

Lambruk Solar Project

Scoping Report

VENN ENERGY PTY LTD

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Document review

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Disclaimer

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Abbreviations

Abbreviation	Definition
ABS	Australia Bureau of Statistics
AC	Alternating Current
ACHA	Aboriginal Cultural Heritage Assessment
AEMO	Australian Energy Market Operator
AHIMS	Aboriginal Heritage Information Management System
AQC	Air Quality Category
BAM	Biodiversity Assessment Method
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
BOM	Bureau of Meteorology
BSAL	Biophysical Strategic Agricultural Land
CBF	Community Benefit Fund
CIA	Cumulative Impact Assessment
CIA Guidelines	Cumulative Impact Assessment Guidelines for State Significant Projects
Conveyancing Act	<i>Conveyancing Act 1919</i>
CSMP	Community and Stakeholder Management Plan
dB	Decibel
dB(A)	Adjusted decibel
DC	Direct Current
DCP	Development Control Plans
DP	Deposited Plan
DPE	NSW Department of Planning and Environment
DPHI	NSW Department of Planning, Housing and Infrastructure (formerly DPE)
EIIA Act	<i>Electricity Infrastructure Investment Act (NSW)</i>
EIS	Environmental Impact Statement
EIS Guidelines	State Significant infrastructure guidelines – preparing an environmental impact statement
EMFs	Electromagnetic Fields
Engagement Guidelines	Undertaking Engagement Guidelines for State Significant Projects
EPA	Environment Protection Agency
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2021 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
EMF	Electromagnetic Field
ESD	Ecologically Sustainable Development
EST	Energy Security Target
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>

Abbreviation	Definition
FTE	Full-time Equivalent
GHG	Greenhouse gas
GWh	Gigawatt hour
HV/MV	High-Voltage/Medium-Voltage
IBRA	Interim Biogeographic Regionalisation for Australia
ICNG	Interim Construction Noise Guideline
INL	Intrusive Noise Level
IPC	Independent Planning Commission
km/h	Kilometres per hour
kV	Kilovolt
LEP	Local Environment Plan
LGA	Local Government Area
Line 84	TransGrid 330 kV electricity transmission line from Tamworth to Liddell
LLS Act	<i>Local Land Services Act 2013</i> (NSW)
LSC	Land and Soil Capability
LSSE Guideline	Large-Scale Solar Energy Guideline
LUCRA	Land Use Conflict Risk Assessment
LVIA Technical Supplement	Large-Scale Solar Energy Guideleines Technical Supplement – Landscape and Visual Impact Assessment
mAHD	Metres Australian Height Datum
MNES	Matters of National Environmental Significance
MW	Megawatt
MWh	Megawatt hour
NEM	National Electricity Market
Net Zero Plan	NSW Government Net Zero Plan Stage 1: 2020–2030
NPI	Noise Policy for Industry
NPW Act	<i>National Parks and Wildlife Act 1974</i> (NSW)
NT Act	<i>Native Title Act 1993</i> (Cth)
PANL	Project Amenity Noise Level
PAT	Visual Assessment Preliminary Assessment Tool
PBAR	Preliminary Biodiversity Assessment Report
PBP	Planning for Bushfire Protection Guideline 2019
PCT	Plant Community Type
PCU	Power Conversion Unit
Phase 1 SIA	Phase 1 social impact assessment
Planning Systems SEPP	State Environmental Planning Policy (Planning Systems) 2021
PINL	Project Intrusive Noise Level
PLVIA	Preliminary Landscape and Visual Impact Assessment

Abbreviation	Definition
PNA	Preliminary Noise Assessment
PNTL	Project Noise Trigger Level
PM	Particulate Matter
PMST	Protected Matters Search Tool
PV	Photovoltaic
Ramsar	The Ramsar Convention on wetlands
Resilience and Hazards SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021
RBL	Rating Background Level
RET	Renewable Energy Target
REZ	Renewable Energy Zone
RNP	NSW Road Noise Policy
RNSW	Rest of New South Wales
Roads Act	<i>Roads Act 1993 (NSW)</i>
SAIL	Serious and Irreversible Impact
SAL	ABS Suburbs and Localities
Scoping Report Guidelines	State Significant Development Guidelines – preparing a scoping report
SEARs	Secretary’s Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SIA Guideline	Social Impact Assessment Guideline for State Significant Projects
SoHI	Statement of Heritage Impact
SSD	State Significant Development
Tamworth Regional LEP	Tamworth Regional Local Environmental Plan 2010
TEC	Threatened Ecological Communities
TfNSW	Transport for NSW
the Project	The proposed Lambruk Solar Project
the Roadmap	NSW Electricity Infrastructure Roadmap
TIA	Traffic Impact Assessment
TISEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021
Venn Energy or Applicant	Venn Energy Pty Ltd
VPA	Voluntary Planning Agreement
WM Act	<i>Water Management Act 2000</i>

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1. Introduction

1.1 Background

Venn Energy Pty Ltd ('Venn Energy' or 'Applicant') is proposing to develop the Lambruk Solar Project (the Project), approximately 15 kilometres (km) south of Tamworth, NSW. The Project would include photovoltaic (PV) solar arrays, a substation, a switchyard, a Battery Energy Storage System (BESS), internal access tracks, an office and amenities building(s) and onsite transmission lines.

The Project aims to provide a contribution to NSW's transition to renewable energy in accordance with Commonwealth, State and local emission reduction policies. The increase in renewable energy generation, supported by appropriate storage and transmission infrastructure, would reduce Australia's reliance on fossil fuels for electricity generation and the adverse impacts of climate change.

This Scoping Report has been prepared to support a request to the NSW Department of Planning, Housing and Infrastructure (DPHI) for the Secretary's Environmental Assessment Requirements (SEARs). The SEARs would guide the preparation of an EIS for the Project by identifying the matters to be assessed and the level of assessment required.

1.2 Applicant

Venn Energy is an Australian renewable energy development company, founded by Canadian developer Venn Energy Inc. and Aira Group, an owner operator of renewable energy systems in Europe.

In March 2019, Venn Energy and Aira Group entered into a long-term strategic partnership to develop over 1 GW of renewable energy (solar, wind and energy storage) projects in Australia. Venn Energy's current renewable energy project portfolio in Australia is presented in Figure 1.1.

The Banksia Solar Project in Queensland was the company's first development in Australia. The development application commenced in June 2019 and received approval from Bundaberg Regional Council in January 2021. The Banksia Solar Project is expected to commence construction in 2024. Other proposed projects include Boree Solar Project in NSW, and Cooba and Moonah Solar Projects in Victoria.

Venn Energy focuses on fostering respectful, transparent, and lasting relationships with stakeholders, particularly landowners and the local community, and are committed to providing access to clear information and seeking community input throughout the approval and development process. Venn Energy's key contacts and information sources are as follows:

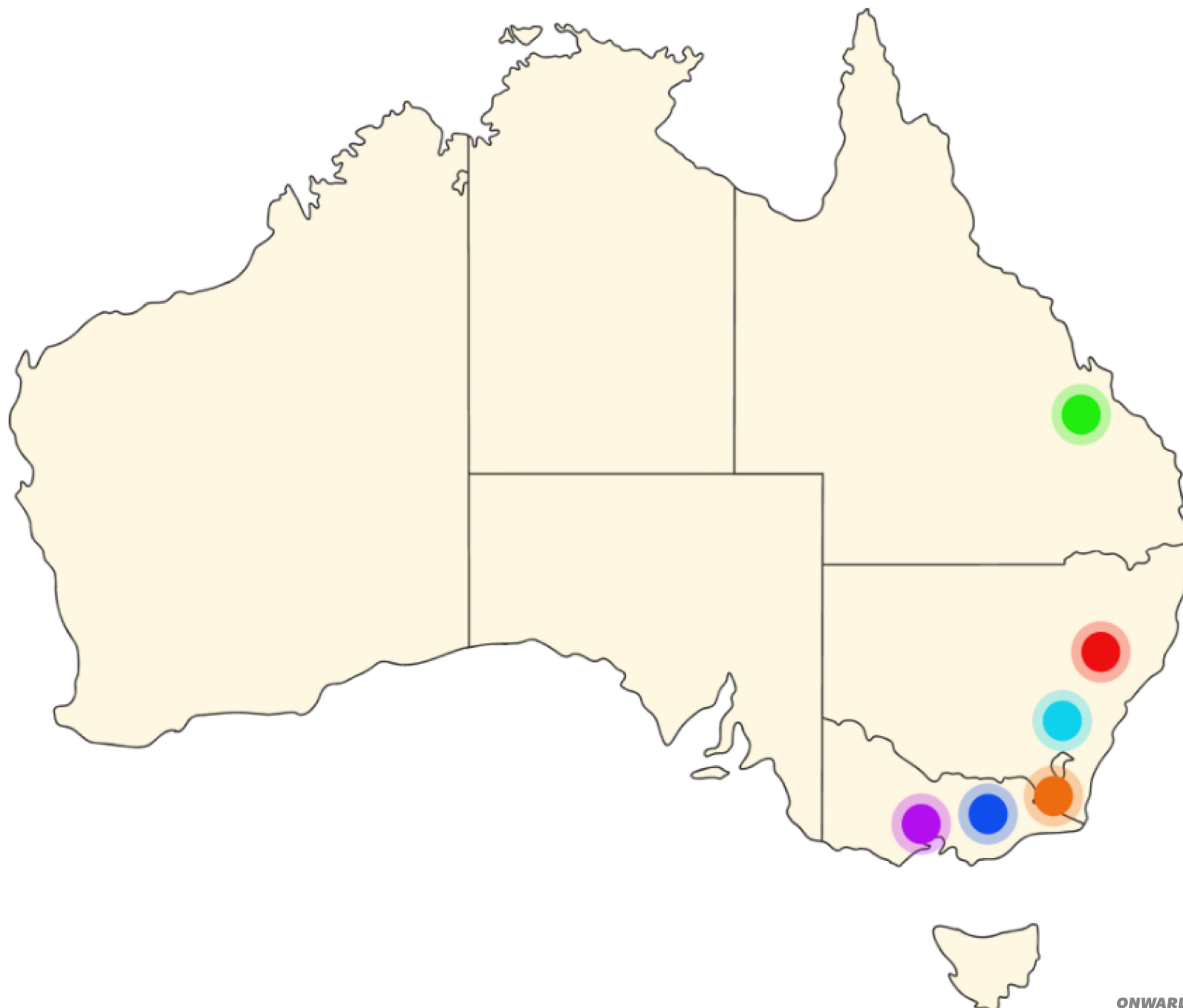
Company Name	Venn Energy Pty Ltd
Applicant ABN	42 632 214 674
Applicant Address	Level 22, Spencer Street 120, Melbourne, VIC, Australia, 3000
Project website	www.lambruksolarproject.com.au
Project email	info@lambruksolarproject.com.au

LAMBRUK SOLAR PROJECT

Venn Energy Solar Projects

Figure 1.1
LEGEND

-  Additional pipeline
-  Boree Solar Project
-  Moonah Solar Project
-  Lambruk Solar Project
-  Banksia Solar Project
-  Cooba Solar Project



1.3 Project overview

The Project would be wholly within Tamworth Regional Council Local Government Area (LGA), approximately 410 km north-west of Sydney and 580 km south-west of Brisbane. The Project Area extends across approximately 1,528 hectares (ha) with the Development Footprint consisting of solar arrays, BESS and supporting infrastructure to occupy approximately 1,003 ha. The location of the Project from a regional context is shown on Figure 1.2.

The Project would involve the construction, operation and decommissioning of a PV solar facility with a capacity of approximately 500 megawatt (MW) (direct current [DC]) and 300 MW (alternating current [AC]) that would supply electricity to the National Electricity Market (NEM), and a BESS with an indicative capacity of up to 300 MW / 1,200 megawatt hour (MWh).

The construction phase is expected to take approximately 24 months, with construction proposed to commence in 2025. It is anticipated that the Project would be operational from 2027 for 30 years. At the end of the proposed operational life, the solar farm would be maintained, replaced, or re-powered. The decommissioning phase would involve removal of all above ground infrastructure, and below ground infrastructure where practicable, and return of the site to its existing land capability. The switchyard would be a shared network asset and would not be removed during decommissioning.

A more detailed project description is provided in Section 3.

1.4 Impact avoidance and minimisation strategies

The Project would be designed to avoid and minimise impacts where practicable in consideration of the environmental values of the site, including waterways, soil resources, important habitat, heritage values and social values.

The indicative Project Layout has been designed to avoid areas of potentially high biodiversity value, including stands of vegetation and watercourses. Where there is a need for vehicle crossings of waterways these would be sited to minimise impacts to the form and function of waterways and to reduce disturbance to riparian vegetation.

