sub-region, while the eastern portion of the Project Area falls within the South Eastern Highlands Bioregion and the Hill End Sub-region.

The NSW South Western Slopes Bioregion is an extensive area of foothills and isolated ranges comprising the lower inland slopes of the Great Dividing Range extending from north of Cowra through southern NSW into western Victoria. The bioregion extends from Albury in the south to Dunedoo in the northeast. This bioregion is dominated by sub-humid climate characterised by hot summers and no dry season.

The South Eastern Highlands Bioregion lies just inland from the coastal bioregions of the South East Corner and the Sydney Basin, bounded by the Australian Alps and South Western Slopes bioregions to the south and west. The bioregion includes most of the Australian Capital Territory and extends south into Victoria. This bioregion is dominated by a temperate climate with significant areas in the north and south at higher elevations experiencing montane climate with milder summers.

The landscape within the Project Area is a combination of native vegetation and cleared agricultural landscape (modified pasture) and includes numerous small creek lines that feed into the nearby Macquarie River and Cudgegong River.

3.3 Biodiversity Values Map

The Biodiversity Values (BV) map identifies land with high biodiversity value that is especially sensitive to impacts from development and clearing. Land types included on the BV map are as follows:

- 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 having potential for 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.

Areas within the Project Boundary identified on the BV Map are shown in **Figure 3.3**. The areas within the Project Area identified in the BV Map correspond to biodiverse riparian land. The biodiversity values within the biodiverse riparian land will be assessed as part of the biodiversity assessment prepared to support the EIS.

3.4 Important Habitat Mapping

For a small number of threatened species as detailed within the TBDC, Section 5.1.3 of the Biodiversity Assessment Method (BAM) provides for the establishment of 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.

There is no mapped important habitat for any of the four listed species within the Project Area.

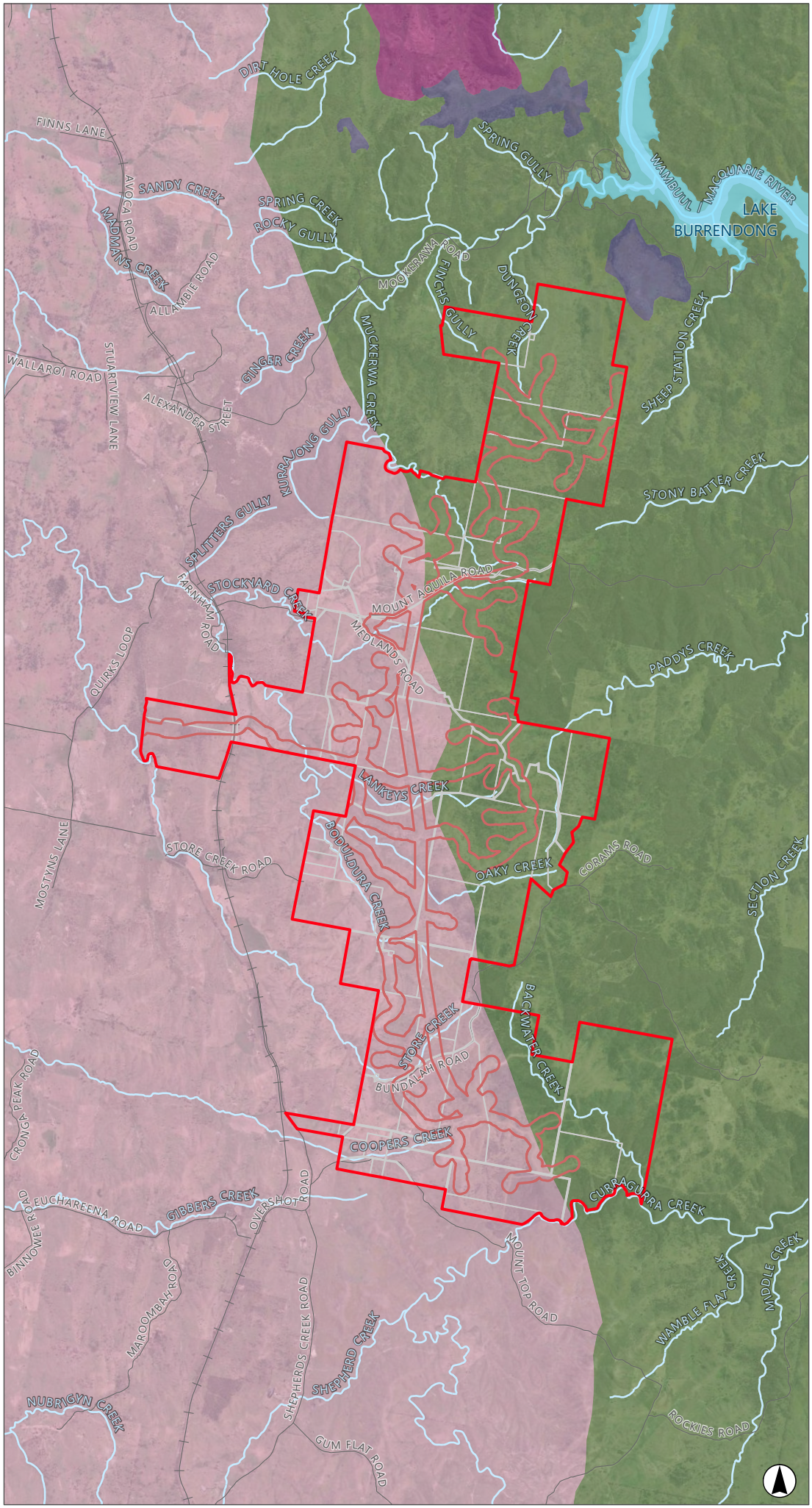


FIGURE 3.1

Landscape Features within the Project Area

Legend

- Project Boundary
- Development Corridor
- Lot Boundary
- Waterbody
- Road
- Railway Line
- Named Watercourse

Mitchell Landscape (v3.1)

- Canobolas Sheet Basalts
- Goonoo Slopes
- Macquarie Valley Basalts
- Mullion Slopes
- Ophir - Hargraves Plateau
- Water

0 1 2
Kilometres

Scale 1:100,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

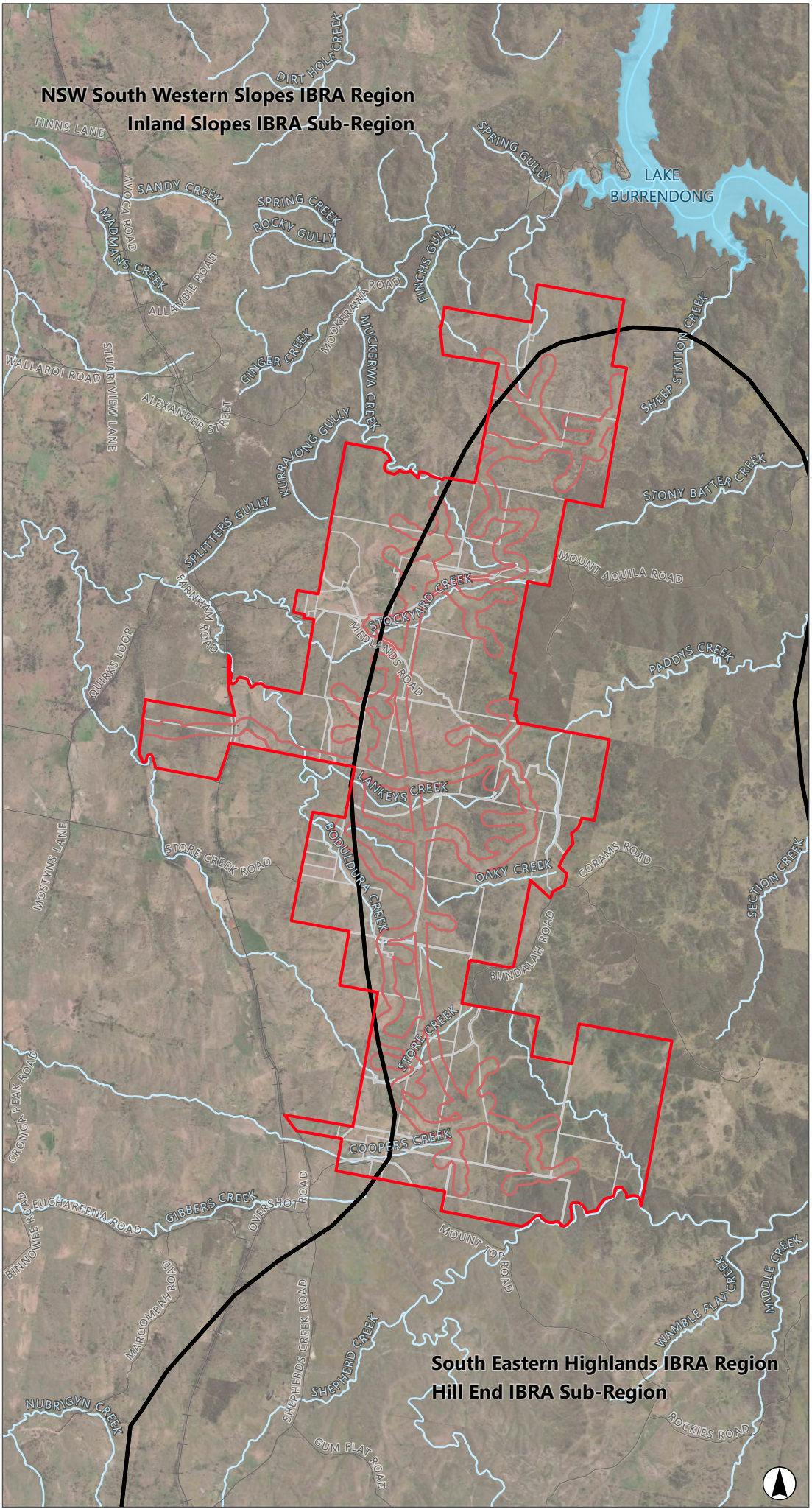


FIGURE 3.2

IBRA Bioregions and Sub-regions

Legend

- Project Boundary
- Development Corridor
- IBRA Sub-region Boundary (v7)
- Lot Boundary
- Waterbody
- Road
- Railway Line
- Named Watercourse

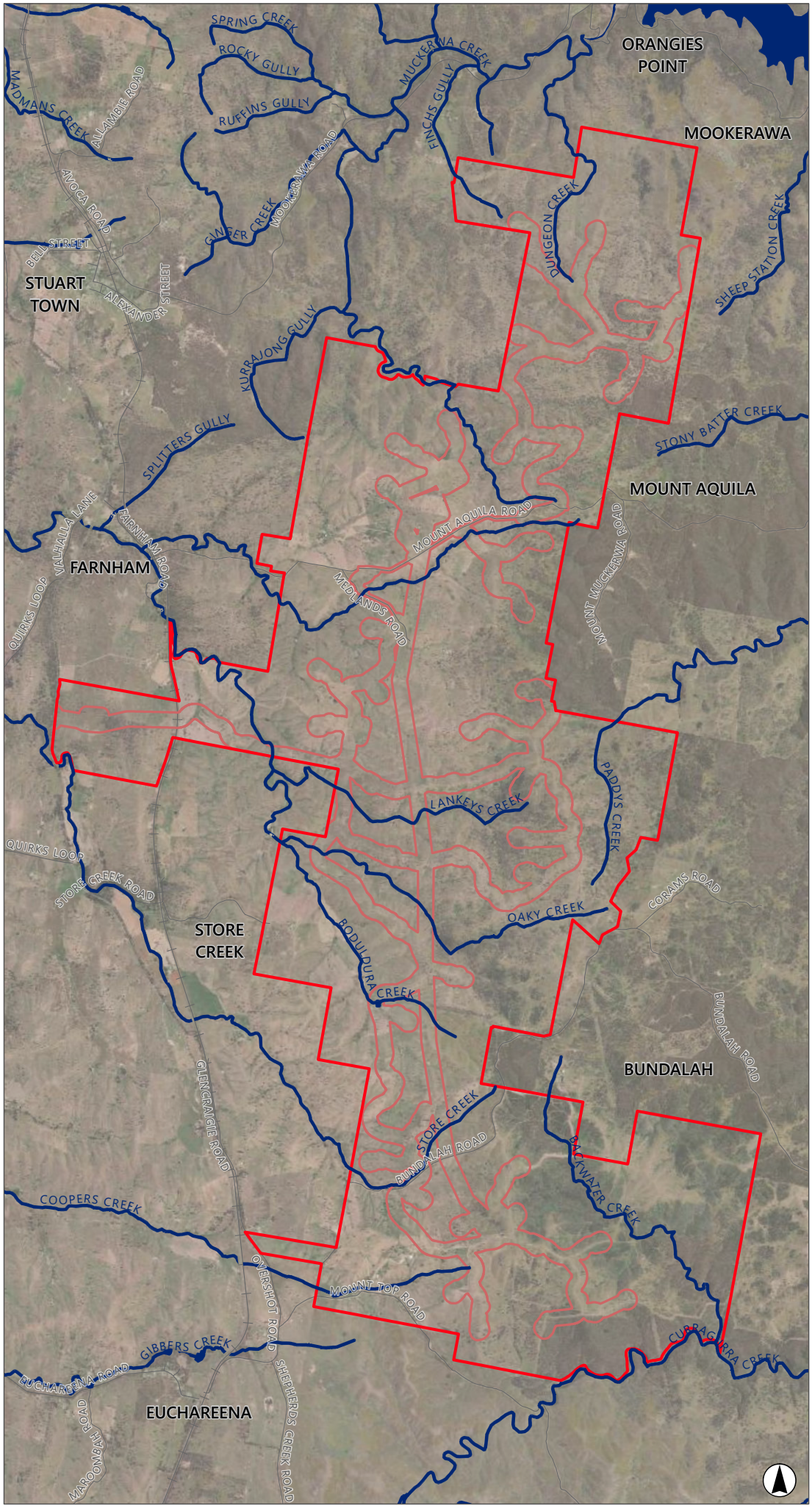
0 1 2
Kilometres

Scale 1:100,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

FIGURE 3.3

Biodiversity Values



Legend

- Project Boundary
- Development Corridor
- Biodiverse Riparian Land (Biodiversity Values v13.5)
- Railway Line

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

3.5 Potential Vegetation Communities

3.5.1 Plant Community Types

The baseline vegetation mapping (NSW SVTM) identified 19 Plant Community Types (PCTs) within the Project Area (**Table 3.2**). The site visit confirmed the likely occurrence of four of these PCTs however their distribution across the Project Area differed to that depicted in the baseline mapping (**Figure 3.4**). It is likely that more than the four confirmed PCTs occur throughout the Project Area. The four PCTs confirmed to occur in the Project Area include:

- PCT 3399 Southwest Hills White Box-Blakelys Red Gum Forest (**Photo 3.3**).
- PCT 3534 Central West Stony Hills Stringybark-Box Forest.
- PCT 3734 Central Tableland Dry Slopes Stringybark-Box Forest.
- Non-native vegetation (**Photo 3.1**).

The most significant difference between the baseline vegetation mapping and what was observed on site was the occurrence of derived native grasslands (**Photo 3.2**). There are no derived native grassland PCTs in the Eastern IBRA subregions of the NSW SVTM, therefore there are none mapped across the eastern half of the Project Area. However, derived native grasslands were incidentally observed across the eastern half of the Project Area. Further assessment will be required to accurately map the occurrence of derived native grasslands across the Project Area.

It should be noted that this mapping is preliminary and would require further surveys as part of any biodiversity assessment carried out as part of an Environmental Impact Statement (EIS).

Table 3.2 Plant Community Types and Potential Threatened Ecological Community Associations

Plant Community Type	BC Act	EPBC Act	Area (Ha) within Project Area	Area (Ha) within Development Corridor
Non-native vegetation.	-	-	4,354.6	1,239.8
PCT 185: Dwyers Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion.	-	-	1.1	0
PCT 186: Dwyers Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion.	Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion (Critically Endangered).	-	0.9	0.0
PCT 266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	62	10.7
PCT 268: White Box - Blakelys Red Gum - Long-leaved Box - Nortons Box - Red Stringybark grass-shrub woodland on shallow soils on hills in the NSW South Western Slopes Bioregion.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	1.1	0.0
PCT 272: White Box - Black Cypress Pine - red gum +/- Mugga Ironbark shrubby woodland in hills of the NSW central western slopes.	-	-	0.7	0.0

Plant Community Type	BC Act	EPBC Act	Area (Ha) within Project Area	Area (Ha) within Development Corridor
PCT 273: White Box shrubby open forest on fine grained sediments on steep slopes in the Mudgee region of the of central western slopes of NSW.	-	-	0.3	0.0
PCT 277: Blakelys Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	5.9	0.0
PCT 280: Red Stringybark – Blakelys Red Gum +/- Long-leaved Box shrub/grass hill woodland of the NSW South Western Slopes Bioregion.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	5.6	0.0
PCT 292: She oak – Fringe Myrtle heathland on rocky ranges in the NSW South Western Slopes Bioregion.	-	-	0.3	0.0
PCT 332: Tumbledown Red Gum - Black Cypress Pine - Red Stringybark woodland on rocky hills in the NSW central western slopes.	-	-	0.7	0.0

Plant Community Type	BC Act	EPBC Act	Area (Ha) within Project Area	Area (Ha) within Development Corridor
PCT 347: White Box - Blakelys Red Gum shrub/grass woodland on metamorphic hillslopes in the mid-southern part of the upper slopes sub-region of the NSW South Western Slopes Bioregion.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	952.3	104.0
PCT 461: Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion.	-	-	27.4	0.0
PCT 511: Queensland Bluegrass - Redleg Grass - Rats Tail Grass - spear grass - panic grass derived grassland of the Nandewar Bioregion and Brigalow Belt South Bioregion.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	74.4	0.0
PCT 1330: Yellow Box - Blakelys Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	4.3	0.0

Plant Community Type	BC Act	EPBC Act	Area (Ha) within Project Area	Area (Ha) within Development Corridor
29.9PCT 3399: Southwest Hills White Box-Blakelys Red Gum Forest.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	228.5	22.0
PCT 3406 - Southwest Ranges White Box Woodland.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered).	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).	3.1	0.0
PCT 3534: Central West Stony Hills Stringybark-Box Forest.	-	-	384.9	40.3
PCT 3734: Central Tableland Dry Slopes Stringybark-Box Forest.	-	-	697.6	80.1
PCT 4063 - Central and Southern Tableland River Oak Forest.	-	-	2.8	0.0
Total non-native vegetation	**-**	**-**	**4,354.6**	**1,239.8**
Total native vegetation	**-**	**-**	**2,453.9**	**257.1**

Photo 3.1 **A paddock dominated by exotic grasses and mapped as Non-native vegetation**

Photo 3.2 **A paddock supporting a mixed assemblage of native and exotic grasses, sedges, herbs and forbs. This paddock has been mapped as potential derived native grassland.**

Photo 3.3 A regenerating woodland mapped as PCT 3399

3.5.2 Threatened Ecological Communities

Prior to the site visit, the desktop assessment identified six TECs with a moderate or higher likelihood of occurring within a 30 km radius of the Project Area. After the site visit, two were determined as occurring (both White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland as listed under the BC Act and EPBC Act) with a further four being assessed as having a moderate likelihood of occurrence within the Project Area.

The TECs identified in the desktop assessment as potentially occurring within the Project Area are detailed in **Table 3.3** and shown in **Figure 3.5**.

Note, detailed vegetation surveys and analyses across the Project Area have not been carried out to date. As such, the presence of other TECs occurring within the Project Area cannot be discounted.

Table 3.3 Threatened Ecological Communities Potentially Occurring in the Project Area

Threatened Ecological Community	BC Act Listing	EPBC Act Listing	Entity with the Potential for SAII	Likelihood of Occurrence	Area (Ha) within Project Area	Area (Ha) within Development Corridor
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.	Not listed	Endangered	No	Moderate	-	-
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions.	Endangered	Not listed	No	Moderate	-	-
Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions.	Endangered	Not listed	No	Moderate	-	-
Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South East Corner Bioregions.	Critically endangered	Not listed	Yes	Moderate	-	-
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Box Gum Woodland, BC Act).	Critically endangered	Not listed	Yes	**Recorded**	1337.2	136.7
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box Gum Woodland, EPBC Act).	Not listed	Critically endangered	-	**Recorded**		

3.5.2.1 White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Box Gum Woodland, BC Act)

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Box Gum Woodland, BC Act) occurs as an open woodland community or as a grassland community where the canopy assemblage has been removed (DPE 2022b). Box Gum Woodland has been mapped from the Queensland border in the north of its distribution through to Victoria in the south of its distribution. As the name implies, this community supports a canopy assemblage dominated by White Box (*Eucalyptus albens*), Yellow Box (*E. melliodora*) and Blakely's Red Gum (*E. blakelyi*). The groundcover is characterised by a diverse assemblage of grasses such as Kangaroo Grass (*Themeda triandra*), *Poa* spp., *Rytidospermsa* spp., and *Austrostipa* spp.

Within the Project Area, stands of PCT 3399 and some areas mapped as non-native vegetation in the baseline mapping have been assessed as Box Gum Woodland (BC Act). These areas were predominantly recorded through the western and central part of the Project Area that were lower in the landscape.

3.5.2.2 White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box Gum Woodland, EPBC Act)

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box Gum Woodland, EPBC Act) has a similar description to Box Gum Woodland as it is listed under the BC Act. For the purpose of this assessment, the description provided for Box Gum Woodland (BC Act) and its distribution across the Project Area can be applied to Box Gum Woodland (EPBC Act).

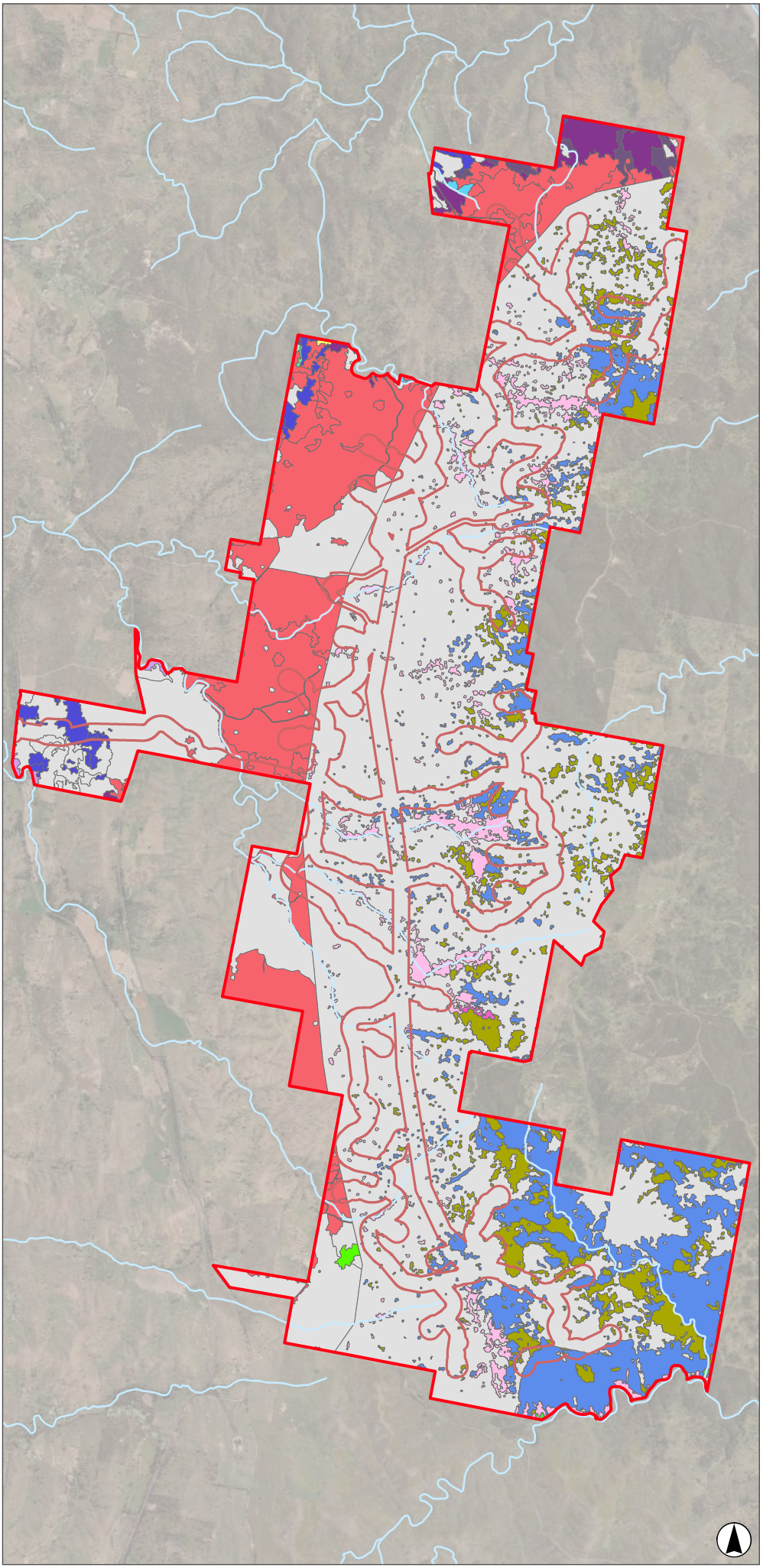


FIGURE 3.4

Preliminary Plant Community Types

Legend

- Project Boundary
- Development Corridor
- Named Watercourse

PCT ID & Name

- 185: Dwyers Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
- 186: Dwyers Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion
- 266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion
- 268: White Box - Blakelys Red Gum - Long-leaved Box - Nortons Box - Red Stringybark grass-shrub woodland on shallow soils on hills in the NSW South Western Slopes Bioregion
- 272: White Box - Black Cypress Pine - red gum +/- Mugga Ironbark shrubby woodland in hills of the NSW central western slopes
- 273: White Box shrubby open forest on fine grained sediments on steep slopes in the Mudgee region of the of central western slopes of NSW
- 277: Blakelys Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
- 280: Red Stringybark - Blakelys Red Gum +/- Long-leaved Box shrub/grass hill woodland of the NSW South Western Slopes Bioregion
- 292: She oak - Fringe Myrtle heathland on rocky ranges in the NSW South Western Slopes Bioregion
- 332: Tumbledown Red Gum - Black Cypress Pine - Red Stringybark woodland on rocky hills in the NSW central western slopes
- 347: White Box - Blakelys Red Gum shrub/ grass woodland on metamorphic hillslopes in the mid-southern part of the upper slopes sub-region of the NSW South Western Slopes Bioregion
- 461: Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion
- 511: Queensland Bluegrass - Redleg Grass - Rats Tail Grass - spear grass - panic grass derived grassland of the Nandewar Bioregion and Brigalow Belt South Bioregion
- 1330: Yellow Box - Blakelys Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
- 3399: Southwest Hills White Box-Blakelys Red Gum Forest
- 3406: Southwest Ranges White Box Woodland
- 3534: Central West Stony Hills Stringybark-Box Forest
- 3734: Central Tableland Dry Slopes Stringybark-Box Forest
- 4063: Central and Southern Tableland River Oak Forest
- Not native vegetation

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

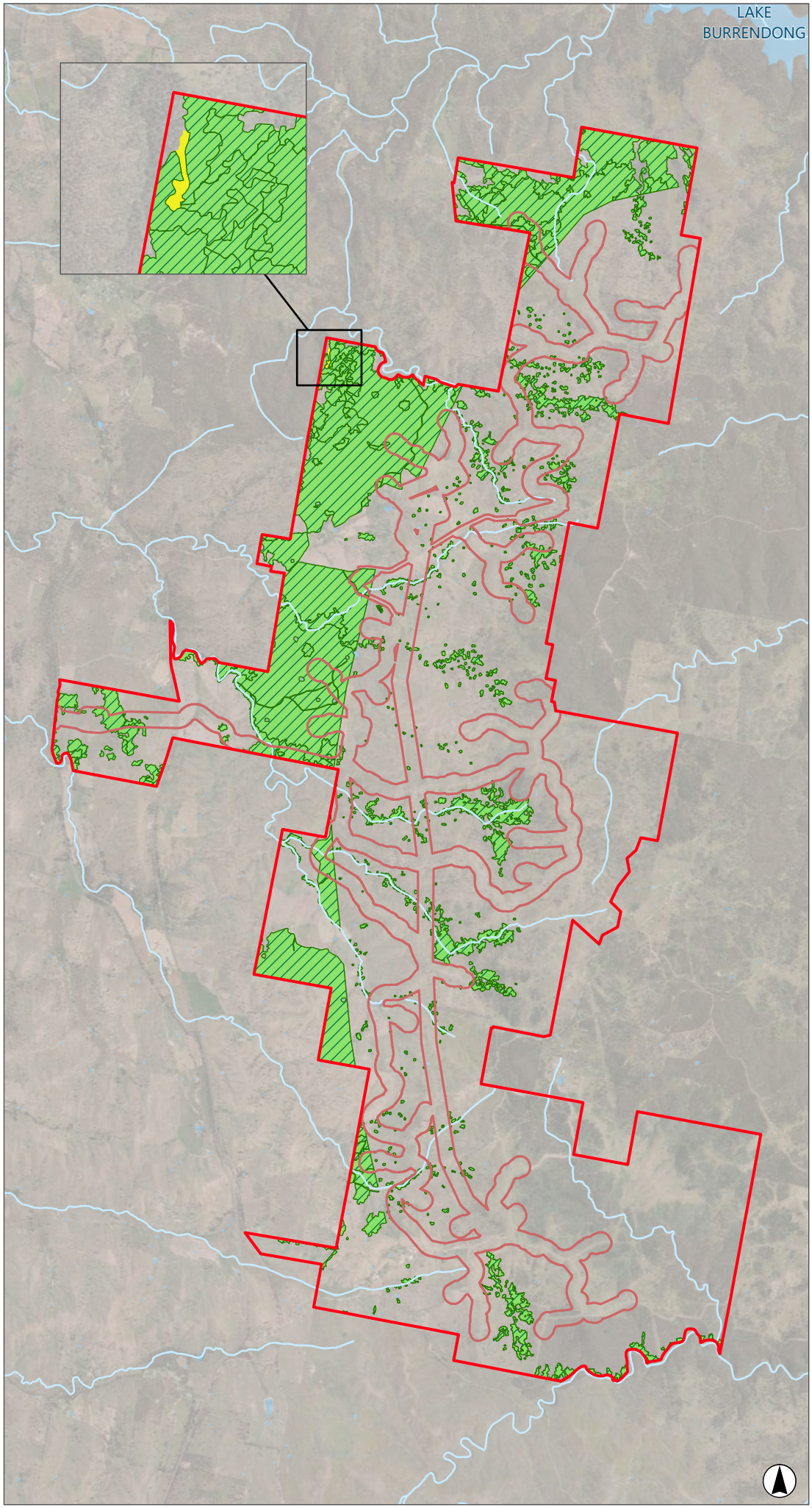


FIGURE 3.5

Threatened Ecological Communities

Legend

- Project Boundary
- Development Corridor
- Named Watercourse

Threatened Ecological Communities (EPBC Act)

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

Threatened Ecological Communities (BC Act)

- Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion
- White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Box Gum Woodland, BC Act)

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

3.5.3 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) and the Risk assessment guidelines for groundwater dependant ecosystems (Serov et al. 2012).

The GDE Atlas delineates and provides information about the following three types of GDEs (BoM 2017):

- 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 is mapped as containing both aquatic and terrestrial GDEs of low to moderate potential (refer to **Table 3.4** and **Figure 3.6**).