The Project would include an onsite grid connection via the existing TransGrid 330 kilovolt (kV) overhead transmission line (Line 84) which traverses the Project Area. This avoids the requirement to construct additional infrastructure for grid connection, such as an 8 km transmission line to the Tamworth substation, hence avoiding additional potential environmental and social impacts.

As further investigations are completed and community and stakeholder engagement undertaken during preparation of the EIS, the indicative Project layout would be reviewed and refined to avoid and protect identified values where practicable. Specific management commitments would accompany the final Project description to ensure that impacts that cannot be avoided would be minimised to an acceptable level. This would include commitments specific to:

- soil resources and rehabilitation objectives in the decommissioning phase advised by an agricultural impact assessment;
- detailed assessment of impacts to local and regional agricultural industries;
- avoidance of important biodiversity features;
- buffers on waterways and commitments to best practice design and rehabilitation where water way crossings are required; and
- buffers on important heritage items and salvage programmes to be developed in consultation with Aboriginal stakeholders.

1.5 Objectives

The objectives of the Project are to:

- develop solar arrays with capacity of approximately 500 MW (DC) and 300 MW (AC) and BESS to store energy produced by the array, with a capacity of up to 300 MW / 1200 MWh;

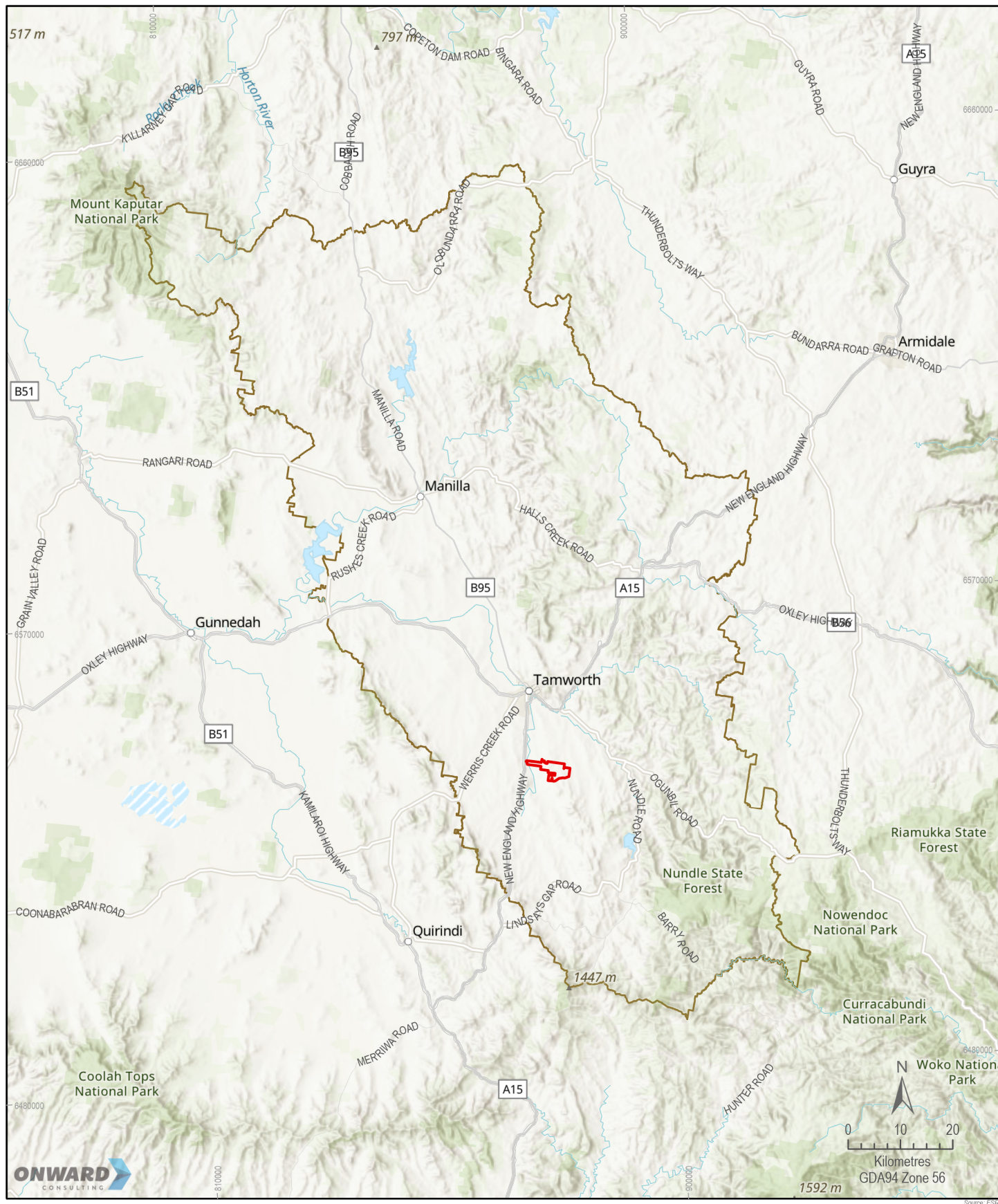
- minimise the economic, environmental and social impacts of the Project;
- deliver low-cost, renewable energy for sale on the NEM;
- support the NSW Government's target for net-zero emissions by 2050, and 75% reduction by 2035;
- provide direct and indirect employment opportunities during all stages of the Project; and
- work with landholders within and near the Project to maximise long-term financial benefits for the community through a Community Benefit Fund (CBF).

1.6 Purpose of this document

The Project is a State Significant Development (SSD) pursuant to the *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP), and approval for the Project is required under Part 4, Division 4.7 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). An Environmental Impact Statement (EIS) is required as the Project has a capital investment value exceeding \$30 million and is therefore classified as an SSD.

This Scoping Report has been prepared to support a request to the DPHI for the SEARs. The SEARs would guide the preparation of an EIS for the Project by identifying the matters to be assessed and the level of assessment required.

This Scoping Report has been prepared in accordance with the State Significant Development Guidelines – preparing a scoping report (DPE, 2022d) (Scoping Report Guidelines), and provides a description of the Project, including the site and its surroundings, the approval pathway and identifies key potential environmental matters that may be associated with the Project and proposed investigation and consultation with stakeholders.



LEGEND

- Project Area
- Tamworth Regional Council
- Highway
- Major roads



LAMBRUK SOLAR PROJECT

Regional Context of the Project Area
Figure 1.2

2. Strategic context

2.1 Alignment with Policy and Strategic Goals

Increased adoption of renewable energy generation would assist Australia to transition away from traditional fossil fuel energy production, which is linked to anthropogenic climate change, atmospheric, water, and land pollution, and human health impacts. Reducing carbon emissions through replacement of traditional energy sources with renewable energy would assist to minimise adverse effects of climate change, benefitting current and future generations in line with the principles of Ecologically Sustainable Development (ESD).

In addition to achieving the objectives outlined in Section 1.4, the Project would assist to achieve objectives of the following International, Commonwealth, and State Government policies as described below.

2.1.1 International commitments

2.1.1.1 Paris Agreement

The Paris Agreement on climate change is a legally binding agreement on climate change adopted in 2015 by 196 countries at the Conference of Parties 21. The Paris Agreement aims to strengthen the global response to the threat of climate change, and to limit the increase in the global average temperature to 'well below 2°C' above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C. As a signatory to the agreement, the Australian Government has committed to reduce greenhouse gas emissions by 43% of 2005 levels by 2030.

The Project would contribute to meeting Australia's commitments under the Paris Agreement through the generation of renewable solar energy and resultant annual reduction in greenhouse gas (GHG) emissions.

2.1.1.2 United Nations Sustainable Development Goals

The United Nations 2030 Agenda for Sustainable Development includes global Sustainable Development Goals to build a more sustainable and resilient future. The 17 Sustainable Development Goals and 169 individual targets cover measures towards improvements to economic, social, and environmental sustainability. All Member States of the United Nations agreed to work towards achieving the Sustainable Development Goals by 2030. Of relevance to the Project are:

- Goal 7: 'Ensure access to affordable, reliable, sustainable and modern energy for all', Target 7.2 states 'By 2030, increase substantially the share of renewable energy in the global energy mix'; and
- Goal 11: 'Sustainable Cities and Communities', Target 11.6 states: 'By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management'.

The Project would provide a source of renewable energy, increasing the proportion of renewable energy generation in Australia. Further, it would assist to reduce reliance on fossil fuels for energy generation, resulting in reduction of GHG emissions and improved air quality.

2.1.2 Commonwealth Government commitments

2.1.2.1 Renewable Energy Target

The Renewable Energy Target (RET) has been in operation since 2001. The RET operates at two certified schemes, the Large-scale Renewable Energy Target and Small-scale Renewable Energy Scheme (CER, 2023). The Large-scale Renewable Energy Target is designed to incentivise the development of renewable energy power stations in Australia to reduce emissions of GHG in the electricity sector and encourage the additional generation of electricity from renewable sources.

Reforms were made to the RET in 2015 with a target for large-scale energy generation of 33,000 gigawatt hours (GWh) (23.5% of Australia's energy supply) by 2020. The target was met in September 2019, however the scheme

would continue to require high-energy users to meet their obligations under the policy until 2030 (CEC, n.d.). As a large-scale solar and BESS development, the Project would provide an alternative power generation source resulting in potential benefit to the Australian community by reducing average household electricity bills and power disruptions.

2.1.2.2 Climate Change Act 2022

The Federal Government *Climate Change Act 2022* outlines Australia's GHG emissions reduction targets of a 43% reduction from 2005 levels by 2030 and reducing Australia's net GHG emissions to zero by 2050, aligning with Australia's Nationally Determined Contribution under the Paris Agreement.

The Project aligns with the Act's objectives for GHG emission reduction by utilising a renewable energy source for Australia's electricity supply, providing a reduction in GHG emissions of approximately 600,000 t CO₂ per annum.

2.1.3 NSW State Government commitments

2.1.3.1 Net Zero Plan Stage 1: 2020-2030

The NSW Government Net Zero Plan Stage 1: 2020–2030 (DPIE, 2020b) (Net Zero Plan) sets the foundation for growing the economy, creating jobs and reducing emissions over the next decade. The Net Zero Plan aims to strengthen the prosperity and quality of life of the people of NSW, while helping to achieve the State's objective to deliver a 70% cut in emissions by 2035 compared to 2005 levels.

The Project would assist to give effect to the Net Zero Plan, including the NSW Government's updated 2030 and 2035 targets by providing a reduction in GHG emissions of approximately 600,000 t CO₂ per annum.

2.1.3.2 NSW Electricity Strategy

The NSW Electricity Strategy (DPIE, 2019) is the NSW Government's plan for a reliable, affordable and sustainable electricity future that supports a growing economy. The Strategy aims to improve the efficiency and competitiveness of the NSW electricity market by reducing risk, cost, and government-caused delays, and to encourage investment in new price-reducing generation and energy saving technologies. Actions to support these objectives include supporting the deployment of utility scale generation in NSW and building electricity generation to meet the Energy Security Target (EST) which set the target capacity required to meet forecast NSW electricity demand during the summer period.

The Project is consistent with this strategy as it provides renewable energy generation that together with other renewable generation projects, is expected to result in lower cost of energy in the NEM.

2.1.3.3 NSW Transmission Infrastructure Strategy

The NSW Transmission Infrastructure Strategy (DPE, 2018) seeks to unlock private sector investment in priority energy infrastructure projects, which can deliver least-cost energy to customers. It forms part of the government's broader plan to make energy more affordable, secure investment in new power generation and network infrastructure and ensure new technologies deliver benefits for consumers.

The transmission strategy seeks to help meet future energy needs by facilitating new transmission that could support up to 17,700 MW of new electricity generation. Other benefits include improved energy reliability, security, timely project delivery, increased affordability, and access to cheaper electricity.

The Project would connect the existing Line 84, which is part of the Queensland-NSW Interconnector prioritised for upgrade to boost interstate transmission capacity and increase power flow, hence transport energy to demand centres. While the Project proposes to connect to the existing Line 84, it supports the NSW transmission Infrastructure Strategy in that the additional renewable energy generation contribute to the distribution of energy to major demand centres.

2.1.3.4 NSW Electricity Infrastructure Roadmap

The NSW Electricity Infrastructure Roadmap (the Roadmap) (DPIE, 2020c), enabled by the NSW *Electricity Infrastructure Investment Act 2020* (EII Act), builds on the NSW Electricity Strategy and NSW Transmission

Infrastructure Strategy. The Roadmap sets a plan for NSW to replace its ageing coal-fired power stations with a coordinated portfolio of generation, storage, and network investment.

The EII Act, together with the Roadmap, is intended to (EnergyCo, 2023):

- attract up to \$32 billion in private investment for regional energy infrastructure by 2030;
- support 6,300 construction jobs and 800 ongoing jobs, mostly in regional NSW;
- save around \$130 a year on the average NSW household electricity bill; and
- help reduce NSW electricity emissions by 90 million tonnes by 2030.

The Roadmap, as well as the NSW Transmission Infrastructure Strategy, consider the establishment of renewable energy zones (REZs) as a key part of delivering against these objectives. These zones have been selected in areas with energy resource potential, reduced land use constraints and where planned transmission upgrades can lower the cost of connection across multiple projects (DPE, 2018). The Project is located 30 km south of the New England REZ, however would connect to existing Line 84 which has been prioritised for upgrade under the Transmission Infrastructure Strategy (outlined in Section 2.1.4.3 above).

The Project would be beneficial to the Roadmap by generating and storing clean energy for the NEM and connect to existing infrastructure identified for priority upgrade. With an anticipated capital investment value of \$750,000,000 and the potential to create up to 350 full time equivalent jobs during construction, and up to 15 full-time equivalent (FTE) jobs during operations, the Project would contribute to the targeted investment under the EII Act and the Roadmap.

2.1.3.5 Climate Change Policy Framework

The NSW Climate Change Policy Framework was introduced in 2016, with an aspirational long-term objective of achieving net zero emissions by 2050. The NSW Renewable Energy Action Plan was also introduced in 2016, and the Project is consistent with the three goals of the plan which are:

- attract renewable energy investment and projects;
- build community support for renewable energy; and
- attract and grow expertise in renewable energy.

In March 2020, the NSW State Government introduced the Net Zero Plan Stage 1: 2020–2030, and this was updated in September 2021. The updated plan sets an interim target of reducing emissions by 50% by 2030 (when compared to 2005 levels).

The Project would generate up to 746 GWh per year, avoiding approximately 600,000 t CO₂ per year when compared to typical black coal electricity generation, and contribute to the achievement of this target.

The Project is also consistent with the current goals and targets for renewable energy generation in NSW. These include:

- contributing to growing the economy, creating jobs and reducing emission over the next decade in line with the Governments Net Zero Plan Stage 1: 2020–2030 grow the economy, create jobs and reduce emissions between 2020–2030;
- Goal 22 of the NSW 2021: A plan to Make NSW Number One:
- contribute to the national renewable energy target [i.e., 20% renewable energy supply] by promoting energy security through a more diverse energy mix, reducing coal dependence, increasing energy efficiency and moving to lower emission energy sources.
- contributing to achieving the NSW target of zero net emissions by 2050; and
- consistent with to the NSW Electricity Strategy (DPIE, 2019), that outlines the NSW Governments plan for reliable, affordable and sustainable electricity.

2.1.3.6 A 20-year Economic Vision for Regional NSW

A 20-year Economic Vision for Regional NSW (NSW Government, 2021) highlights how renewable energy development is crucial for diversifying the local economy and creating new jobs in the region. The vision recognises renewable energy as an industry that is driving the economic future of NSW, and that development of REZs would capitalise on the state's energy resources and further attract renewable energy project development.

2.1.4 Contributing to the National Electricity Market

The NEM is the largest national grid, covering much of the populated area of the south and east of Australia, extending from Port Douglas in Queensland to Port Lincoln in South Australia, and across to Tasmania (DCCEEW, 2023a). The Project would connect to the existing TransGrid 330 kV Line 84 Tamworth to Liddell. Traditionally, Australian electricity needs have been met using coal-fired generation and some gas peaking power plants. In 2022, non-renewable fuels (coal, gas and oil) supplied 69% of the total electricity generated in Australia (DCCEEW, 2023a). Whilst still the dominant source, coal's generation share has declined markedly from 68% a decade ago, and a historical peak around 84% in the late 1990s.

Due to the scheduled closure of several coal-fired power stations in NSW by 2029, the Australian Energy Market Operator's (AEMO) 2022 Electricity Statement of Opportunity has forecasted shortfalls in electricity generation against the interim reliability measure to deliver sufficient power 99.9994% of the time, between 2025-26 and 2027 onwards. Furthermore, the Energy Security Target Monitor Report – October 2022 (AEMO, 2022b) predicts shortfalls based on the NSW EST between 2025 and 2027 and beyond 2030. Risks of shortfalls are further compounded by failure increases as a result of the age of these power stations, hence decreasing reliability of the power system, and the delayed delivery of new renewable energy generation and transmission projects.

The AEMO Integrated Systems Plan is a whole-of-system plan that provides an integrated road map for the efficient development of the NEM over the next 20 years and beyond (AEMO, 2022a). The Integrated Systems Plan states that given the imminent retirement of a significant portion of NSW coal fired power generation, and the relative lower capacity factors of wind and solar compared to coal, almost 9-fold renewable energy generation and three times the firming capacity is needed to replace coal fired power stations (AEMO, 2022a).

The Project would help meet the projected nine-fold increase in utility-scale variable renewable energy required to meet the optimal development pathway for the NEM. The Project would therefore augment the security and reliability of the electricity system in the NEM, through renewable energy generation and transmission to the existing Line 84.

2.2 Regional and local commitments

2.2.1 New England North West Regional Plan 2041

The New England North West Regional Plan 2041 (DPE, 2022c) guides land use planning priorities and decision making in the regions for the next two decades. Objective 9 'Lead renewable energy technology and investment' addresses the region's goal in adapting to climate change and resilience to threats from it. The Project would directly contribute to Objective 9 of the Regional Plan 'Lead renewable energy technology and investment' by:

- contributing to the national renewable energy target;
- promoting energy security through a more diverse energy mix;
- taking advantage of the region's transmission infrastructure and exploring its potential to connect with the electricity network; and
- increasing energy efficiency and moving to lower emission energy sources.

2.2.2 Tamworth Regional Local Environmental Plan 2010

The Project is located within the Tamworth Regional Council LGA and is therefore subject to the relevant provisions of the Tamworth Regional Local Environmental Plan 2010 (Tamworth Regional LEP).

The Tamworth Regional LEP aims relevant to the Project include:

- to encourage the orderly management, development and conservation of natural and other resources within the Tamworth region;
- to promote ecologically sustainable urban and rural development; and
- to secure a future for agriculture by expanding Tamworth's economic base and minimising the loss or fragmentation of productive agricultural land.

The Project Area is zoned as RU1 Primary Production and RU4 Primary Production Small Lots. Relevant objectives of RU1 zone to the Project include to:

- encourage sustainable primary industry production by maintaining and enhancing the natural resource base; and
- encourage diversity in primary industry enterprises and systems appropriate for the area; and
- minimise the fragmentation and alienation of resource lands.

Relevant objectives of RU4 zone include:

- enable sustainable primary industry and other compatible land uses; and
- encourage and promote diversity and employment opportunities in relation to primary industry enterprises, particularly those that require smaller lots or that are more intensive in nature.

Although not a primary industry project, the Project is consistent with the objectives of the Tamworth Regional LEP and the RU1 and RU4 land use zones. The Project would allow continuation of compatible agricultural activities, thereby preventing fragmentation of agricultural land, helping to promote local diversity and employment opportunities preventing fragmentation of agricultural land in the region. Furthermore, income from the lease agreements would diversify income stream derived from the natural resource base, enhancing the resilience of agricultural enterprises hosting project infrastructure to the impacts of climate change and fluctuations in commodity prices.

2.2.3 Tamworth Regional Blueprint 100 Our Community Plan 2023-2033

The Tamworth Regional Blueprint 100 Our Community Plan 2023-2033 (Tamworth Regional Council, 2022a) aims to guide the community towards a shared vision over 10 years to 2033. By providing a renewable form of energy production that diversifies energy generation improving sustainability, resilience, and reliability of the energy network in the community, the Project would be consistent with the following key focus areas of the community plan:

- Focus Area 3: Prosperity and innovation: create a prosperous region;
- Focus Area 4: Resilient and diverse communities: build resilient communities; and
- Focus Area 6: Working with and protecting our environment: design with nature.

2.3 Site setting and features

2.3.1 Site context

2.3.1.1 Regional context

The Project would be located approximately 15 km south of Tamworth, NSW, and approximately 410 km north-west of Sydney and 580 km south-west of Brisbane (Figure 1.2).

The Tamworth Regional LGA has a population of 63,070 people (ABS, 2021a), and covers an area of 9,894 km², bounded by Gwydir Shire in the north, Uralla Shire and the Walcha Council area in the east, Upper Hunter Shire in the south, and Liverpool Plains, Gunnedah and Narrabri Shires in the west (Tamworth Regional Council, 2022b). The Project sits within the Tamworth Local Aboriginal Land Council area, and the traditional custodians of the land are the Kamilaroi/ Gamilaroi / Gomeroi people.

Key land uses in the local and broader region include agriculture, mining, forestry and tourism. Several National Parks, State Forests, and nature reserves occur throughout the Tamworth Regional LGA.

The regional centre of Tamworth provides goods, services and employment to the surrounding community and settlements. The growing populations of the region creates a need for well-planned infrastructure that would support the needs of existing and future residents in the area.

2.3.1.2 Local context

The Project is located in rural locality of Loomberah, which has a population of 552 people (ABS, 2021b), and in close proximity to Timbumburi, with a population of 122 people (ABS, 2021c). The Project has access to the New England Highway (A15, State Road that forms part of the National Highway network) via Duri-Dungowan Road and Kia Ora Lane (both Local Roads). The Project is intersected by north-south aligned Ascot-Calala Road and Marsden Park Road (both Local Roads). Heavy vehicle access to the Project is currently being investigated, but is likely to be from Duri-Dungowan Road. There are 152 non-associated and 4 associated receivers within 4 km of the Project.

Goonoo Goonoo Creek, a Crown Waterway is located on the westernmost boundary of the Project Area. The creek's length is 52.9 km and is formed below Razorback Ridge at an elevation of 517 m and ends at an elevation of 377 m flowing into the Peel River.

2.3.1.3 Natural features

The Project Area is characterised by generally undulating terrain with elevations ranging from approximately 450 mAHD in the northwest corner of the site to 560 mAHD along the tops of ridge lines located to the southeast of the site. The Project Area contains a mix of cultivated land, improved pasture and remnant native vegetation.

Waterways within the Project Area include Goonang Creek (Strahler stream order 3) and Lambruk Creek (Strahler stream order 4). Other unnamed waterways (Strahler stream order 1 and 2) run within the Project Area. Several man-made dams occur within the Project Area to provide water for livestock.

The nearest National Park to the Project Area is the Nowendoc National Park, approximately 50 km southeast from easternmost Project boundary. Melville Range Nature Reserve is located approximately 30 km northwest of the Project. The nearest State Forest is Nundle State Forest, located approximately 27 km southeast of the easternmost project boundary.

2.3.1.4 Built features

Major transport corridors in proximity to the Project include:

- New England Highway: located adjacent to the west boundary of the Project, which connects Yarraman in Queensland to Newcastle via Armidale and Tamworth in NSW; and
- Oxley Highway: located approximately 15 km (by road) northwest of the Project, connecting the village of Nevertire from Mitchell Highway, to Port Macquarie.

The Project is in close proximity to built public features including the Loomberah church and memorial hall (1.3 km east) and the Timbumburi Public School (790 m northwest).

Various airports are in the vicinity of the Project including Tamworth, Armidale and Gunnedah. Tamworth Regional Airport is the closest to the Project, located approximately 15.5 km northwest.

Several operational, in construction or proposed SSD electricity generation projects are located in the broader region, including wind farms, solar farms, BESS facilities, and pumped hydro energy storage projects. Further detail is provided in Section 2.5 and Section 6.11.

Two existing 330 kV transmission lines pass through the Project Area and are operated by TransGrid.

2.3.2 Project Area land use and ownership

Land use within the Project Area and surrounds comprises agricultural productivity, including sheep and cattle grazing which is consistent with predominant land uses in the Tamworth Regional LGA.

The Project Area (Figure 2.1) is approximately 1,528 ha comprising of agricultural land used for cropping and grazing on improved and native pastures. Marsden Park Road, Ascot Calala Road and Macqueens Road are single-lane unsealed roads, running through the site with driveways leading into residential properties. Powerlines run across, Lots 421 and 422/DP534185, Lot 422/DP534185, Lot 2/DP626710, Lots 5 and 6/DP255100, Lot 414/DP747692, and Lot 33/DP755343.

There are five landholders associated with the Project, encompassing 14 lots (Figure 2.1). Lots within and around the Project Area are zoned RU1 Primary Production and RU4 Primary Production Small Lots under the Tamworth Regional LEP. The lots and corresponding zoning are provided in Table 2.1 and shown in Figure 2.1.

Table 2.1 Lots/DP land use zones within the Project Area

Land Use Zones	Lots/DP
RU4 Primary Production Small Lots	Lots 5 and 6/DP255100, Lots 421 and 422/DP534185, Lot 2/DP626710, Lot 414/DP747692 and Lots 33, 46 and 66/DP755343.
RU1 Primary Production	Lots 4, 5 and 14/DP755329, and Lot 6/DP658003.