Table 3.4 Groundwater Dependent Ecosystems Mapped in the Project Area

Potential GDE	Landscape Feature
Aquatic	
Moderate potential – national assessment	Backwater Creek
Moderate potential – national assessment	Boduldura Creek
Moderate potential – national assessment	Coopers Creek
Moderate potential – national assessment	Curragurra Creek
Moderate potential – national assessment	Dungeon Creek
Moderate potential – national assessment	Finchs Gully
Moderate potential – national assessment	Lankeys Creek
Moderate potential – national assessment	Muckerwa Creek
Moderate potential – national assessment	Oaky Creek
Moderate potential – national assessment	Paddys Creek
Moderate potential – national assessment	Sheep Station Creek
Moderate potential – national assessment	Stockyard Creek
Moderate potential – national assessment	Store Creek

Potential GDE	Landscape Feature
Terrestrial	
Low potential – regional studies	*Acacia dealbata, Acacia genistifolia, Acacia mearnsii, Hibbertia obtusifolia / Acaena ovina, B*
Low potential – regional studies	*Eucalyptus albens, Callitris endlicheri, Eucalyptus sideroxylon / Acacia vestita, Cassinia laevis*
Low potential – regional studies	*Eucalyptus albens, Eucalyptus blakelyi, Eucalyptus macrorhyncha / Brachyloma daphnoides subsp. dap*
Low potential – regional studies	*Eucalyptus albens / Acacia decora, Acacia implexa, Acacia deanei subsp. paucijuga / Themeda austra*
Moderate potential – regional studies	*Eucalyptus blakelyi, Eucalyptus melliodora, Eucalyptus bridgesiana / Acacia dealbata / Themeda aus*
Low potential – regional studies	*Eucalyptus dealbata, Callitris endlicheri, Eucalyptus macrorhyncha / Styphelia triflora, Calytrix*
Low potential – regional studies	*Eucalyptus dealbata, Eucalyptus albens, Callitris endlicheri, Brachychiton populneus subsp. popul*
Low potential – regional studies	*Eucalyptus dwyeri, Callitris endlicheri, Acacia doratoxylon / Calytrix tetragona, Dodonaea viscos*
Low potential – regional studies	*Eucalyptus dwyeri, Callitris endlicheri, Eucalyptus rossii / Allocasuarina diminuta subsp. diminut*
Low potential – regional studies	*Eucalyptus dwyeri, Callitris glaucophylla, Acacia doratoxylon / Cassinia laevis, Leptospermum div*
Low potential – regional studies	*Eucalyptus macrorhyncha, Eucalyptus blakelyi, Eucalyptus goniocalyx / Lissanthe strigosa subsp. st*
Low potential – regional studies	*Eucalyptus macrorhyncha, Eucalyptus mannifera, Eucalyptus pauciflora, Eucalyptus dives / Lissanth*
Low potential – regional studies	*Eucalyptus rossii, Eucalyptus macrorhyncha, Callitris endlicheri, Eucalyptus goniocalyx / Grevill*
Low potential – regional studies	*Eucalyptus sideroxylon, Eucalyptus rossii , Eucalyptus macrorhyncha , Eucalyptus polyanthemos / Bra*

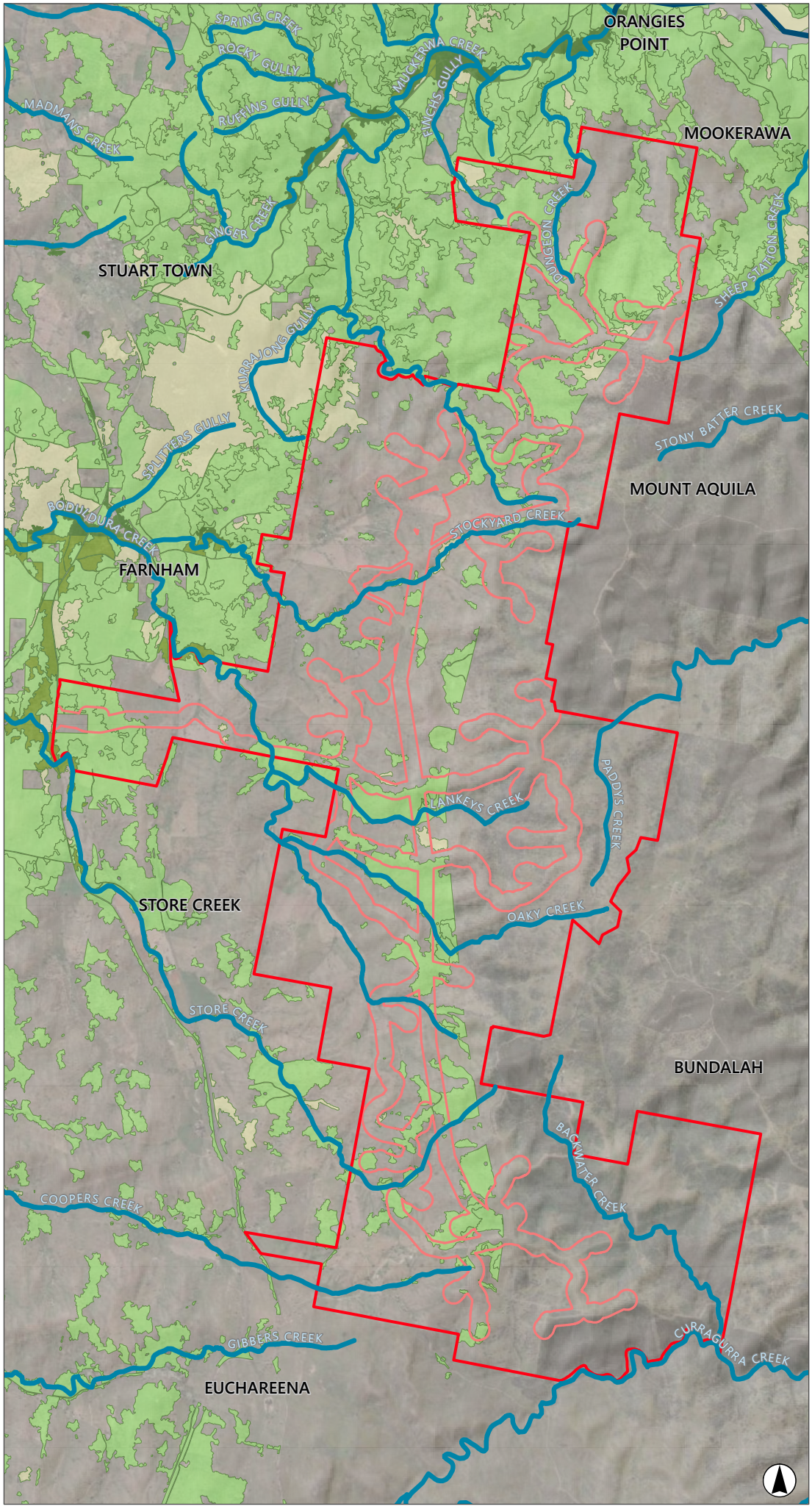


FIGURE 3.6

Groundwater Dependent Ecosystems

Legend

- Project Boundary
- Development Corridor

Aquatic Groundwater Dependant Ecosystems

- High Potential
- Moderate Potential

Terrestrial Groundwater Dependant Ecosystems

- High Potential
- Moderate Potential
- Low Potential
- Unclassified

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); BOM (2021); ACEN (2022)

3.6 Threatened Flora

The NSW BioNet Wildlife Atlas search and Commonwealth PMST search identified records for 22 threatened flora species within a 30 km radius of the Project Area. Of these, 16 threatened flora species are assessed as having a moderate or higher likelihood of occurrence in the Project Area (**Table 3.5**). Threatened flora species recorded within the locality of the Project Area are shown in **Figure 3.7** below**.**

Table 3.5 Threatened Flora Potentially Occurring in the Project Area

Common Name (*Scientific Name*)	BC Act	EPBC Act	Entity with the Potential for SAII*	Likelihood of Occurrence
Small Purple-pea (*Swainsona recta*)	Endangered	Endangered	No	Previously recorded in the Project Area
Acacia meiantha	Endangered	Endangered	Yes	Moderate
Yass Daisy (*Ammobium craspedioides*)	Vulnerable	Vulnerable	No	Moderate
Commersonia procumbens	Vulnerable	Vulnerable	No	Moderate
Bluegrass (*Dichanthium setosum*)	Vulnerable	Vulnerable	No	Moderate
Black Gum (*Eucalyptus aggregata*)	Vulnerable	Vulnerable	No	Moderate
Silver-leafed Gum (*Eucalyptus pulverulenta*)	Vulnerable	Vulnerable	No	Moderate
Robertson's Peppermint (*Eucalyptus robertsonii* subsp. *hemisphaerica*)	Vulnerable	Vulnerable	Yes	Moderate
Fairy Bells (*Homoranthus darwinioides*)	Vulnerable	Vulnerable	No	Moderate
Spiny Pepper-cress (*Lepidium aschersonii*)	Vulnerable	Vulnerable	No	Moderate
Hoary Sunray (*Leucochrysum albicans* var. *tricolor*)	Not listed	Endangered	No	Moderate
Tarengo Leek Orchid (*Prasophyllum petilum*)	Endangered	Endangered	No	Moderate
Prasophyllum sp. Wybong	Not listed	Critically endangered	Yes	Moderate
Austral Toadflax (*Thesium australe*)	Vulnerable	Vulnerable	No	Moderate
Granite Zieria (*Zieria obcordata*)	Endangered	Endangered	Yes	Moderate
Silky Swainson-pea (*Swainsona sericea*)	Vulnerable	-	No	Moderate

**Note: SAII only applies to species-credit-species. Ecosystem-credit-species have not been reviewed for SAII.*

3.7 Threatened Fauna

The NSW BioNet Wildlife Atlas search and Commonwealth PMST search identified records for 69 threatened fauna species within a 30 km radius of the Project Area. Of these, one threatened amphibian species, three threatened reptiles, 35 threatened birds and nine threatened mammal species are assessed as having a moderate or higher likelihood of occurrence in the Project Area (**Table 3.6**).

Threatened fauna species recorded within the locality of the Project Area are shown in **Figure 3.8** below.

No threatened invertebrates or fish were assessed as having a moderate or higher likelihood of occurring in the Project Area.

Table 3.6 Threatened Fauna Species Potentially Occurring in the Project Area

Common Name (*Scientific Name*)	BC Act	EPBC Act	Entity with the Potential for SAII*	Likelihood of Occurrence
Amphibians				
Booroolong Frog (*Litoria booroolongensis*)	Endangered	Endangered	No	Moderate
Reptiles				
Pink-tailed Worm-lizard (*Aprasia parapulchella*)	Vulnerable	Vulnerable	No	Moderate
Striped Legless Lizard (*Delma impar*)	Vulnerable	Vulnerable	No	Moderate
Bathurst Grassland Earless Dragon (*Tympanocryptis mccartneyi*)	Critically Endangered	Critically Endangered	Yes	Moderate
Birds				
Little Lorikeet (*Glossopsitta pusilla*)	Vulnerable	Not listed	-	Moderate
Swift Parrot (*Lathamus discolor*)	Endangered	Critically Endangered	Yes	Moderate
Superb Parrot (*Polytelis swainsonii*)	Vulnerable	Vulnerable	No	Moderate
Grey-crowned babbler (*Pomatostomus temporalis temporalis*)	Vulnerable	Not listed	-	Moderate
White-throated Needletail (*Hirundapus caudacutus*)	Not listed	Vulnerable	-	Moderate
Australian Painted Snipe (*Rostratula australis*)	Endangered	Endangered	-	Moderate
Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*)	Vulnerable	Not listed	-	High
Speckled Warbler (*Chthonicola sagittata*)	Vulnerable	Not listed	-	High

Common Name (*Scientific Name*)	BC Act	EPBC Act	Entity with the Potential for SAII*	Likelihood of Occurrence
Regent Honeyeater (*Anthochaera phrygia*)	Critically endangered	Critically endangered	Yes	Moderate
Painted Honeyeater (*Grantiella picta*)	Vulnerable	Vulnerable	-	Moderate
Black-chinned Honeyeater (eastern subspecies) (*Melithreptus gularis gularis*)	Vulnerable	Not listed	-	Moderate
Gilbert's Whistler (*Pachycephala inornata*)	Vulnerable	Not listed	-	Moderate
Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)	Vulnerable	Not listed	-	High
Hooded Robin (south-eastern form) (*Melanodryas cucullata cucullata*)	Vulnerable	Not listed	-	High
Diamond Firetail (*Stagonopleura guttata*)	Vulnerable	Not listed	-	High
Gang-gang Cockatoo (*Callocephalon fimbriatum*)	Vulnerable	Endangered	No	Moderate
South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*)	Vulnerable	Vulnerable	No	Moderate
Southern Whiteface (*Aphelocephala leucopsis*)	Not Listed	Vulnerable	No	Moderate
Major Mitchell's Cockatoo (eastern) (*Lophochroa leadbeateri leadbeateri*)	Not Listed	Endangered	No	Moderate
Blue-winged Parrot (*Neophema chrysostoma*)	Not Listed	Vulnerable	No	Moderate
Freckled Duck (*Stictonetta naevosa*)	Vulnerable	Not Listed	-	Moderate
Spotted Harrier (*Circus assimilis*)	Vulnerable	Not Listed	-	Moderate
White-bellied Sea-Eagle (*Haliaeetus leucogaster*)	Vulnerable	Not Listed	No	Moderate
Black-breasted Buzzard (*Hamirostra melanosternon*)	Vulnerable	Not Listed	No	Moderate
Little Eagle (*Hieraaetus morphnoides*)	Vulnerable	Not Listed	No	Moderate

Common Name (*Scientific Name*)	BC Act	EPBC Act	Entity with the Potential for SAII*	Likelihood of Occurrence
Square-tailed Kite (*Lophoictinia isura*)	Vulnerable	Not Listed	No	Moderate
Black Falcon (*Falco subniger*)	Vulnerable	Not Listed	-	Moderate
Bush Stone-curlew (*Burhinus grallarius*)	Endangered	Not Listed	No	Moderate
Turquoise Parrot (*Neophema pulchella*)	Vulnerable	Not Listed	-	Moderate
Barking Owl (*Ninox connivens*)	Vulnerable	Not Listed	No	Moderate
Masked Owl (*Tyto novaehollandiae*)	Vulnerable	Not Listed	No	Moderate
White-fronted Chat (*Epthianura albifrons*)	Vulnerable	Not Listed	-	Moderate
Varied Sittella (*Daphoenositta chrysoptera*)	Vulnerable	Not Listed	-	Moderate
Scarlet Robin (*Petroica boodang*)	Vulnerable	Not Listed	-	Moderate
Flame Robin (*Petroica phoenicea*)	Vulnerable	Not Listed	-	Moderate
Mammals				
Spotted-tailed Quoll (*Dasyurus maculatus*)	Vulnerable	Endangered	-	Moderate
Koala (*Phascolarctos cinereus*)	Vulnerable	Vulnerable	No	Moderate
Large-eared Pied Bat (*Chalinolobus dwyeri*)	Vulnerable	Vulnerable	Yes	Moderate
Corben's Long-eared Bat (*Nyctophilus corbeni*)	Vulnerable	Vulnerable	-	Moderate
Grey-headed Flying-fox (*Pteropus poliocephalus*)	Vulnerable	Vulnerable	No	Moderate
Squirrel Glider (*Petaurus norfolcensis*)	Vulnerable	Not Listed	No	Moderate
Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)	Vulnerable	Not Listed	-	Moderate
Southern Myotis (*Myotis Macropus*)	Vulnerable	Not Listed	No	Moderate
Large Bent-winged Bat (*Miniopterus orianae oceanensis*)	Vulnerable	Not Listed	Yes	Moderate

**Note: SAII only applies to species-credit-species. Ecosystem-credit-species have not been reviewed for SAII.*

3.7.1 Threatened Fauna Habitat

The Project Area supports a variety of different habitat features for threatened and non-threatened fauna. The habitat features recorded on site are identified in **Table 3.7** below.

Table 3.7 Fauna Habitat Features Recorded in the Project Area

Habitat Feature	Occupying Threatened Species	Occurrence Throughout the Project Area
Creek lines and dams	Booroolong Frog (*Litoria booroolongensis*)	Occur frequently throughout the Project Area (**Photo 3.5**). Ephemeral creeks are more frequent towards the east of the Project Area where the topography is higher and steeper. Permanent creek lines were more frequently recorded towards the west where the topography was lower and flatter.
Tree hollows	Woodland birds and microbats	Occur frequently throughout the Project Area in areas of woodland (**Photo 3.4**).
Rocks and boulder fields	Spotted-tailed Quoll (*Dasyurus maculatus*), Pink-tailed Worm-lizard (*Aprasia parapulchella*), Striped Legless Lizard (*Delma impar*)	Rocky slopes, hills and small boulder fields were infrequently dispersed throughout the project area.
Logs	Spotted-tailed Quoll (*Dasyurus maculatus*)	Occur frequently throughout the Project Area in areas of woodland.

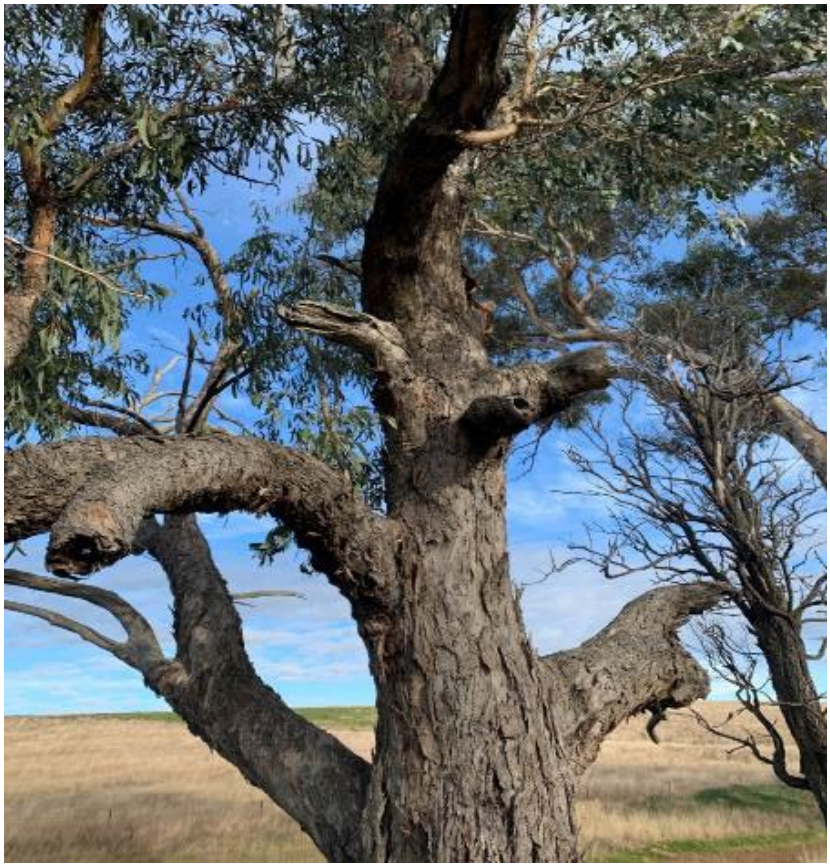


Photo 3.4 A remnant paddock tree supporting both small (1 to 10 cm wide) and medium (11 to 20 cm wide) sized hollows

Photo 3.5 An unnamed creek line that has been subject to erosion. The creek line is surrounded by remnant Eucalyptus spp., native sedges and rushes, and both native and exotic grasses.

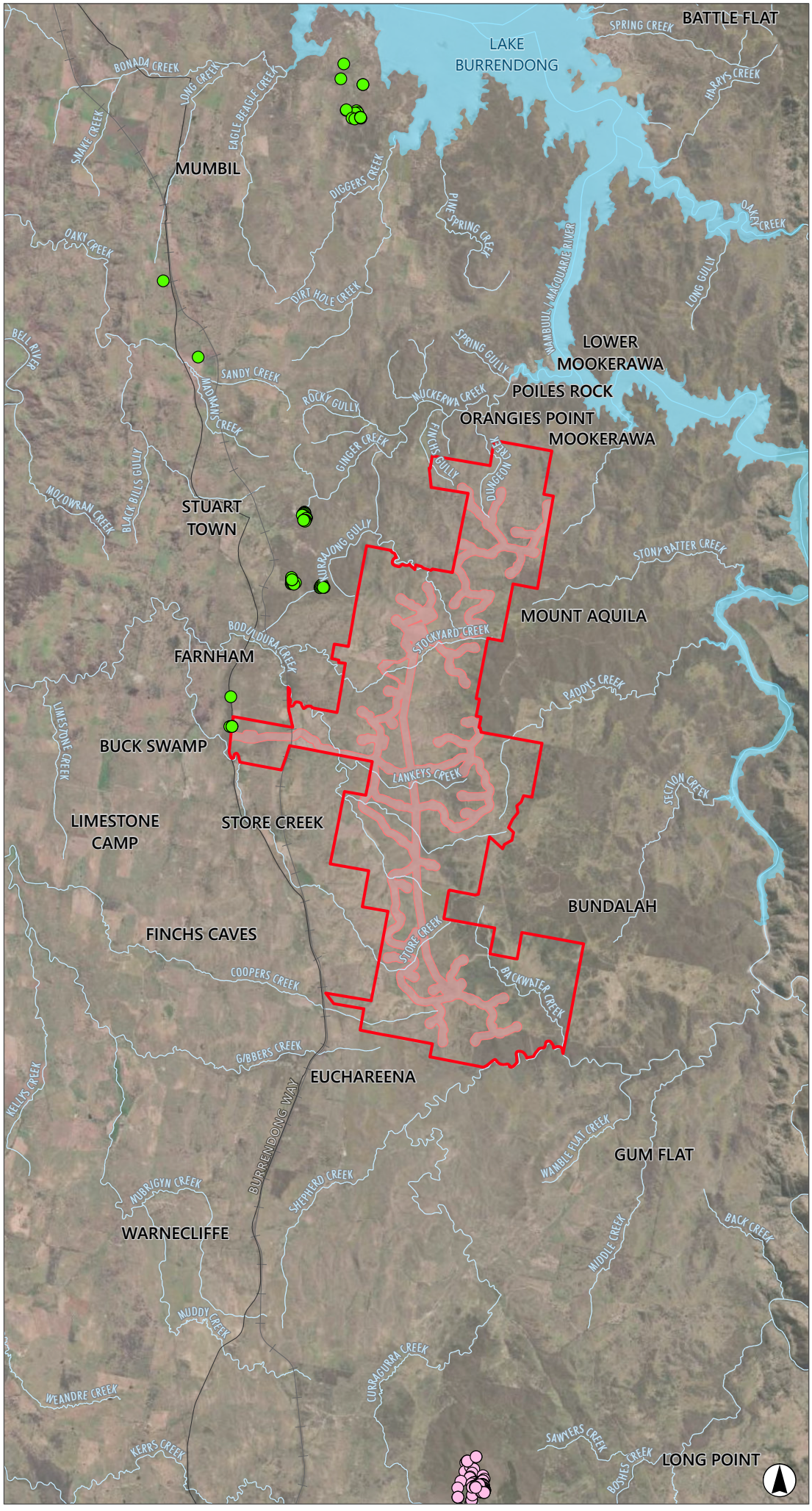


FIGURE 3.7

Threatened Flora Records

Legend

- Project Boundary
- Development Corridor
- Waterbody
- Named Watercourse
- Road
- Railway Line

Threatened Fauna Records (EPBC Listed - BioNet)

- *Acacia meiantha*
- *Swainsona recta*

0 2.5 5
Kilometres

Scale 1:150,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022), Atlas-BioNet (2023)

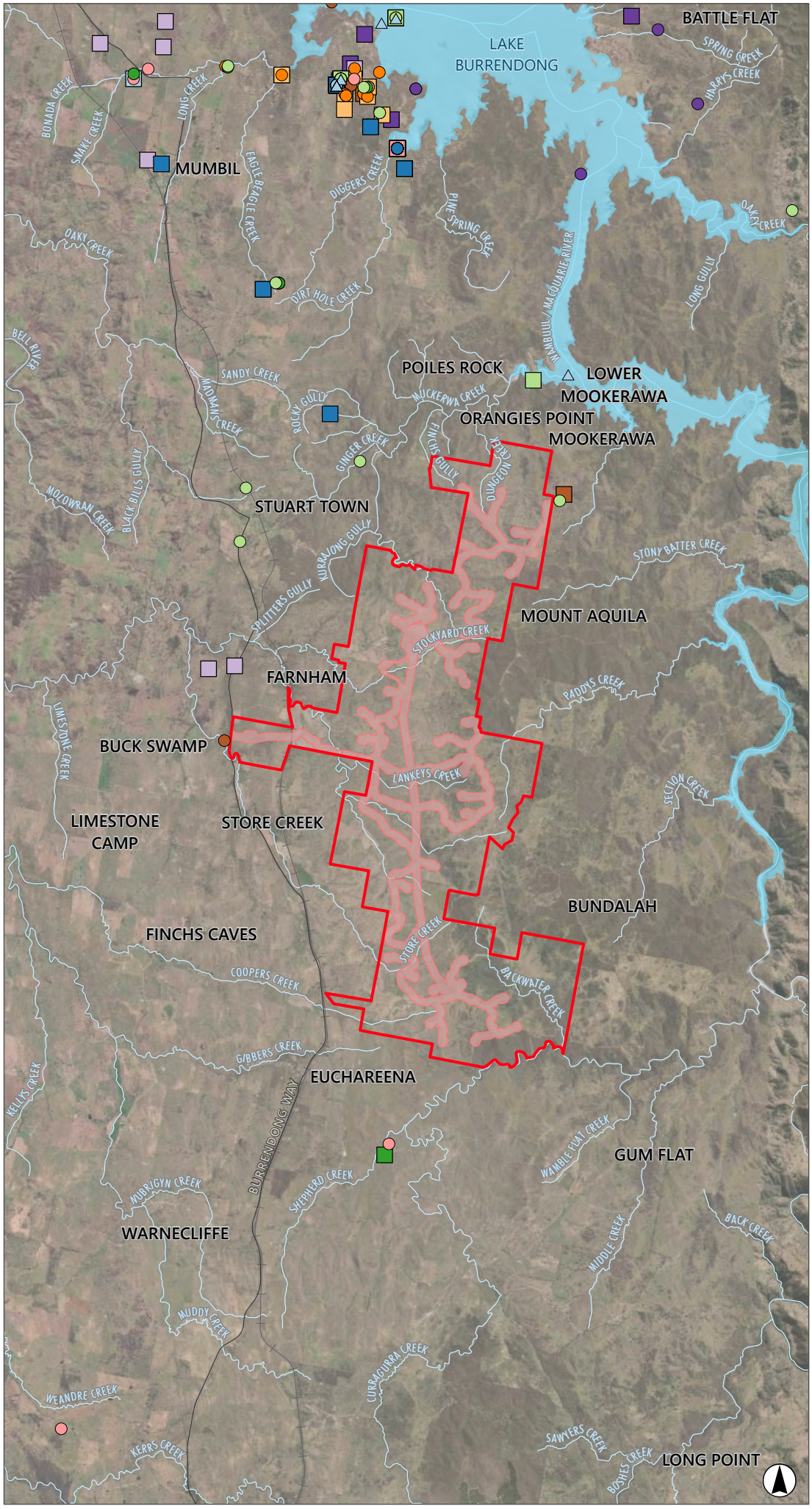


FIGURE 3.8

Threatened Fauna Records

Legend

- Project Boundary
- Development Corridor
- Waterbody
- Named Watercourse
- Road
- Railway Line

Threatened Fauna Sighting Records (NSW BioNet)*

- Black Falcon
- Black-chinned Honeyeater (eastern subspecies)
- Brown Treecreeper (eastern subspecies)
- Diamond Firetail
- Dusky Woodswallow
- Gilbert's Whistler
- Grey-crowned Babbler (eastern subspecies)
- Koala
- Little Eagle
- Little Lorikeet
- Painted Honeyeater
- Regent Honeyeater
- Scarlet Robin
- South-eastern Glossy Black-Cockatoo
- South-eastern Hooded Robin
- Southern Whiteface
- Speckled Warbler
- Square-tailed Kite
- Superb Parrot
- Swift Parrot
- Turquoise Parrot
- Varied Sittella
- White-bellied Sea-Eagle
- White-throated Needletail

0 2.5 5
Kilometres

Scale 1:150,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); NSW DPIE (2022); ACEN (2022), Atlas-BioNet (2023)

3.8 Migratory Species

The PMST search identified records for 11 migratory species within a 30 km radius of the Project Area. Three of these migratory terrestrial species are considered to have a moderate to higher likelihood of occurring within the Project Area as described in **Table 3.8**. In addition, and as per the PMST, Latham's Snipe, Japanese Snipe (*Gallinago hardwickii*) a migratory wetlands species is considered likely to be present within the Project Area.

Table 3.8 Migratory Species Potentially Occurring in the Project Area

Common Name (*Scientific Name*)	BC Act	EPBC Act	Likelihood of Occurrence
Migratory (Terrestrial)			
White-throated Needletail (*Hirundapus caudacutus*)	Not listed	Migratory, Vulnerable	Moderate
Satin Flycatcher (*Myiagra cyanoleuca*)	Not listed	Migratory	Moderate
Rufous Fantail (*Rhipidura rufifrons*)	Not listed	Migratory	Moderate

3.9 Matters of National Environmental Significance

The EPBC Act provides protection of the environment from actions proposed to 'have the potential to significantly impact on Matters of National Environmental Significance (MNES) or the environment of Commonwealth land'. MNES under the Act include the following:

- World Heritage Properties.
- National Heritage Places.
- Ramsar Wetlands.
- Threatened species or ecological communities listed in the EPBC Act.
- Migratory species listed in the EPBC Act.
- Commonwealth marine environment.
- Nuclear actions.
- Great Barrier Reef Marine Park.
- A water resource, in relation to coal seam gas development and large coal mining development.

A search of the EPBC PMST was undertaken on 7 December 2023. The search included a 30 km buffer from the Project Area. The search results are summarised below in **Table 3.9** and a record of the PMST report is provided in **Appendix A**.

Table 3.9 Matters of National Environmental Significance (MNES)

MNES	Relevance to Development
World heritage properties	0
National heritage properties	0
Wetlands of international importance	5
Listed threatened ecological communities	3
Listed threatened species	61
Listed migratory species	11
State and territory reserves	4
Commonwealth marine area	0
Commonwealth lands	7
The Great Barrier Reef Marine Park	0

The PMST identified the following threatened ecological communities which may occur within 30 km of the Project Area:

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.
- Natural Temperate Grassland of the South Eastern Highlands.
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

The PMST identified the following migratory species which may occur within 30 km of the Project Area:

- Satin Flycatcher (*Myiagra cyanoleuca*)
- Fork-tailed Swift (*Apus pacificus*)
- Pectoral Sandpiper (*Calidris melanotos*)
- Rufous Fantail (*Rhipidura rufifrons*)
- Black-faced Monarch (*Monarcha melanopsis*)
- Curlew Sandpiper (*Calidris ferruginea*)
- Common Sandpiper (*Actitis hypoleucos*)
- Yellow Wagtail (*Motacilla flava*)
- Sharp-tailed Sandpiper (*Calidris acuminata*)
- White-throated Needletail (*Hirundapus caudacutus*)
- Latham's Snipe, Japanese Snipe (*Gallinago hardwickii*).

The PMST identified the following state and territory reserves within 30 km of the Project Area:

- Boshes Creek Flora Reserve.
- Freemantle Nature Reserve.
- Girralang Nature Reserve.
- Mullion Range State Conservation Area.

Surveys to determine the presence and likelihood of impacts to MNES would be undertaken during the preparation of the EIS.

Further information regarding MNES of potential relevance to this BCA was provided in **Section 3.6** and **Section 3.7** (threatened species), **Section 3.5.2** (threatened ecological communities) and **Section 3.8** (migratory species) above.

Five wetlands of international importance are indicated in the search as their tributaries are located within 30 km of the Project Boundary, however it is noted that the wetlands themselves are between 200 and 1,000 km downstream of the Project Boundary. Only one of these wetlands, the Macquarie Marshes, is located within NSW. The Macquarie Marshes are located in central northern NSW, approximately 200–300 km northwest of the Project Area. The other four wetland comprise the:

- Hattah-Kulkyne Lakes (located in northern Victoria).
- Banrock Station Wetland Complex (located on the lower Murray River floodplain in South Australia).
- Riverland (located on the Murray River in South Australia).
- The Coorong, and Lakes Alexandrina and Albert Wetland (located at the mouth of the Murray River in South Australia).

4.0 Threatened Species Survey Requirements

All BAM assessments require extensive field surveys including the collection of floristic data, vegetation mapping and targeted seasonal species-credit species surveys. Seasonal requirements for threatened species surveys can be variable and up to a year is usually required to cover all predicted species-credit species survey periods. The exact survey requirements are driven by the PCT, patch size, and presence of habitat constraints within the survey corridor. The Biodiversity Assessment Method Calculator (BAMC), BioNet Atlas records, and PMST was used to derive a list of candidate species that would likely require survey and assessment in accordance with the BAM.

These species are detailed in **Section 4.1** and **Section 4.2** below.

It is noted that the tables outlining the species credit species required for survey were generated using a mix of existing PCTs and four legacy PCTs. Updated versions of the four legacy PCTs are currently part of the new SNW SVTM, however these PCTs have not been uploaded onto the BAMC – the tool used to identify species credit species requiring survey. There is the potential that the species credit species requiring survey may change when the new PCTs are uploaded onto the BAMC in 2024.

4.1 Flora Species Credit Species Survey Requirements

Threatened flora species-credit-species which would likely require survey and assessment as part of an EIA for the Project are detailed in **Table 4.1**.

4.2 Fauna Species Credit Species Survey Requirements

Threatened fauna species-credit-species which would likely require survey and assessment as part of an EIA for the Project are detailed in **Table 4.2**.

Table 4.1 Threatened Flora Species Credit Species Likely Requiring Survey

Common Name (*Scientific Name*)	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the Potential for SAII	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ausfeld's Wattle (*Acacia ausfeldii*)	V	-	Footslopes and low rises on sandstone	-	No												
Capertee Stringybark (*Eucalyptus cannonii*)	V	-	-	-	No												
Grevillea divaricata	E	-	-	-	Yes												
Hoary Sunray (*Leucochrysum albicans* var. *tricolor*)	-	E	-	-	No												
Clandulla Geebung (*Persoonia marginata*)	V	V	-	-	No												
Small Purple-pea (*Swainsona recta*)	E	E	-	-	No												
Silky Swainson-pea (*Swainsona sericea*)	V	-	-	-	No												
Veronica blakelyi	V	-	-	-	No												
Granite Zieria (*Zieria obcordata*)	E	E	Rocky areas, Land containing granite or boulders	-	Yes												

Table 4.2 Threatened Fauna Species Credit Species Likely Requiring Survey

Common Name (*Scientific Name*)	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the Potential for SAII	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pink-tailed Legless Lizard (*Aprasia parapulchella*)	V	V	Rocky areas or within 50 m of rocky areas	-	No												
Bush Stone-curlew (*Burhinus grallarius*)	E	-	Fallen/standing dead timber including logs	-	No												
Gang-gang Cockatoo (Breeding) (*Callocephalon fimbriatum*)	V	E	Hollow bearing trees Eucalypt tree species hollows greater than 9 cm diameter	-	No												
Glossy Black-Cockatoo (Breeding) (*Calyptorhynchus lathami*)	V	-	Hollow bearing trees Living or dead tree with hollow greater than 15 cm diameter and greater than 8 m above the ground	-	No												
Eastern Pygmy-possum (*Cercartetus nanus*)	V	-	-	-	No												
Large-eared Pied Bat (*Chalinolobus dwyeri*)	V	V	Cliffs Within 2 km of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within 2 km of old mines or tunnels	-	Yes												

Common Name (*Scientific Name*)	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the Potential for SAII	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
White-bellied Sea-Eagle (*Haliaeetus leucogaster*) (Breeding habitat only)	V	-	Living or dead mature trees within suitable vegetation within 1 km of a rivers, lakes, large dams or creeks, wetlands and coastlines	-	No												
Little Eagle (*Hieraaetus morphnoides*) (Breeding habitat only)	V	-	Nest trees - live (occasionally dead) large old trees within vegetation)	-	No												
Key's Matchstick Grasshopper (*Keyacris scurra*)	E	-	-	-	No												
Green and Golden Bell Frog (*Litoria aurea*)	E	V	Semi-permanent/ ephemeral wet areas Within 1 km of wet areas/ swamps/ waterbodies	-	No												
Booroolong Frog (*Litoria booroolongensis*)	E	E	-	-	No												

Common Name (*Scientific Name*)	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the Potential for SAII	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Square-tailed Kite (*Lophoictinia isura*) (Breeding habitat only)	V	-	-	-	No												
Large Bent-winged Bat (*Miniopterus orianae oceanensis*) (Breeding habitat only)	V	-	Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records	-	Yes												
Barking Owl (*Ninox connivens*) (Breeding habitat only)	V	-	Hollow bearing trees Living or dead trees with hollows greater than 20 cm diameter and greater than 4 m above the ground	-	No												
Powerful Owl (*Ninox strenua*) (Breeding habitat only)	V	-	Hollow bearing trees Living or dead trees with hollow greater than 20 cm diameter	-	No												
Purple Copper Butterfly, Bathurst Copper Butterfly (*Paralucia spinifera*)	E	V	Bursaria spinosa or within 40 m of Bursaria spinosa	-	No												

Common Name (*Scientific Name*)	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the Potential for SAII	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Greater Glider (*Petauroides volans*)	-	V	-	-	No												
Squirrel Glider (*Petaurus norfolcensis*)	V	-	-	-	No												
Brush-tailed Phascogale (*Phascogale tapoatafa*)	V	-	-	-	No												
Koala (*Phascolarctos cinereus*)	E	E	Presence of koala use trees	-	No												
Superb Parrot (*Polytelis swainsonii*) (Breeding habitat only)	V	V	Hollow bearing trees Living or dead *E. blakelyi, E. melliodora, E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. mannifera, E. intertexta* with hollows greater than 5 cm diameter greater than 4 m above ground or trees with a DBH of greater than 30 cm	-	No												

Common Name (*Scientific Name*)	BC Act	EPBC Act	Habitat Constraints	Geographic Limitations	Entity with the Potential for SAII	Survey Period											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Grey-headed Flying-fox (***Pteropus poliocephalus***) **(Breeding habitat only)**	V	V	Breeding camps	-	No												
Masked Owl (***Tyto novaehollandiae***) **(Breeding habitat only)**	V	-	Hollow bearing trees Living or dead trees with hollows greater than 20 cm diameter	-	No												

5.0 Potential Impacts

The BAM requires the assessment of discrete types of impacts on biodiversity values resulting from a 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 Biodiversity Conservation Regulation 2017 (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. transporting weeds or pathogens, dumping rubbish).
- **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:** 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 5.1** below.