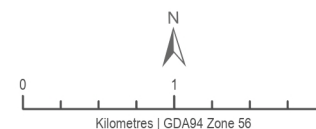
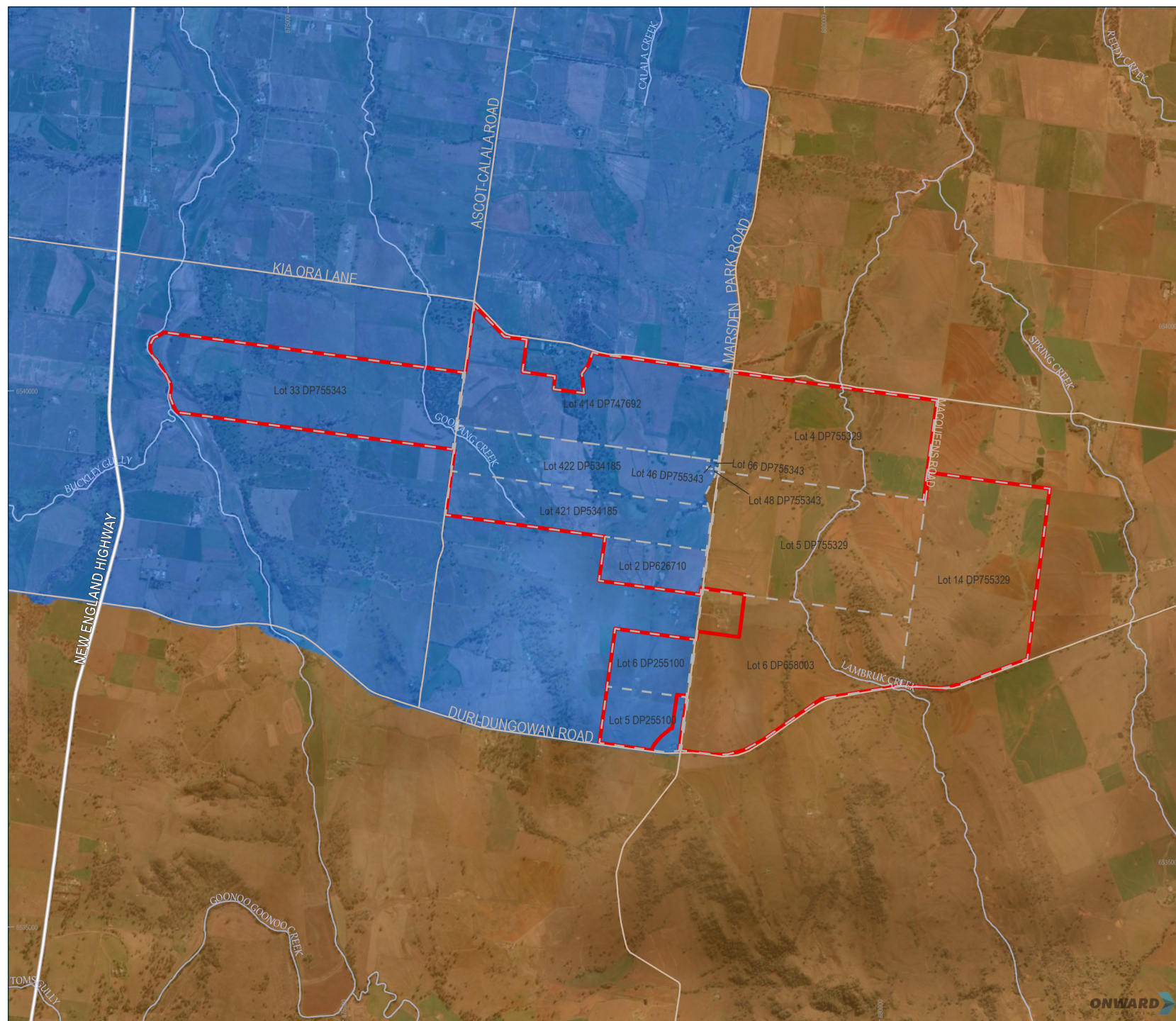
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Lots/DPs and Land Use Zoning Associated with the Project Area

Figure 2.1

LEGEND

-  Project Area
-  RU1 Primary Production
-  RU4 Primary Production Small Lots
-  Lot and DP boundary
-  Highway
-  Local roads
-  Named watercourses



2.4 Agreements with other parties

2.4.1 Landowner agreement

Prior to construction of the Project, Venn Energy would take control of the site under a combination of both lease agreements and freehold purchase. Landowner agreements would be finalised during the EIS phase.

2.4.2 Other agreements

Venn Energy is proposing a CBF, which would ensure long-term financial support for the life of the Project. The CBF would be developed in consideration of the draft Benefit Sharing Guideline (DPE, 2023a) or subsequent version. The value of the CBF would equate to approximately \$150,000 per year, which equates to \$4.5 million over the expected 30-year operational life of the project. This fund would be designed to evolve with the changing needs of the community and respond to the matters that are important to the local community. The CBF would be administered by the Project, with the assistance of a community-led committee.

Neighbour benefit sharing program would be offered to eligible surrounding landholders based on the proximity of neighbours to the Project Area as well outcomes of the visual and noise impact assessments.

2.5 Project justification

2.5.1 Project benefits

2.5.1.1 Socio-economic benefits

Socio-economic benefits of the Project would accrue through:

- applying long term downward pressure on electricity prices through renewable energy generation;
- supporting the transition towards renewable energy and the planned closure of coal fired power stations in NSW;
- a benefit linked back to State and Commonwealth government GHG emission reduction and energy security policies;
- providing diversification of land use and additional income stream within the rural economy;
- providing employment and economic stimulus, primarily through the construction phase; and
- providing ongoing community benefits to spread the economic benefits of the project through the operational phase.

Solar energy development provides valuable natural resource and a way of diversifying regional economies. Solar projects can be developed to have a minor and largely reversible impact on the agricultural capacity of the sites they occupy, while providing an additional income stream to associated landholders. The Project would provide an alternative drought proof income stream for host landowners.

During construction, approximately 350 full time jobs would be created along with up to 15 FTE jobs during operation. Due to this influx of workers, the Project would generate economic stimulus in Loomberah, and surrounding areas including Tamworth, Werris Creek, Quirindi, Wallabadah, Willow Tree, and potentially Carroll, Attunga and Gunnedah. These areas would provide accommodation, food, fuel and trade equipment and services, mostly during the construction phase. During operation of the solar farm, economic benefits would include services relating to monitoring and inspections, maintenance, repair and upgrade of infrastructure, much of which is likely to be provided by the resident surrounding labour force.

As well as employment and economic stimulus, the Project would provide an alternative drought proof income stream for host landowners, with flow on benefits for the local communities.

The economic benefits of the Project would be realised by the host landholders, neighbours, surrounding community and broader region via:

- Lease and Option deed with host landowners;
- neighbour benefit sharing program;
- a Voluntary Planning Agreement (VPA) in negotiation with Tamworth Regional Council that may include but would not be limited to:
 - CBF of \$150,00 per year; and
 - investment to address specific local issues.

The Australian Energy Market Commission's (AEMC) analysis indicated that multiple renewable energy projects are also likely to put downward pressure on the wholesale electricity prices, which has the potential to reduced electricity bills for households and businesses across NSW (AEMC, 2019). The Project is a utility scale solar project and would make a contribution to lowering electricity prices for consumers.

2.5.1.2 Environmental benefits and impact minimisation

The development of Project specifically, would result in environmental benefits through its contribution to the electricity market's transition away from fossil fuels to renewable generation options which would reduce greenhouse gas emissions and the adverse effects of climate change. Climate change presents specific risks to regional rural economies and biodiversity. The 2022 Intergovernmental Panel on Climate Change report (IPCC, 2022) states with a high level of confidence that energy diversification, including with decentralised renewable generation can reduce vulnerabilities to climate change especially for rural communities.

The Project would have the ability to produce approximately 746 GWh megawatt-hours of renewable energy per year, which would:

- displace about 600,000 tonnes of CO₂ emissions annually, compared to typical coal fired production assuming an average household emissions value of between 15 and 20 CO₂ per year); and
- power approximately 180,000 typical Australian homes.

The Project would be designed in consideration of the environmental values of the site, including waterways, soil resources, important habitat and heritage values. These matters would be investigated during the EIS, with measures developed to avoid and protect these values where practicable through all stages of the Project. Specific management commitments would accompany the final Project description to ensure that impacts that cannot be avoided would be minimised to an acceptable level. This would include commitments specific to:

- soil resources and rehabilitation objectives in the decommissioning phase advised by an agricultural impact assessment;
- detailed assessment of impacts to local and regional agricultural industries;
- avoidance of important biodiversity features;
- buffers on waterways and commitments to best practice design and rehabilitation where water way crossings are required; and
- buffers on important heritage items and salvage programmes to be developed in consultation with Aboriginal stakeholders.

2.5.2 Site suitability

The LSSE Guidelines note the importance of demonstrating the suitability of the selected solar farm location and outlines key constraints that should be identified and considered.

Venn Energy has reviewed the solar generation potential of many areas in NSW using a Geographic Information System model and considering the LSSE Guidelines. The Project site was selected based on a combination of high solar exposure, direct connection to electricity infrastructure, limited environmental effects and economic feasibility.

The Project design has considered the LSSE Guidelines in identifying opportunity to avoid or minimise negative impacts with a focus on mitigating and managing unavoidable impacts. Table 2.2 outlines the suitability of the site for the Project, which indicates the site has favourable conditions for solar development.

Table 2.2 Site selection criteria – site suitability

Preferable site condition	Applicability to the Project
Optimal solar resources	The Tamworth Airport weather station (located approximately 18.43 km from the Project Area) shows good average daily solar irradiance of 18.7 MJ M² on an annual basis between 1990 and 2017 (BOM, 2023b). To further support the location of the site, the solar resource map of Global horizontal irradiance output indicates the Tamworth area receives 5.9kWh/m² per day on average (Global Solar Atlas, 2023).
Suitable land	Generally flat to gently undulating land containing a large amount of modified, exotic and cultivated areas of vegetation with minimal native vegetation that would primarily be avoided through detailed design. Existing access is provided via Kia Ora Lane, Ascot-Calala Road, Marsden Park Road and Duri-Dungowan Road.
Local impacts minimised	Early environmental investigations and community engagement are currently underway to enable the Project to minimise its environmental and social impacts. There are 36 non-associated receivers within 1 km of the Project Area, and 4 associated, who may be impacted visually and by construction noise (Figure 2.2). The magnitude of potential impacts would be determined through further investigations in the EIS and would identify appropriate mitigation and management measures to minimise these impacts. Biodiversity constraints mapping identified conservation significant areas, which have largely been avoided during the initial design. Community engagement identified additional local values (summarised in Section 5). Hydrological hazard modelling would guide infrastructure placement, to protect the hydraulic function of waterways and prevent erosion.
Capacity to rehabilitate	The project would be designed and constructed to be reversable, protecting important site values and restoring the site to existing agricultural capability during the decommissioning stage. This would include: – extensive landform modification is not proposed beneath the arrays, pile driven array mounts for the solar array are proposed, which result in minimal ground disturbance; – groundcover beneath panels would be retained and managed including regular monitoring and weed control; – best practice design and rehabilitation would be undertaken specific to water ways, where impacts are required; and – grazing, if undertaken during operation, would be managed to protect the groundcover and allow continued agricultural production onsite.
Ability to co-exist with agricultural activity	The Applicant is exploring options that would allow for carefully managed sheep grazing throughout the Project Area. This has been used in other solar projects across the state as a solution for ground cover management and maintaining agricultural productivity.
Proximity to electrical network	The existing Tamworth to Liddell Transgrid 330kV transmission line runs through the Project Area allowing direct access for grid connection.
Connection capacity	Extensive power system studies have been conducted to verify the grid connection point is suitable for connection of the proposed project, thereby eliminating the need for a new transmission line and potential associated environmental and social impacts. The surrounding network infrastructure has thermal capacity to support connection of the Project during full export conditions, provides adequate system strength and comprehensive static and dynamic studies have demonstrated excellent performance of the plant during grid contingency events.

While site investigations are preliminary at this stage, early results indicate the following key constraints (Table 2.3), which would be the subject of further detailed investigations as the project description is refined, with the objective to ensure the Project is responsive to its site context in final design.

Table 2.3 Site selection criteria – constraints

Areas of constraint	Applicability to the Project
Native vegetation	The majority of the Project Area is currently used for grazing or cultivation, with limited native vegetation remaining. The Project design proposed in this Scoping Report has already considered avoidance of remaining native vegetation.
Potential residences	152 non-associated residences are located within 4 km of the Project Area as well as four associated landowners (Figure 2.2). The location of noise emitting components (e.g. BESS, inverters) has been located in consideration of proximity to residences. Existing vegetation and topography would limit potential visual impacts, however, a detailed assessment and consultation would be undertaken to understand amenity impacts and effectiveness of mitigation. Visual amenity and noise and vibration are considered in Section 6.3 and Section 6.4, respectively.
Waterways	Waterways within the Project Area include Goonang Creek (Strahler stream order 3) and Lambruk Creek (Strahler stream order 4). Several minor waterways (Strahler ≤ 2) are mapped within the Project Area. The indicative Development Footprint avoids the Goonoo Goonoo Creek floodplain. Protected Matters Search Tool search returned a Wetlands of International importance known as 'Riverland' approximately 900 km – 1000 km upstream as well as four listed threatened ecological communities. Detailed assessment would be undertaken during the EIS including hydrological modelling which would guide infrastructure placement, to protect the hydraulic function of waterways and prevent erosion.
Aboriginal cultural heritage	An extensive search of the Aboriginal Heritage Information Management Systems (AHIMS) identified no Aboriginal heritage sites or places within the Project Area. Four Aboriginal sites have been recorded within 1 km of the Project Area and ten within 10 km. The AHIMS sites within 1 km include: – Artefact: Moore Creek; Upper Moore Creek – Culturally Modified Tree (Carved or Scarred): Isolated Find – Culturally Modified Tree (Carved or Scarred): Shield Tree – Artefact: Hilltop IF1 Detailed assessment including consultation with Registered Aboriginal Parties would be undertaken during the EIS.
Historic heritage	Desktop studies identified two historic heritage sites within the locality. This included the 'Timbumburi School', 790 m northwest, and 'Loomberah War Memorial Hall', 1.3 km east of the Project Area, registered under the Tamworth Regional LEP.
Agricultural land	The majority of the Project Area is not mapped as Biophysical Strategic Agricultural Land (BSAL) or Class 1, 2 or 3. However, there is small area of land on the western most boundary mapped as Class 3 'Moderate limitations' and BSAL, which would be avoided for the development of the Project. The detailed assessment for the EIS would include an agricultural impact assessment coupled with soil testing to ground truth the capability mapping.
Land zoning	The land is zoned RU1 Primary Production and RU4 Primary Production Small Lots under the Tamworth Regional LEP and allows development for the purpose of electricity generating works.
Resource developments	There are no mineral or petroleum exploration licences associated with the Project Area.
Crown Land	Crown land is not present within the indicative Development Footprint.
Bushfire Prone Land	The Project Area is classified as category 1 vegetation (high bushfire risk) and category 3 vegetation (medium bushfire risk).
Flooding	The Project Area is not within flood prone land mapping.
Coastal Hazards	Due to the inland location of the Project, there are no coastal/coastline hazard areas.
Mine subsidence prone land	There is no mine subsidence prone land or development within the Project Area.

Areas of constraint	Applicability to the Project
Landslide Risk Land	The Project Area is not within landslide risk land.
Protected Land	There is no protected or reserved land within the Project Area.

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Sensitive Receivers within 4 km of the Project Area

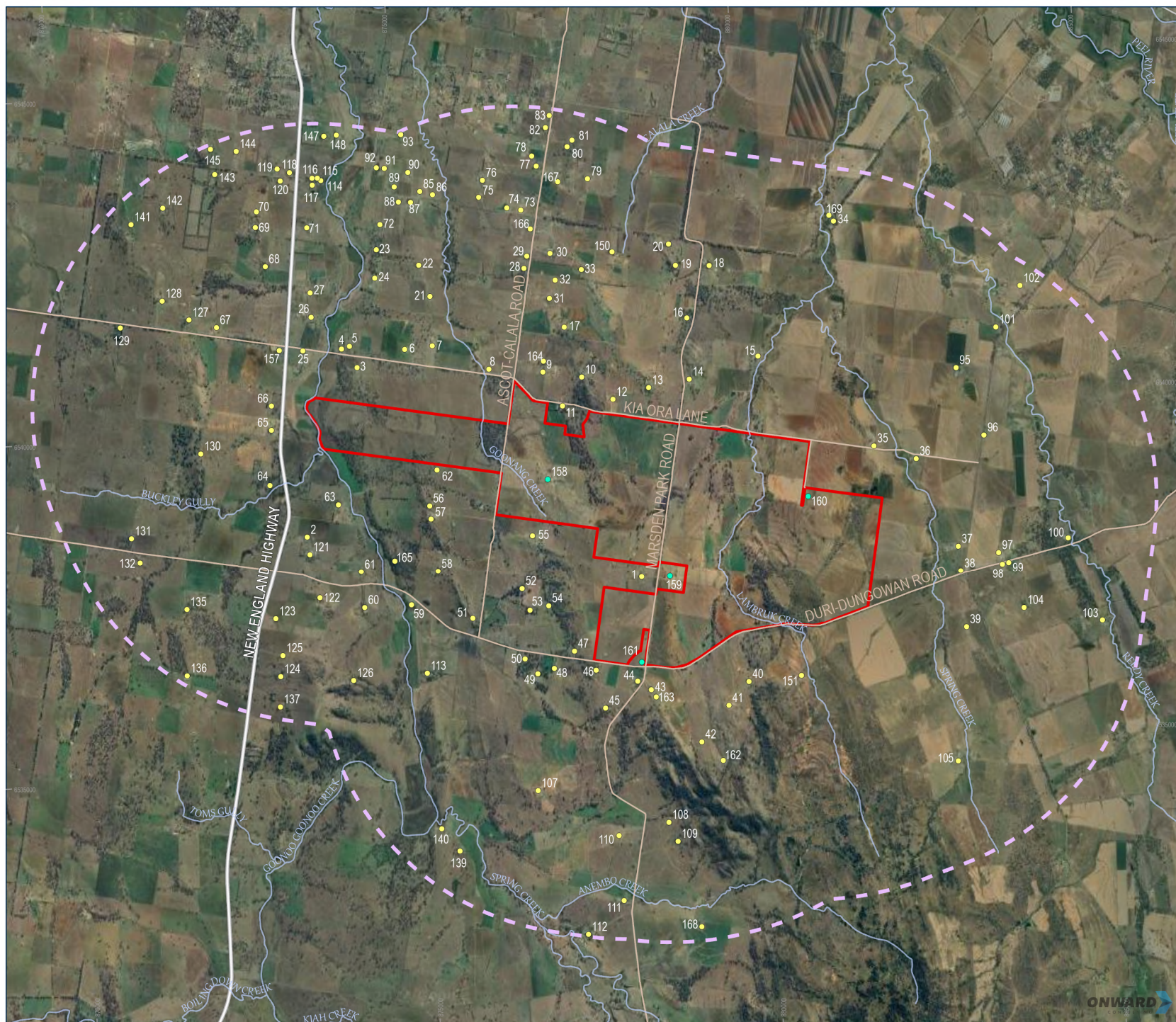
Figure 2.2

LEGEND

-  Project Area
-  Project Area 4 km buffer
-  Highway
-  Major roads
-  Local roads
-  Named watercourses

Sensitive receivers

-  Associated
-  Non-associated



3. The Project

3.1 Project area

The Project Area is defined as the area of land corresponding to property boundaries on which the Project is located, and extends across approximately 1,528 ha over 13 lots, in the Tamworth Regional Council LGA. Under the Tamworth Regional LEP, the Project Area land is zoned RU1 – Primary Production and RU4 – Primary Production Small Lots.

3.2 Indicative project design

The Project would involve the construction, operation and decommissioning of a PV solar facility with a capacity of approximately 500 MW (DC) and 300 MW (AC) that would supply electricity to the NEM, and a BESS with an indicative capacity of up to 300 MW / 1,200 MWh.

The Project would include (at least) the following elements:

- up to 850,000 PV modules;
- up to 178 solar power conversion units (solar inverters);
- a BESS facility or distributed BESS throughout the solar array with a capacity of up to 300 MW / 1,200 MWh;
- 330/kV onsite switchyard connected to the existing 330 kV overhead lines that currently traverse the site;
- 330/33 kV substation;
- reactive plant and other electricity network support equipment;
- temporary facilities including:
 - access tracks;
 - hardstands;
 - laydown areas;
 - site compounds;
 - temporary site offices that may be formalised as operations site offices; and
 - stockpiles.
- permanent infrastructure including operations and maintenance compound, site offices, amenities and workshop/stores buildings, carparks, water tanks, fire-fighting equipment, internal access tracks, perimeter fencing, security and communications systems and other infrastructure;
- weather measurement stations;
- landscaping, subject to final visual impact outcomes; and
- upgrade Marsden Park Road from Duri-Dungowan Road to site access (approximately 2.7 km) and Ascot-Calala Road from Duri-Dungowan Road to site access (approximately 2.7 km), pending outcomes of the traffic impact assessment.

The Project Area boundary and indicative Development Footprint is shown in Figure 3.1.

The final design and location of the components of the Project (including infrastructure) would be subject to further detailed design and assessment, including consideration of the outcomes of technical and environmental assessment as part of the EIS.

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Indicative Development Footprint

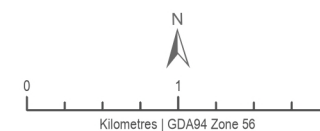
Figure 3.1

LEGEND

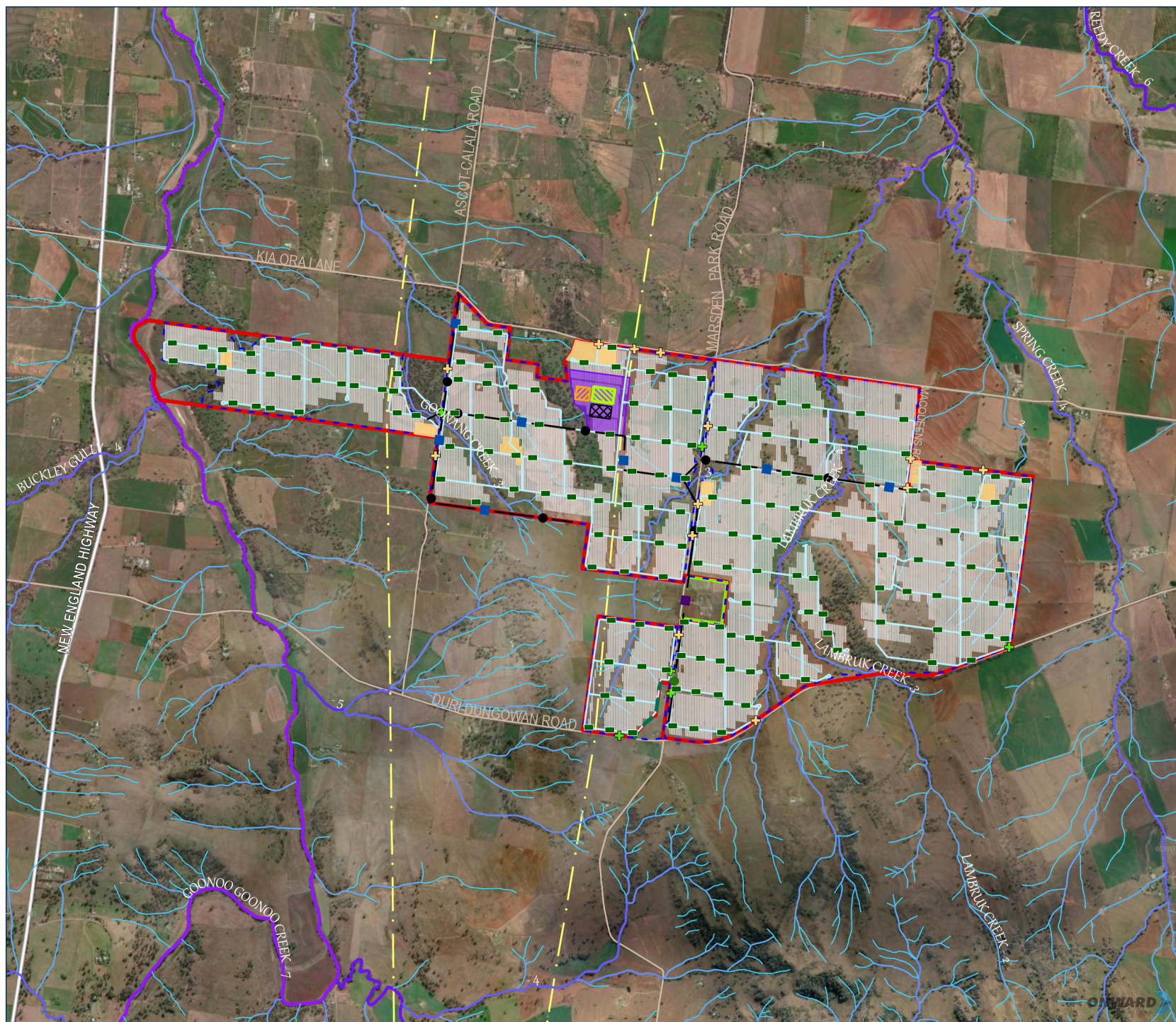
-  Project Area
-  Security fence
-  O&M facility, Switchyard, substation and BESS area
-  Switchyard
-  Substation
-  BESS
-  Temporary facilities
-  Inverters
-  Proposed 33kV easement
-  Proposed new transmission line
-  Internal access tracks
-  Solar array
-  Vegetation screening
-  Land buffer
-  Primary access point
-  Secondary access point
-  Existing 330kV Transmission line
-  Highway
-  Local roads

Strahler stream order

-  1
-  2
-  3
-  4
-  5
-  6
-  7



Source: ESRI, WaterNSW



3.2.1 Site access

3.2.1.1 Internal access

The construction and maintenance of the Project would require construction of new internal access tracks within the Project Area. The tracks would provide ongoing access to Project infrastructure including the transmission line. Where practicable and with landholder agreement, the internal access track network would be aligned along the route of existing farm tracks to reduce impacts to biodiversity and to provide upgraded access for ongoing agricultural activities. Internal tracks would connect to a site access points (currently under investigation) and the existing local and State roads.