Table 5.1 Potential Impacts Associated with the Project

Impact Type	Potential Impact	Details
Direct impacts	Removal of native vegetation Removal of threatened species and their habitat Fauna mortality	• 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 may contribute to further fragmentation of native vegetation communities within the locality. • Removal of grassland habitat may impact suitable habitat for the Pink-tailed Legless Lizard and the Striped Legless Lizard known to occur within the Project Area. • 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. The proposal has the potential to remove these tree hollows, thereby impacting on threatened species that may utilise them as habitat. • Construction of WTGs and access roads may clear the rocky habitat of threatened fauna species such as the Spotted-tailed Quoll. • Construction of WTGs and their access roads may clear logs and debris used by threatened flora and fauna species predicted to occur within the Project Area.

Impact Type	Potential Impact	Details
Indirect impacts	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. • Noise and vibration disturbances to fauna. • Fire mitigation strategies may result in changes to fire regime across the Project Area. Changes to fire regime is known to negatively impact Plains-wanderer and its habitat.
	Reduced viability of adjacent habitat due to edge effects	
	Reduced viability of adjacent habitat due to noise, dust or light spill	
	Transport of weeds and pathogens from the site to adjacent vegetation	
	Changed fire regimes	
Prescribed impacts	Impacts from wind turbine strike	• The operation of the proposed WTGs has the potential to directly impact upon threatened birds and bats, through turbine blade strike. • 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. • Project construction may require the augmentation 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	
SAII	As per examples listed above	• A number of entities with the potential for SAII could be present within the Project Area. • The BAM assessment will likely require an assessment of impacts on SAII entities as identified in **Section 3.6** and **Section 3.7**.

6.0 Avoid-minimise Hierarchy

The BOS is underpinned by the hierarchy of 'avoid-minimise-offset'. Consequently, the BAM requires proponents to demonstrate how impacts on biodiversity have been avoided and minimised through project development and design, including during the process of selecting project location. All projects must demonstrate that that reasonable steps to avoid and minimise impacts to biodiversity values have been carried out as part of project development. Impacts must be avoided and minimised before offsets are proposed to compensate for any residual impacts. Justifications for residual impacts must be provided within the BDAR.

Table 6.1 details a avoid-minimise hierarchy to assist with avoiding and minimising impacts during project development. The hierarchy ranks biodiversity values recorded during the desktop assessment in order priority for avoidance and minimisation during the early stage of project development. As the project progresses, the ranking of different biodiversity values for avoidance and minimisation may need to be reviewed and revised based on new information, such as data from on-ground biodiversity surveys.

Table 6.1 Avoid-minimise Hierarchy

Avoid – minimise hierarchy (from highest to lowest priority)	Comment
Entities with the potential for SAII	Impacts to entities with the potential for SAII should be avoided where feasible and minimised as a priority. Two SAIIs, White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland and Werriwa Tablelands Cool Temperate Grassy Woodland, have been mapped on the NSW SVTM and may be present within the Project Area.
Threatened Ecological Communities (Woody vegetation)	Where feasible impacts to TECs comprising of woody vegetation should be avoided or minimised. Large patches of TEC or patches of TEC which are contiguous with large tracts of non-threatened woody vegetation should be prioritised for retention over smaller, fragmented patches or scattered trees. Impacts to these smaller patches or scattered trees may be avoided or minimised at a later stage of project development.
Non-threatened woody vegetation	Where feasible impacts to woody vegetation not conforming to a TEC should be avoided or minimised. Large tracts of non-threatened woody vegetation should be prioritised for retention over smaller, fragmented patches or scattered trees. Impacts to these smaller patches or scattered trees may be avoided or minimised at a later stage of project development.
Biodiversity Corridors	Where feasible, impacts to biodiversity corridors should be avoided and/or minimised. Examples of biodiversity corridors include travelling stock routes, significant roadside vegetation, riparian vegetation, and corridors mapped by Councils, LLS, DPE etc for conservation purposes.
Threatened species and their habitat	Where feasible, impacts to known locations of threatened species should be avoided and/or minimised. The feasibility of avoiding/minimising impacts may be species dependent, with flora species more easily avoided. It should be noted that the importance of avoiding impacts to threatened species and their habitat will become more important once detailed biodiversity surveys for the project commence, and more accurate on-ground data is available.

Avoid – minimise hierarchy (from highest to lowest priority)	Comment
Threatened Ecological Communities (Grassy vegetation)	Where feasible impacts to TECs comprising of grassy vegetation should be avoided or minimised.
Riparian land	Impacts to riparian corridors (width dependent on Strahler stream order) should be avoided (with exception of creek crossings). Generally addressed later in project design. Where feasible avoid locating WTGs, roads, ancillaries within 40 m of creeklines (riparian land as per *Water Management Act 2000*).

The following areas should be prioritised for development as part of the project:

- Category 1 – exempt land.
- Exotic vegetation.
- Established access tracks and internal roads.

7.0 References

Bureau of Meteorology (BOM), (2017), Groundwater Dependent Ecosystems Atlas, Commonwealth of Australia, Canberra.

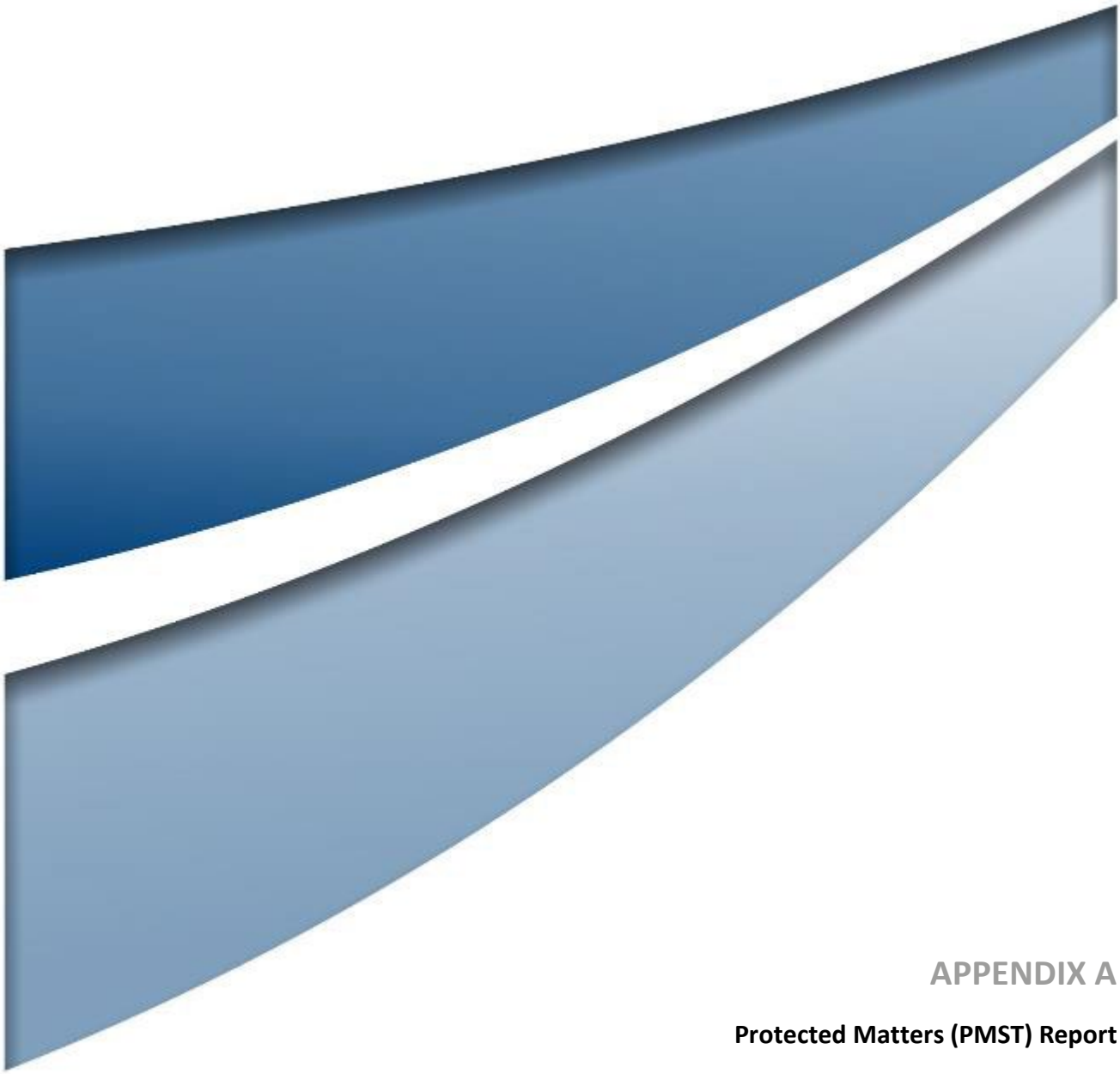
Department of the Environment, Water, Heritage and the Arts (DoEWHA) (2013) *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance.* Department of the Environment, Water, Heritage and the Arts.

Department of Planning, Industry, and the Environment (DPIE) (2020) *Biodiversity Assessment Method.* Department of Planning, Industry, and the Environment, Sydney.

Department of Planning and Environment (DPE) (2022a). NSW State Vegetation Type Map (SVTM) Edition C1.1.M1.

Department of Planning and Environment (DPE) (2022b). White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions – profile. Obtained from https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10837 on 02/08/2022.

Serov, P., Kuginis, L. and Williams, J.P., (2012) *Risk assessment guidelines for groundwater dependent ecosystems*. NSW Department of Primary Industries, Office of Water, Sydney.



APPENDIX A

Protected Matters (PMST) Report

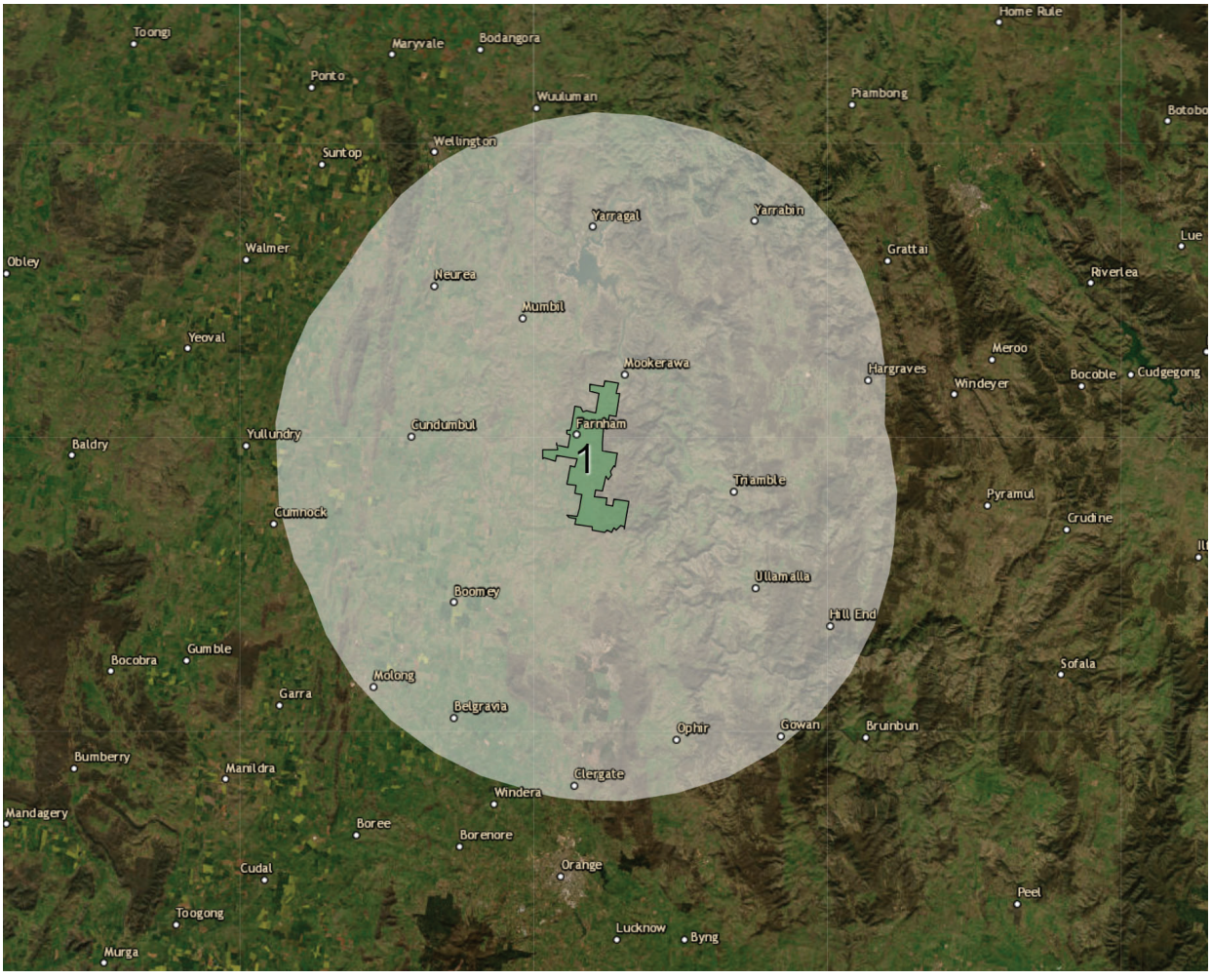
EPBC Act Protected Matters Report

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: 07-Dec-2023

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



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	5
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	61
Listed Migratory Species:	11

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 environment anywhere.

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 https://www.dcceew.gov.au/parks-heritage/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:	7
Commonwealth Heritage Places:	1
Listed Marine Species:	18
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:	None
EPBC Act Referrals:	11
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	700 - 800km upstream from Ramsar site	In feature area
Hattah-kulkyne lakes	600 - 700km upstream from Ramsar site	In buffer area only
Riverland	700 - 800km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	900 - 1000km upstream from Ramsar site	In feature area
The macquarie marshes	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
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area	In feature area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically 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			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
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 may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat known to occur within area	In feature area
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 known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lophochroa leadbeateri leadbeateri Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo [82926]	Endangered	Species or species habitat known to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat known to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	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 buffer area only
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	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 feature area
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
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 feature area
FROG			
Crinia sloanei Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area	In buffer area only
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Litoria castanea Yellow-spotted Tree Frog, Yellow-spotted Bell Frog [1848]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat may occur within area	In buffer area only
INSECT			
Synemon plana Golden Sun Moth [25234]	Vulnerable	Species or species habitat may occur within area	In buffer area only
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In buffer area only
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
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 known to occur within area	In feature area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area	In feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
PLANT			
Acacia meiantha [55608]	Endangered	Species or species habitat known to occur within area	In buffer area only
Ammobium craspedioides Yass Daisy [20758]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Androcalva procumbens [87153]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Austrostipa wakoolica [66623]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eucalyptus aggregata Black Gum [20890]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eucalyptus pulverulenta Silver-leaved Mountain Gum, Silver-leaved Gum [21537]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Eucalyptus robertsonii subsp. hemisphaerica Robertson's Peppermint [56223]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area	In feature area
Homoranthus darwinioides [12974]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In feature area
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat may occur within area	In buffer area only
Ozothamnus tesselatus [56203]	Vulnerable	Species or species habitat may occur within area	In feature area
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area	In feature area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area	In feature area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thesium australe			
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Vincetoxicum forsteri listed as Tylophora linearis			
[92384]	Endangered	Species or species habitat may occur within area	In buffer area only
Zieria obcordata			
Granite Zieria [3240]	Endangered	Species or species habitat known to occur within area	In feature area
REPTILE			
Aprasia parapulchella			
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat known to occur within area	In feature area
Delma impar			
Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area	In feature area
Tympanocryptis mccartneyi			
Bathurst Grassland Earless Dragon [90478]	Critically 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			
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis			
Black-faced Monarch [609]		Species or species habitat may occur within area	In buffer area only
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Myiagra cyanoleuca			
Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons			
Rufous Fantail [592]		Species or species habitat known to 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 may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area

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
Communications, Information Technology and the Arts - Australian Postal Corporation		
Commonwealth Land - Australian Postal Commission [13256]	NSW	In buffer area only
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [13259]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [13264]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Australian Telecommunications Commission [13257]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [13266]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Corporation [12400]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [13265]	NSW	In buffer area only

Commonwealth Heritage Places [Resource Information]

Name	State	Status	Buffer Status
Historic			
Wellington Post Office	NSW	Listed place	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
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 may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
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 known to 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
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysostoma			
Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Rhipidura rufifrons			
Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Boshes Creek	Flora Reserve	NSW	In buffer area only
Freemantle	Nature Reserve	NSW	In buffer area only
Girralang	Nature Reserve	NSW	In buffer area only
Mullion Range	State Conservation Area	NSW	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Aquila Wind	2023/09499		Referral Decision	In feature area
Dixons Long Point Crossing road upgrade project	2022/09240		Completed	In buffer area only
Controlled action				
Burrendong Wind Farm	2021/8916	Controlled Action	Assessment Approach	In buffer area only
Construction of a 36 km Pipeline and Ancillary Infrastructure	2011/6202	Controlled Action	Post-Approval	In buffer area only
Resource Reprocessing Facility	2002/783	Controlled Action	Completed	In buffer area only
Uungula Wind Farm, Goolma, NSW	2013/7026	Controlled Action	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Not controlled action				
132kV transmission line	2001/527	Not Controlled Action	Completed	In buffer area only
66kV transmission line to link the Molong-Cumnock and the TransGrid Molong-Manildra 132kV transmissi	2002/616	Not Controlled Action	Completed	In buffer area only
Construction and operation of baled waste landfill and composting facility, Euc	2009/5020	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
Aerial baiting for wild dog control	2006/2713	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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Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

APPENDIX 8

Preliminary Heritage Constraints Assessment

umwelt
Environmental & Social Consultants

ACEN | Australia

AQUILA WIND

Preliminary Heritage Constraints Assessment

FINAL

January 2024

AQUILA WIND

Preliminary Heritage Constraints Assessment

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
ACEN Australia

Project Director: Nathan Baker
Project Manager: Lauren Evans
Report No. 21793/R04
Date: January 2024

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.

Disclaimer

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
01	Lauren Evans	17 October 2022	Nathan Baker	21 October 2022
02	Lauren Evans	03 November 2022	Nathan Baker	03 November 2022
03	Lauren Evans	22 November 2022	Nathan Baker	22 November 2022
04	Lauren Evans	09 February 2023	Nathan Baker	10 February 2023
05	Lauren Evans	20 February 2023	Nathan Baker	20 February 2023
06	Lauren Evans	06 December 2023	Nathan Baker	06 December 2023
07	Lauren Evans	19 January 2024	Nathan Baker	19 January 2024
08	Lauren Evans	25 January 2024	Nathan Baker	25 January 2024

Abbreviations

Abbreviation	Definition
ACEN	ACEN Australia
ACHAR	Aboriginal Cultural Heritage Assessment Report
AGL	Above ground level
AHIMS	Aboriginal Heritage Information Management System
BESS	Battery Energy Storage System
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning & Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
HHA	Historic Heritage Assessment
IBRA	Interim Biogeographic Regionalisation for Australia
ICOMOS	International Council on Monuments and Sites
ILUA	Indigenous Land Use Agreements
LEP	Local Environmental Plan
MNES	Matters of National Environmental Significance
MW	Megawatt
MWh	Megawatt hour
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
RAPs	Registered Aboriginal Parties
REZ	Renewable Energy Zone
SEARs	Secretary's Environmental Assessment Requirements
SHI	State Heritage Inventory
Umwelt	Umwelt (Australia) Pty Limited

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1.0 Introduction

1.1 Background

ACEN Australia (ACEN) proposes to develop Aquila Wind (the Project) to supply renewable electricity to the National Electricity Market (NEM) and reduce Australia's greenhouse gas (GHG) emissions through the generation of renewable electricity powered by the wind, as an alternative to the burning of fossil fuels.

The Project is located approximately 2.5 km southeast of Stuart Town and 2 km northeast of Euchareena, in the Central West region of NSW, within the Dubbo Regional Council Local Government Area (LGA) (refer to **Figure 1.1** and **Figure 1.2**) and on the lands of the Wiradjuri Nation. Dubbo is situated approximately 70 km northwest of the Project Boundary[1] (the northern most extent). The other regional centres of Mudgee, Wellington and Orange are situated approximately 40 km to the northeast, 30 km to the northwest and 35 km to the south respectively (refer to **Figure 1.2**). Lake Burrendong is located approximately 8 km north of the Project Boundary. The Project Area[2] is traversed by the Main Western Railway and is located approximately 14 km east of the Mitchell Highway.

The Project design includes up to 48 x 6.2 megawatt (MW) Wind Turbine Generators (WTGs) (each with a blade-tip height of up to 250 m) comprising an installed capacity of up to 300 MW, a Battery Energy Storage System (BESS) approximately 100 MW (2-hr), temporary and permanent meteorological masts, vegetation removal, earthworks, ancillary civil and electrical engineering infrastructure, temporary construction facilities and temporary concrete batching plants, and permanent worker facilities. The Project will create employment opportunities for approximately 300 temporary workers during the 2-year construction phase plus 15 permanent workers during the operational phase.

Umwelt (Australia) Pty Limited (Umwelt) has been engaged by ACEN to prepare this Scoping Report in support of the Proponent's State Significant Development application and request for the Secretary's Environmental Assessment Requirements (SEARs) for the Project.

1.2 Purpose and Objectives

This preliminary heritage constraints assessment report has been prepared to document the outcomes of preliminary desktop investigations conducted for the Project. Consistent with the requirements of Division 2 of the NSW *Environmental Planning and Assessment Regulation 2021*, it aims to support the Scoping Report prepared by Umwelt, and more broadly the proponent's request for SEARs.

It presents any already identified heritage sites, objects or places established via searches of existing and publicly available resources and databases, and other environmental and archaeological information accessible at the time the investigations were completed.

[1] The Project Boundary is the maximum spatial extent of potential land access defined by the boundaries of the Host landholder properties (i.e. all agreed lots owned by Host landholders). The Project Boundary is outlined in red in the supporting figures throughout this PHCA.

[2] The Project Area encompasses all land within and including the Project Boundary.

It presents recommended next steps formed on the basis of anticipated requirements for a project of this type and scale, and the preliminary research conducted to date. The assessment of constraints documented herein are preliminary only and any guidance is limited to likely future heritage assessment requirements and compliance obligations.

Accordingly, this report is not designed to fulfill the legislative and statutory requirements of the NSW *National Parks and Wildlife Act 1974* (NPW Act) or the NSW *Heritage Act 1977* (Heritage Act), however these requirements would be fulfilled in the future with the implementation of recommendations documented herein, and confirmation of these requirements following receipt of the SEARs.

The preliminary investigations referenced in this report are based on desktop searches and research, and independent verification of third-party results or interpretations did not occur. Aboriginal Heritage Information Management System (AHIMS) data was sourced from Heritage NSW and, in the absence of verification, reflects the accuracy of that AHIMS data, which can be limited. No field investigations and/or detailed site surveys, or Aboriginal stakeholder consultation was completed during the preparation of this report. These obligations would again be achieved in the future with the implementation of the recommendations documented herein, and confirmation of these requirements following receipt of the SEARs.

1.2.1 Contributing Authors

This report was prepared by the following contributing authors:

- Gemma Hopkins – Environmental Consultant.
- Andrew Crisp – Senior Archaeologist.
- Nathan Baker – Principal Environmental Consultant.

1.3 Project Overview

The Project Area is located near Mount Aquila, approximately 2.5 km southeast of Stuart Town and approximately 2 km northeast of Euchareena. Beyond these smaller townships, isolated rural residential properties surround the site (refer to **Figure 1.3**).

The Project Area is zoned RU1 Primary Production pursuant to *Dubbo Regional Local Environmental Plan 2022* (Dubbo Regional LEP 2022). Land surrounding the Project Boundary is zoned part C3 Environmental Management and part RU1 Primary Production. Other land use zones further afield in and around Stuart Town include R5 Large Lot Residential, RE1 Public Recreation, RE2 Private Recreation RU1 Primary Production, RU5 Village, SP2 Infrastructure and W1 Natural Waterways. Land zoning is shown in **Figure 1.4**.

The 'Main Western Railway' extends north to south and passes through the westernmost portion of the Project Area for approximately 500 m, between Store Creek and Farnham.

The Project Boundary comprises an area of approximately 6,806 ha. ACEN has identified an indicative Development Corridor of approximately 1,497 ha within which all Project infrastructure will be placed. Within this indicative Development Corridor, it is estimated that the actual land disturbance area (based on the current Project layout) would be in the order of 388 ha, or approximately 5–6% of the total Project Area.

The Project Area (all land within and including the Project Boundary) is situated at an elevation of approximately 600 to 800 m above sea level (ASL) (refer to **Figure 1.5**) and comprises a complex terrain, with steep arid hills to the eastern Project Boundary and rolling ridge lines to the west that are dominated by improved pasture used for grazing.

1.3.1 Indicative Design

The Project includes the installation, operation, maintenance and decommissioning of up to 48 WTGs, a BESS, ancillary civil and electrical engineering infrastructure, temporary construction facilities and permanent worker facilities. The key components of the Project include:

- Up to 48 (three blade) WTGs, with a maximum blade-tip height of 250 m above ground level.
- Power infrastructure providing connection to the existing 330 kV transmission line i.e. on-site substations/switchyards.
- Internal electrical reticulation network i.e. electrical connections between the proposed wind turbines and substation consisting of a combination of underground cables and overhead powerlines.
- Construction of a new/upgraded site access roads, intersection upgrades, and level rail crossing over the Main Western Railway Line.
- Other associated permanent infrastructure including hardstands, new/upgraded farm access tracks, secondary access point/s from public roads, operation, and maintenance buildings.
- A BESS (100 MW/200 MWh).
- Permanent meteorological monitoring masts.
- Temporary construction facilities including:
    - Construction compounds, site office buildings and storage areas.
    - On-site concrete batching plants for use during the construction phase.
    - Laydown areas used for wind turbine installation and storage of WTG components.
- Targeted road network upgrades to facilitate delivery of oversize and overmass (OSOM) WTG components to the Project Area as required.
- A permanent operations and maintenance facility for the Project.

Other Wind Farm Projects

The approved Uungula Wind Farm is located approximately 20 km north-east of the Project. Burrendong Wind Farm (being developed by Epuron) is situated approximately 15 km north-east of the Project and Kerrs Creek wind farm (being developed by Renewable Energy Systems (RES)) is situated directly south of the Project. The above-mentioned wind farm developments fall within or are situated close to the Central-West Orana Renewable Energy Zone (CWO REZ) (refer to **Figure 1.1**).

The Project Area encompasses lands within both the Wellington and Orange Local Aboriginal Land Council (LALC) Areas. The Nudgee LALC is located to the west of the Project.

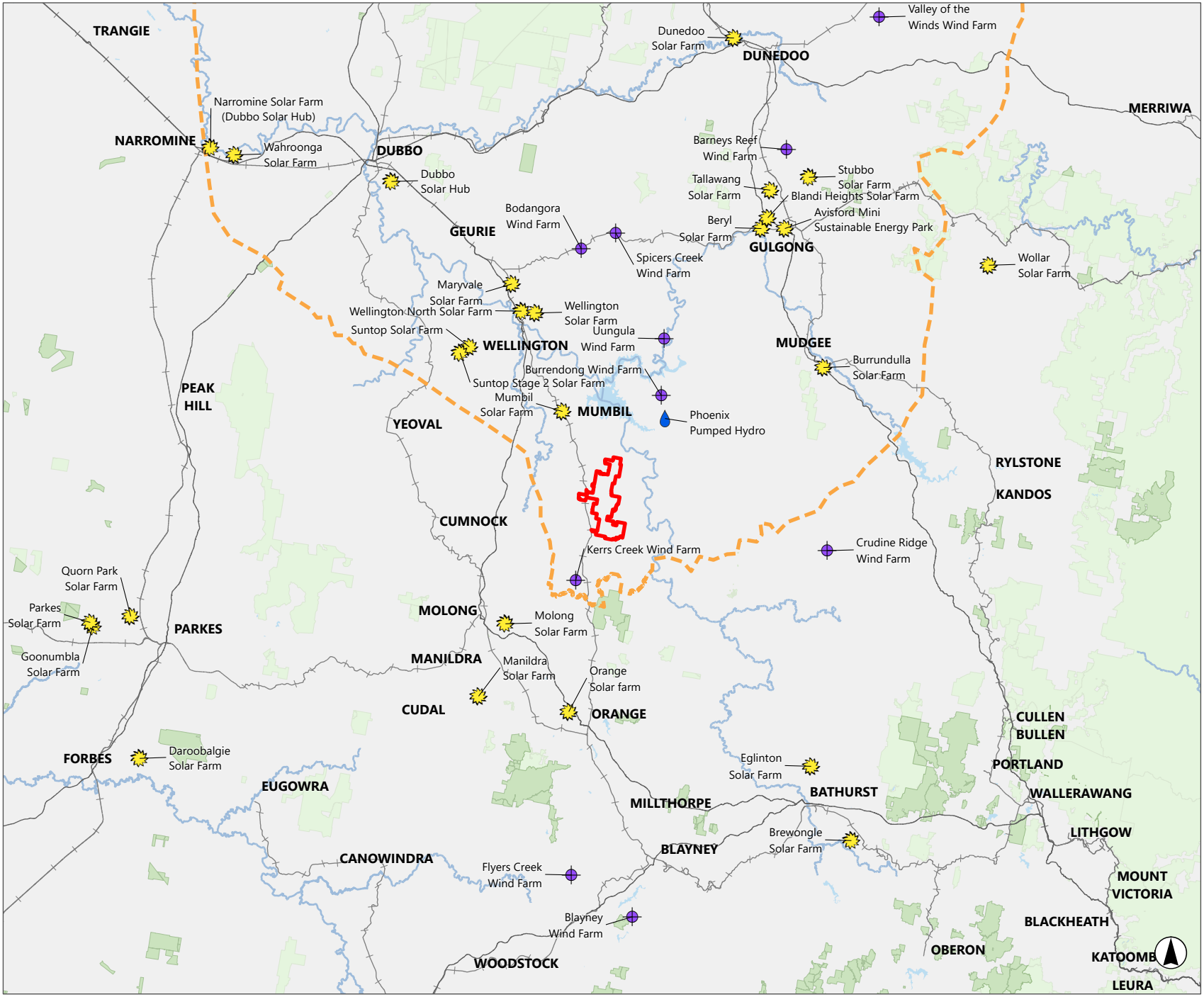
The Project's regional context, indicative layout, land-use zoning, elevations and other relevant features are identified in **Figure 1.2** to **Figure 1.5**.

1.4 Study Area

For the purpose of this assessment, the Study Area has been defined based on all land within and including the Project Boundary plus a buffer of 10 km. This area (i.e., the Project Boundary + 10 km) is the extent of all searches made for this assessment. Due to the relatively small number of registered Aboriginal sites located within or directly adjacent to the Project Area (which generally indicates a scarcity of prior surveys or studies), a 10 km buffer has been applied in order to gain an improved understanding of archaeological potential within the locality. Information beyond the Study Area has not been sought for this assessment.