If waterways within the Project Area require crossing for access to Project's elements, the crossing design would consider specific guidelines, such as:

- Guidelines for Controlled Activities on Waterfront Land (DPI, 2018);
- Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (DPI, 2003); and
- Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013).

3.2.1.2 Project access

Proposed access during construction and operation to the Project is under investigation, but may include:

- heavy vehicle access off the New England Highway via the existing sealed Duri-Dungowan Road to the south of the Project;
- secondary access may include points on Ascot-Calala Road and Marsden Park Road, which are local and unsealed roads; and
- light vehicle and emergency access/egress via Kia Ora Lane Access to the north of the Project off the New England Highway.

The main access routes and locations would consider specialist studies during the EIS, including transport, noise and biodiversity.

3.2.1.3 Port access

The transport route for large components would likely include the following, subject to further consideration in the EIS:

- Port of Brisbane via (in NSW) the New England Highway;
- Port of Newcastle via Newcastle Link Road, Hunter Expressway / M15 to New England Highway; and
- Port of Melbourne via Newell Highway, Oxley Highway and New England Highway.

3.2.2 Solar energy generation

The 300 MW (AC) solar array would be facilitated by a network of up to 850,000 individual PV modules. The PV modules would be elevated from the ground on specialised single axis sun tracking structures that change the orientation of the panels throughout the day to improve efficiency of electricity generation.

The PV modules would typically be configured either in either landscape or portrait orientation, with up to five PV modules high, and in rows up to 150 m long. The top of the PV modules would be no more than 8 m above the finished ground surface level at maximum inclination (Figure 3.2).

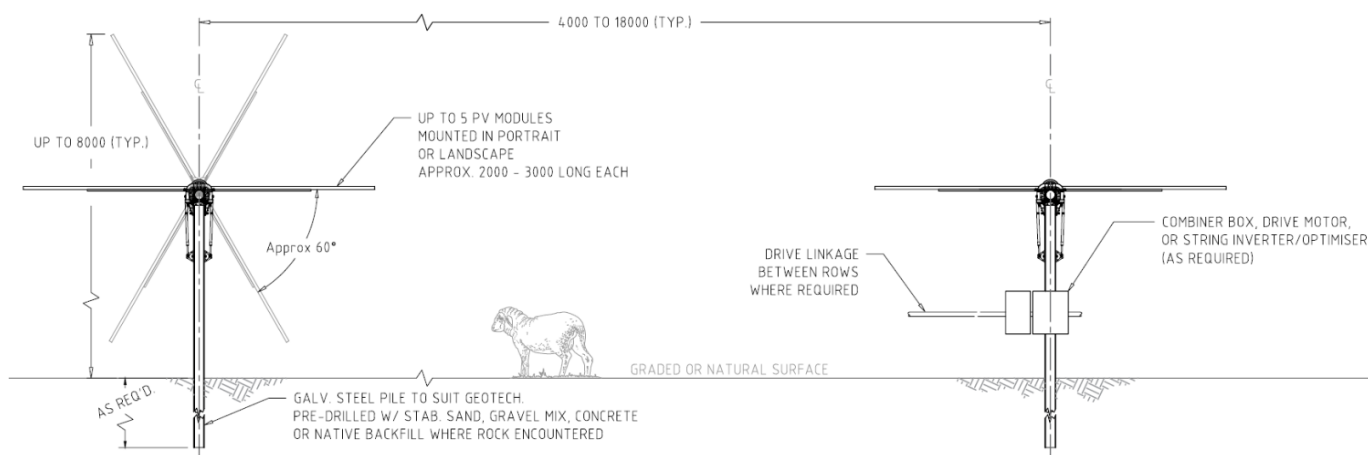


Figure 3.2 Indicative single access tracking system elevation (not to scale)

Figure 3.1 shows a maximum footprint of solar arrays on site. The array areas would consist of multiple rows of PV modules that would have an estimated row spacing between 4 and 18 m depending on the final design and selection of tracking system technology and PV modules. The rows are aligned approximately in a north-south orientation. The array area would be subject to further detailed assessment in the EIS and would consider detailed environmental investigations and community and stakeholder consultation.

PV module groups would connect to the project substation via a series of Power Conversion Units (PCUs), typically mounted on a concrete slab or piles throughout the array to minimise cabling and electrical energy losses. The PCUs are composed of inverters, transformers and switchgear and facilitate energy transfer from the solar panels to the internal AC reticulation system.

3.2.3 BESS

The BESS would have transfer capacity at the connection point of up to 300 MW and provide up to 1,200 MWh of energy storage. The BESS construction may occur at the same time as the solar arrays, or staged and follow construction of the solar arrays. The BESS would store excess electricity generated from the Project and release to the NEM during periods where there is a deficiency in generation or where there is increased demand. An automated control system would direct electricity flow from the Project solar array and BESS to the NEM or from the solar array to the BESS.

The BESS would be located within the area nominated as 'temporary and permanent facilities' shown on Figure 3.1. or installed as a 'distributed BESS' where the BESS components would be spread out throughout the Project Area and installed adjacent to each power conversion unit. The precise location and layout would be subject to further design works in consideration of ground conditions, detailed environmental investigations, and community and stakeholder consultation.

The BESS may include the following components:

- battery modular stack units configured either in outdoor rated enclosures with appropriate fire protections and cooling equipment, or installed in racks, within an indoor facility, or several outdoor enclosures;
- a range of battery, temperature, electrical and fire monitoring systems. These monitoring systems are integrated with automated and manual safety protection systems, including:
- internal temperature controls, heating, ventilation and air conditioning;
- fire detection systems such as smoke detectors and heat sensors;
- a range of electrical monitoring and alarm systems;
- telemetric reporting of sensor data to the onsite control room;
- telemetric reporting to offsite operations and maintenance facility;

- power shut down and disconnection;
- high voltage and medium voltage switchgear, overhead lines and underground cables;
- protection, control spare parts and switchgear buildings;
- power transformers;
- oil containment bunds and oil/water separators;
- lighting poles and lightning protection poles;
- static firefighting water if defined by the fire study;
- in the case of a centralised, 'AC Coupled' BESS facility, bi-directional PCUs to convert the energy to a form capable of transmission to the project substation, comprising a transformer unit and inverter;
- fences and a hardstand area; and
- a minimum 10 m asset protection zone around the BESS modules, or as otherwise determined by the fire study.

3.2.4 Connection and internal electrical network

The Project would connect to the NEM via a new 330/33 kV substation and 330 kV switching station, to be constructed adjacent to the existing 330 kV transmission lines which traverse the Project Area. Connections to existing substations outside the Project Area are not proposed, which will avoid the need for additional high voltage transmission lines.

Electricity produced by solar PV modules would be converted to alternating current (AC), and transformed to medium voltage at the PCUs. The PCUs would be connected to the substation via underground and/or overground medium voltage cabling. The substation would transform the electricity so that the voltage is compatible with the nearby transmission lines and send and receive energy to these transmission lines via the new switchyard.

The onsite substation location would be sited within the area nominated as 'temporary and permanent facilities' shown on Figure 3.1. The precise location and layout would be subject to further design works in consideration of ground conditions, detailed environmental investigations, and community and stakeholder consultation.

3.2.5 Ancillary infrastructure

Ancillary infrastructure would typically include:

- perimeter fencing around solar arrays;
- weather measurement stations;
- car parking areas;
- operations and maintenance facilities;
- lighting and security systems;
- carparking;
- water tanks;
- landscaping, subject to final visual impact outcomes;
- access upgrades from final entry/exit points from the local road network; and
- internal road network constructed to be all weather compatible.

3.2.6 Temporary facilities

Temporary construction facilities including:

- access tracks
- laydown areas and site compounds;

- temporary site offices that may be formalised as operations site offices; and
- stockpiles.

3.3 Staging

3.3.1 Construction

The construction phase of the Project would be undertaken over approximately 24 months. Construction may be staged in consideration of final design, grid connection, material and labour availability. The construction schedule would be subject to the development application process, however indicatively would commence in Quarter 1 of calendar year of 2025. Commencement of each component of construction would be determined during detailed design, however typically would commence with ancillary infrastructure such as intersection, road, and access upgrades, followed by installation of the solar array and the BESS.

Main construction materials would include:

- aggregates, road base, bedding sand and concrete;
- BESS and associated infrastructure including substation and switchyard;
- fencing materials;
- solar modules;
- steel footings and frames to support the solar arrays;
- cables, conduits, junction boxes;
- electrical equipment;
- steel framing and sheeting for permanent buildings; and
- timber and fixtures for building fit-out.

3.3.2 Operation

It is anticipated the Project would have an operational life of 30 years. Operation of the Project would include remote monitoring, and onsite maintenance for PV modules and other equipment. Site maintenance would be undertaken by site staff on an ongoing basis with activities scheduled throughout each year. Site maintenance would include at least the PV modules, reticulation network, access roads, substations, transmission line, groundcover management, landscaping, and facilities (e.g. stormwater and wastewater).

Most maintenance would comprise routine maintenance, however, circumstances may arise where additional specialists technical maintenance staff are required (e.g. such as unplanned equipment failure).

Daily maintenance would occur during standard working hours. Whilst most activity is anticipated to occur during business-hours Monday to Friday, access to the Project would be required on a 24-hour bases, seven days a week.

During operations, it is expected that up to 15 FTE would be required during operation including general site labour, trades, professional, scientific and technical personnel.

Procedures and management plans for all operational activities would be included in an Operational Environmental Management Plan, prepared prior to commissioning.

3.3.3 Decommissioning, Rehabilitation or Repowering

The Applicant would enter into long-term agreements with host landholders for the construction and operation of the Project. Following decommissioning, the final land use would revert to preference of the host landholder, with consideration of the land use objectives of the RU1 and RU4 zone.

The Project would operate for a minimum of 30 years. At the end of Year 30, the following options would be considered:

- repower as a solar farm using the existing or 'best practice' at the time technology (or replacement) modules and other infrastructure; or
- decommission the Project and removed the modules and associated infrastructure in accordance with a Decommissioning and Rehabilitation Plan.

If replacement infrastructure is installed, these would remain within the development footprint and predicted impacts for which any development consent is granted (unless a modification is sought and granted). The Applicant would fund and manage the decommissioning of the Project in consideration of the draft Solar Energy Decommissioning Calculator (DPE, 2023b), or subsequent version. Decommissioning would generally involve the following:

- consultation with key stakeholders including host and surrounding landholders, Council and relevant Government agencies;
- all above ground structures, except for the switchyard, would be removed where practicable and the land rehabilitated to return to the current agricultural use, unless otherwise agreed with the landholder and Government agencies;
- some infrastructure may be retained *in situ* (e.g. internal access tracks) where beneficial and as agreed with the landholder and Government agencies; and
- some below ground infrastructure may be left *in situ* to avoid further disturbance and minimise clearing of revegetated areas, unless otherwise agreed with the landholder and/or specified in the conditions of development consent.

The Applicant aims to recycle all dismantled and decommissioned infrastructure and equipment, removed from the Project, where practicable. Materials that cannot be recycled would be disposed of at a licensed waste management facility (Section 6.10.4).

3.4 Analysis of alternatives

Alternative technology and site locations considered for the Project are described below.

3.4.1 Alternative technologies and components

Alternative technologies for renewable energy generation encompass generation technology (primarily solar or wind), PV solar equipment and the BESS.