FIGURE 1.1

Central-West Orana Renewable Energy Zone



Legend

- Indicative Central West Orana Renewable Energy Zone Boundary

Other Renewable Projects

- Solar
- Wind
- Pumped Hydro

- Project Boundary
- State Forest
- NPWS Estate
- Roads
- Railway
- Major Watercourse
- Waterbodies

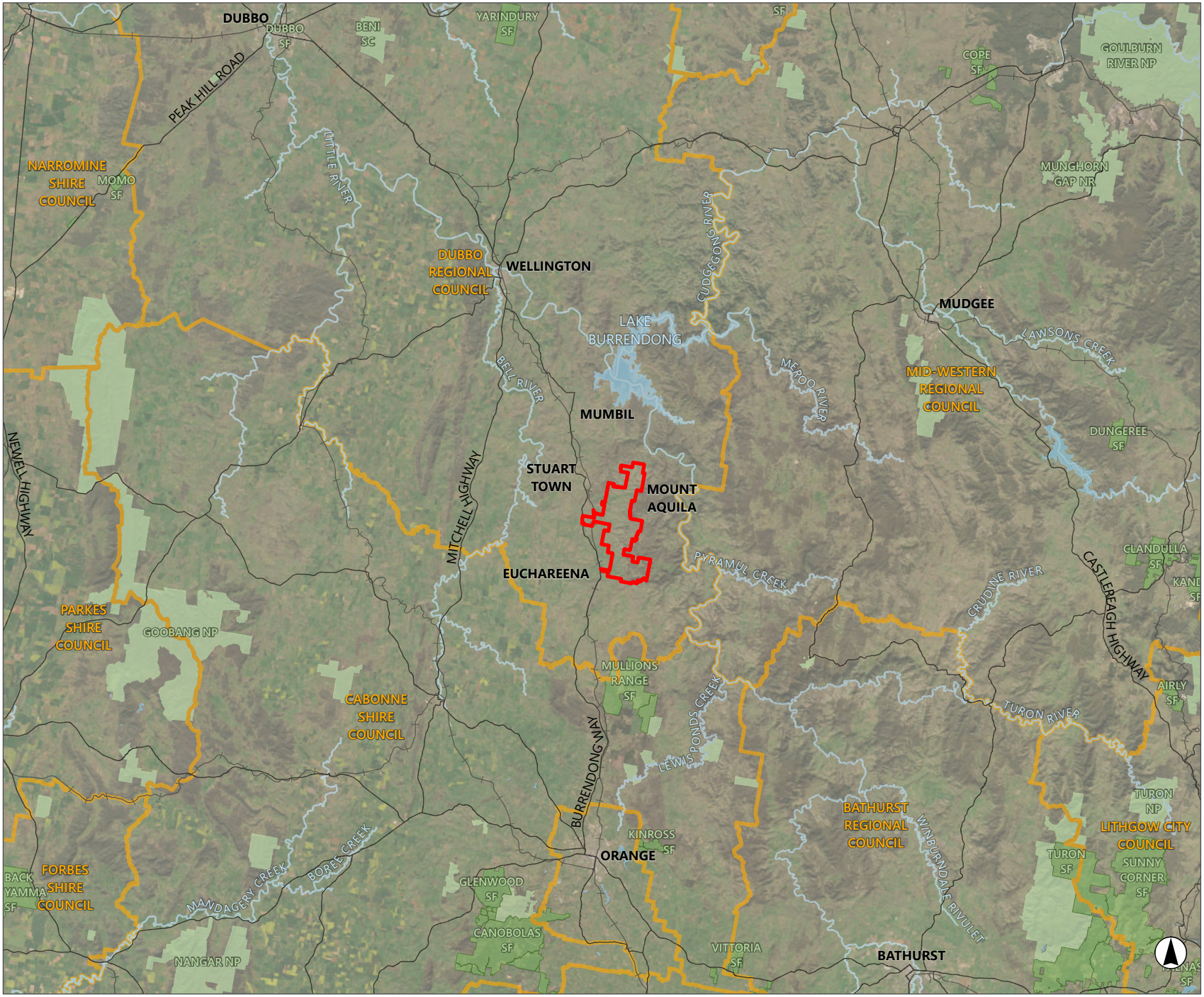
0 20 40
Kilometres

Scale 1:1,100,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

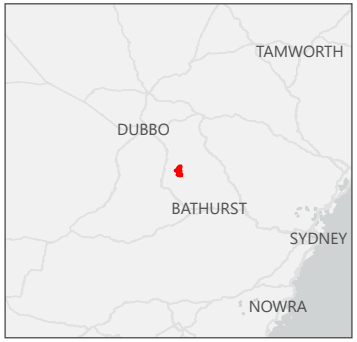
FIGURE 1.2

Regional Context



Legend

- Project Boundary
- Local Government Area Boundary
- State Forest
- NPWS Estate
- Roads
- Railway
- Major Watercourse
- Waterbodies



0 10 20
Kilometres

Scale 1:750,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

C:\USERS\CMISKELL\UMWELT (AUSTRALIA) PTY. LTD\21793 - 03 S&VF_R04\21793_R04_HERITAGECONSTRAINTS_V6_APRX - 21793_R04_0102_REGIONALCONTEXT

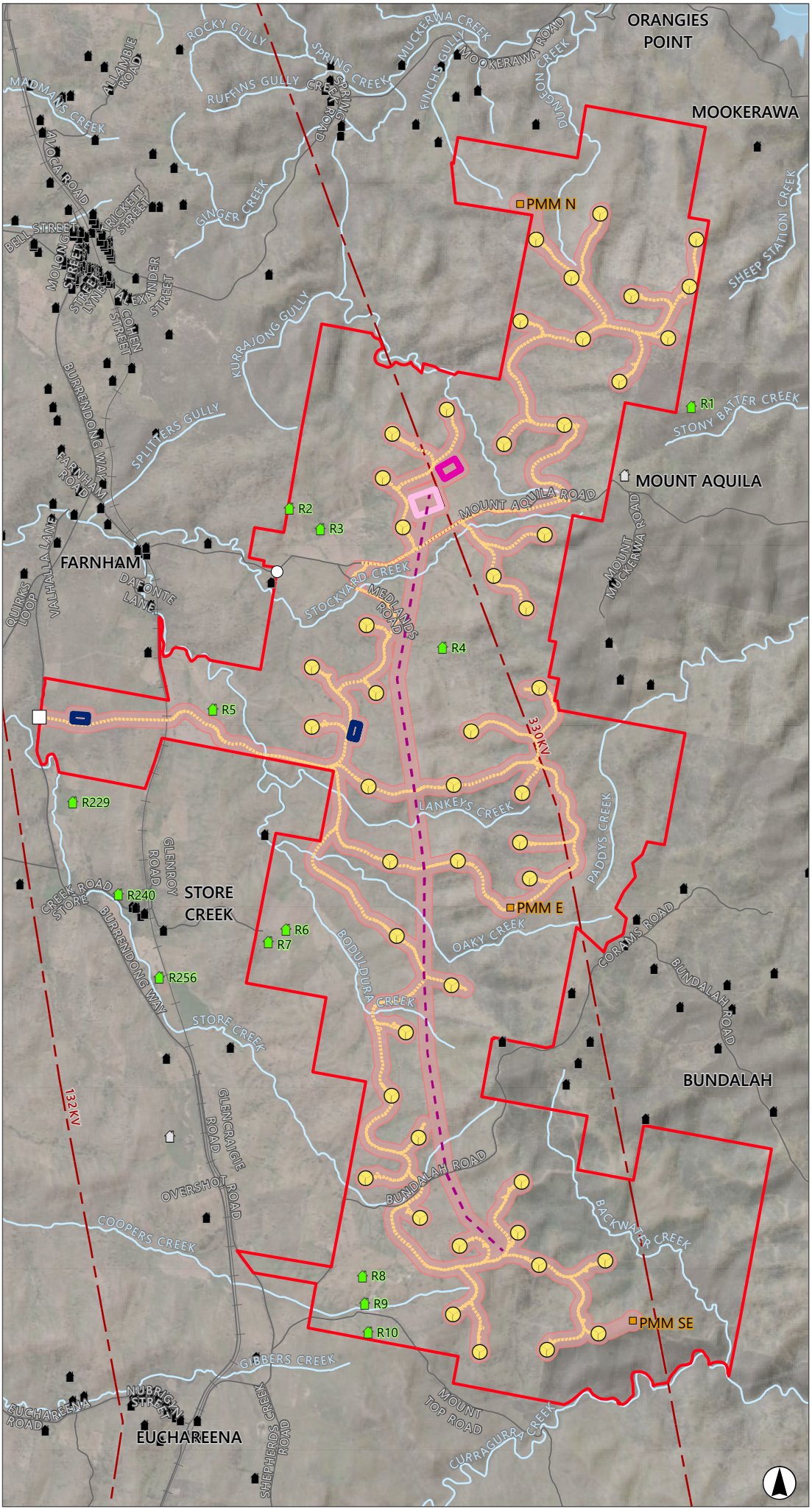


FIGURE 1.3

Indicative Project Layout

Legend

- Project Boundary
- Proposed BESS
- Proposed Compounds
- Proposed Substation
- Development Corridor
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Primary Access Point
- Secondary Access Point
- Proposed Transmission Lines
- Existing Electricity Transmission Line
- Railway Line
- Waterbody
- Named Watercourse

Existing Dwellings

- Host Dwelling (labelled with R#)
- Non-associated Dwelling

Proposed Dwelling

- Potential Future Dwelling

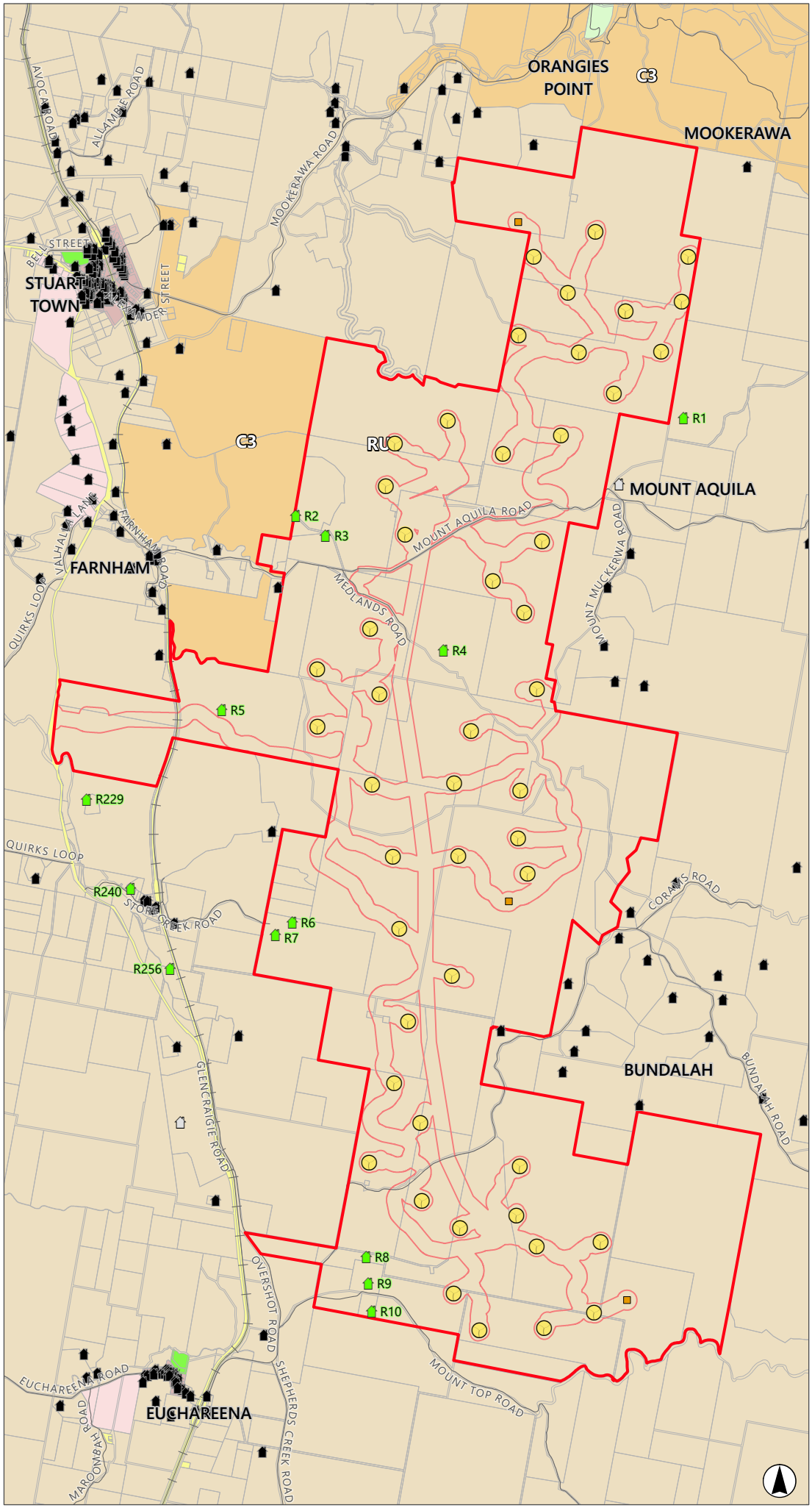
0 1 2
Kilometres

Scale 1:72,500 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

FIGURE 1.4

Land Zoning



Legend

- Project Boundary
- Development Corridor
- Lot Boundary
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Road
- Railway Line

Proposed Dwelling

- Potential Future Dwelling

Existing Dwellings

- Host Dwelling (labelled with R#)
- Non-associated Dwelling

Land Zones

- C3 Environmental Management
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU5 Village
- SP2 Infrastructure

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); NSW DPE (2022); ACEN (2022)

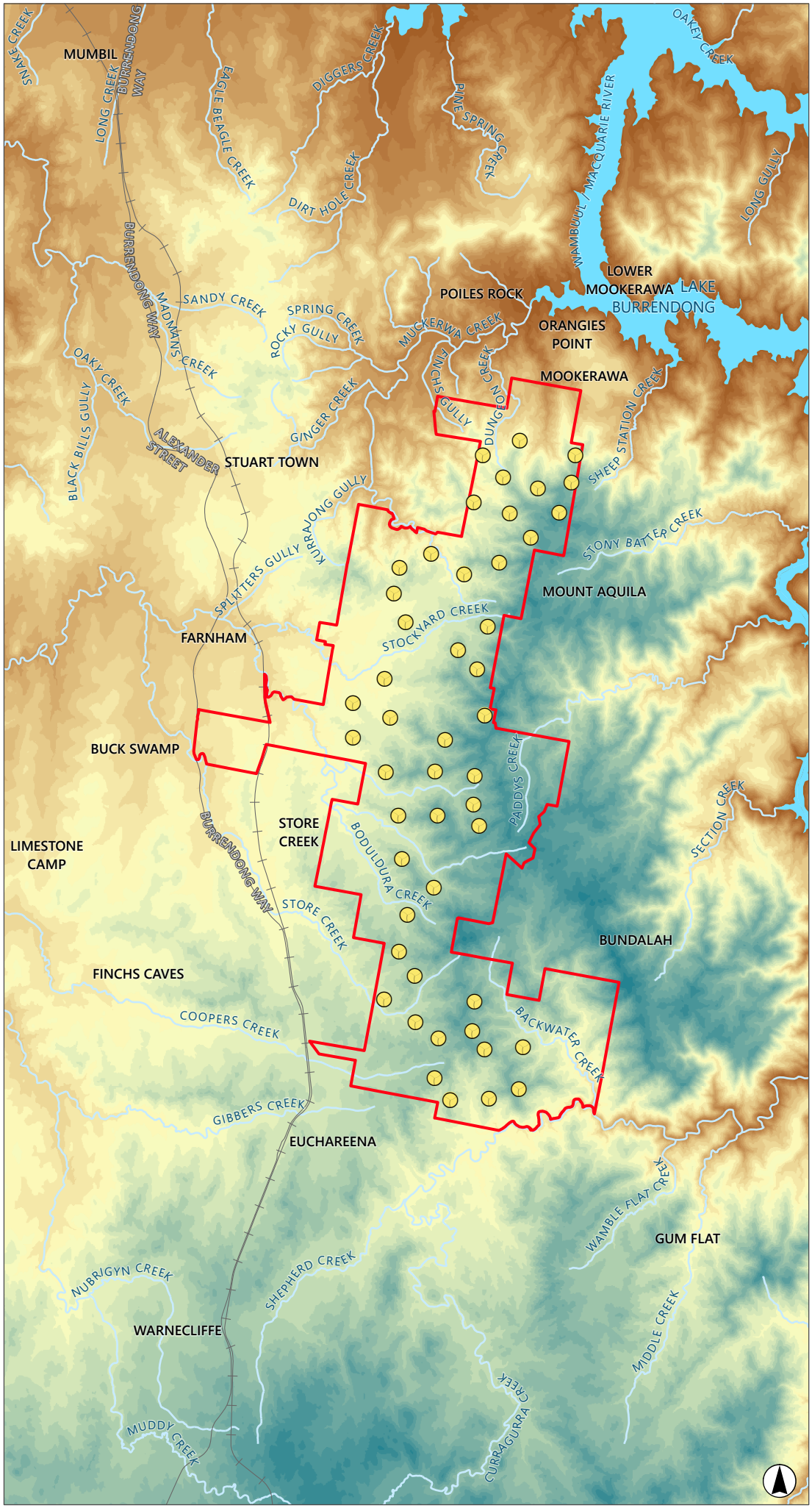


FIGURE 1.5

Elevations

Legend

- Project Boundary
- Waterbody
- Indicative Turbine Locations
- Road
- Railway Line
- Named Watercourse

Elevation (m)

- 320 - 340
- 340 - 360
- 360 - 380
- 380 - 400
- 400 - 420
- 420 - 440
- 440 - 460
- 460 - 480
- 480 - 500
- 500 - 520
- 520 - 540
- 540 - 560
- 560 - 580
- 580 - 600
- 600 - 620
- 620 - 640
- 640 - 660
- 660 - 680
- 680 - 700
- 700 - 720
- 720 - 740
- 740 - 760
- 760 - 780
- 780 - 800
- 800 - 820
- 820 - 840

0 2 4
Kilometres

Scale 1:125,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

2.0 Environmental Context

2.1.1 Vegetation

The Project Area falls across two Interim Biogeographic Regionalisation for Australia (IBRA) Bioregions and associated IBRA Sub-regions (refer to **Figure 2.1** below). The western portion of the Project Area falls within the NSW South Western Slopes Bioregion and the Inland Slopes Sub-region, while the eastern portion of the Project Area falls within the South Eastern Highlands Bioregion and the Hill End Sub-region.

The NSW South Western Slopes Bioregion is an extensive area of foothills and isolated ranges comprising the lower inland slopes of the Great Dividing Range extending from north of Cowra through southern NSW into western Victoria. The bioregion extends from Albury in the south to Dunedoo in the northeast. This bioregion is dominated by sub-humid climate characterised by hot summers and no dry season.

The South Eastern Highlands Bioregion lies just inland from the coastal bioregions of the South East Corner and the Sydney Basin, bounded by the Australian Alps and South Western Slopes bioregions to the south and west. The bioregion includes most of the Australian Capital Territory and extends south into Victoria. This bioregion is dominated by a temperate climate with significant areas in the north and south at higher elevations experiencing montane climate with milder summers.

The landscape within the Project Area is a combination of native vegetation and cleared agricultural landscape (modified pasture) and includes numerous small creek lines that feed into the nearby Macquarie River and Cudgegong River.

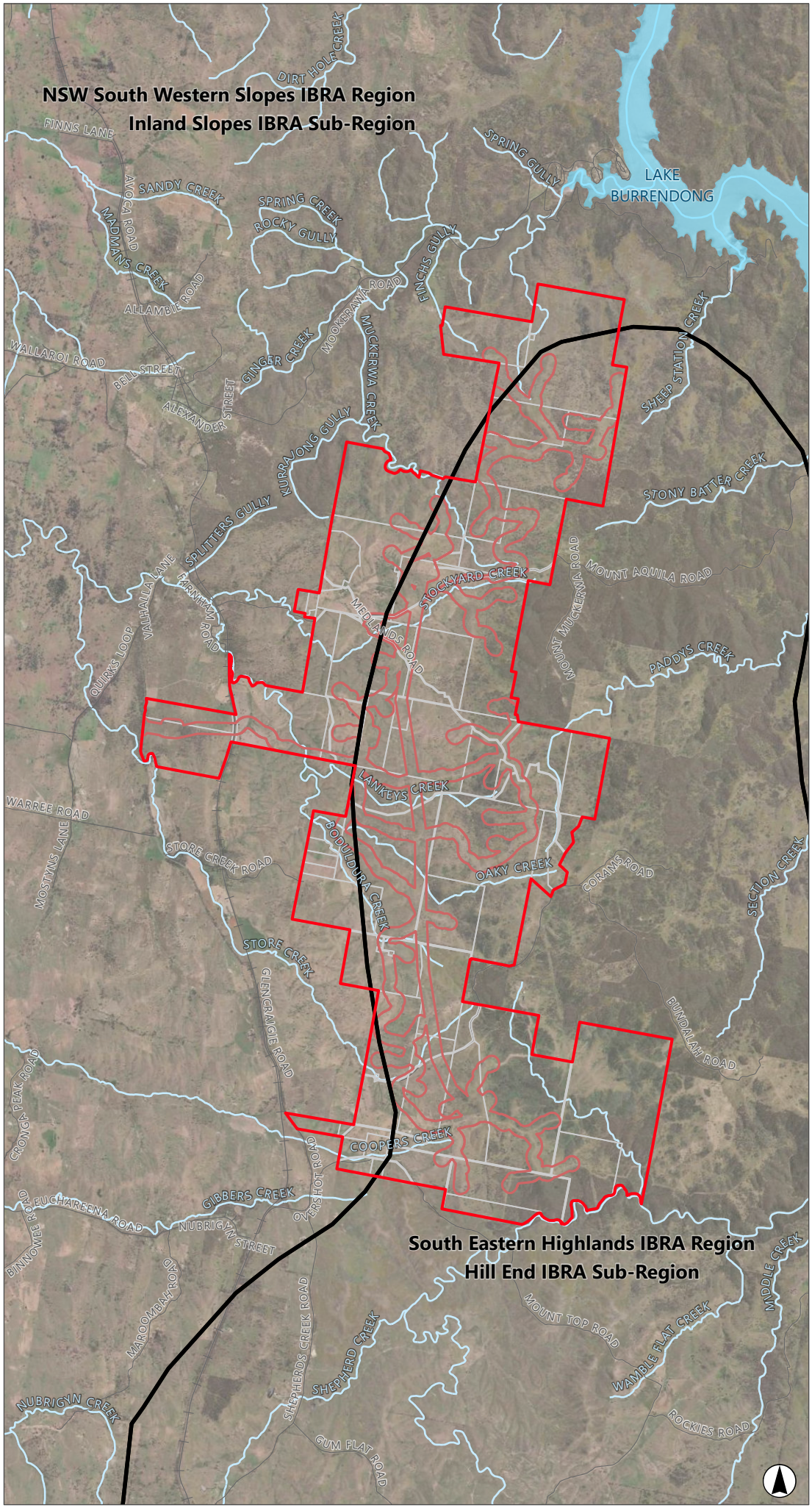


FIGURE 2.1

IBRA Bioregions and Sub-regions

Legend

- Project Boundary
- Development Corridor
- IBRA Sub-region Boundary (v7)
- Lot Boundary
- Waterbody
- Road
- Railway Line
- Named Watercourse

0 1 2
Kilometres

Scale 1:100,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

2.1.2 Geology and Soil Landscape

The Project is situated predominately within the Hill End Trough. The key geological units associated with the trough include:

- Chesleigh Formation (Sch).
- Cookman Formation (Scf).
- Undifferentiated (S-Dc).
- Cunningham Formation (Dcf).
- Dunmoogin Formation (S-Dcd).
- Lana Formation (S-Dcl).
- Guroba Formation (S-Dcg).

The parent rocks include quartz rich greywacke and slates, quartzite like greywacke and slate, siltstone, acid volcanics, felspathic and lithic greywacke and tuff, conglomerate, tuff, calcareous greywacke, greywacke conglomerate and shale. Of these raw materials, some (such as greywacke, tuff, and quartzite) can be suitable for the manufacture of stone artefacts and may have provided a useful resource for Aboriginal people within the area.

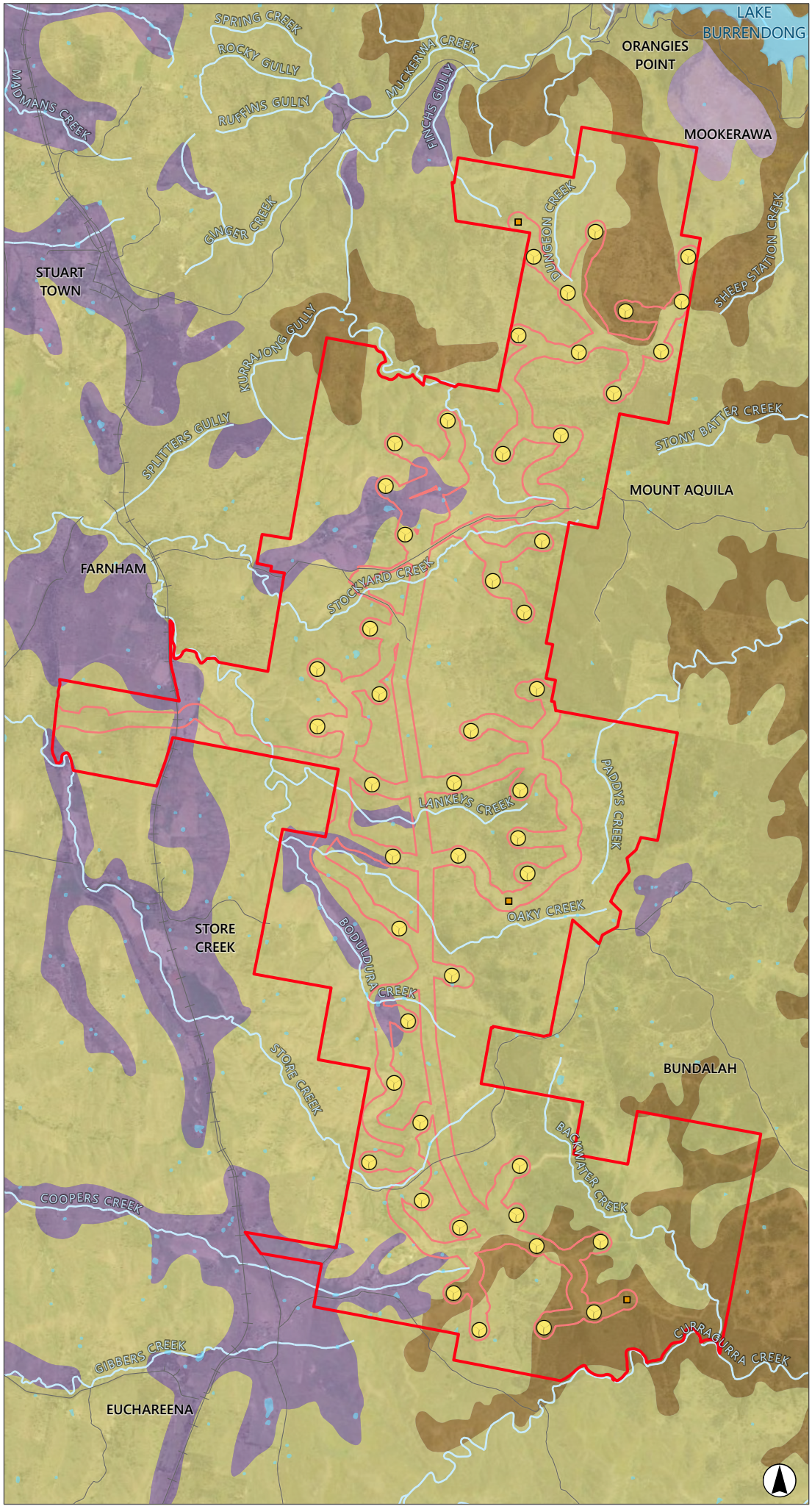
The soil landscape within the Project Boundary is predominately Mookerawa (SI5504mk), with areas of Mullion Creek (SI5504mu), Burrendong (SI5504bd) and Cudal (SI5504mk) (DPIE, 2020) (refer to **Figure 2.2**). The characteristics of these soil landscapes are detailed in **Table 2.1**.

Table 2.1 Soil Landscape Characteristics

Soil Landscape	Topography	Land Use	Soils	Parent Materials
Mookerawa	• Landscape is undulating to rolling low hills, with relief of 50–140 m. • Slopes of 8–30%, but generally less than 15%. • Drainage lines are 800–3000 m apart and often severely gullied.	• Extensively cleared. • Grazing native pasture. • Small areas of improved pasture.	• Topsoil and subsoil comprise of Yellow Soloths and Red Podzolic Soils. • Topsoil can reach up to 25–40 cm depth on average. • Subsoil with Red Podzolic Soils are subject to sheet erosion when cleared of native vegetation.	In situ and alluvial-colluvial materials derived from parent rock.
Mullion Creek	• Landscape is undulating rolling low hills, with relief of 40–60 m (sometimes reaching 80 m). • Slopes of 3–6% and sometimes up to 12%. • Drainage lines are generally spaced 200–500 m apart.	• Grazing on improved and native pastures. • Some occasional cropping, especially for fodder.	• Topsoil and subsoil comprise of Yellow Soloths/Yellow Solodic Soils and Red Podzolic Soils. • Topsoil can reach up to 14–40 cm depth on average. • Subsoil with Yellow Soloths/Yellow Solodic Soils are very susceptible to gullying erosion and some areas have severe gully erosion.	In situ and alluvial-colluvial materials derived from parent rock.
Burrendong	• Landscape comprises rolling to steep hills with rocky slopes. • Slopes range from 21–50%. • The main drainage channels are fixed and spaced from 250–800 m apart.	• Grazing native pasture.	• Topsoil and subsoil comprise of Yellow Soloths, Skeletal Loams and Red Podzolic Soils. • Topsoil can reach up to 15–30 cm depth on average. • Subsoil with Red Podzolic Soils are subject to sheet erosion when cleared of native vegetation.	In situ and alluvial-colluvial materials derived from parent rock.
Cudal	• Landscape is undulating low rises. Basalt, with relief of 20–80 m.	• Cropping. • Grazing on improved pastures.	• Topsoil and subsoil comprise of Euchrozems. • Topsoil can reach up to 10 cm in depth. • Subsoil with Euchrozems have low erosion hazard.	In situ and alluvial-colluvial materials derived from parent rock.

FIGURE 2.2

Soil Landscapes



Legend

- Project Boundary
- Development Corridor
- Waterbody
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Road
- Railway Line
- Named Watercourse

Soil Landscapes of Central Eastern NSW

- Burrendong
- Cudal
- Mookerawa
- Mullion Creek

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); DPIE (2022);ACEN (2022)

2.1.3 Riparian Zones and Waterways

The Macquarie River runs parallel to the Project Boundary, approximately 1.5 km from the northern boundary and 5 km from the eastern boundary. Lake Burrendong is located approximately 8 km north of the Project Boundary. Lake Burrendong has been substantially modified to establish a large dam, involving modification to the Macquarie and Cudgegong Rivers.

Figure 2.3 illustrates the riparian land identified in the Dubbo Regional LEP 2022 and the waterways within proximity to the Project.

During the Scoping Report, the stream order data (Strahler) for these watercourses within the Project Area was obtained to provide further information on the nature of these watercourses and the associated implications for resource availability for Aboriginal people, refer **Figure 2.4**. This stream order data was utilised during the Scoping stage to situate WTG and ancillary infrastructure outside identified buffers, where possible.

Water availability is a major influence on the range of resources available and the suitability of an area for Aboriginal occupation. Water resources are key for the identification and interpretation of areas of occupation, environment, archaeological potential and depositional formation. All deterministic models must be understood in the project-specific context (disturbance level, catchment type, soil landscapes etc), however, in essence the higher the Strahler order (3+), the larger the watercourse, the more likely there is perennial water, the higher density of resources and the higher the archaeological potential.

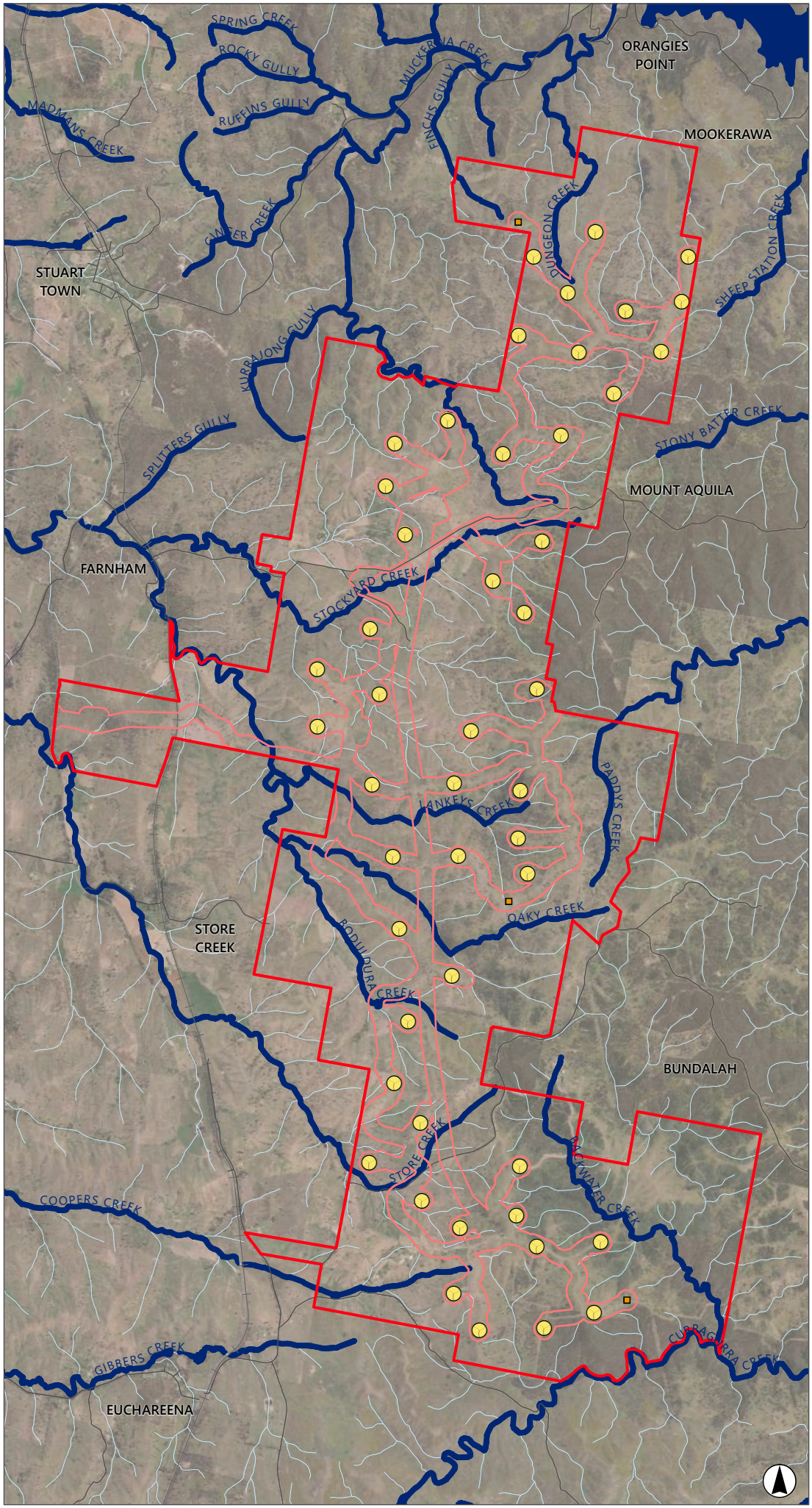


FIGURE 2.3

Riparian Zones and Waterways

Legend

- Project Boundary
- Development Corridor
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Riparian Zones - Biodiverse Riparian Land (Biodiversity Values v13.5)
- Railway Line
- Un-named Watercourse

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

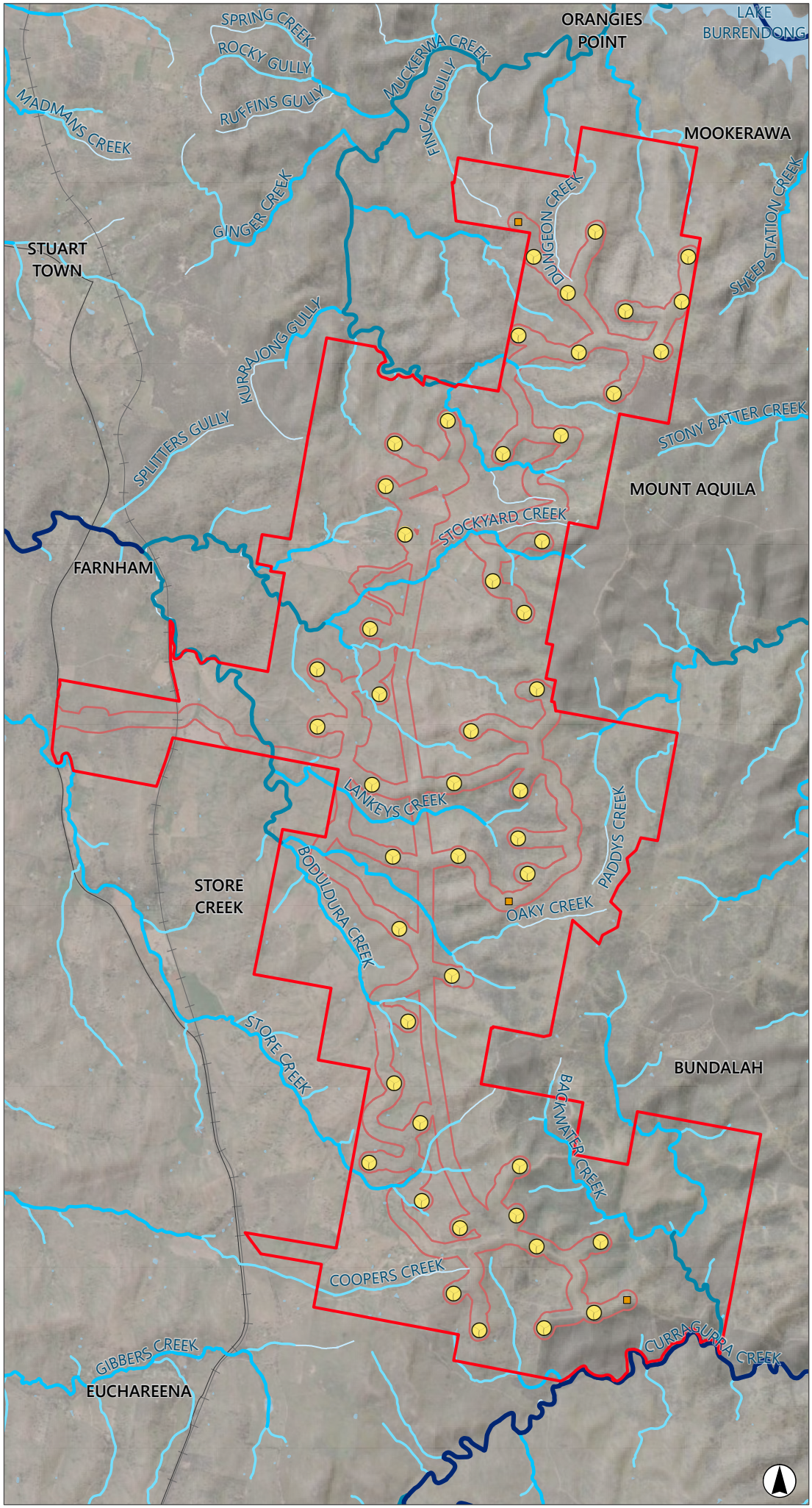


FIGURE 2.4

Strahler Stream Order

Legend

- Project Boundary
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Waterbody
- Named Watercourse
- Road
- Railway Line

Strahler Stream Order

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream
- 4th Order Stream
- 5th Order Stream or Higher

0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); NSW RFS (2022); ACEN (2022)

2.2 Statutory Context

This preliminary heritage constraints assessment report was prepared in the context of the following key legislation:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984.*
- *Environmental Planning and Assessment Act 1979* (EP&A Act).
- *Native Title Act 1993.*
- *Aboriginal Lands Right Act 1983.*
- *Crown Lands Management Act 2016.*

It is noted that no native title schedule, applications, determinations or Indigenous Land Use Agreements (ILUA) were identified within the Project Area. NC2018/002 is the closest application and is situated approximately 18 km east of the Project.

3.0 Database Searches

Umwelt conducted the desk-top heritage investigations utilising publicly available resources to map and then provide an indication of potential heritage constraints that may occur within the Project Area.

A high-level Aboriginal heritage assessment was then conducted to provide an overview of identified heritage constraints and the associated risk, based on a review of relevant databases and subsequent analysis of identifiable landscape features. Historic (Non-Aboriginal) heritage was also considered.

This desktop scope considered the following publicly available online databases:

- AHIMS Web Services, accessed on 6 December 2023.
- Australian Heritage Database, accessed on 6 December 2023.
- NSW State Heritage Inventory (SHI), accessed on 6 December 2023.
- Schedule 5 of relevant Local Environmental Plans (LEPs) for the Dubbo, Cabonne and Mid-Western LGAs,[3] accessed on 6 December 2023.

In addition to these searches the heritage assessment provides an overview of matters relating to the EPBC Act, Heritage Act, and *National Parks and Wildlife Act 1974* noting:

- The EPBC Act provides protection of the environment from actions proposed to '*have the potential to significantly impact on Matters of National Environmental Significance or the environment of Commonwealth land*'. Approval is required by the Commonwealth Minister for the Environment for actions that may have a significant impact on Matters of National Environmental Significance (MNES). MNES under the Act relating to heritage include World Heritage Properties and National Heritage Places.
- The Heritage Act is administered by Heritage NSW and aims to protect the cultural and natural history of NSW with emphasis on historic (European) heritage items, including places, buildings, works, relics, moveable objects, or precincts with significance to the State or a local area. It provides protection for surface and sub-surface relics and for heritage items of state significance listed on the SHR. The Heritage Act defers to local planning instruments under the EP&A Act for the protection of items of local significance.
- 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 area, and the protection of certain fauna, native plants, and Aboriginal objects. Any proposed development would have to assess Aboriginal cultural heritage values at the site location. Under the provisions of Section 4.4.1 of the EP&A Act, a Section 90 Aboriginal heritage impact permit is not required for State Significant Developments.

[3] Based on the nominated Study Area (Project Boundary + 10 km buffer). LGA boundaries are shown in **Figure 1.2**.

- LEPs guide planning decisions for local government areas through zoning and development controls. Local heritage items and heritage conservation areas are identified in Schedule 5 of the three relevant LEPs, comprising the following:
    - Dubbo Regional Local Environmental Plan 2022.
    - Cabonne Local Environmental Plan 2012.
    - Mid-Western Regional Local Environmental Plan 2012.

The outcomes of preliminary desktop investigations including searches of the above-mentioned existing and publicly available resources and databases, and other environmental and archaeological information accessible at the time the investigations were completed, are provided in **Section 3.1** below.

3.1 Search Results

3.1.1 Environment Protection and Biodiversity Conservation Act 1999

Approval is required by the Commonwealth Minister for the Environment for actions that may have a significant impact on MNES. MNES under the Act include the following:

- World Heritage Properties.
- National Heritage Places.
- Ramsar Wetlands.
- Threatened species or ecological communities listed in the EPBC Act.
- Migratory species listed in the EPBC Act.
- Commonwealth marine environment.
- Nuclear actions.
- Great Barrier Reef Marine Park.
- A water resource, in relation to coal seam gas development and large coal mining development.

The Australian Government has formally endorsed the NSW Biodiversity Offsets Scheme (BOS) through the EPBC Act Condition-setting Policy. This Bilateral Agreement only covers Major Developments (where the NSW Government is the consent authority) as it is an agreement between the NSW and Australian Governments.

A search of the EPBC Protected Matters Search Tool (PMST) was undertaken on 6 December 2023 within a 10 km buffer measured from the Project Boundary. The search results are summarised below in **Table 3.1**.

Table 3.1 Matters of National Environmental Significance (MNES)

MNES	Relevance to Development
World Heritage Properties	0
National heritage properties	0
Wetlands of international importance	4
Listed Threatened ecological communities	3
Listed Threatened species	50
Listed Migratory species	10
Commonwealth marine area	0
Commonwealth Lands	3
The Great Barrier Reef Marine Park	0

Four wetlands of international importance are indicated in the search as their tributaries are located within 10 km of the Project Boundary, but the wetlands themselves are between 200 and 1,000 km downstream of the Project.

3.1.2 Australian Heritage Database

A search of the World Heritage List, National Heritage List and Commonwealth Heritage List on the Department of Agriculture, Water and Environment's website was undertaken on 6 December 2023. No items were identified within 10 km of the Project Boundary that were listed as World, National or Commonwealth heritage.

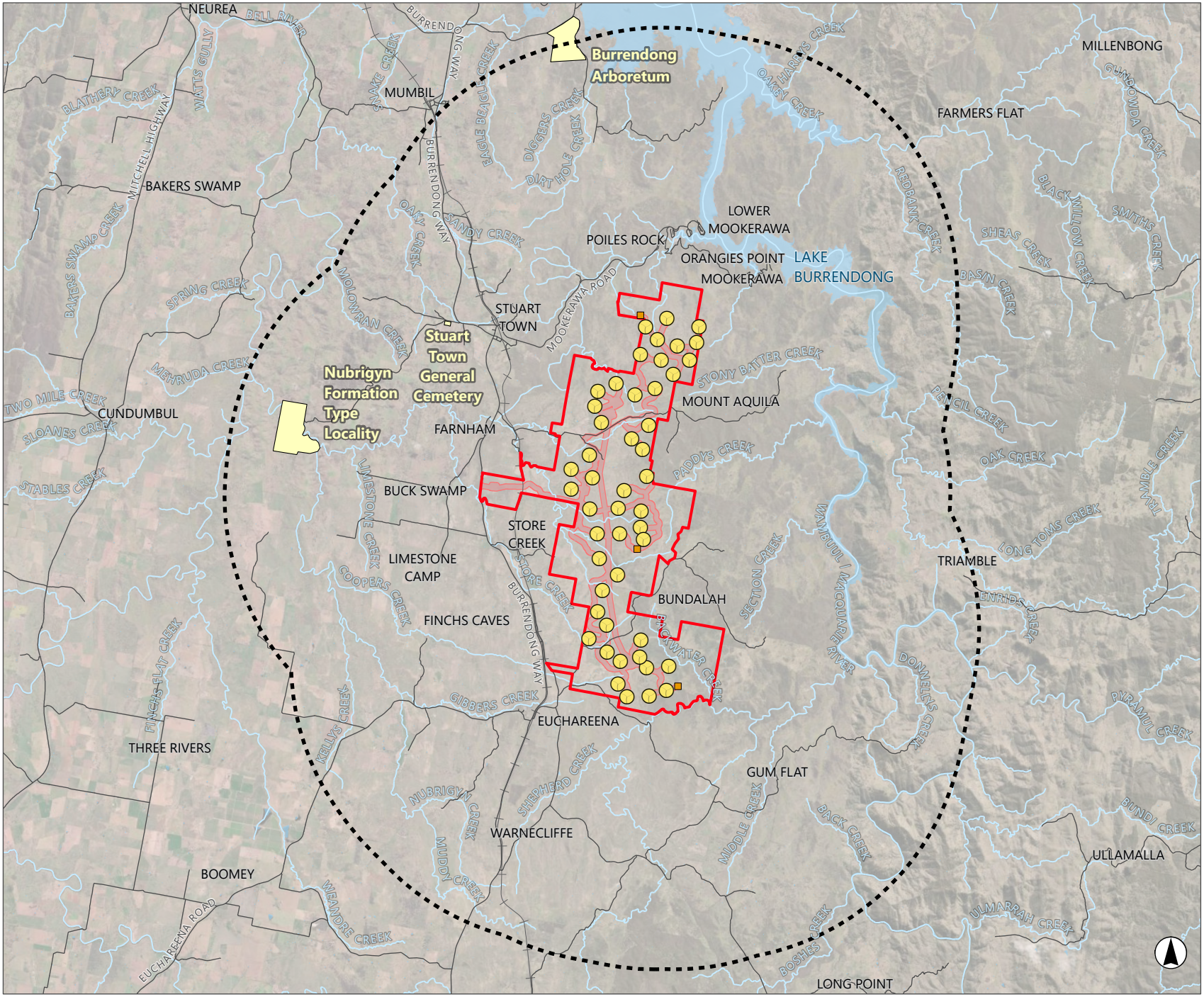
It is noted that three (3) items were identified within 10 km of the Project Boundary that are listed in the Register of the National Estate. This register was closed in 2007 and is no longer a statutory list. Refer to **Table 3.2** and **Figure 3.1**. Two of these sites were nominated to the register for their natural (rather than cultural) heritage values. The Stuart Town General Cemetery was nominated based on its historic heritage values.

Table 3.2 Register of the National Estate Sites within 10 km of the Project

Name	ID	Class	Status
Nubrigyn Formation Type Locality	503	Natural	Registered
Burrendong Arboretum	500	Natural	Registered
Stuart Town General Cemetery	101000	Historic	Indicative Place

FIGURE 3.1

Register of the National Estate Sites within 10km of the Project



Legend

- Project Boundary
- Development Corridor
- 10km Buffer from Project Boundary
- Register of the National Estate Sites within 10 km of the Project
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Railway Line
- Named Watercourse
- Waterbody

0 2.5 5
Kilometres

Scale 1:210,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

3.1.3 NSW State Heritage Inventory (SHI)

A search of the NSW SHI was undertaken on 6 December 2023 for the Study Area.

The results of the search indicated that there is no State heritage listed items within the Project Boundary and two State heritage listed items within 10 km of the Project Boundary. **Table 3.3** provides detail on these heritage items, which are also illustrated on **Figure 3.2**.

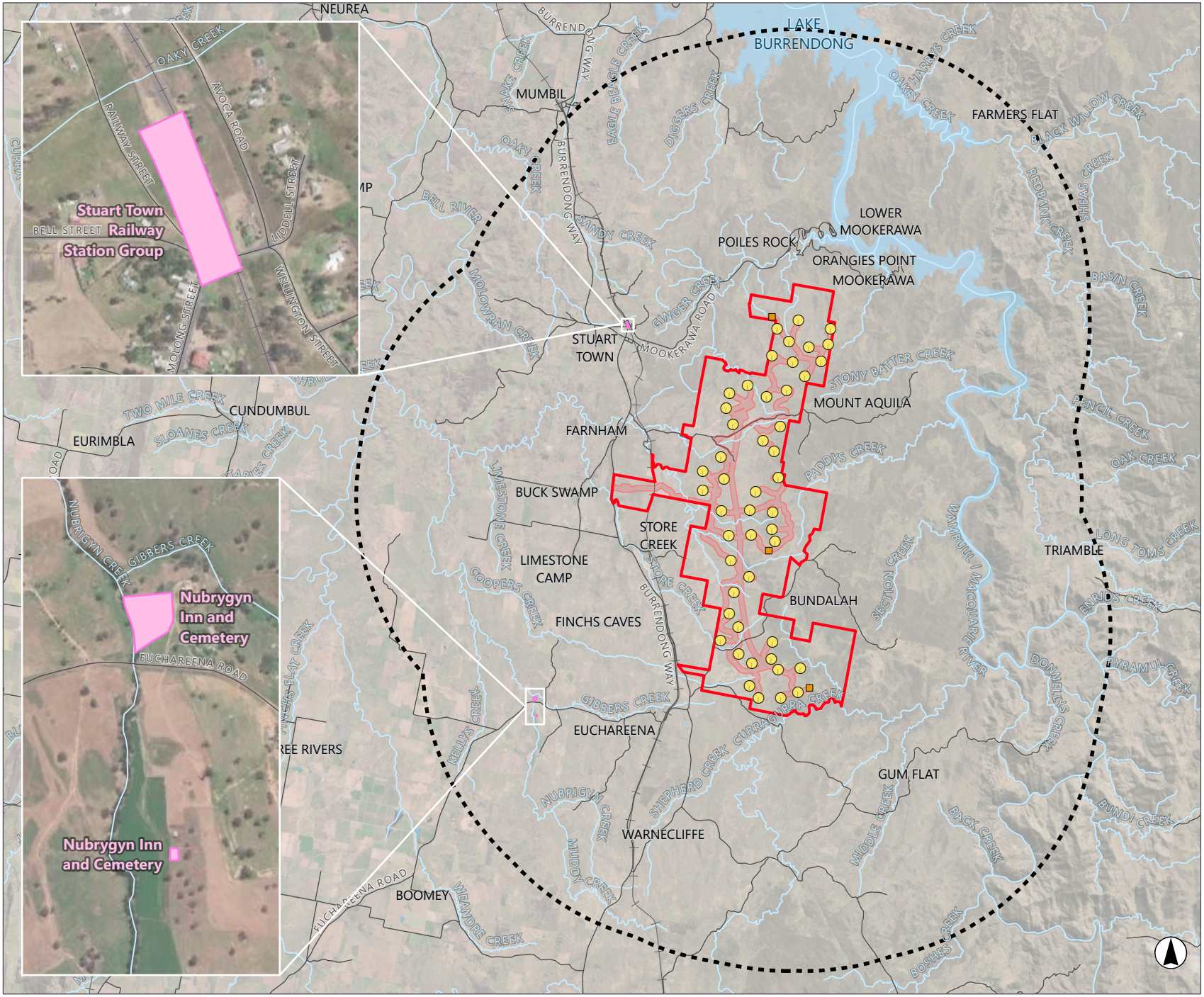
Table 3.3 State Heritage Items within 10 km of the Project Boundary

Name	Listing No.	Listing Description
Nubrygyn Inn and Cemetery	01976	The site of Nubrygyn Inn and Cemetery is of state significance for its role in the earliest frontier expansion beyond Bathurst into the Central West. It was originally a 'halting' place on the 1823 road for the soldiers and convicts travelling from Bathurst to the remote Wellington convict farm. The 'halting place' utilised permanent water in the adjacent Nubrygyn Creek and a surviving gum tree where convicts were chained while resting.
Stuart Town Railway Station Group	01253	Stuart Town is one of the best third-class country stations on the NSW railway system. The station building is of high quality with good detail and the retention of a very interesting entrance porch, and the setting retains ancillary buildings, signs and platform with a good example of a typical early gatehouse that were seen throughout NSW. With Wellington this station is an important reminder of the early line through the area which showed confidence and pride in railway construction by the substantial quality of the buildings not seen on the later lines that developed.

Impact to the Stuart Town Railway Station Group and Nubrygyn Inn and Cemetery is unlikely, due to the 3 km and 6 km respective distance offsets between the sites and the Project Boundary, however, given the nature of the Project, consideration will be given to indirect visual impacts.

FIGURE 3.2

State Heritage Items within 10km of the Project



Legend

- Project Boundary
- Development Corridor
- 10km Buffer from Project Boundary
- State Heritage Sites within 10km of the Project
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Railway Line
- Named Watercourse
- Waterbody

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022)

3.1.4 Schedule 5 to the Relevant Local Environmental Plans

Dubbo Regional LEP 2022, Mid-Western Regional LEP 2012 and Cabonne LEP 2012 were reviewed on 6 December 2023, for any listed heritage items or heritage conservation areas within 10 km of the Project Boundary.

The results of the search indicated that there are no local heritage items within the Project Boundary. A total of 22 locally listed heritage items were identified within 10 km of the Project Boundary. Two of the locally listed heritage items are also listed in the State Heritage Inventory (refer to **Section 3.1.3** above). **Table 3.4** provides the listing details for these 22 heritage items, which are also illustrated on **Figure 3.3**.

Given the nature of the Project (including the visibility of turbines), the Project EIS will require a detailed assessment of potential visual impacts to any listed items in the vicinity of the Project Area. This will include, but not be limited to, the 'Stuart Town gold mining area and common' which is located immediately adjacent to the northeastern Project Boundary, with further consideration given to the potential for indirect impacts during detailed design.

Table 3.4 Local Heritage Items within 10 km of the Project Boundary

Name	LEP	Listing No.	Listing Description in the SHI and LEP
Nubrygyn Inn and Cemetery	Dubbo Regional LEP 2022	I241	Refer to **Section 3.1.3** for this heritage item description.
Australia Hotel (former Carrington Hotel)	Dubbo Regional LEP 2022	I320	The hotel was built during the 19th Century during a period of great expansion and development in the village of Stuart Town associated with the development of the gold mines and later the railway and was built using local bricks the hotel. The original details include two stories and a wide verandah which originally had cast iron balustrades and posts with brackets. Hotels have always been of immense social importance to developing areas: built to serve the community they provided a social centre for working men and a meeting place for the townspeople and travellers. A full description of the heritage item can be found here.
Beehive Classroom, Euchareena Public School	Dubbo Regional LEP 2022	I245	The place is of historical interest as the building was provided by the Department of NSW Government Railways at the beginning of the 20th Century. Interesting aesthetically due to its unusual roofline. Socially significant to the community as part of the local Primary School and of great rarity value being one of only two of the type remaining in NSW. A full description of the heritage item can be found here.
Boehme's Hall	Dubbo Regional LEP 2022	I314	Historically the hall has strong connections to the gold mining days of Stuart Town in the days when it was known as Ironbarks. The hall has been socially significant and an integral part of the community and their entertainment and activities. Aesthetically interesting and reflecting early building forms, the building was erected using materials such as rough sawn slabs for walls and bush poles for the roof structure available at the time. A full description of the heritage item can be found here.
Burrendong Arboretum	Dubbo Regional LEP 2022	I292	The Burrendong Arboretum is important for its living collection of about 2,000 species of native Australian plants. These include 253 species which are rare, endangered, or vulnerable, of which at least eighteen are in serious danger of disappearing from the wild state. The arboretum was included in a core network of Botanic Gardens recommended for Australia to ensure a full range of habitats for cultivation of the Australian flora. The living collections in the arboretum are important for maintenance of genetic and horticultural stock of Australian native plants, particularly rare and endangered species, and for the scientific study of, and education about, the Australian flora. It is also an important recreational area.

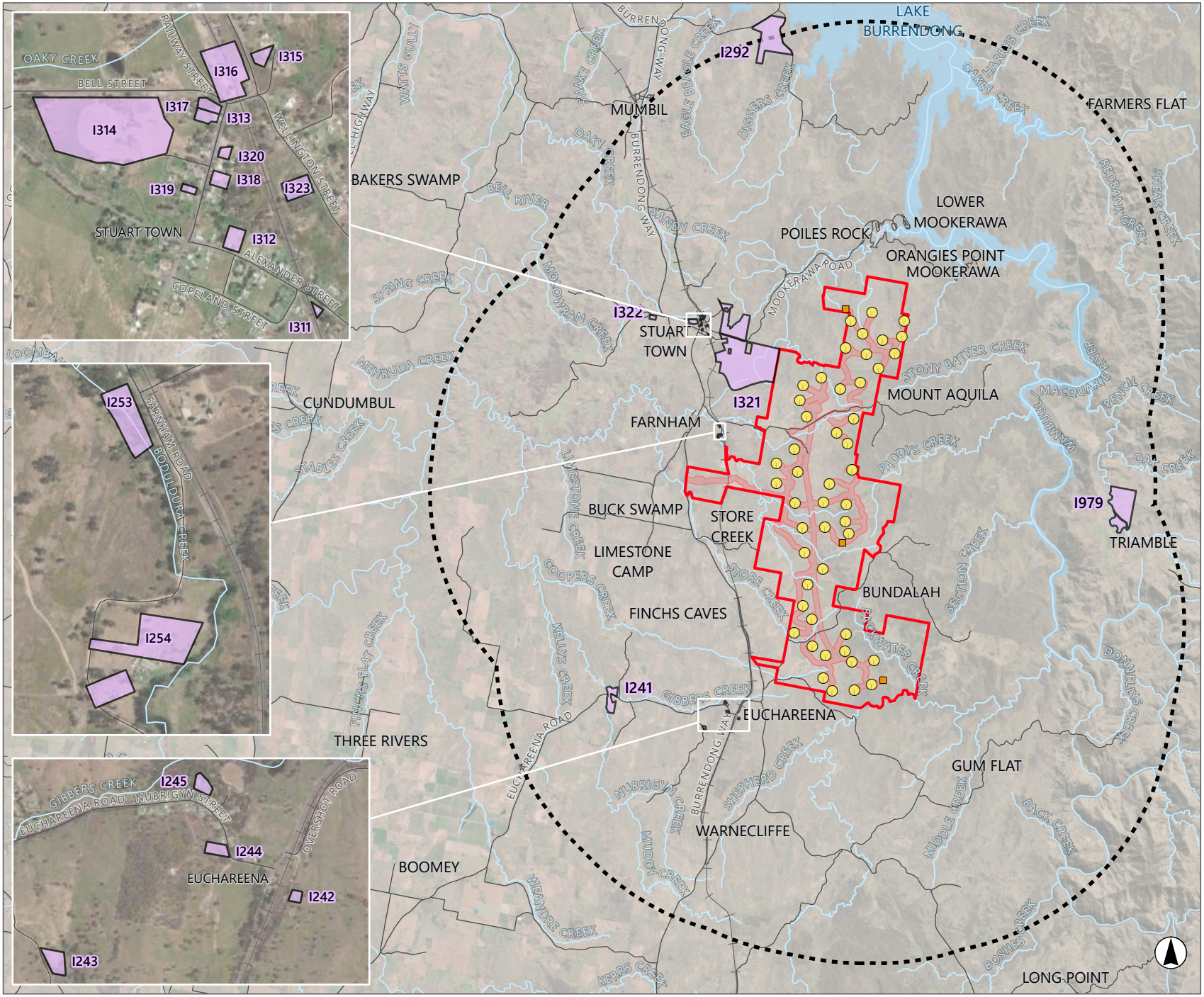
Name	LEP	Listing No.	Listing Description in the SHI and LEP
Crick's Store	Dubbo Regional LEP 2022	I313	The site is historically significant as a remnant of the period when Stuart Town was a flourishing gold mining town, architecturally interesting with the combination of the two materials and the two different styles and the unpainted weathered timber fits well into the surroundings. The building is valued by the community for the long association the owner had with the town through the business.
Euchareena General Cemetery	Dubbo Regional LEP 2022	I243	Historically significant due to the cemetery being the resting place of many of the early settlers who were prominent in the development of the district, there are many aesthetically important headstones within the cemetery many dating from the Victorian period as well as the more restrained designs from later periods and the cemetery has a strong social and emotional connection to the community as it is the resting place of many members of local families.
Farnham Post Office and out buildings	Dubbo Regional LEP 2022	I253	The Post Office is important socially as a centre of community gathering place, materially significant and rare in its construction of bricks finished with pise external plaster, while the building was a centre of social gathering for the district providing both hotel and postal services.
Nicholls Farm Buildings	Dubbo Regional LEP 2022	I254	Historically interesting as a remainder of original farm buildings built at a time of early expansion and development and technically important with their construction using slab timber logs from untrimmed timber. These buildings are prime examples of settlers making use of materials readily available to meet their needs.
Post office (former Railway Hotel)	Dubbo Regional LEP 2022	I317	The Post Office building is an historically important remnant of the period when Stuart Town was a busy and vibrant gold mining town with a much larger population. This timber building is typical of the period when it was erected using materials and a style which were available and popular at the time and were chosen to meet local needs. The Post Office has great social significance both with its origin as a gold mining town hotel and presently as the centre of local gatherings, arts festivals, and communications.
Railway Gatekeeper's Cottage	Dubbo Regional LEP 2022	I311	The site is historically significant as one of the early Railway gatekeepers' cottages much in use when the Western Railway line was busy and there were no red lights at crossings, it retains the early character with its utilitarian design which is rare and existed only as a Railway cottage style and is valued by the local community as an integral part of the railway.
Residence and artist studio (former Stuart Town Bakery)	Dubbo Regional LEP 2022	I319	The bakery is historically important for the connection to the period when Stuart Town was a bustling and busy commercial hub for the farm sector while technically it shows the use of multiple materials to erect the three buildings and the original Bakery and retail uses are capable of interpretation.

Name	LEP	Listing No.	Listing Description in the SHI and LEP
St Brigid's Catholic Church (former)	Dubbo Regional LEP 2022	I242	Outstanding historic building with a powerful townscape impact. One of only thirteen nineteenth century buildings made of exposed stone. Magnificent stone building typical Ecclesiastical Gothic style.
St John the Baptist Catholic Church	Dubbo Regional LEP 2022	I315	The Catholic Church of St John the Baptist in Stuart Town has aesthetic significance as a pleasing and intact example of a Federation Gothic style country church, constructed of local bricks and provides a substantial landmark from the once large and thriving gold mining village of Stuart Town and it has strong social significance to the community of Stuart Town as a symbol of the Catholic presence in Stuart Town for more than one hundred years.
St Michael and All the Angels Anglican Church and Convict Bell A	Dubbo Regional LEP 2022	I323	St Michael and All the Angels Anglican Church is an attractive example of a small country church. Attractively sited in the valley it shows the influence of the Gothic style for small churches. The building has been adapted and modernised to suit the changing needs of the community. Historically important the Stuart Town Anglican Church has been an integral part of an active Anglican community for more than one hundred years. The bell which hangs in St Michael and All the Angels has immense historic importance being one of three bells from the Wellington Valley first settlement in 1823. St Michael and All the Angels has a strong and involved congregation whose many social and philanthropic activities revolve around their church.
St Thomas Anglican Church	Dubbo Regional LEP 2022	I244	Vernacular timber slab Church that demonstrates the once significant technology of timber slab construction that is rarely evidenced in a religious building, and the importance of Anglicanism in the religious life of rural settlers in the colonial period (HO). The building design has been retained and the influences of the Gothic Country styles are evident while the Church is centrally placed within its boundaries and framed by the surrounding trees.
Stuart Town General Cemetery	Dubbo Regional LEP 2022	I322	The site is distinguished by a large range of monuments including an unusual early concrete monument and a substantial rendered brick vault capped with a large marble angel on plinth and with dwarf cast iron rail on the vault roof and surrounded by an iron rail fence. There is a large range of white marble catalogue statuary of themes including Rock of Ages and angels. There are several mid Victorian simple but well-formed sandstone monuments (including the first stone of 1877). The site well reflects the diverse tastes, social mores, and economic circumstances of the region.
Stuart Town gold mining area and common	Dubbo Regional LEP 2022	I321	The Stuart Town Common is important as the site of numerous mines which sprang up in the area in the 1870s amidst the gold rush of the era. These were worked by members of different ethnic communities, demonstrating the mining techniques used by different cultures. It also provides a focal point for a town made famous by Banjo Patterson's "The Man from Ironbark" and as the birthplace of NSW Premier Robert Askin.

Name	LEP	Listing No.	Listing Description in the SHI and LEP
Stuart Town Railway Station Group	Dubbo Regional LEP 2022	I316	Stuart Town is one of the best third-class country stations on the NSW railway system. The station building is of high quality with good detail and the retention of a very interesting entrance porch, and the setting retains ancillary buildings, signs and platform with a good example of a typical early gatehouse that were seen throughout NSW. With Wellington this station is an important reminder of the early line through the area which showed confidence and pride in railway construction by the substantial quality of the buildings not seen on the later lines that developed.
Stuart Town School of Arts	Dubbo Regional LEP 2022	I318	The School of Arts Hall has great social significance for Stuart Town as the centre of the community and its activities, recreational and literary, since it was built in 1934 while today it is reminiscent of a period when members of a small community would join together and organise and provide for their own needs and facilities.
Wing Vee Homestead and Woolshed and Quartz Roasting Pits	Mid-Western Regional LEP 2012	I979	The "Wing Vee" property at Triamble, near Hargraves, began as part of the Triamble Station which was taken up by Charles Suttor of the Bathurst-based pioneering family in the early 1830s. The station was subdivided between family members, with the portion that became "Wing Vee" still in Suttor hands (Claude) in the 1950s. Later, "Wing Vee" became the country retreat for a time of the Sydney-based entrepreneur and aviator Dick Smith.
Yee Lee's Store (former)	Dubbo Regional LEP 2022	I312	This site has a strong association with Chinese commercial development in the gold fields from the 1870's onwards. The site possesses an extant shop with a strong association with a prominent local Chinese retailer Yee Lee whose family became prominent in the locality.

FIGURE 3.3

Local Heritage Items within 10km of the Project



Legend

- Project Boundary
- Development Corridor
- 10km Buffer from Project Boundary
- Local Heritage Sites within 10km of Project
- Waterbody
- Indicative Turbine Locations
- Proposed Permanent Met Masts
- Road
- Railway Line
- Named Watercourse

Site Label and Name

I241 - Nubrygyn Inn and Cemetery
I242 - Former St Brigid's Catholic Church
I243 - Euchareena General Cemetery
I244 - St Thomas Anglican Church
I245 - Beehive Classroom, Euchareena Public School
I253 - Farnham Post Office and out buildings
I254 - Nicholls Farm Buildings
I292 - Burrendong Arboretum
I311 - Railway Gatekeeper's Cottage
I312 - Former Yee Lee's Store
I313 - Crick's Store building
I314 - Boehme's Hall
I315 - St John the Baptist Catholic Church
I316 - Stuart Town Railway Station Group
I317 - Former Railway Hotel
I318 - Stuart Town School of Arts
I319 - Former Stuart Town Bakery (dwelling house and artist studio)
I320 - Australia Hotel (former Carrington Hotel)
I321 - Stuart Town gold mining area and common
I322 - Stuart Town General Cemetery
I323 - St Michael and All the Angels Anglican Church and Convict Bell A
I979 - Wingvee Homestead and Woolshed and Quartz Roasting Pits

0 2.5 5
Kilometres

Scale 1:210,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); Planning NSW (2022); ACEN (2022)

4.0 Aboriginal Archaeological Context

Aboriginal people have occupied what we now know as the Australian continent for at least 40,000 years and perhaps 60,000 years and beyond (Mulvaney and Kamminga 1999, Hiscock 2007). While no regional synthesis of the archaeology has been completed for the Wellington area, research studies have been undertaken in the Upper Macquarie River region by Pearson (1981) and Koettig (1985). The following is a summary of the finding from these studies.

Pearson (1981) analysed a series of sites which tended to be biased towards larger and more noticeable sites identified by local residents. During this study, he excavated three rockshelters (Botobolar 5, Granites 1 and Granites 2) which provided a record of regional Aboriginal occupation in the area to 5,000 years before present. Based on his finding, Pearson categorised these sites as either occupation sites or non-occupation sites (sites that are generally for a single purpose i.e. scarred trees, grinding grooves and burial sites) and built an archaeological model based on location. The model developed by Pearson is summarised below:

- Distance to water from sites varied from 10 to 500 m, with larger sites found closer to a water source.
- Good soil drainage and an outlook over a water source were important to location.
- Ceremonial and stone arrangement sites were located away from campsites.
- Quarry sites were located in areas with desirable stone source qualities and reasonably accessible.

Koettig (1985) continued to build on the archaeological understanding of this region by conducting a comprehensive and systematic study of the Dubbo region, which although over 70 km to the west, is relevant as one of only a few wide-ranging archaeological studies. Koettig investigated all topographic landform units and creek orders through sample survey to clarify locations and site types. The study arrived at the following conclusions:

- Aboriginal sites may be expected throughout all landscapes.
- Artefact scatters, scar trees and grinding grooves are the most frequently occurring site types.
- The location and size of sites were determined by various factors; predominantly environmental and social factors around the proximity to water, geological formations and the availability of food resources.

Koettig (1985) suggested that larger and constantly occupied sites are likely to occur along permanent watercourses, while more sporadic occupation would have occurred along ridge tops or temporary water courses. Purcell (2002) conducted a broad regional cultural heritage study of the Brigalow Belt South Bioregion in NSW. This bioregion extends from Dubbo north to Moree. The study indicated that Aboriginal sites have been recorded more frequently on high contour and alluvial landforms. The majority of the sites recorded were within 100–400 m of water. OzArk (2007) conducted a cultural heritage review of the Dubbo LGA that overlaid all recorded sites within the LGA on a mapped geomorphological GIS layer of landforms. The study confirmed that most Aboriginal sites are recorded within 100 m of water accompanied by a general trend of there being fewer sites recorded further away from water. Additionally, the majority of the recorded sites were identified to be located on Quaternary alluvium soils that once supported the more complex ecological communities in the region. This geological unit in the region occurs near major waterways and consequently, the likelihood of associated Aboriginal objects and sites in such landforms increases.