The critical components of a solar project include:

- generation of DC electricity from PV solar panels;
- conversion of DC to AC electricity using inverters; and
- energy storage equipment.

Over recent years, the underlying technology surrounding solar project development has been evolving at an increasingly rapid rate. Venn Energy would utilise the latest technical and cost-efficient technology available at the time of construction.

3.4.2 Generation technology

PV solar technology was selected for electricity generation due to its relative cost-effective, low profile, durable and flexible nature for layout and siting. It is a proven technology which is readily available for broad scale deployment, and well suited to the characteristics of the Project Area (Section 2.3). Solar electricity generation can be rapidly deployed to assist in meeting both state and national climate change targets.

3.4.3 Alternative site locations/consideration of larger project feasibility

The LSSE Guidelines note the importance of demonstrating the suitability of the selected solar project location and outlines key constraints that should be identified and considered.

Venn Energy has reviewed the solar generation potential of several areas in NSW mapping of renewable energy resources (Geological Survey of New South Wales, 2019) and considering the LSSE Guidelines. During the site selection process for the Project, various criteria were considered, including:

- proximity and access to existing 330 kV line with adequate technical characteristics to support a large-scale solar project;
- accessibility to the Project via a major road;
- an area that would avoid or limit the need to remove native vegetation or impact on other environmental values;
- a site with topographical features that would require minimal earthworks/soil disturbance;
- a site with minimal flooding or bushfire risk; and
- minimal environmental impacts.

The Applicant considered several alternative sites that did not meet these criteria. The site location for the Project was selected as it ranked highest across these criteria.

The site is of a scale that allows for flexibility in the design, allowing Venn Energy to avoid ecological and other constraints which may be identified during the EIS process. The factors that determine the final design area would be detailed in the EIS.

Once the general area was selected, the Applicant compared the selected option and the option not to continue with the proposal:

1. no construction of the Project (the 'do nothing' option; not preferred); or
2. a 300 MW (AC) solar and BESS development (preferred, now included in this report).

Alternative locations for a project of this magnitude are limited due to the requirements of surface area, topography, proximity to existing and/or proposed energy infrastructure and available network capacity, as well as the need to avoid major townships or areas of high biodiversity value.

3.4.3.1 Option 1 do-nothing

The do-nothing option needs consideration as it represents the status quo, avoids development impacts but does not realise the Projects benefits. Doing nothing would avoid potential impacts associated with the development and operation of the Project and would retain the current land use – agricultural production.

The potential impacts that could be avoided include construction and operational noise, traffic, dust, visual and biodiversity. Section 6 provides further discussion of these impacts.

Although the do-nothing option would not incur the environmental impacts of the Project and continuity of status quo, it would also forgo the benefits, particularly those relating to Commonwealth, State, and regional policies, and strategies to decarbonise the NEM. Should the Project not proceed, the estimated 600,000 t CO₂ pa reduction in GHG emissions would not be realised. Similarly, not proceeding with the Project would forgo the social and economic benefits detailed in this EIS, including the provision of direct and indirect employment and economic stimulus.

3.4.3.2 Option 2 500 MW solar farm (preferred)

The Project Area is of a scale that allows for flexibility in the design, allowing the Applicant to avoid biodiversity and other constraints which may be identified during the EIS process. The factors that determine the final design area would be detailed in the EIS. A more detailed explanation of this option is outlined in Section 2.3.

Option 2 is preferred as it would align with the strategic justification of the Project (Section 2). The expected positive outcomes of the Project are considered to outweigh the negative environmental impacts with consideration to mitigation measures that can be applied.

4. Statutory context

This section outlines the key statutory requirements for the Project under the EP&A Act and other relevant NSW and Commonwealth legislation. It describes the power to grant approval, permissibility, any post approvals required under relevant Acts. Detailed consideration of relevant statutory requirements would be provided in the EIS.

4.1 Power to Grant Consent

Approval for the Project would be sought under Part 4, Division 4.7 of the EP&A Act, which outlines the approval pathway for the development deemed to be SSD. Section 4.36(2) of the EP&A Act states:

“(2) A State environmental planning policy may declare any development, or any class or description of development to be State significant development.”

The *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) identifies development that is SSD. Section 2.6(1) of the Planning Systems SEPP states:

“(a) the development on land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and (b) the development is specified in Schedule 1 or 2...”

Section 20 of Schedule 1 of the Planning Systems SEPP states that the following is considered an SSD:

“Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that:

(a) has a capital investment value of more than \$30 million, or

(b) has a capital investment value of more than \$10 million and is located in an environmentally sensitive area of State significance.”

The Project would have a capital investment cost estimate of more than \$30 million. Therefore, the Project is classified as “State Significant Development” under Division 4.7 of the EP&A Act. Under Section 4.12 of the EP&A Act a DA for SSD is to be accompanied by an EIS.

The Minister for Planning and Public Spaces is the consent authority for SSD, and SSD applications are assessed by DPHI unless specific conditions occur whereby the Independent Planning Commission (IPC) would be the consent authority.

4.2 Permissibility

The Project Area is zoned RU1 Primary Production and RU4 Primary Production Small Lots, under the Tamworth Regional LEP. Electricity generation is permitted with consent within these land use zones. Further, clause 2.36(1)(b) of the *Transport and Infrastructure State Environmental Planning Policy 2021* (TISEPP) states 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. Therefore, the Project is permissible with development consent.

4.3 Other approvals

Approvals required under relevant NSW and Commonwealth legislation are detailed in Table 4.1.

Table 4.1 Required approvals

Approval	Requirement
Consistent Approvals	
Overview	Section 4.42 of the EP&A Act states an authorisation cannot be refused if it is necessary for carrying out an approved SSD and is to be substantially consistent with the development consent”:
<i>Roads Act 1993</i> (Roads Act)	Consent under section 138 of the Roads Act for road upgrades to the public road network.
Commonwealth Approvals	
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	Approval from the Minister for the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) is required for any action that will or is likely to have a significant impact on one or more Matters of National Environmental Significance (MNES). The findings of the Preliminary Biodiversity Assessment Report (Appendix B) confirmed the presence of threatened species and ecological communities listed under the EPBC Act within the Project Area. As such, a referral under the EPBC Act to the Commonwealth Minister for the Environment and Water would be evaluated during the EIS in consideration of detailed biodiversity assessments and design refinements.
<i>Native Title Act 1993</i> (NT Act)	Under section 13 of the NT Act, an individual may apply to the Federal Court for a determination of native title. Title claimants as required. There is one native title claimant application over the Project Area by the Gomerioi People (NC2011/006). Native title may exist in certain land areas including vacant Crown Land, waterways that are not privately owned, and some types of pastoral leases. Where a native title claim exists in relation to the Project Area, the Applicant would comply with all provisions of the NT Act and undertake consultation with native title claimants as required. There are no active determinations of native title over the Project Area.
Other Approvals	
<i>Water Management Act 2000</i> (WM Act)	The Project may require water access licences under the WM Act. The Project is within the Water Sharing Plan for the Namoi and Peel Unregulated Rivers Water Sources 2012. The EIS would assess and identify any requirement for water access licences for the Project
<i>Conveyancing Act 1919</i> (Conveyancing Act)	The Project would require a lease from the owners of the affected land. Lease of a solar farm site is treated as a lease of premises regardless of whether the lease would be for more or less than 25 years. No subdivision is required for the switchyard or substation as these would remain assets associated with the Project. Subdivision consent is not required under section 23G of the Conveyancing Act.
Approvals not required under section 4.41 of the EP&A Act	
<i>Fisheries Management Act 1994</i> (FM Act)	A permit under section 201 and section 219 of the FM Act to carry out dredging or reclamation work, or to block passage of fish respectively, is not required for the Project. The Project requires vehicle and cable crossings of Lambruk and Goonang Creeks and their tributaries. These works would be undertaken in accordance with the DPI guidelines for controlled activities on waterfront land.
<i>Heritage Act 1977</i>	An approval under Part 4, or an excavation permit under section 139 of the Heritage Act 1977 would not be required for the Project. A desktop search of available datasets showed that there are no historic heritage items within the investigation area or its vicinity.

Approval	Requirement
<i>National Parks and Wildlife Act 1979</i> (NPWS Act)	An Aboriginal heritage impact permit under section 90 of the NPWS Act 1974 is not required for SSD Projects. A search undertaken on 20 November 2023 of the Aboriginal Heritage Information Management System (AHIMS) web service did not identify any previously recorded sites within or surrounding the investigation area, however this may be due to a lack of prior investigation in the area. An Aboriginal Cultural Heritage Assessment (ACHA) would be prepared as part of the EIS and would include consultation with the registered Aboriginal parties.
<i>Rural Fires Act 1997</i>	A bushfire safety authority under section 100B would not be required for the Project. A bushfire assessment would be carried out for the Project in accordance with Planning for Bushfire Protection (RFS, 2019).
<i>Water Management Act 2000</i> (WM Act)	A water use approval under section 89, a water management work approval under section 90, or an activity approval under section 91 of the WM Act would not be required for the Project. Construction work within or near watercourses would be required as part of the Project. These works would be carried out in accordance with relevant NSW DCCEE guidelines for controlled activities.

4.4 Pre-conditions to exercising the power to grant consent

Table 4.2 Applicable pre-conditions to granting development consent

Statutory Reference	Requirement
<i>Environmental Planning and Assessment Regulation 2021</i>	
Section 28(2)	A development application that is accompanied by a Biodiversity Development Assessment Report (BDAR) under the <i>Biodiversity Conservation Act 2016</i> must contain the "biodiversity credits information." The development application for the Project would be accompanied by a BDAR, including biodiversity credit information) and the EIS would include the biodiversity assessment required by the SEARs.
<i>Biodiversity Conservation Act 2016</i>	
Section 7.9	A development application for State significant development is to be accompanied by a BDAR (unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values) and the EIS is to include the biodiversity assessment required by the environmental assessment requirements of the Planning Agency Head under the EP&A Act. The development application for the Project would be accompanied by a BDAR, including biodiversity credit information) and the EIS would include the biodiversity assessment required by the SEARs.
<i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i>	
Section 2.48	Section 2.48 of the TISEPP requires written notice to be given of a project located near electrical infrastructure to the electricity supply authority inviting comments about potential safety risks and take into consideration any response to the notice received in 21 days after the notice is given. The Project would be situated adjacent to two existing 330 kV transmission lines, therefore consultation with the electricity authority would be undertaken in preparation of the EIS.

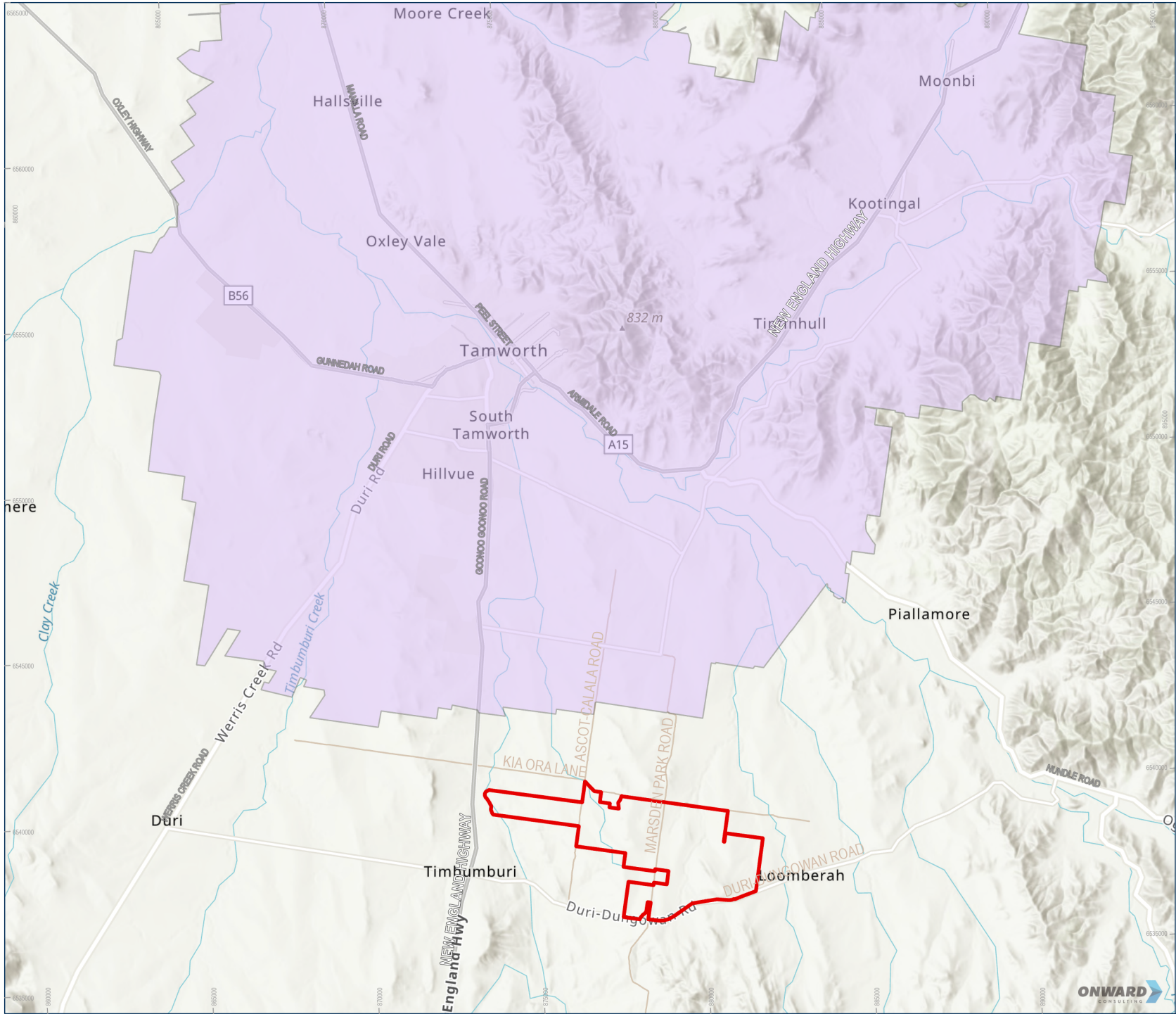
4.5 Mandatory matters for consideration

When deciding whether to grant consent for the Project, the consent authority is required to consider a range of mandatory matters, as identified in Table 4.3. The EIS would explore how the Project is consistent with these requirements.