4.1.1 AHIMS Database Search Results

The Aboriginal Heritage Information Management System (AHIMS) database contains records of all Aboriginal objects reported to the Secretary of the Department of Premier and Cabinet in accordance with Section 89A of the *National Parks and Wildlife Act 1974*. It also contains information about Aboriginal places, which have been identified as having special significance with respect to Aboriginal culture. Previously recorded Aboriginal objects and declared Aboriginal places are known as 'Aboriginal sites'.

A search of the AHIMS database undertaken on 6 December 2023 (AHIMS search ID: 846630) for an approximate 10 km radius centred on the Project Boundary (i.e., the 'AHIMS search area') returned 110 site entries. Of those, five (5) AHIMS registered Aboriginal sites are located within the Project Boundary (refer **Section 4.1.1.1**).

As indicated in **Table 4.1**, open artefact sites (comprising isolated artefacts or artefact scatters) are the most common site type represented within the AHIMS search area, accounting for 63.64% (n=70) of known sites. Culturally modified trees (carved or scarred) accounted for 22.73% (n=25). Stone quarries, comprising areas with or without artefacts, accounted for 8.18% (n=9) of reported site types.

Other, less common site types included a single water hole (0.91%), a single ochre quarry (0.91%), a single hearth site (0.91%), a single stone arrangement (0.91%), and a Potential Archaeological Deposit (PAD) (0.91%). A single 'Restricted' site was also reported in the AHIMS search results. Email correspondence with the Heritage NSW registrar on 27 April 2022 (during initial searches conducted for the Project) confirmed that this restricted site would not be impacted by any works within the Project Boundary. No new restricted sites were identified in the December 2023 AHIMS searches.

Thirty (30) of the reported Aboriginal sites were identified in the vicinity of Lake Burrendong. As the Project Boundary is 8 km south of Lake Burrendong, direct (and indirect) impacts are unlikely. Direct and indirect impacts to the remaining Aboriginal sites outside the Project Boundary are also unlikely but these matters would be further investigated during the EIS phase of works as a component of the Aboriginal cultural heritage assessment.

Table 4.1 AHIMS Search Summary Data

Site Type	Count (n)	Percentage of Total
Open Artefact Site; Hearth	1	0.91%
Restricted	1	0.91%
Modified Tree (Carved or Scarred)	25	22.73%
Ochre Quarry	1	0.91%
Water Hole	1	0.91%
Stone Quarry	9	8.18%
Open Artefact Site	70	63.64%
Stone Arrangement	1	0.91%
Potential Archaeological Deposit (PAD)	1	0.91%
Total	**110**	**100.0%**

Data source: Department of Premier and Cabinet (AHIMS search ID: 846630, dated 6 December 2023).

4.1.1.1 Within the Project Boundary

The results of the search indicated that there are five (5) Aboriginal sites registered within the Project Boundary. No Aboriginal places were identified within the Project Boundary. A copy of the AHIMS search results is provided in **Appendix 1**, and a summary of registered AHIMS sites is presented in **Table 4.2** and illustrated on **Figure 4.1**.

Table 4.2 Aboriginal Sites within the Project Boundary

Name	ID	Site Type	Site Features
Stockyard Creek; Stockyard Creek 1	36-5-0017	Open Camp Site	Artefact
Backwater Creek; Backwater Creek 2	36-5-0026	Open Camp Site	Artefact
Backwater Creek; Backwater Creek 3	36-5-0025	Open Camp Site	Artefact
Stockyard Creek; Stockyard Creek 4	36-5-0030	Open Camp Site	Artefact
Stockyard Creek; Stockyard Creek 5	36-5-0029	Open Camp Site	Artefact

Avoiding these five (5) sites (and applying a suitable curtilage) would be advised to avoid direct and indirect impacts. However detailed design changes relevant to these AHIMS sites are best advised to occur during later planning approval stages (e.g., during EIS preparation), when detailed investigations have occurred, consultation has commenced, and field works has occurred to ground-truth and survey these and other important heritage matters. It is noted that the currently proposed wind turbine locations are at least 350 m from the identified AHIMS sites. Site cards have been obtained for these five AHIMS sites within the Project Boundary to gain an understanding of the nature and extent of each site, they are reproduced here in **Appendix 2**.

The presence of these sites also indicates that an Aboriginal cultural heritage assessment or survey may have been undertaken in the area and this will be reviewed during the EIS phase. This information will assist to inform the pattern and distribution of the sites and will have implications for providing advice regarding the potential for other sites, at that later time. The AHIMS sites within the Project Boundary (and those recorded more broadly, see below) demonstrate the presence of Aboriginal objects within the Project Area and the local area and suggest that additional Aboriginal objects/sites may be presence within the Project Area. The abovementioned potential is normal for a development of this scale and locality. Direct and indirect impacts would be further investigated during the EIS phase of works following normal Aboriginal cultural heritage assessment practices.

4.1.1.2 Within 10 km of the Project Boundary

Figure 4.2 presents the AHIMS sites identified within 10 km of the Project Boundary. An inset is included at a different scale for clarity.

A total of 105 AHIMS registered sites were identified within 10 km of the Project Boundary, including:

- A total of 65 Open Artefact Sites.
- Nine (9) Stone Quarries.
- One (1) Open Artefact Site; Hearth.

- 25 Culturally Modified Trees.
- One (1) Ochre Quarry.
- One (1) Water Hole.
- One (1) Stone Arrangement.
- One (1) PAD.
- One (1) AHIMS item with information restrictions (Restricted Aboriginal Site 36-5-0085). Heritage NSW has confirmed that this site would not be impacted by any works within the Project Area.

A total of 30 of these sites were identified in the vicinity of Lake Burrendong (refer to **Figure 4.2**). As the Project Boundary is approximately 8 km south of Lake Burrendong, direct (and indirect) impacts are unlikely. Direct and indirect impacts to the remaining sites outside the Project Boundary are also unlikely, however these matters would be further investigated during the EIS phase of works as a component of the Aboriginal cultural heritage assessment.

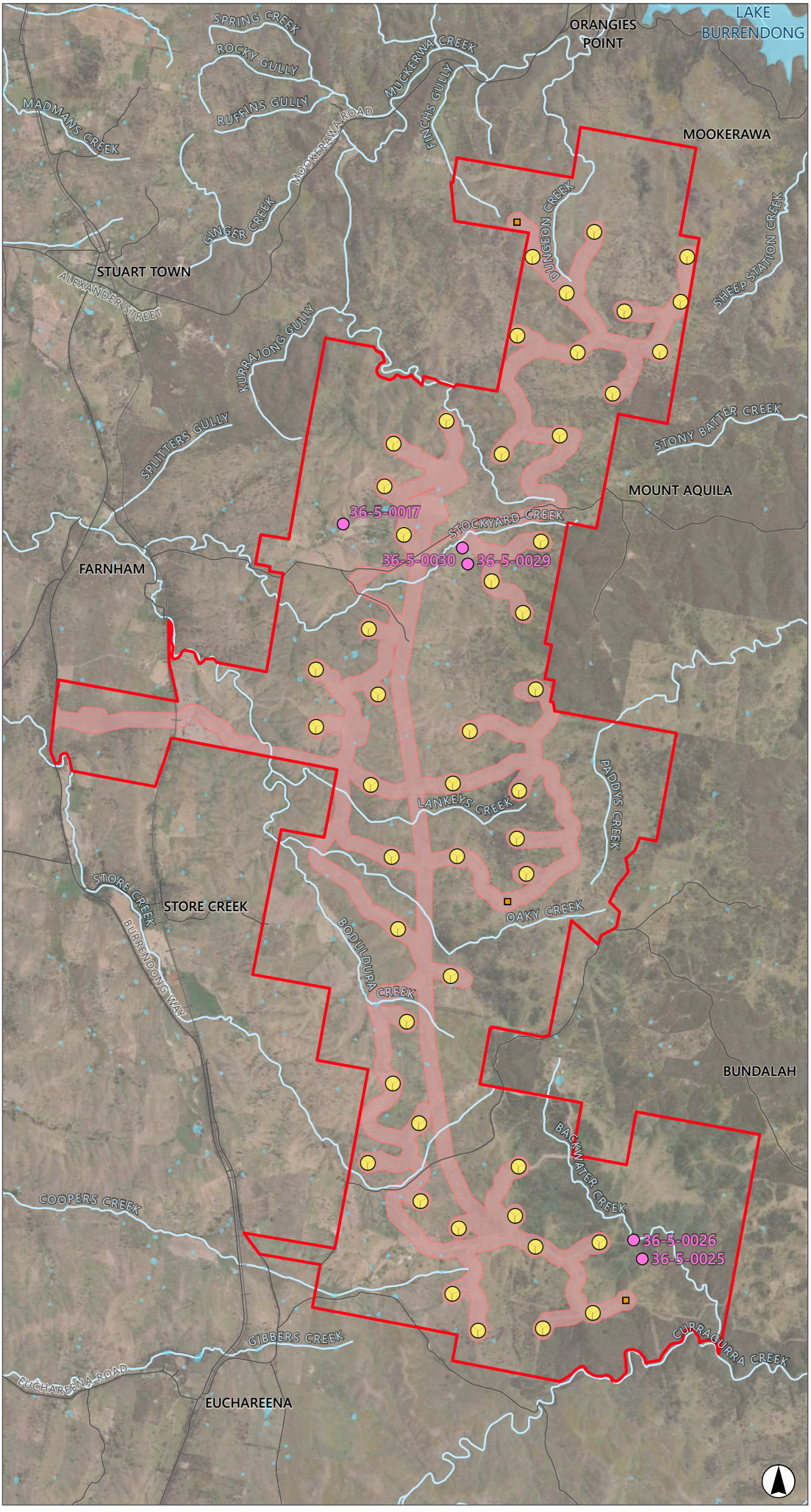


FIGURE 4.1

Aboriginal Sites within the Project Boundary

Legend

- Project Boundary
- Development Corridor
- Waterbody
- Named Watercourse
- Railway Line
- Road
- Indicative Turbine Locations
- Proposed Permanent Met Masts

Aboriginal Sites within the Project Boundary

- Open Artefact Site

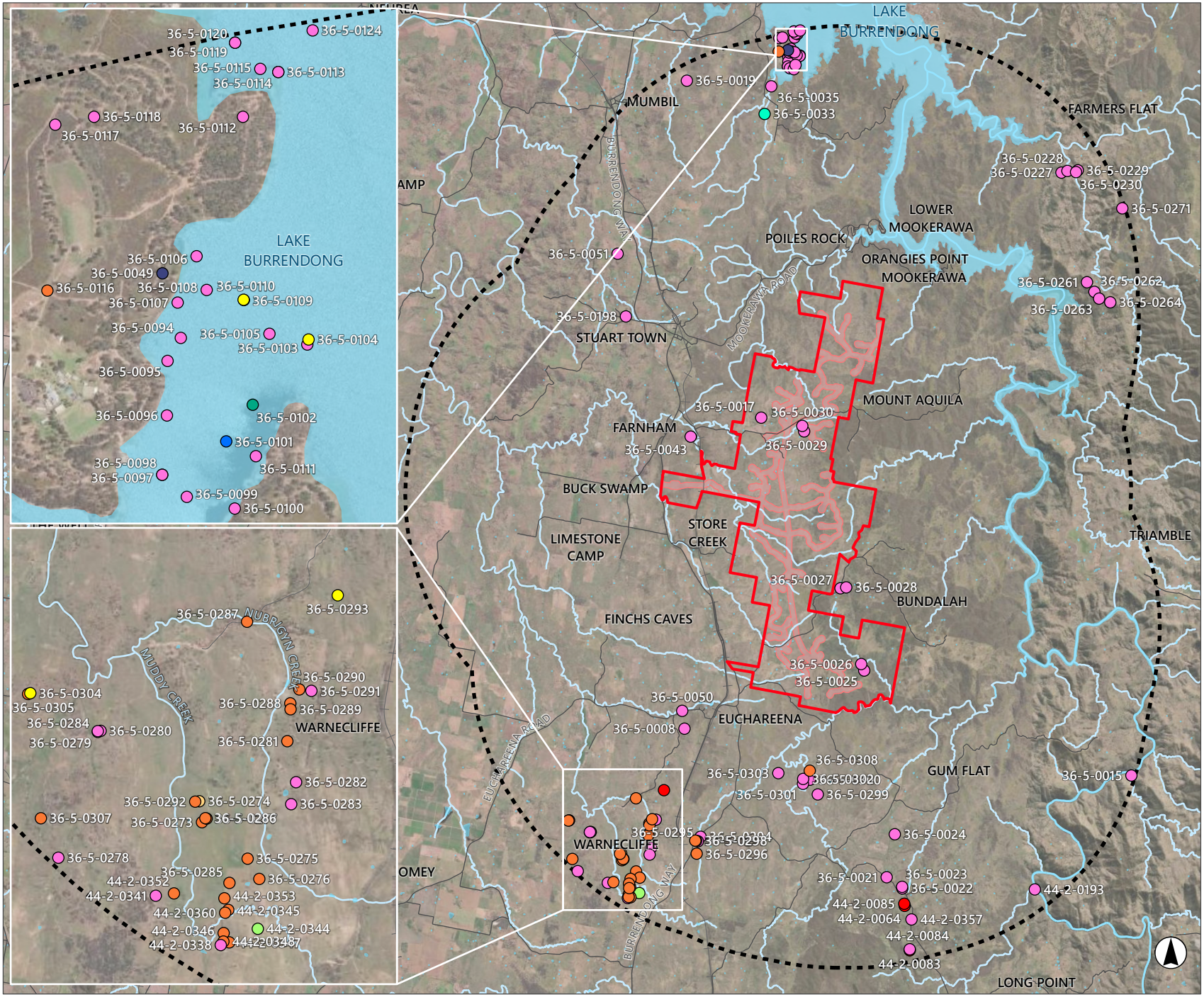
0 1 2
Kilometres

Scale 1:75,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); DPIE (2022);ACEN (2022), AWS (2023)

FIGURE 4.2

AHIMS Sites within 10km of The Project



Legend

- Project Boundary
- Development Corridor
- 10km Buffer from Project Boundary
- Waterbody
- Road
- Railway Line
- Named Watercourse

Aboriginal Sites

- Culturally Modified Tree
- Ochre Quarry
- Open Artefact Site
- Open Artefact Site; Potential Archaeological Deposit
- Open Artefact Site; Hearth
- Stone Arrangement
- Stone Quarry
- Water Hole

0 2.5 5
Kilometres

Scale 1:210,000 at A4
GDA2020 MGA Zone 55

Image Source: ESRI Basemap (2022) **Data source:** NSW DFSI (2022); ACEN (2022), AWS (2023)

4.2 Further Archaeological Background

A summary of the AHIMS search results and relevant site card information is provided for AHIMS ID#: 36-5-0017, 36-5-0025, 36-5-0026, 36-5-0029 and 36-5-0030 in **Figure 4.3** and **Table 4.3** below.

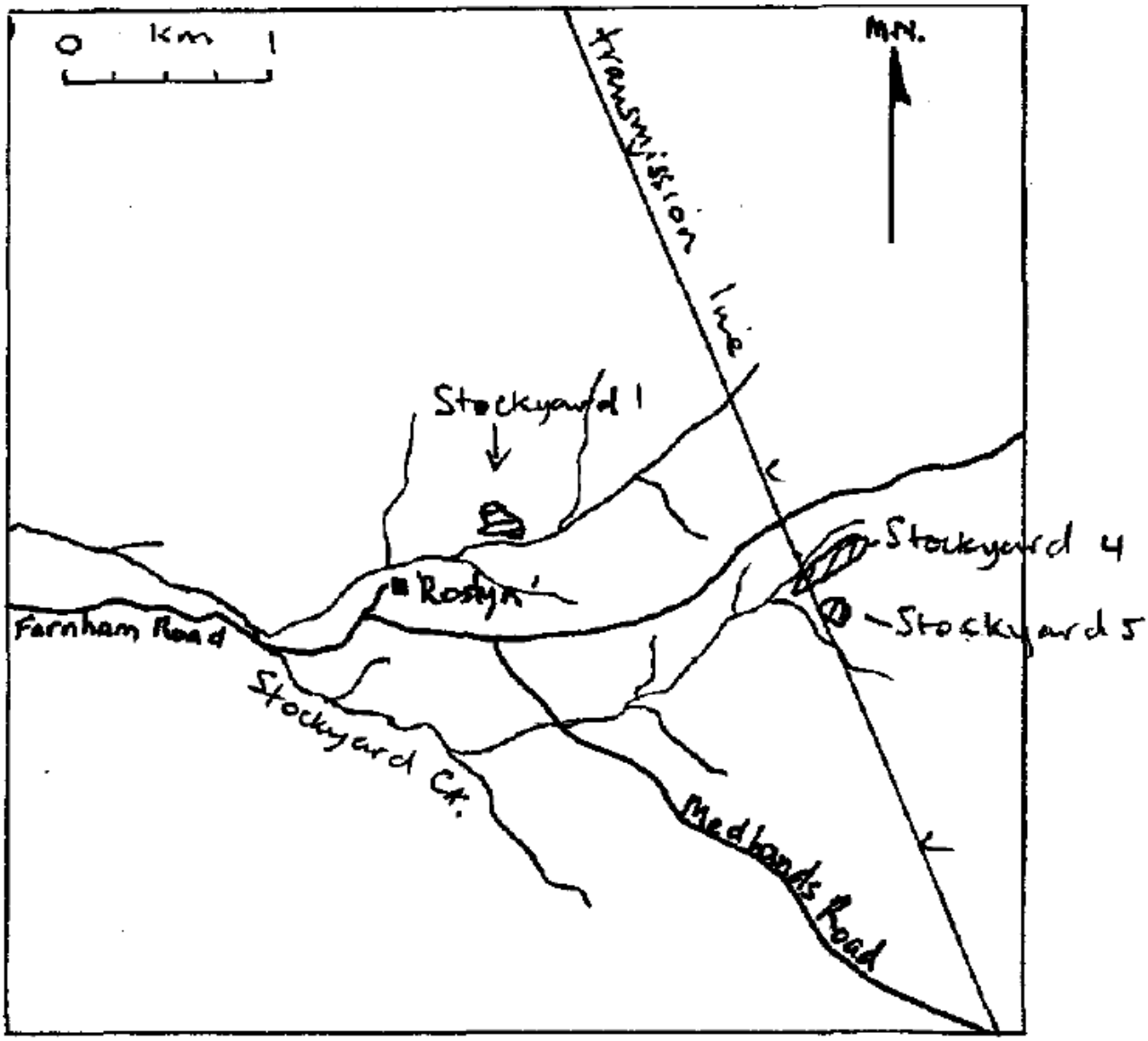
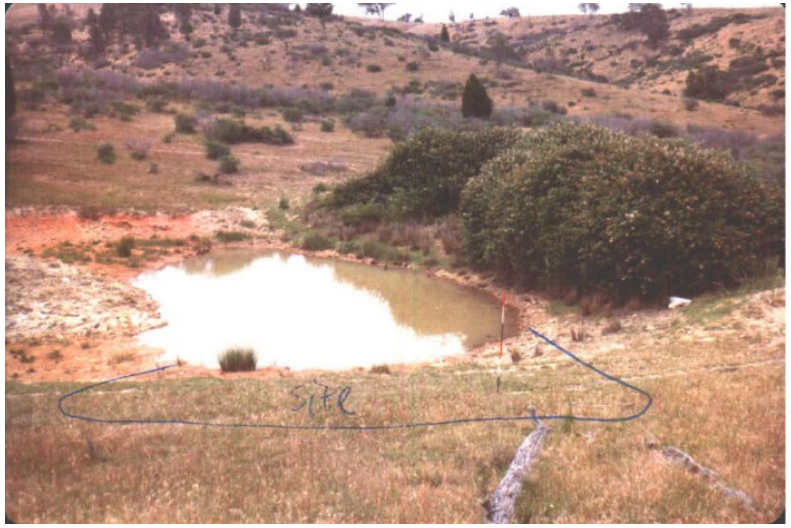
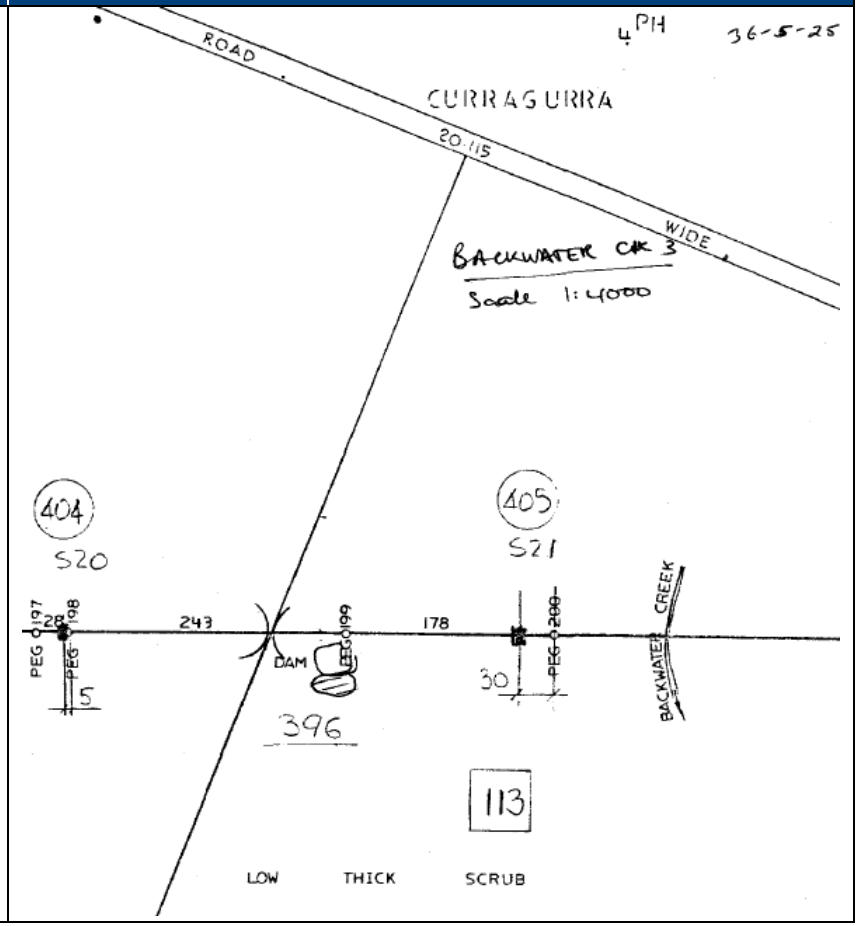


Figure 4.3 Mud-Map of Stockyard Creek Sites 1, 4 and 5 (36-5-0017,0029 & 0030)

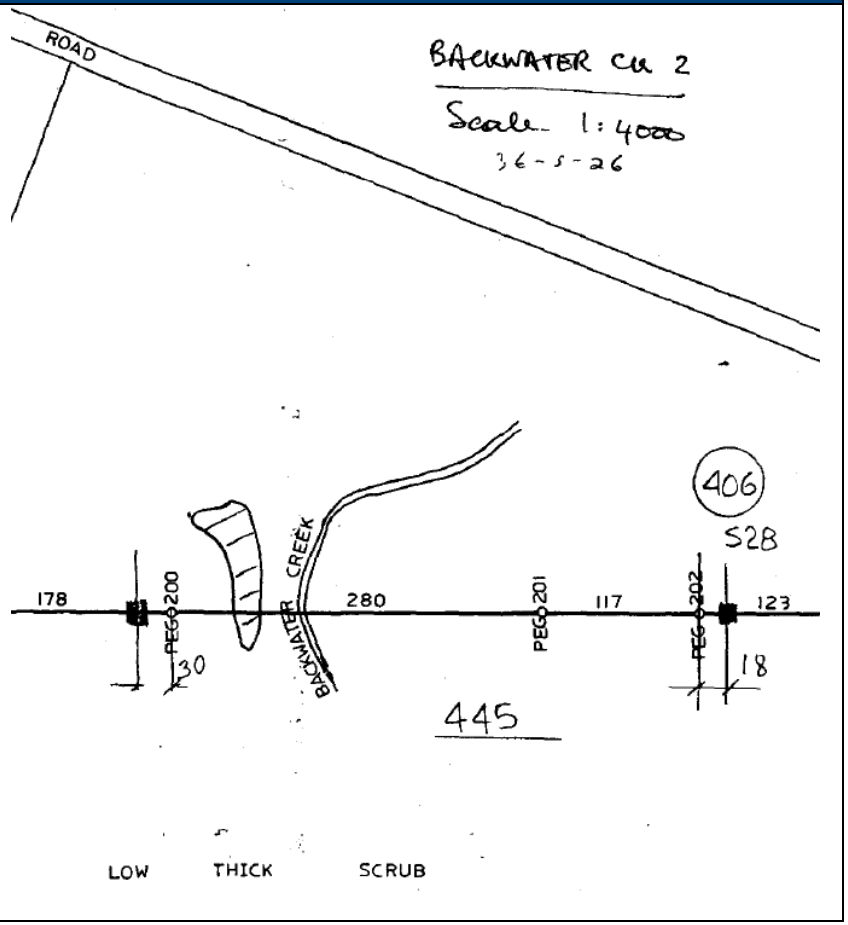
Source: AHIMS Site Card for 36-5-0017.

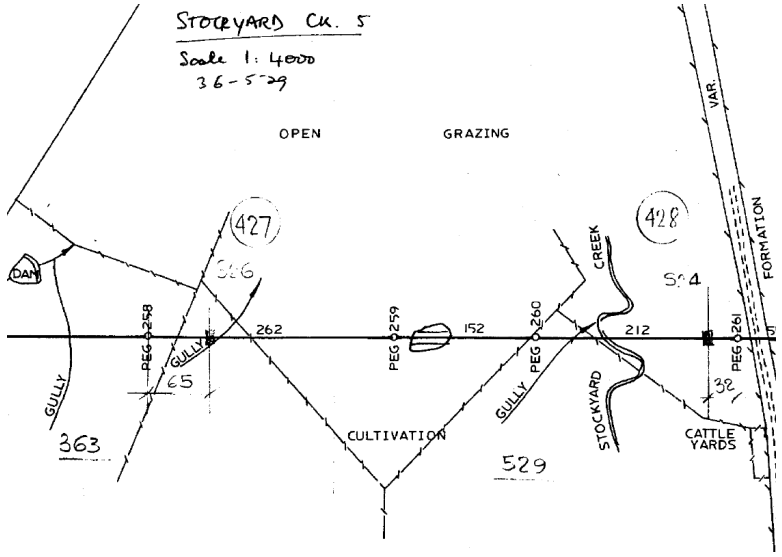
Table 4.3 Summary of AHIMS Search Results and Site Cards

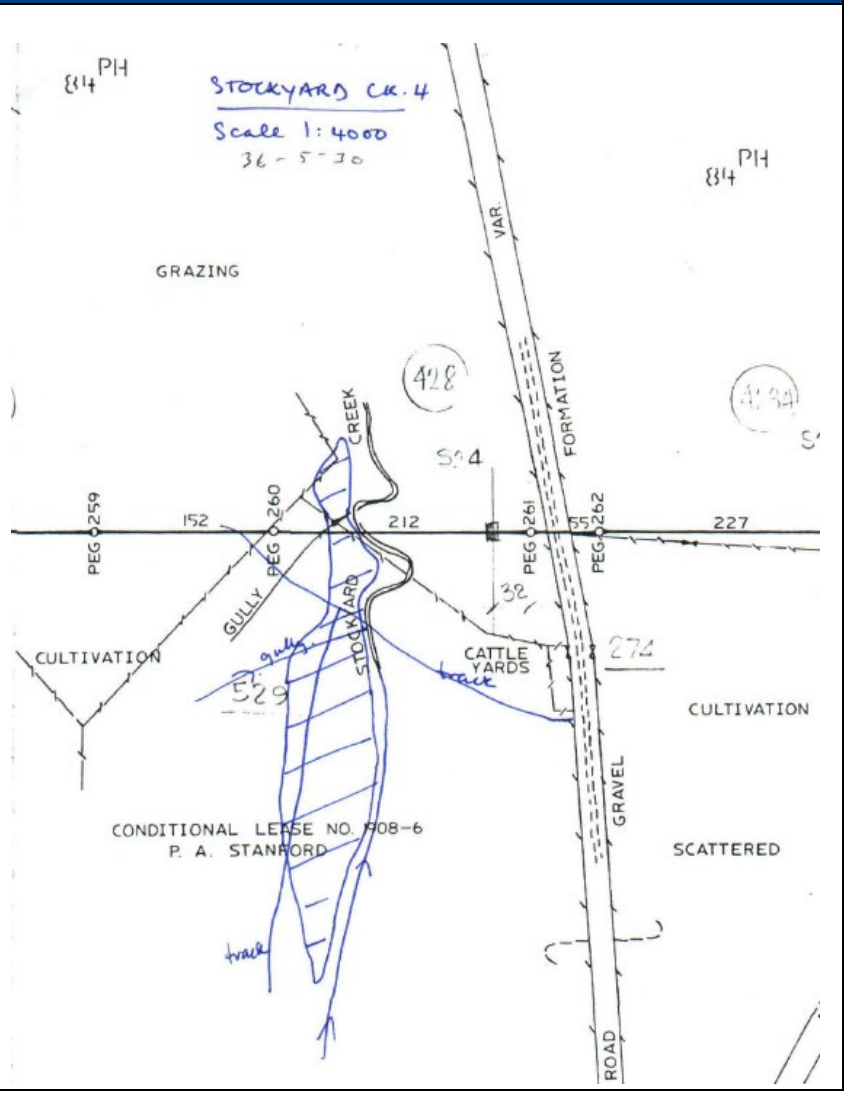
Name	ID	Site Type	Site Features	Description	Photograph and/or Mud-Map from Site Card
Stockyard Creek; Stockyard Creek 1	36-5-0017	Open Camp Site	Artefact	*"Aboriginal open site with cores, grinding stone slabs, and flakes exposed in patches of rocky ground. in paddock; approximate area 120 m x 80 m. Exposure by ploughing, construction of contour banks, dams and general grazing. A number of artefacts damaged and displacement from in situ positions resulting from agricultural practices. Artefacts scattered over wide area including the holding banks of dams but tend to be visible close to the intermittent stream which is a tributary of Stockyard Creek.* *Several artefacts present in exposed vehicular trackway. Site has been subject of selective amateur collection in 1960s. No charcoal, dietary remains or non-lithic artefactual material present.* *Site situated on slight slope close to an intermittent or very small stream; now ploughed and graded."*	
Backwater Creek; Backwater Creek 3	36-5-0025	Open Camp Site	Artefact	*"Small open site situated on slope and stock tracks leading into darn. Deposit largely destroyed by erosion following construction of dam. Five (5) artefacts scattered on slope and site may have contained a much larger number. Core and flakes represented. Raw materials: white quartz.* *Site located in broad valley; approximately 500 m to permanent stream."*	

Name	ID	Site Type	Site Features	Description	Photograph and/or Mud-Map from Site Card
					

Name	ID	Site Type	Site Features	Description	Photograph and/or Mud-Map from Site Card
Backwater Creek; Backwater Creek 2	36-5-0026	Open Camp Site	Artefact	*"Small open site, approximately 20 m x 30 m (600 m^2), close to small permanent stream.* *Artefacts exposed in stock tracks but otherwise undisturbed. Thirty (30) flakes and a core represented at this site. Most of these artefacts are small and bladelike.* *Core has some flake scars partially encrusted with lichen. Some flakes possibly used but others have weathered with exposure. Some charcoal eroding out of stock tracks but this is an indefinite association with artefacts; no apparent hearth is visible. Site is within 30 m of permanent stream in a broad undulating valley."*	

Name	ID	Site Type	Site Features	Description	Photograph and/or Mud-Map from Site Card
					

Name	ID	Site Type	Site Features	Description	Photograph and/or Mud-Map from Site Card
Stockyard Creek; Stockyard Creek 5	36-5-0029	Open Camp Site	Artefact	*"Open site, 52 m x 25 m (1,300 m^2), on slight ridge, with artefacts lying on surface.* *Possible deposit but ploughing has disturbed part of the site. Artefacts include cores, chopper, and flakes. Several cores have lichen growing on flake scars.* *Artefactual raw material includes light blue chert, quartzite and white quartz; artefacts number 103. No organic remains at site. In a wide valley with permanent water.* *Narrow valley floor near intermittent or semi-permanent stream."*	
Stockyard Creek; Stockyard Creek 4	36-5-0030	Open Camp Site	Artefact	*"Extensive open site, approximately 800 m x 35 m (38,000 m^2) along banks of Stockyard Creek with areas of artefacts and potential deposit.* *Artefacts in two areas of deposit have been damaged by clearing and bulldozing; some scattering of artefacts in these areas. Minor erosion along small gullies, vehicular track and stock tracks.* *Several areas of flaking with small cores, flakes and spalding flakes in undisturbed deposit intact. Possibly up to 1500 to 2000 artefacts represented at site.* *Stone artefacts include grinding slabs, choppers, cores, scrapers, and flakes; raw materials include white and crystalline quartz, chalcedoney, dark blue/pink/light blue-green/grey chert, and quartzite.*	

Name	ID	Site Type	Site Features	Description	Photograph and/or Mud-Map from Site Card
				Site is located near permanent water in a wide valley which may have originally been open woodland with grassy understorey."	

4.3 Predictive Model

Predictive models provide an assessment of likely areas of archaeological potential within a given study area and are indicative of the likely types of present archaeological evidence at a given location. Predictive models comprise a series of inputs about the nature and distribution of evidence of Aboriginal land use that may be anticipated, the outcomes of which are derived based on:

- Landscape context and landform units.
- Historical descriptions of Aboriginal land use.
- Historical disturbance and landscape modification.
- Results of previous archaeological work in the vicinity of the subject site.
- Historical accounts of Aboriginal occupation, and landscape character.
- Predictive modelling proposed in previous archaeological investigations.

4.3.1 Consideration of Archaeological Potential

The presence or absence of identified Aboriginal archaeological sites and non-Aboriginal heritage items/sites is often reflective of the extent of prior surveys or studies, with sites typically recorded where surveys or studies have been completed. In relation to the Project Area, it is necessary to consider the potential for additional sites/items to be present but not recorded.

In relation to Aboriginal archaeological sites, most sites recorded in the vicinity of the Project Area are located in proximity to watercourses, including those associated with Lake Burrendong (formerly the confluence of the Cudgegong and Macquarie Rivers). Within the AHIMS search area, sites are also associated with three (3) watercourses located within the Project Area, being Stockyard Creek, Backwater Creek and Gibbers Creek (sites associated with this creek are located outside the Project Area but the creek and its tributaries are present within the Project Area).

This pattern is relatively common within this region and it is typically accepted that there is a higher likelihood of sites containing stone artefacts being present in association with watercourse, with the likely number and extent of sites typically increasing in proximity to more reliable sources of water that could have supported occupation for longer periods.

In relation to other site types, the recorded scarred tree and water hole are both located on the banks of Lake Burrendong, as is a cluster of quarry sites (ochre and stone). The quarry sites are located in soil landscapes and geological contexts that are the same as those within the Project Area. A second cluster of quarry sites is present to the south of the Project Area in associated with an elevated landform known as Sawmill Hill, which has similar geology to that within the Project Area. There is consequently potential that quarry sites of this kind may be present within the Project Area. However, this will be dependent on the exposure of suitable ochre and/or stone deposits, with stone quarries generally most commonly found on elevated landforms where suitable stone material outcrops.

Based on the above, the key site types likely to occur within the Project Area are listed below:

- **Artefact scatters/isolated artefacts** may be located anywhere within the Project Area. The potential for these sites is greatest in association with key watercourses within the Project Area, with higher numbers of sites and higher densities of artefacts expected on lower slopes/terraces bordering watercourses that provided a reliable or semi-reliable supply of water. In many cases, artefacts may be present below the ground surface in these areas, which would be considered to be areas of potential archaeological deposit. The nature and extent of these sites can only be confirmed by test excavation, which would be required as a component of the Aboriginal cultural heritage assessment to inform any requirements for avoidance or salvage of such areas.

- **Quarry sites** may be present within the Project Area where suitable stone was exposed and accessed by Aboriginal people. This would typically be on elevated landforms with outcrops.

- **Scarred trees** may be present where remnant vegetation of sufficient maturity exists. Based on the aerial photography of the Project Area, the likelihood of such vegetation is greatest along creek lines and in association with the elevated areas along the western edge of the Project Area.

Other site types (such as grinding grooves, rock shelters and burials) may occur within the Project Area however are unlikely based on the distribution of sites in the local area and the geology and topography of the Project Area.

It is sometimes customary to visualise the above predictive statements as spatial extents within a predictive model. Based on the limited surveys in the Project Area a visual representation of the predictive statements above may misrepresent the spatial extent of potential sensitivities and constraints. Accordingly, it is recommended that these preliminary predictive statements are verified via site surveys for the Project at the ACHA stage.

5.0 Recommendations

In summary, the AHIMS database search indicates that there are five (5) Aboriginal sites registered within the Project Boundary, within an additional 50 registered sites located within the broader Study Area outside the Project Boundary. No Aboriginal places were identified within the Study Area. There are no heritage items within the Project Area listed on World, National, Commonwealth, State or Local heritage registers.

5.1 Aboriginal Heritage

Based on prior experience, it is our understanding that SEARs for the project would require an Aboriginal Cultural Heritage Assessment Report (ACHAR) to be completed as a part of the EIS. The ACHAR would be prepared in accordance with the following key guidelines:

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

The ACHAR will include consultation with the Registered Aboriginal Parties (RAPs) 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). The ACHAR would include:

- Consultation with the local Aboriginal community.
- Review of the Aboriginal cultural heritage context for the Project Area.
- Survey of the Project Area to identify any additional sites and to identify key areas of archaeological potential.
- Test excavation within identified areas of archaeological potential likely to be impacted by the Project.
- Assessment of the Aboriginal cultural significance for the Project Area.
- Assessment of impacts on Aboriginal cultural significance for the Project Area.
- Recommendations and mitigation measures for the development of the Project.

The significance of unknown Aboriginal objects cannot be determined until a survey of the Project is completed, and until then targeted mitigation and management measures cannot be defined. Salvage works should be anticipated where harm to significant sub-surface Aboriginal objects cannot be avoided. Where harm cannot be avoided to surface Aboriginal objects, regardless of significance, it is likely that a salvage of surface artefacts will be required.

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.

It is noted that formal notification process for the Aboriginal Cultural Heritage Assessment may commence with the completion of this assessment, at the latest it should commence following receipt of the SEARs. Once commenced, detailed consultation will be undertaken should be the RAPs for the Project. Consultation should be undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010b).

5.2 Historic Heritage

While there are no registered non-Aboriginal heritage items within the Project Boundary, there are 22 registered items are located within the broader the Study Area outside the Project Boundary. It is therefore likely (based on our knowledge of other recent wind farm SEARs) that a Historic Heritage Assessment (HHA) would be required to support the EIS.

The HHA would assess the potential for unlisted heritage items and non-Aboriginal archaeological remains to be present within the Project Area and evaluate the potential direct and indirect impacts of the Project. The HHA 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 International Council on Monuments and Sites (ICOMOS) Charter for Places of Cultural Significance* (ICOMOS, 2013).

5.2.1 Aquila Wind Design Revisions

Based on the information reviewed to date Umwelt recommends ACEN:

- Continue to consider the location and extent of AHIMS sites 36-5-0017, 36-5-0030, 36-5-0025, 36-5-0026 and 36-5-0029 during detailed design.
- Avoid key watercourses by applying an appropriate buffer around waterbodies, riparian land and creeklines.

The above recommendations are suitable to the Project stage and have been considered by ACEN as part of scoping stage Project design revisions. At this stage it is not be possible to provide advice on design considerations to avoid harm to unknown Aboriginal objects. Further, the background research has only resulted in the development of predictive statement regarding the likely location of Aboriginal objects that would be refined during the EIS and detailed design stages of the Project.

Preliminary analysis does however indicate that the Project design can accommodate the avoidance of existing registered sites. It is expected that additional Aboriginal sites and values will be present in the Project Area and a detailed ACHAR will be undertaken to assess potential impacts in accordance with the registered Aboriginal parties for the Project.

6.0 References

Hiscock, Peter – *Archaeology of Ancient Australia,* dated October 2007 (Hiscock, 2007).

International Council on Monuments and Sites (ICOMOS) - *The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance*, dated October 2013 (ICOMOS, 2013).

Koettig, M. – *Assessment of Aboriginal sites in the Dubbo City area.* Report to Dubbo City Council, dated 1985 (Koettig, 1985).

OzArk – Aboriginal Heritage Study: Dubbo Local Government Area – Stage 2, Field Survey, Dubbo, NSW. Report to Dubbo City Council, dated 2007 (OzArk, 2007).

NSW Government – Department of Planning, Industry and Environment (DPIE) – *Soil Landscapes of Central and Eastern NSW - v2.1*, NSW Office of Environment and Heritage, Sydney, dated 2020 (DPIE, 2020).

NSW Government – Office of Environment and Heritage (OEH, now DPE) – *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW,* dated April 2011 (OEH, 2011).

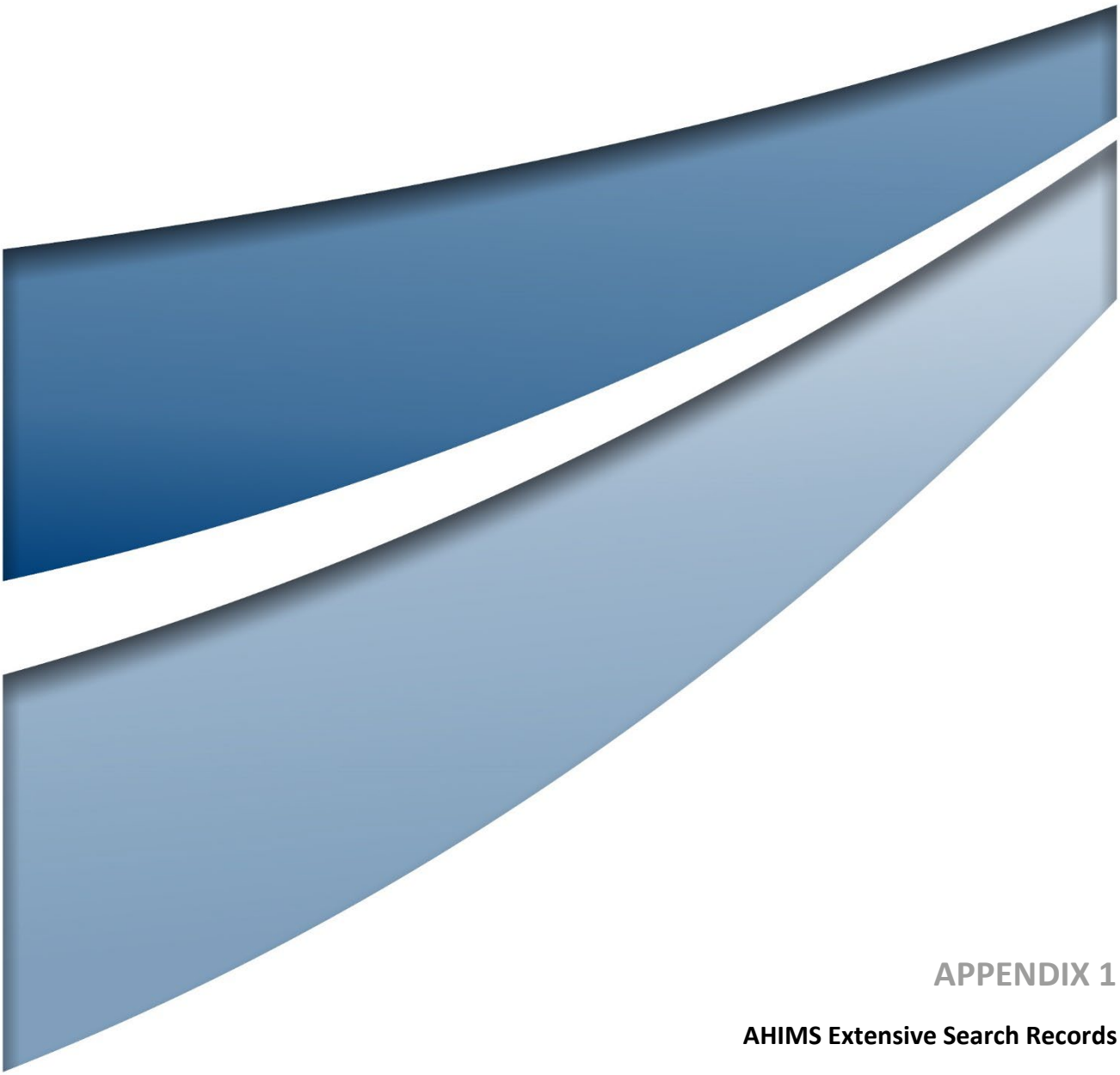
NSW Government – Department of Environment, Climate Change and Water NSW (DECCW) - *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW,* dated September 2010 (DECCW, 2010a).

Mulvaney, D. J. & Kamminga, Johan – *Prehistory of Australia.* Washington, D.C: Smithsonian Institution Press, dated 1999 (Mulvaney and Hamminga, 1999).

NSW Government – DECCW – Aboriginal Cultural Heritage Consultation Requirements for Proponents, dated April 2010 (DECCW, 2010b).

Pearson, Michael – Seen through different eyes: changing land use and settlement patterns in the Upper Macquarie River Region of N.S.W., from prehistoric times to 1860, dated 1981 (Pearson, 1981).

Purcell – *DECCW Aboriginal Cultural Heritage Assessment Brigalow Belt South Stage 1.* Resource and Conservation Assessment Council, dated 2000 (Purcell, 2000).



APPENDIX 1

AHIMS Extensive Search Records

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 21793

Client Service ID : 846630

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
36-5-0008	Euchareena;	AGD	55	694779	6352705	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Mr.Warwick Pearson					**Permits**		
36-5-0015	Bundi Creek;	AGD	55	712292	6350869	Open site	Valid	Artefact : -	Open Camp Site	1299
	Contact	**Recorders**	Michael Pearson					**Permits**		
36-5-0017	Stockyard Creek;Stockyard Creek 1;	AGD	55	697787	6364895	Open site	Valid	Artefact : -	Open Camp Site	232,102800
	Contact	**Recorders**	L Cubis					**Permits**		
44-2-0083	Sawmill 6;	AGD	55	703607	6344018	Open site	Valid	Stone Quarry : -, Artefact : -	Quarry	232
	Contact	**Recorders**	ASRSYS					**Permits**		
44-2-0084	Sawmill 5;	AGD	55	703606	6344060	Open site	Valid	Artefact : -	Open Camp Site	232
	Contact	**Recorders**	ASRSYS					**Permits**		
44-2-0085	Sawmill 1;	AGD	55	703391	6345843	Open site	Valid	Stone Quarry : -, Artefact : -	Quarry	232
	Contact	**Recorders**	ASRSYS					**Permits**		
36-5-0049	The Point;	AGD	55	698835	6379299	Open site	Valid	Ochre Quarry : -	Ochre Quarry	
	Contact	**Recorders**	Bill Allen					**Permits**		
36-5-0050	GC-OS-1;	AGD	55	694690	6353404	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Central West Archaeological and Heritage Services Pty Ltd					**Permits**		
36-5-0051	OC-OS-1;	AGD	55	692160	6371320	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Central West Archaeological and Heritage Services Pty Ltd					**Permits**		
36-5-0019	Eagle Beagle Creek;Eagle Beagle Creek 1;	AGD	55	694872	6378102	Open site	Valid	Artefact : -	Open Camp Site	232,102800
	Contact	**Recorders**	L Cubis					**Permits**		
36-5-0021	Middle Creek;Middle Creek 5;	AGD	55	702702	6346882	Open site	Valid	Artefact : -	Open Camp Site	232,102800
	Contact	**Recorders**	L Cubis					**Permits**		
36-5-0022	Middle Creek;Middle Creek 4;	AGD	55	703314	6346443	Open site	Valid	Artefact : -	Open Camp Site	232
	Contact	**Recorders**	L Cubis					**Permits**		
36-5-0023	Middle Creek;Middle Creek 3;	AGD	55	703308	6346507	Open site	Valid	Artefact : -	Open Camp Site	232
	Contact	**Recorders**	L Cubis					**Permits**		
36-5-0024	Middle Creek;Middle Creek 1;	AGD	55	703021	6348567	Open site	Valid	Artefact : -	Open Camp Site	232
	Contact	**Recorders**	L Cubis					**Permits**		
36-5-0025	Backwater Creek;Backwater Creek 3;	AGD	55	701822	6354983	Open site	Valid	Artefact : -	Open Camp Site	232
	Contact	**Recorders**	L Cubis					**Permits**		
36-5-0026	Backwater Creek;Backwater Creek 2;	AGD	55	701705	6355239	Open site	Valid	Artefact : -	Open Camp Site	232
	Contact	**Recorders**	L Cubis					**Permits**		
36-5-0027	Flagstaff;Flagstaff 2;	AGD	55	700894	6358208	Open site	Valid	Artefact : -	Open Camp Site	232
	Contact	**Recorders**	L Cubis					**Permits**		
36-5-0028	Flagstaff;Flagstaff 1;	AGD	55	701117	6358243	Open site	Valid	Artefact : -	Open Camp Site	232

Report generated by AHIMS Web Service on 06/12/2023 for Gemma Hopkins for the following area at Search using shape-file 21793_10km_Boundary with a buffer of 0 meters. Additional Info : Environmental Impact Assessment/ Development Application. Number of Aboriginal sites and Aboriginal objects found is 110

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 21793

Client Service ID : 846630

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	L Cubis					Permits		
36-5-0029	Stockyard Creek;Stockyard Creek 5;	AGD	55	699468	6364356	Open site	Valid	Artefact : -	Open Camp Site	232
	Contact	Recorders	L Cubis					Permits		
36-5-0030	Stockyard Creek;Stockyard Creek 4;	AGD	55	699396	6364572	Open site	Valid	Artefact : -	Open Camp Site	232
	Contact	Recorders	L Cubis					Permits		
36-5-0033	Dirt Hole Creek;Mumbil;	AGD	55	697919	6376798	Open site	Valid	Artefact : -, Hearth : -	Open Camp Site	
	Contact	Recorders	T.E. Whittingham					Permits		
36-5-0035	Tara Foreshores;Mumbil;	AGD	55	698180	6377882	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	T.E. Whittingham					Permits		
36-5-0043	Farnham;	AGD	55	695022	6364151	Open site	Valid	Artefact : -	Open Camp Site	2650
	Contact	Recorders	S Davies,Davies Heritage Consultants Pty Ltd					Permits		
44-2-0064	Sawmill 2;	AGD	55	703407	6345760	Open site	Valid	Stone Quarry : -, Artefact : -	Quarry	83,232
	Contact	Recorders	ASRSYS					Permits		
36-5-0124	Sport and Recreaction Burrendong 30	GDA	55	699424	6380253	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0116	Sport and Recreaction Burrendong 22	GDA	55	698583	6379428	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0117	Sport and Recreaction Burrendong 23	GDA	55	698608	6379954	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0118	Sport and Recreaction Burrendong 24	GDA	55	698731	6379979	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0119	Sport and Recreaction Burrendong 25	GDA	55	699178	6380214	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0110	Sport and Recreaction Burrendong 16	GDA	55	699205	6379399	Open site	Valid	Stone Quarry : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0111	Sport and Recreaction Burrendong 17	GDA	55	699244	6378903	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0112	Sport and Recreaction Burrendong 18	GDA	55	699203	6379979	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0113	Sport and Recreaction Burrendong 19	GDA	55	699315	6380121	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0114	Sport and Recreaction Burrendong 20	GDA	55	699315	6380121	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0115	Sport and Recreaction Burrendong 21	GDA	55	699258	6380131	Open site	Valid	Artefact : -		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 21793

Client Service ID : 846630

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0120	Sport and Recreaction Burrendong 26	GDA	55	699178	6380214	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0105	Sport and Recreaction Burrendong 11	GDA	55	699287	6379291	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0106	Sport and Recreaction Burrendong 12	GDA	55	699056	6379537	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0098	Sport and Recreaction Burrendong 4	GDA	55	698947	6378844	Open site	Valid	Artefact : -, Stone Quarry : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0099	Sport and Recreaction Burrendong 5	GDA	55	699025	6378774	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0100	Sport and Recreaction Burrendong 6	GDA	55	699177	6378737	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0101	Sport and Recreaction Burrendong 7	GDA	55	699150	6378950	Open site	Valid	Water Hole : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0102	Sport and Recreaction Burrendong 8	GDA	55	699234	6379066	Open site	Valid	Artefact : -, Stone Quarry : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0103	Sport and Recreaction Burrendong 9	GDA	55	699407	6379257	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0104	Sport and Recreaction Burrendong 10	GDA	55	699411	6379273	Open site	Valid	Stone Quarry : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0094	Sport and Recreaction Burrendong	GDA	55	699006	6379278	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0095	Sport and Recreaction Burrendong 1	GDA	55	698964	6379205	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0096	Sport and Recreaction Burrendong 2	GDA	55	698962	6379032	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0097	Sport and Recreaction Burrendong 3	GDA	55	698947	6378844	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0107	Sport and Recreaction Burrendong 13	GDA	55	698996	6379390	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0108	Sport and Recreaction Burrendong 14	GDA	55	699088	6379430	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		
36-5-0109	Sport and Recreaction Burrendong 15	GDA	55	699206	6379398	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.John Shipp					Permits		

Report generated by AHIMS Web Service on 06/12/2023 for Gemma Hopkins for the following area at Search using shape-file 21793_10km_Boundary with a buffer of 0 meters. Additional Info : Environmental Impact Assessment/ Development Application. Number of Aboriginal sites and Aboriginal objects found is 110

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SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
36-5-0085	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Valid			
	Contact T Russell	**Recorders**	L Nolan					**Permits**		
44-2-0193	MPA12	GDA	55	708621	6346588	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Navin Officer Heritage Consultants Pty Ltd,Mr.Adrian Cressey					**Permits**		
36-5-0198	Commissioners Lane-OS1	GDA	55	692596	6369047	Open site	Valid	Artefact : -		
	Contact	**Recorders**	OzArk Environmental and Heritage Management - Dubbo,Miss.Stephanie Rusden					**Permits**		
36-5-0227	BWF AS37	GDA	55	709664	6374683	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Eco Logical Australia Pty Ltd - Sydney - Individual users,Ms.Jennifer Norfolk					**Permits**		
36-5-0228	BWF AS38	GDA	55	709899	6374749	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Eco Logical Australia Pty Ltd - Sydney - Individual users,Ms.Jennifer Norfolk					**Permits**		
36-5-0229	BWF AS40	GDA	55	710306	6374774	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Eco Logical Australia Pty Ltd - Sydney - Individual users,Ms.Jennifer Norfolk					**Permits**		
36-5-0230	BWF AS39	GDA	55	710236	6374703	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Eco Logical Australia Pty Ltd - Sydney - Individual users,Ms.Jennifer Norfolk					**Permits**		
36-5-0261	BWF AS1	GDA	55	710665	6370387	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Eco Logical Australia Pty Ltd - Sydney - Individual users,Ms.Jennifer Norfolk					**Permits**		
36-5-0262	BWF AS2	GDA	55	710956	6370010	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Eco Logical Australia Pty Ltd - Sydney - Individual users,Ms.Jennifer Norfolk					**Permits**		
36-5-0263	BWF AS3	GDA	55	711141	6369745	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Eco Logical Australia Pty Ltd - Sydney - Individual users,Ms.Jennifer Norfolk					**Permits**		
36-5-0264	BWF AS4	GDA	55	711578	6369600	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Eco Logical Australia Pty Ltd - Sydney - Individual users,Ms.Jennifer Norfolk					**Permits**		
36-5-0271	BWF AS12	GDA	55	712049	6373283	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Eco Logical Australia Pty Ltd - Sydney - Individual users,Ms.Jennifer Norfolk					**Permits**		
36-5-0273	KCWF SU1 12	GDA	55	692446	6347735	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	ERM Brisbane,Miss.Mia Linton-Smith					**Permits**		
36-5-0274	KCWF SU1 08	GDA	55	692413	6347989	Open site	Valid	Stone Arrangement : -		
	Contact	**Recorders**	ERM Brisbane,Miss.Mia Linton-Smith					**Permits**		
36-5-0275	KCWF SU1 07	GDA	55	692998	6347294	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	ERM Brisbane,Miss.Mia Linton-Smith					**Permits**		
36-5-0276	KCWF SU1 06	GDA	55	693139	6347049	Open site	Valid	Modified Tree (Carved or Scarred) : -		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 21793

Client Service ID : 846630

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
44-2-0338	KCWF SU1 16	GDA	55	692673	6346249	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
44-2-0341	KCWF SU1 31	GDA	55	691887	6346846	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
44-2-0344	KCWF SU1 01	GDA	55	693121	6346446	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
44-2-0345	KCWF SU1 02	GDA	55	692764	6346674	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
44-2-0346	KCWF SU1 15	GDA	55	692708	6346394	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
44-2-0347	KCWF SU1 14	GDA	55	692776	6346282	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
44-2-0348	KCWF SU1 13	GDA	55	692705	6346292	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0277	KCWF SU1 11	GDA	55	692502	6347779	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
44-2-0352	KCWF SU1 32	GDA	55	692107	6346874	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0278	KCWF SU1 33	GDA	55	690709	6347306	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0279	KCWF SU2 03	GDA	55	691186	6348827	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0280	KCWF SU2 01	GDA	55	691220	6348840	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		

Report generated by AHIMS Web Service on 06/12/2023 for Gemma Hopkins for the following area at Search using shape-file 21793_10km_Boundary with a buffer of 0 meters. Additional Info : Environmental Impact Assessment/ Development Application. Number of Aboriginal sites and Aboriginal objects found is 110

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
36-5-0281	KCWF SU2 04	GDA	55	693478	6348715	Open site	Valid	Modified Tree (Carved or Scarred) : -		
Contact		Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0282	KCWF SU2 05	GDA	55	693584	6348219	Open site	Valid	Artefact : -		
Contact		Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0284	KCWF SU2 02	GDA	55	691186	6348837	Open site	Valid	Artefact : -		
Contact		Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0285	KCWF SU1 05	GDA	55	692778	6347001	Open site	Valid	Modified Tree (Carved or Scarred) : -		
Contact		Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
44-2-0353	KCWF SU1 04	GDA	55	692717	6346815	Open site	Valid	Modified Tree (Carved or Scarred) : -		
Contact		Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0286	KCWF SU1 10	GDA	55	692487	6347784	Open site	Valid	Modified Tree (Carved or Scarred) : -		
Contact		Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0287	KCWF SU2 11	GDA	55	692991	6350160	Open site	Valid	Modified Tree (Carved or Scarred) : -		
Contact		Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0288	KCWF SU2 10	GDA	55	693514	6349173	Open site	Valid	Modified Tree (Carved or Scarred) : -		
Contact		Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0289	KCWF SU2 07	GDA	55	693517	6349101	Open site	Valid	Modified Tree (Carved or Scarred) : -		
Contact		Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0290	KCWF SU2 08	GDA	55	693623	6349341	Open site	Valid	Modified Tree (Carved or Scarred) : -		
Contact		Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0291	KCWF SU2 09	GDA	55	693769	6349324	Open site	Valid	Artefact : -		
Contact		Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0292	KCWF SU1 09	GDA	55	692364	6347984	Open site	Valid	Modified Tree (Carved or Scarred) : -		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 21793

Client Service ID : 846630

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0293	KCWF SU2 12	GDA	55	694088	6350479	Open site	Valid	Stone Quarry : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0294	KCWF SU3 01	GDA	55	695524	6348653	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0295	KCWF SU3 03	GDA	55	695418	6348475	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0296	KCWF SU3 04	GDA	55	695370	6347990	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0297	KCWF SU3 05	GDA	55	695316	6348501	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
44-2-0357	KCWF SU3 06	GDA	55	703788	6345412	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0298	KCWF SU3 02	GDA	55	695351	6348494	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0283	KCWF SU2 06	GDA	55	693525	6347953	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0299	KCWF SU4 03	GDA	55	700115	6350312	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0300	KCWF SU4 04	GDA	55	699804	6350889	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0301	KCWF SU4 05	GDA	55	699535	6350727	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0302	KCWF SU4 06	GDA	55	699542	6350919	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0303	KCWF SU4 01	GDA	55	698569	6351146	Open site	Valid	Artefact : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0304	KCWF SU1 30	GDA	55	690370	6349296	Open site	Valid	Stone Quarry : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		
36-5-0305	KCWF SU1 29	GDA	55	690343	6349286	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	ERM Brisbane,Miss.Mia Linton-Smith					Permits		

Report generated by AHIMS Web Service on 06/12/2023 for Gemma Hopkins for the following area at Search using shape-file 21793_10km_Boundary with a buffer of 0 meters. Additional Info : Environmental Impact Assessment/ Development Application. Number of Aboriginal sites and Aboriginal objects found is 110

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 21793

Client Service ID : 846630

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
36-5-0307	KCWF SU1 28	GDA	55	690498	6347783	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	ERM Brisbane,Miss.Mia Linton-Smith					**Permits**		
44-2-0360	KCWF SU1 03	GDA	55	692726	6346640	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	ERM Brisbane,Miss.Mia Linton-Smith					**Permits**		
36-5-0308	KCWF SU4 02	GDA	55	699801	6351242	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	ERM Brisbane,Miss.Mia Linton-Smith					**Permits**		

**** Site Status**

Valid - The site has been recorded and accepted onto the system as valid

Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 06/12/2023 for Gemma Hopkins for the following area at Search using shape-file 21793_10km_Boundary with a buffer of 0 meters. Additional Info : Environmental Impact Assessment/ Development Application. Number of Aboriginal sites and Aboriginal objects found is 110

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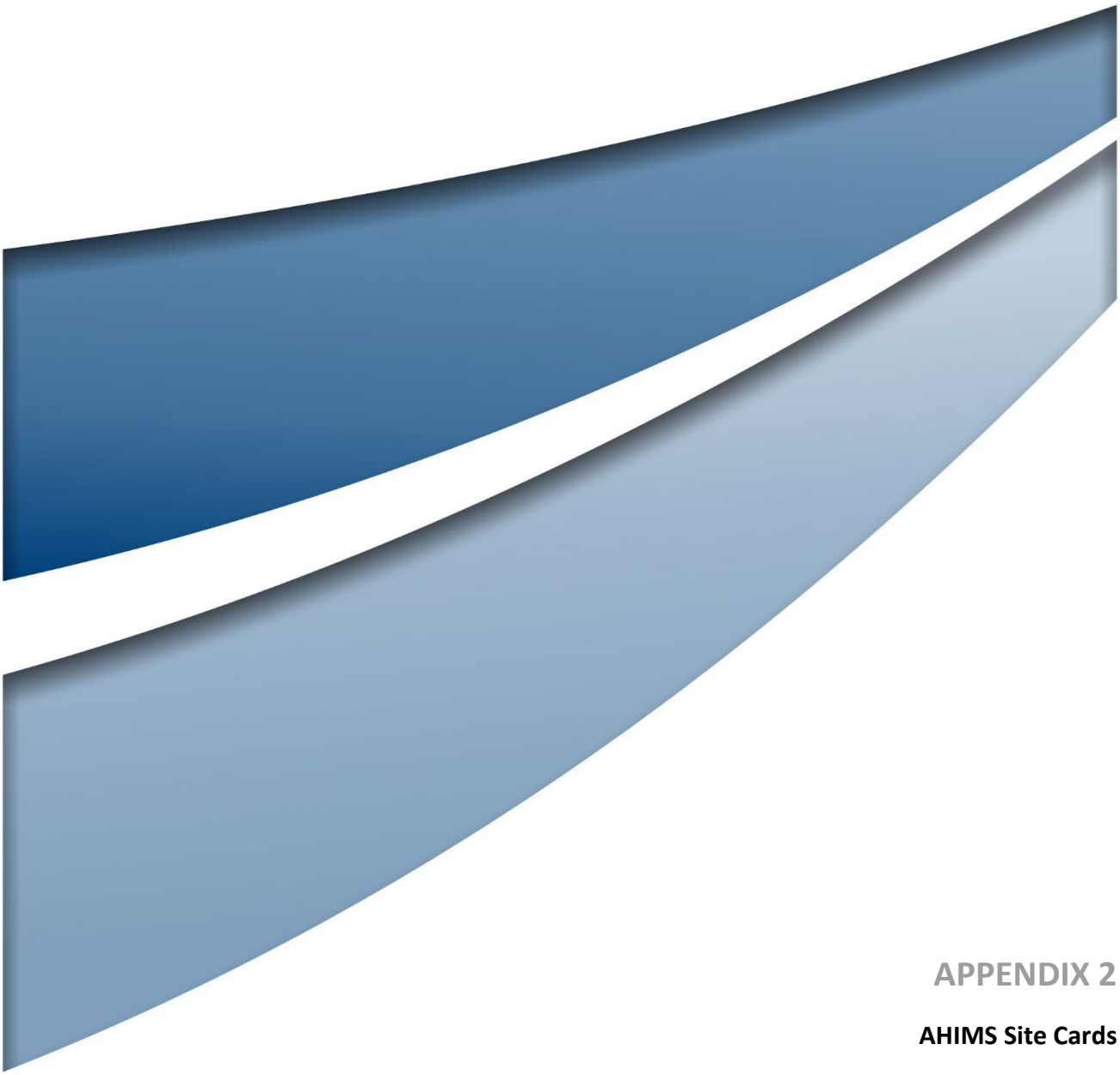


APPENDIX 2

AHIMS Site Cards

C-232

36-5-17

1. Map Name Dubbo.....Euchareena 8732 II & III
2. Scale 1:250 000 1:50 000
3. Grid ref 206 939 978 649
4. Site name(s) Stockyard Ck.1
5. Site No. .....
6. Site type .....
Open site.....
7. Classification .....

8. Air photo ref .....
9. Cadastral Wellington County, Boduldura Parish, Portion 89.....
10. Land Status Freehold..... 11. .....

12. Directions for site relocation
From Stuart Town proceed south for approximately 4km to Farnham Road, turn left, crossing the railway line , along the Farnham Rd for approximately 2.5kms to "Roslyn" property. Turn into property, pass the homestead. Going through a gate immediately behind the homestead, proceed for approximately 500m . Stop at dam on right and proceed east. Site is situated along base of contour bank and on slope to east of vehicle track.

13. Owner L.J.Stanford.....
Address "Roslyn"; Farnham, via....
Stuart Town.....
Attitude Enthusiatic to show site..

14. Tenant/Manager .
Address .....
.....
Attitude .....

36-5-0017

15. Site Description

Aboriginal open site with cores, grinding stone slabs, and flakes exposed in patches of rocky ground in paddock; approximate area 120m x 80m (960 m²). Exposure by ploughing, construction of contour banks, dams and general grazing. A number of artefacts damaged and displacement from in situ positions resulting from agricultural practices. Artefacts scattered over wide area including the holding banks of dams, but tend to be visible close to the intermittent stream which is a tributary of Stockyard Creek. Several artefacts present in exposed vehicular trackway. Site has been subject of selective amateur collection in 1960s. No charcoal, dietary, dietary remains or non lithic artefactual material present.

16. Reasons for investigation Wellington/Wallerawang Electricity transmission line survey.
17. Condition .....
Largely destroyed by ploughing and construction of dam and contour banks, also collections made from site.
18. Interpretation Open campsite.....
19. Visitation Easy access. 11,xii,81.....
20. Recommendations .....
.....

21. Environmental description of site locality

Site situated on a slight slope close to an intermittent or very small stream; now ploughed and graded.
Further details in report

---

22. Relation to other sites in locality

Within 3kms: Storkyard 4,5.

---

23. Details of artifact collections

none collected though amateurs have collected here in?1960s.

---

24. Is plan or diagram of site attached? Yes/

25. Are annotated photographs attached? Yes/ **How many?** 4

26. Other additions

---

27. Importance of site to Aborigines
none

28. Source of this information
Mr B Riley, Wellington.

---

29. Oral sources of information
Mr Stanford, 'Roslyn'.

30. Written references
L.Cubis, An archaeological report on the proposed Wallerawang/Wellington 330kV Power Transmission line.

---

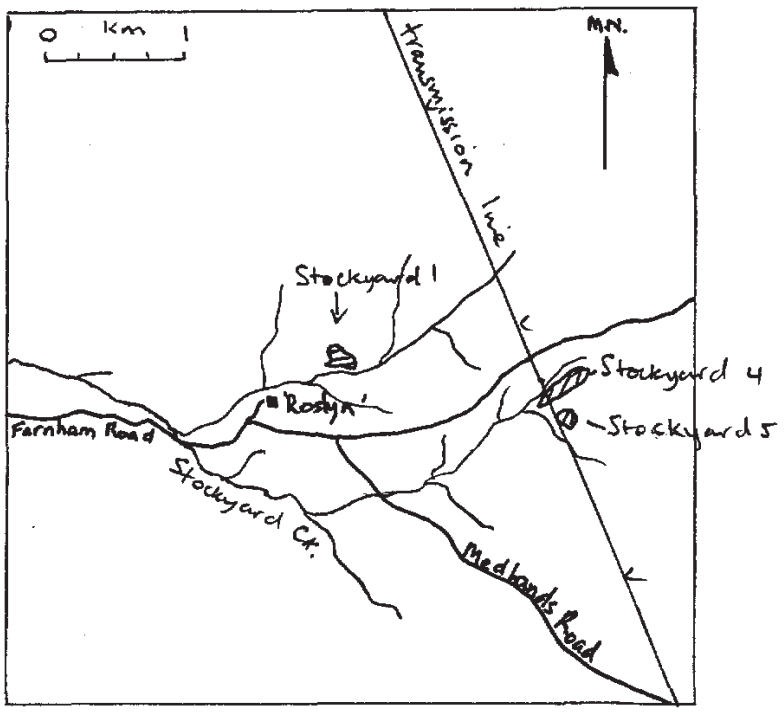
31. Recorded by L.Cubis **Filed by**

21/7/82

Address PO Box 43, Holme Building,
University of Sydney.NSW.2006.

Date 3.i.82 **Date**

Figure 5: Location of the site 36-577



SITE

JMH.

C-232

36-5-25

1. Map Name Dubbo Euchareena 8732.II.&.III 5. Site No.
2. Scale 1:250 000 1:50 000 6. Site type
3. Grid ref 211 929 017 550 Open site
4. Site name(s) Backwater Ck.3 7. Classification

8. Air photo ref
9. Cadastral County Wellington, Curragurra Parish, Portion 8;
10. Land Status Free hold 11.

12. Directions for site relocation

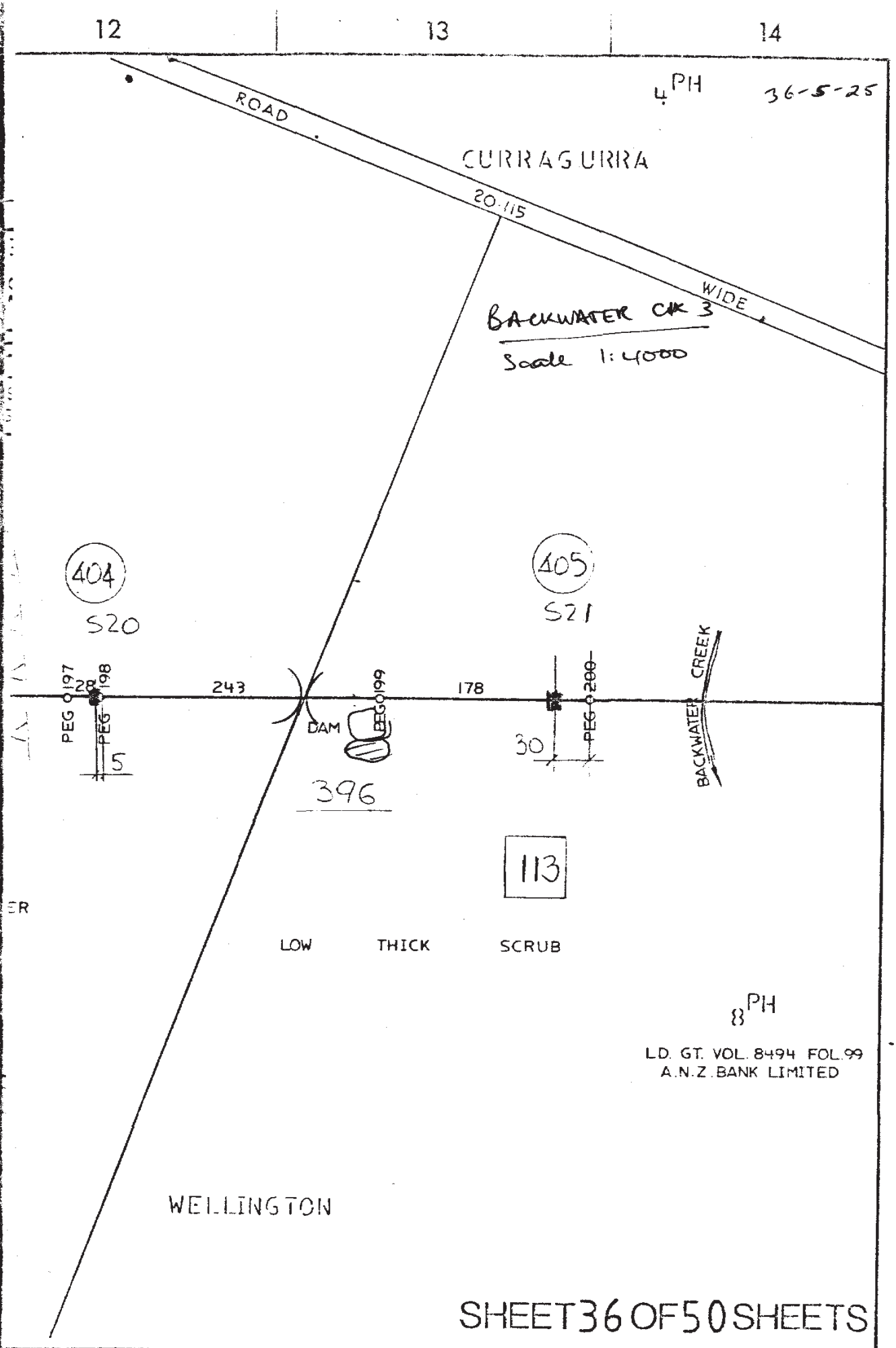
From Euchareena proceed north towards Store Creek for approximately 2kms, take left turn to "Mt Top" and "Wumble" properties. Continue to "Mt Top" for approximately 1.5kms and then turn into this property. Pass homestead and farm buildings and proceed east for approximately 3kms. Take left turh for approximately 1km. Track ends at Backwater Creek. Follow creek downstream for approximately 350m where a small tributary comes in from the north east. Proceed in a NE direction for 125m over a ridge and then following the same direction, pass to the east of a dam. The site is on a NE track close to the dam.

13. Owner ANZ Bank Ltd. 14. Tenant/Manager unknown
Address Address
Attitude not visited Attitude

15. Site Description

Small open site situated on slope and stock tracks leading into dam. Deposit largely destroyed by erosion following construction of dam. Five (5) artefacts scattered on slope and site may have contained a much larger number. Core and flakes represented. Raw materials: white quartz. Site located in broad valley; approximately 500m to permanent stream.

16. Reasons for investigation Wellington/Wellerawang Electricity Transmission Line survey.
17. Condition Eroding out of trackway.
18. Interpretation Possibly part of larger open campsite of Backwater 2; an open campsite on floor of narrow valley.
19. Visitation 12.xii.81
20. Recommendations See report

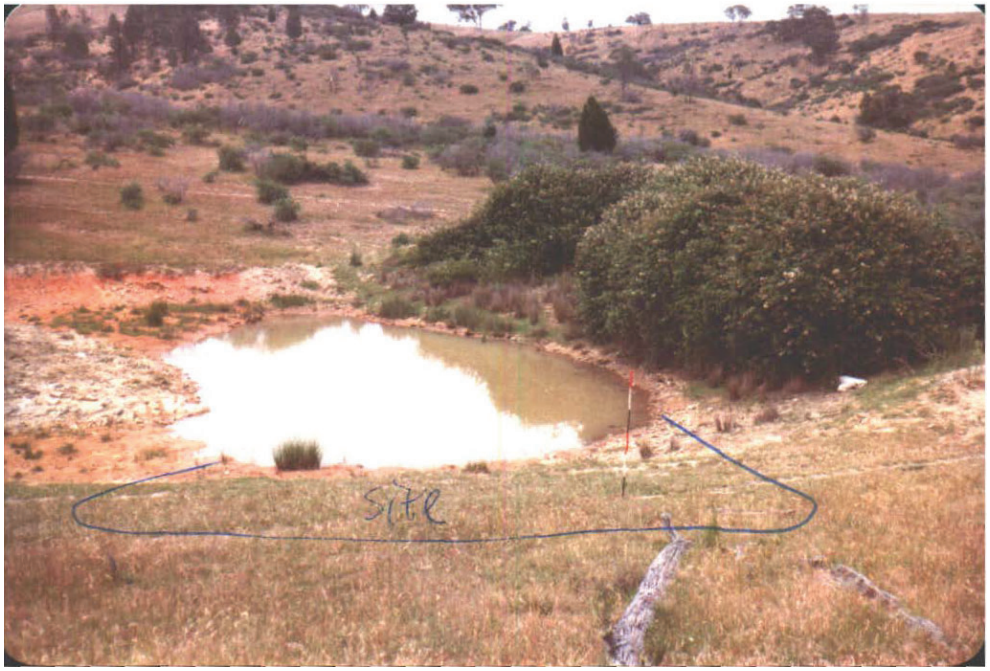


SHEET 36 OF 50 SHEETS

SION OF NEW SOUTH WALES
ON DIVISION

PLAN

CHIEF ENGINEER — DATE


Site

C232

1. Map Name Dubbo Euchareena 8732 II & III 5. Site No. 36-5-26
2. Scale 1:250 000 1:50 000 6. Site type
3. Grid ref 211 929 017 552 Open site
4. Site name(s) Backwater Ck 2 7. Classification

8. Air photo ref
9. Cadastral County Wellington, Curragurra Parish, Portion 8
10. Land Status Land Grant 8494 Fol 99 11.

12. **Directions for site relocation**
From Euchareema proceed north towards Store Creek for approximately 2kms, take left turn to "Mt Top" and "Wumble" properties. Continue to "Mt Top" for approximately 1.5kms and turn into this property. Pass homestead and farm buildings and proceed east for approximately 3kms. Take left hand turn for approximately 1km. Track ends at Backwater Ck. Follow Ck downstream for approximately 350m where a small tributary of Backwater Ck comes in from the northeast. Site is opposite this junction, approximately 10m south of Backwater Ck.

13. Owner ANZ Bank Ltd. 14. Tenant/Manager unknown
Address Address
Attitude Attitude

36-5-0026

15. **Site Description**

Small open site, approximately 20m x 30m (600m^2), close to small permanent stream. Artefacts exposed in stocktracks but otherwise undisturbed. Thirty (30) flakes and a core represented at this site. Most of these artefacts are small and bladelike. Core has some flake scars partially encrusted with lichen. Some flakes possibly used but others have weathered with exposure. Some charcoal eroding out of stock tracks but this is an indefinite association with artefacts; no apparent hearth is visible. Site is within 30m of permanent stream in a broad undulating valley.

16. Reasons for investigation Wellington/Wallerawang Electricity Transmission line survey.
17. Condition Intact, artefacts eroding along foot tracks but not visible in vegetated areas.
18. Interpretation Small campsite, possibly manufacturing site.
19. Visitation Rare 12.xii.81
20. Recommendations

21. **Environmental description of site locality**

Small valley close to semi-permanent stream.
Further details see report.

---

22. **Relation to other sites in locality**

Backwater 3 nearby.

---

23. **Details of artifact collections**

none collected

---

24. **Is plan or diagram of site attached?** **Yes/~~No~~**

25. **Are annotated photographs attached?** **Yes/~~No~~** **How many?** 6

26. **Other additions**

---

27. Importance of site to Aborigines unknown to Aborigines

28. Source of this information

---

29. Oral sources of information none

30. Written references Cubis, Archaeological report of the Wallerawang/Wellington Transmission Line.

---

31. Recorded by L.Cubis
PO Box 43, Holme Building,
University of Sydney.NSW.2006.

Address

3.i.82

Date

Filed by

21/7/82

Date

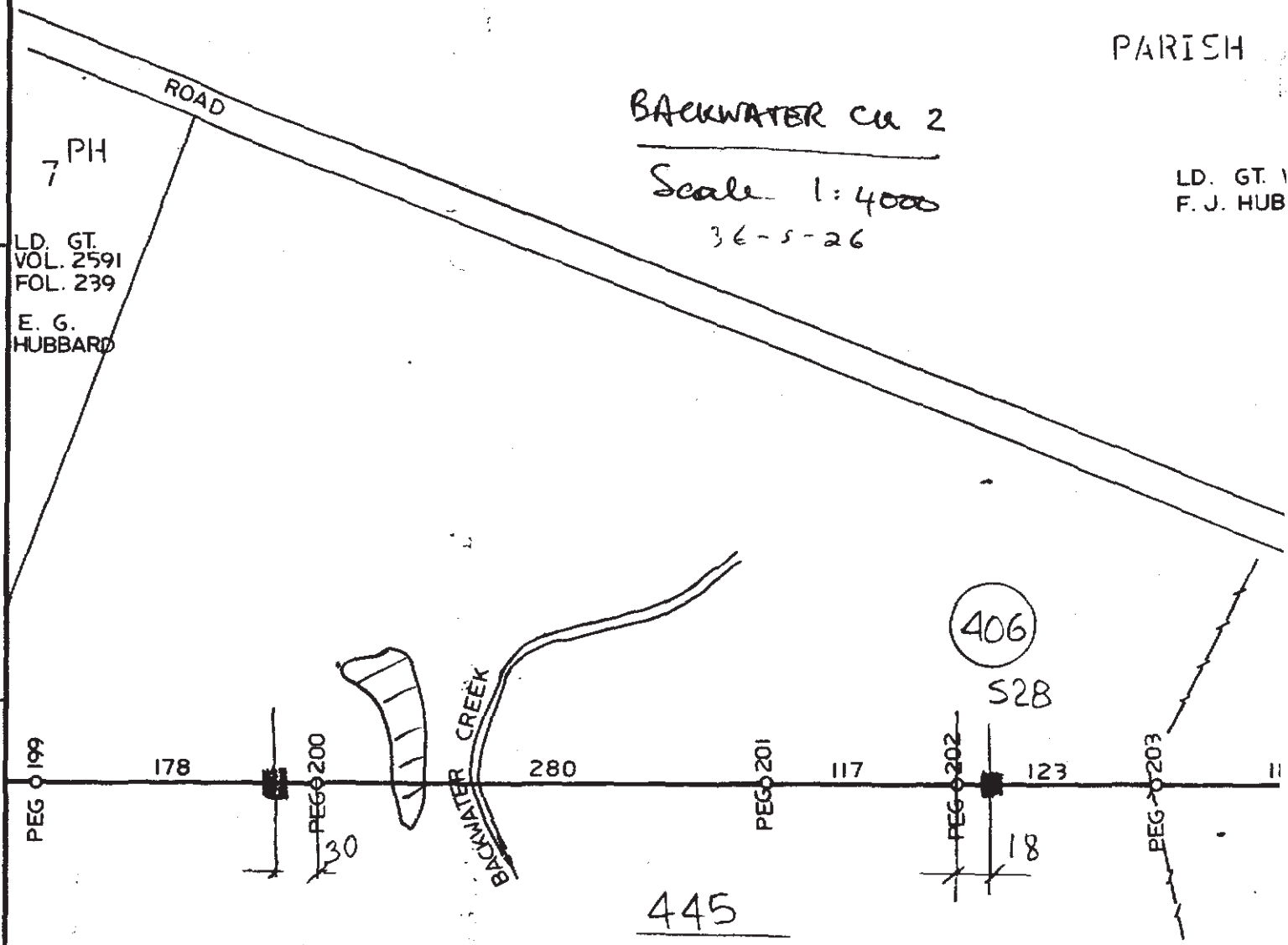
AME & PRI

A

B

1 2 3

UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN METRES



LOW THICK SCRUB OPEN

LD. GT. VOL. 8494 FOL. 99
A.N.Z. BANK LIMITED

C

D

COUNTY

C232

1. Map Name Dubbo.....Euchareena 8732 II & III 5. Site No. 36-5-29
2. Scale ...1:250.000....1:50.000..... 6. Site type .....
3. Grid ref 207.939.....995.642..... Open campsite.....
4. Site name(s) Stockyard Gk 5. ..... 7. Classification .....
8. Air photo ref .....
9. Cadastral Wellington County, Parish Bodulura, Portion 84; .....
10. Land Status Freehold..... 11. .....

12. Directions for site relocation

From Stuart Town proceed south for approximately 4kms to Farnham. Turn left, immediately crossing the railway line, continue for approximately 4.25kms to stockyards and a gate on the right. Go through the gate, cross a gully and turn sharp right towards a fence. Going through the gate on this fence, proceed for approximately 200m. The site is on the left of the farm track on a slight ridge.

13. Owner P A Stanford ..... 14. Tenant/Manager ..
Address "Medlands", Farnham. via Stuart Town. Address .....
....
Attitude Knows of sites, but busy. Attitude .....

36-5-0029

15. Site Description

Open site, 52m x 25m (1,300m^2), on slight ridge, with artefacts lying on surface. Possible deposit but ploughing has disturbed part of the site. Artefacts include cores, chopper, and flakes. Several cores have lichen growing on flake scars. Artefactual raw material includes light blue chert, quartzite and white quartz; artefacts number 103. No organic remains at site. In a wide valley with permanent water.

16. Reasons for investigation Wellington/Wallerawang Electricity Transmission line survey.
17. Condition .....
Area may have been ploughed once, but otherwise undisturbed.
18. Interpretation Open campsite .....
19. Visitation Relatively easy access. 11.xii.81.....
20. Recommendations .....
.....

21. **Environmental description of site locality**

Narrow valley floor near intermittent or semi-permanent stream. Further details in report.

---

22. **Relation to other sites in locality**

Within 3kms: Stockyard 4, 3,2,1.

---

23. **Details of artifact collections**

None made

---

24. **Is plan or diagram of site attached?** Yes/~~No~~

25. **Are annotated photographs attached?** NO ~~Yes/No~~ **How many?**

26. Other additions

---

27. Importance of site to Aborigines unknown to Aborigines

28. Source of this information

---

29. Oral sources of information none

30. Written references Cubis. Archaeological report on Wallerawang/Wellington Transmission Line.

---

31. **Recorded by** L.Cubis
PO Box 43, Holme Building,
University of Sydney.2006.

Filed by

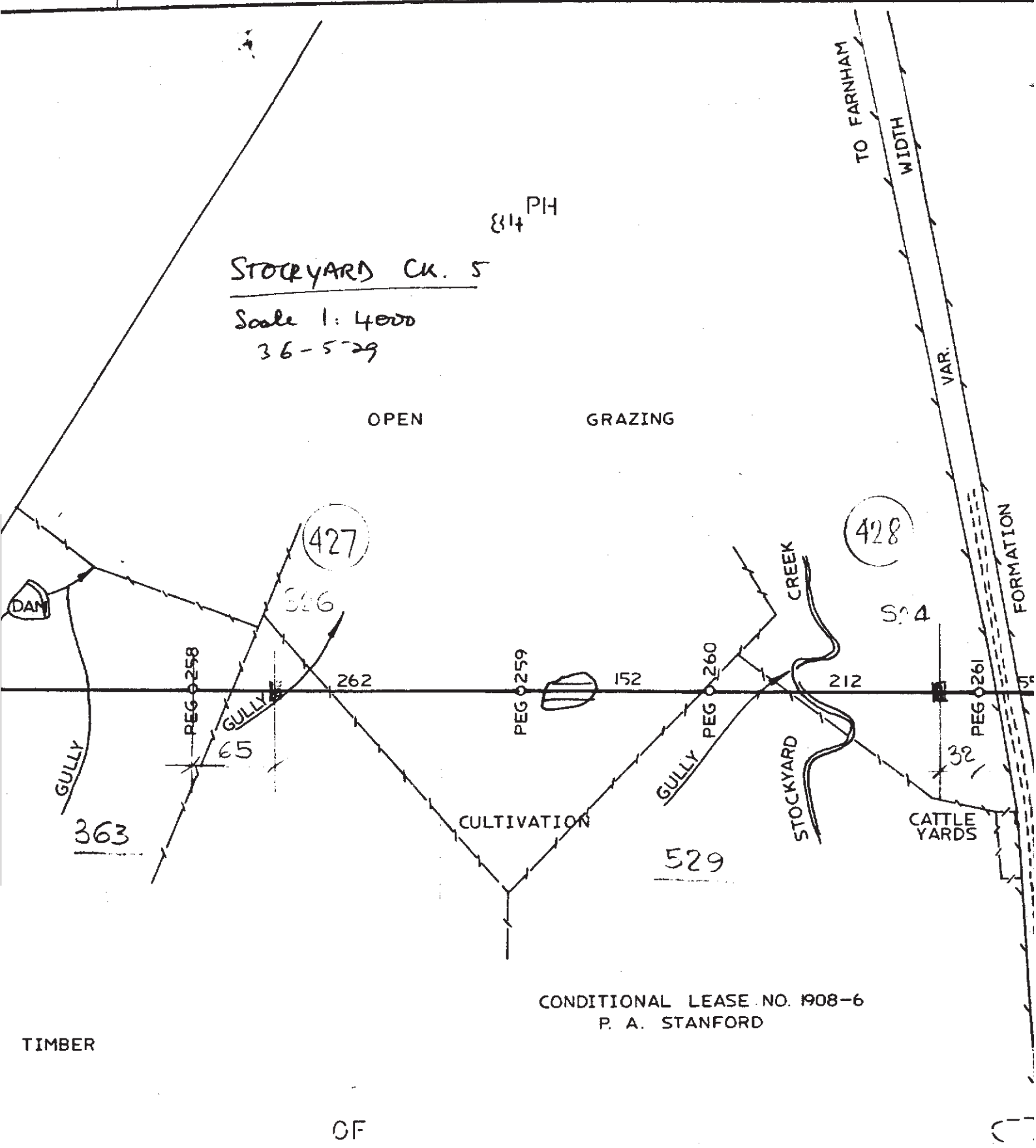
Address

3.1.82

21/7/82

Date

Date



SURVEY BRANCH | REPRESENTATIVE FRACTION 1:4000

44

1. Map Name Dubbo.....Euchareena 8752 II & III 5. Site No. 36-5-30
2. Scale ...1:250.000..1:50.000..... 6. Site type .....
3. Grid ref 207.939....995.645 ..... Open site.....
4. Site name(s) Stockyard Ck 4 ..... 7. Classification .....

8. Air photo ref .....
9. Cadastral County Wellington; Parish Bodulura; Portion 84.....
10. Land Status Freehold..... 11. .....

12. Directions for site relocation
From Stuart Town proceed south for approximately 4kms to Farnham. Turn left, imm ediatly crossing the railway line, continue for approximately 4.25kms to stockyards and a gate on the right. Go through the gate, cross a gully and steep slope on the opposite side. This is the north western boundary of the site.

36-5-0030

13. Owner P A Stanford..... 14. Tenant/Manager ....
Address "Medlands", Farnham, via Stuart Town. Address .....
....
Attitude Knows of sites, but very busy. Attitude .....

15. Site Description

Extensive open site, approximately 800m x 35m (38,000m^2) along banks of Stockyard Creek with areas of artefacts and potential deposit. Artefacts in two areas of deposit have been damaged by clearing and bulldozing; some scattering of artefacts in these areas. Minor erosion along small gullies, vehicular track and stock tracks. Several areas of flaking with small cores, flakes and spalding flakes in undisturbed deposit intact. Possibly up to 1500 to 2000 artefacts represented at site. Stone artefacts include grinding slabs, choppers, cores, scrapers, and flakes; raw materials include white and crystalline quartz, chalcedoney, dark blue/pink/light blue-green/grey chert, and quartzite. Site is located near permanent water in a wide valley which may have originally been open woodland with grassy understorey.

... /

16. Reasons for investigation Wellington/Wallerawang Electricity Transmission line survey.
17. Condition ..... C232 .....
Some areas of site in situ, others extensively disturbed by ploughing and bulldozing.
18. Interpretation Aboriginal campsite and tool manufacture site.....
19. Visitation Relatively easy access....11,xii,81.....
20. Recommendations .....
.....

4

21. Environmental description of site locality

Narrow valley floor near intermittent and small stream. Further details in report.

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22. Relation to other sites in locality

Within 3kms: Stockyard 1, 2, 3,5.

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23. Details of artifact collections

None collected

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24. Is plan or diagram of site attached? **Yes/**

25. Are annotated photographs attached? **Yes/** **How many?** 10

26. Other additions

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27. Importance of site to Aborigines unknown to Aborigines

28. Source of this information

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29. Oral sources of information none

30. Written references Cubis, Archaeological report on the proposed Wallerawang - Wellington Transmission line.

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31. **Recorded by** L.Cubis
PO Box 43, Holme Building,
University of Sydney.2006.

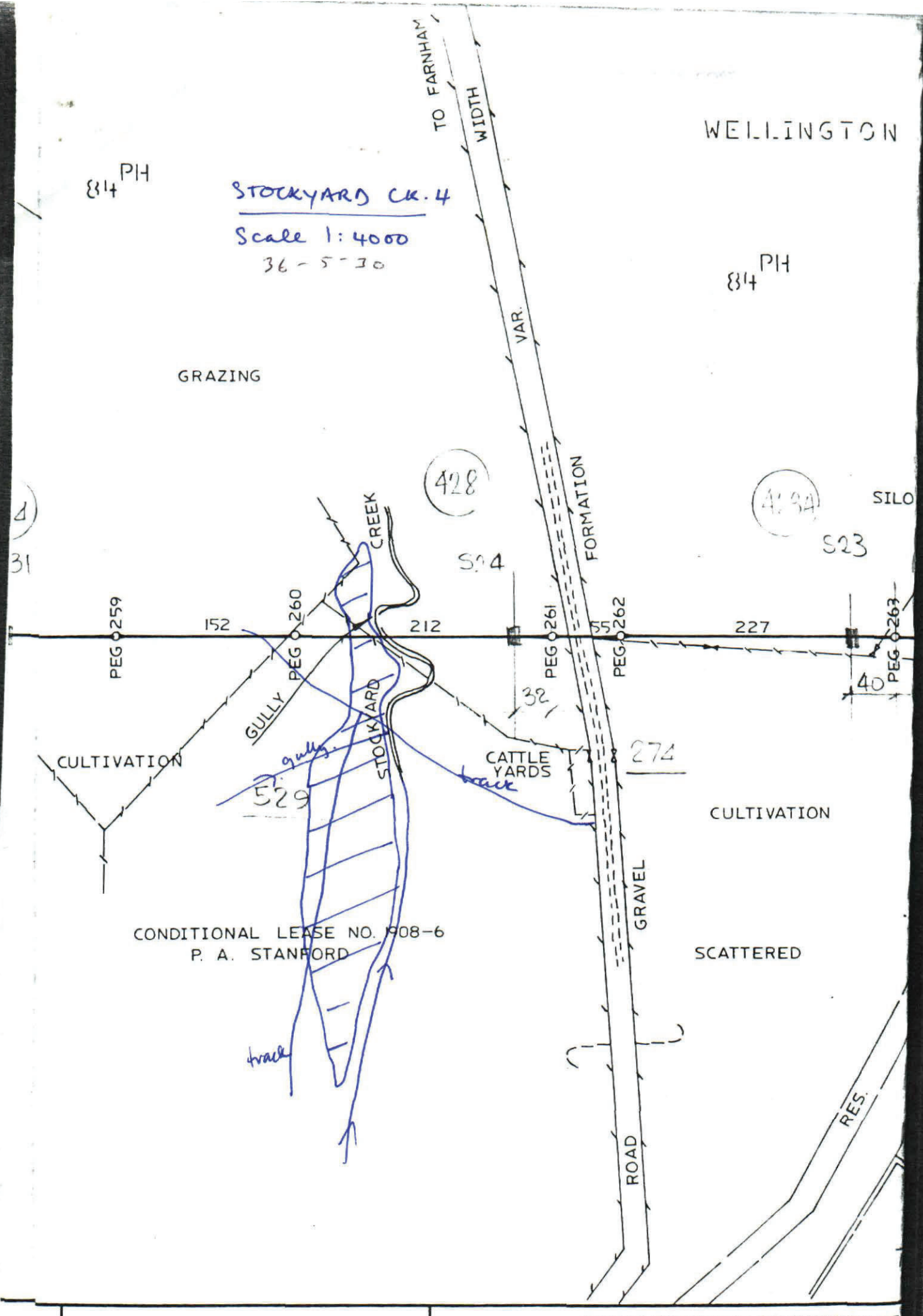
Address 3.i.82

Date

Filed by

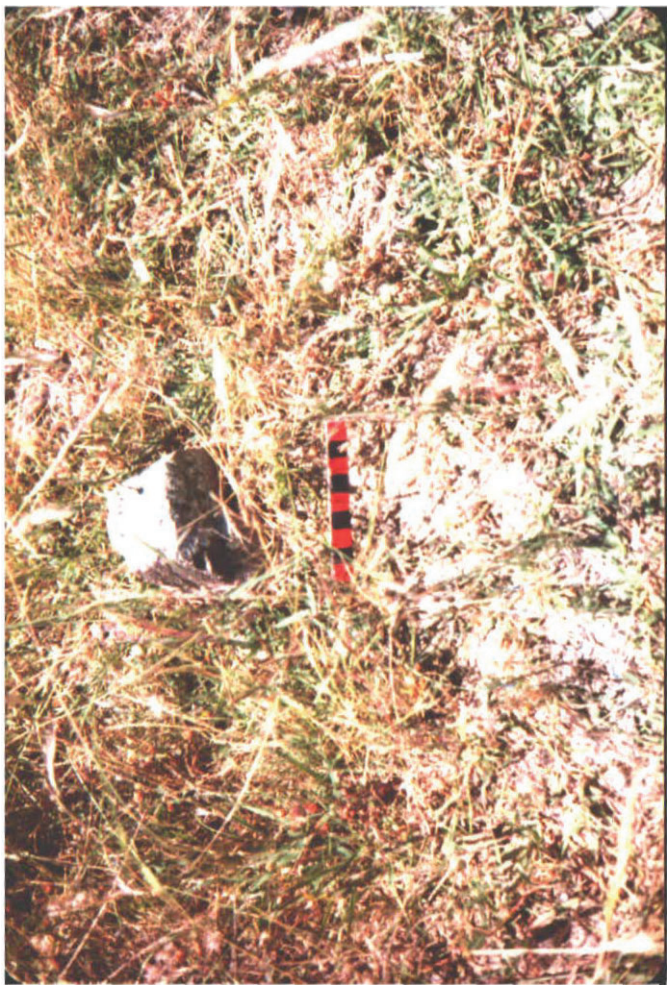
21/7/82

Date



REPRESENTATIVE FRACTION 1:4000	THE ELECTRICITY COMMISSION OF TRANSMISSION DIVI
REFERENCE DRAWINGS	ROUTE

SITE



APPENDIX 9

Schedule of Land

Appendix 9 Schedule of Land

Lot/Section/DP	Street Address
121/-/DP722857	1000 MOOKERAWA ROAD FARNHAM
34/-/DP756879	1016 BUNDALAH ROAD EUCHAREENA
4/-/DP1130249	1115 BUNDALAH ROAD EUCHAREENA
34/-/DP756866	124 STORE CREEK ROAD STUART TOWN
2/-/DP1130249	1257 BUNDALAH ROAD EUCHAREENA
91/-/DP756875	129 MOUNT TOP ROAD EUCHAREENA
1/-/DP1130249	1316 BUNDALAH ROAD EUCHAREENA
107/-/DP756893	140 MEDLANDS ROAD FARNHAM
68/-/DP756866	
64/-/DP756866	
63/-/DP756866	
67/-/DP756866	
82/-/DP756866	
53/-/DP756893	
84/-/DP756866	
61/-/DP756875	179 BUNDALAH ROAD EUCHAREENA
46/-/DP756875	184 GLENCRAIGIE ROAD EUCHAREENA
24/-/DP756866	219 MOUNT AQUILA ROAD FARNHAM
29/-/DP756866	
47/-/DP756866	
1/-/DP241555	
26/-/DP756866	
122/-/DP722857	
2/-/DP617035	
1/-/DP1260062	
2/-/DP1260062	
1/-/DP617035	221 MOUNT AQUILA ROAD FARNHAM
85/-/DP756866	223 FARNHAM ROAD FARNHAM
86/-/DP756866	
1/-/DP1206393	
342/-/DP43501	260 MOOKERAWA ROAD MOOKERAWA
1/-/DP1280100	2921 EUCHAREENA ROAD EUCHAREENA
1/-/DP182567	296 STORE CREEK ROAD EUCHAREENA

Lot/Section/DP	Street Address
52/-/DP756866	
54/-/DP756866	
33/-/DP756866	296 STORE CREEK ROAD STUART TOWN
1/-/DP756866	
53/-/DP756866	
2/-/DP1124869	
3/-/DP1124869	
40/-/DP756866	35 DAFONTE LANE FARNHAM
80/-/DP756866	
4/-/DP241555	
3/-/DP241555	
81/-/DP756866	
98/-/DP756866	
50/-/DP737225	371 BUNDALAH ROAD EUCHAREENA
55/-/DP737224	
49/-/DP737225	
54/-/DP737224	
46/-/DP704143	
52/-/DP737224	
B/-/DP378939	
73/-/DP756875	
1/-/DP972405	
2/-/DP182567	
1/-/DP972404	
1/-/DP721278	
3/-/DP756879	
A/-/DP378939	
1/-/DP405560	
100/-/DP1087500	
101/-/DP1087500	
53/-/DP737224	371 MOUNT TOP ROAD EUCHAREENA
51/-/DP737224	
1/-/DP728770	511 BUNDALAH ROAD EUCHAREENA
65/-/DP756866	
41/-/DP756879	
73/-/DP756893	558 MOUNT AQUILA ROAD MOUNT AQUILA

Lot/Section/DP	Street Address
74/-/DP756893	
15/-/DP756879	596 BUNDALAH ROAD EUCHAREENA
16/-/DP756879	
1/-/DP706289	681 BUNDALAH ROAD EUCHAREENA
64/-/DP756893	688 MOOKERAWA ROAD MOOKERAWA
100/-/DP756893	
91/-/DP756893	
162/-/DP630516	
163/-/DP630516	
47/-/DP756893	
88/-/DP756893	
12/-/DP756893	689 MOUNT AQUILA ROAD MOUNT AQUILA
77/-/DP756893	
78/-/DP756893	
33/-/DP756893	693 MOUNT AQUILA ROAD MOUNT AQUILA
72/-/DP756875	70 BUNDALAH ROAD EUCHAREENA
70/-/DP756866	71 STORE CREEK ROAD STUART TOWN
1/-/DP1218566	
66/-/DP756866	749 BUNDALAH ROAD EUCHAREENA
2/-/DP706289	
4/-/DP706289	809 BUNDALAH ROAD EUCHAREENA
3/-/DP706289	881 MOUNT TOP ROAD EUCHAREENA
1/-/DP1218286	
60/-/DP756893	884 MOOKERAWA ROAD MOOKERAWA
68/-/DP756893	MOOKERAWA ROAD MOOKERAWA
65/-/DP756893	
124/-/DP756866	MOUNT AQUILA ROAD FARNHAM
100/-/DP731439	MOUNT AQUILA ROAD MOUNT AQUILA
343/-/DP43501	N/A
7009/-/DP1209935	

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Environmental & Social
Consultants

Umwelt (Australia) Pty Limited

T| 1300 793 267 E| info@umwelt.com.au www.umwelt.com.au