Table 4.3 Mandatory considerations – planning

Statutory Reference	Mandatory consideration
Considerations under the EP&A Act	
Section 1.3 – Objects of the Act	The Objects of the Act are: a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources, b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment, c) to promote the orderly and economic use and development of land, d) to promote the delivery and maintenance of affordable housing, e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats, f) to the sustainable management of built and cultural heritage (including Aboriginal cultural heritage), g) to promote good design and amenity of the built environment, h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants, i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State, j) to provide increased opportunity for community participation in environmental planning and assessment. The EIS would consider and confirm the Project's concurrence with the Objects of the Act
Section 4.15	The consent authority is required to take the following matters into consideration in determining a development application: – Relevant environmental planning instruments including: – TISEPP – State Environmental Planning Policy (Resilience and Hazards) 2021 (Hazards SEPP) – SEPP (Biodiversity and Conservation) 2021 – Tamworth Regional LEP – The likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality – The suitability of the site for the development – Any submissions made in accordance with this Act or the regulations – The public interest The EIS would address each evaluation matter and provide relevant detail in relation to how the Project is consistent with each.
Considerations under the other legislation	
<i>Biodiversity Conservation Act 2016</i>	Section 7.16 of the BC Act (serious and irreversible impacts on biodiversity values) would be considered in the BDAR and EIS.
Considerations under relevant EPIs	
State Environmental Planning Policy (Resilience and Hazards) 2021 (Hazards SEPP)	Hazards SEPP assesses the potential hazards associated with the proposed development by providing definitions and guidelines for hazardous industry, offensive industry, hazardous storage establishments, and offensive storage establishments. In accordance with clause 3.7 of the Hazards SEPP, consideration would be given to current circulars or guidelines published by the Department of Planning relating to hazardous or offensive development, including:

Statutory Reference	Mandatory consideration
	– Hazardous Industry Advisory Paper No 4 – Risk Criteria for Land Use Safety Planning’ (DoP, 2011); and – Hazardous Industry Planning Advisory Paper No 6 – Hazard Analysis’ and ‘Multi-level Risk Assessment (DoP, 2011). Under section 4.6 of the Hazards SEPP, a consent authority is required to consider whether a development is affected by soil or other contaminants before granting consent. Each of a hazards and contamination assessment would be prepared as part of the EIS.
TISEPP	Clause 2.42 applies to SSD in a regional city, as shown in the State Environmental Planning Policy (Infrastructure) 2007 Regional Cities Map, for the purposes of electricity generating works using a solar resource. Development consent must not be granted unless the consent authority is satisfied the development is located to avoid significant conflict with existing or approved residential development or a commercial use land surrounding the development and is unlikely to have a significant adverse impact on the regional city’s capacity for growth, or scenic quality and landscape character. Tamworth is identified as a regional city in the Regional Cities Map (Figure 4.1). The Project is approximately 2.5 km south of the Tamworth regional city, therefore section 2.42 of the TISEPP is not applicable to the Project
Tamworth Regional Local Environmental Plan 2010	The EIS would address relevant components of the Tamworth Regional LEP, including: – Section 1.2 – Aims of Plan; – Section 2.3 – Zone Objectives and land use table; – Section 5.21 – Flood planning; and – Section 7.1 – Earthworks
Considerations under Development Control Plans (DCP)	
Tamworth Regional DCP	In accordance with section 2.10 of the Planning Systems SEPP, DCPs do not apply to SSD and are not a relevant consideration for the Project.



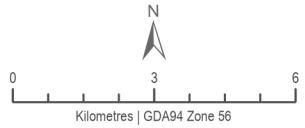
LAMBRUK SOLAR PROJECT

Project Location in Relation to the Tamworth
Regional City as Defined by the TISEPP

Figure 4.1

LEGEND

-  Project Area
-  Regional cities subject land
-  Highway
-  Major roads
-  Local roads



5. Community and stakeholder engagement

5.1 Overview

The Engagement Guidelines require upfront and ongoing engagement for all State significant projects (DPIE, 2022). As part of the development of the Project and preparation of the Scoping Report, engagement has been undertaken with a range of stakeholders including relevant Government agencies, the local community, special interest groups and neighbouring and proximate landholders.

The Applicant is committed to ensuring public concerns and comments are considered, and that attempts are made to avoid, minimise, or mitigate potential impacts where possible. Engagement would continue with relevant stakeholder throughout the EIS development.

5.2 Community and stakeholder management plan

A Community and Stakeholder Management Plan (CSMP) has been prepared for the Project (Appendix F). The CSMP is an evolving document, which includes consideration of the International Association of Public Participation (IAP2) (IAP2, 2022) and the Engagement Guidelines (DPIE, 2022).

The CSMP has facilitated engagement with relevant stakeholders which is open and inclusive, easy to access, relevant, timely and meaningful, as required in the Engagement Guidelines (DPIE, 2022). The CSMP also demonstrates the Applicant's commitment to continuously evaluate community engagement and modify when needed, to ensure the Applicant meets stakeholder expectations.

The engagement objectives of the CSMP are to:

- initiate conversations with neighbouring residents, sensitive receivers and key stakeholders;
- create a basis for consistent, genuine and reliable engagement from scoping through to EIS and project approval;
- consistent, transparent information for interactions and subsequent engagement;
- inform the consultation process by gathering feedback and questions from the scoping phase;
- work together with the neighbouring properties in a collaborative way;
- develop a sense of local ownership in the Project;
- maintain a positive corporate image for the client and the renewable energy industry;
- produce clear information on the potential impacts and benefits for the environment, community, and region;
- support an uplift in the regional economy and level of local prosperity;
- demonstrate sharing of Project benefits; and
- support and engage local capabilities.

5.3 Engagement carried out

5.3.1 Stakeholder identification

The CSMP was designed to enable community members to be part of the Project planning and development process, and to provide them with the opportunity to engage in a meaningful way at an early stage in the assessment process for the Project.

Stakeholders were identified through various methods, including:

- compilation of land ownership information;
- stakeholder mapping and analysis activities;
- consideration of the local and wider community, industry, and service providers;

- direct contact with known stakeholders;
- networking with different individuals and community organisations;
- discussion with Project neighbours; and
- discussion with regulators.

Table 5.1 identifies key stakeholders relevant to the Project, and that would be consulted in the preparation of the EIS.

Table 5.1 Stakeholders identified

Category	Stakeholder
Landholders	– Non-associated – Associated
Nearby Communities	– Local communities: – Loomberah – Timbumburi – Regional centres: – Tamworth
Community Groups	– Tamworth Clay Target Club – Loomberah Hall Committee – Tamworth LALC and local RAPs – Loomberah Church – Loomberah No Solar Action Group – RED4NE – Hills of Gold Preservation Committee – Tamworth Parents and Friends for Climate Action – Tamworth Regional Landcare Association – Timbumburi Public School – Dongowan Cowboys Rugby League Club
Other Industry and Stakeholders	– Infrastructure owners – TransGrid, UGL Regional Linx (UGLRL), Essential Energy Electrical cables, Telstra NSW North assets, AARNet fibre optic cable assets – Business groups – Tamworth Business Chamber
Local Council	– Tamworth Regional Council
State Government Agencies	– DPHI – NSW DCCEEW – Water Assessments – DPI – Agriculture – Heritage NSW – EPA – Shadow Minister for Gaming and Racing, Shadow Minister for the Arts and Heritage and State Member for Tamworth – State Member for Northern Tablelands – NSW Rural Fire Service (RFS) – Fire and Rescue NSW (FRSNW) – Biodiversity, Conservation and Science Directorate (BCS) – North West Planning Team – Mining, Exploration and Geoscience (MEG) – Crown Lands – TfNSW – Natural Resources Access Regulator (NRAR) – Energy Corporation of NSW (EnergyCo)

Category	Stakeholder
Aboriginal Agencies	– Office of the Registrar – <i>Aboriginal Land Rights Act 1983</i> – Tamworth LALC, National Native Title Tribunal – National Native Title Services Corporation Ltd (NTSCORP) – North West Local Land Services (LLS)
Federal Government Agencies	– DCCEEW – Federal Member for New England

5.3.2 Community engagement

Table 5.2 provides a summary of a range of engagement tools that have been or would be implemented to discuss the Project with stakeholders and to build an understanding of potential concerns, opportunities, and mitigation strategies. It also aimed to gather information that could inform the broader communication required to support future stages of the Project including during the EIS phase.

Table 5.2 Summary of key community engagement activities

Stakeholder	Date / Tools	Engagement summary
All Stakeholders	November 2023 – Ongoing Website	A dedicated website was launched to further drive community awareness of the Project and the Lambruk Solar Project, which provides: – Project overview, including location and timelines – Project updates and community sessions details, found at: https://lambruksolarproject.com.au/news – Past community newsletters and factsheets – Sign up option to receive regular updates: https://lambruksolarproject.com.au/stay-informed/ Community hotline phone number, email address, and a 'get in touch' feedback section: https://lambruksolarproject.com.au/get-in-touch/ – Project team biographies: https://lambruksolarproject.com.au/about-us/
All Stakeholders	September 2023 – Ongoing Email address and hotline	A dedicated email address and phone hotline are available to answer queries and allow the community to provide feedback anytime. This hotline and email are monitored regularly by the Project community engagement team and provide an additional stream for two-way communication between stakeholders and the Applicant. The details for the hotline and email address are shared on the Project's website, social media, newsletters and on factsheets, and business cards handed out at the community hub and pop-up sessions: – Email: info@lambruksolarproject.com.au – Hotline: 0485 840 493 To date nine calls have been made to or received from the community enquiring about the Project on the community hotline. Names, contact details and enquires have been recorded in the Stakeholder Register.
Landholders	November 2022 – Ongoing Face-to-face, phone calls and emails	Face-to-face meetings were held to share relevant Project updates and progress. Face-to-face meetings include 21 meetings with associated landholders. Ongoing liaison with the host landholders also occurred via phone and email, equating to 246 individual interactions. All questions were captured in the Stakeholder Register.

Stakeholder	Date / Tools	Engagement summary
Neighbouring landholders	November 2022 – Ongoing Face-to-face, phone calls and emails	Face-to-face meetings were held to share relevant Project updates and progress. Face-to-face meetings include 29 meetings with neighbour landholders. Ongoing liaison with the host landholders also occurred via phone and email, equating to approximately 60 individual interactions. All questions were captured in the Stakeholder Register.
Local community	8 December 2022 Face-to-face	A community information session at Loomberah Hall on between 2:20 pm – 7:30 pm. The session was advertised via direct communications including the information pack. Approximately 100 people attended, 54 people entered their communication details into the Stakeholder Register.

5.3.3 Regulators

Table 5.3 summaries the preliminary meetings with relevant regulators and purpose of each.

Table 5.3 Summary of key regulator engagement activities

Regulator	Date / Tools	Engagement summary
DPHI (formerly DPE – Planning)	14 November 2023 Virtual meeting	- Pre-scoping meeting to discuss the preliminary project layout, assessment findings and avoidance and mitigation to date. - DPHI team indicated standards and expectations for the Scoping Report content. DPHI was also interested that the Project refinement has avoided areas of high biodiversity values and reduced impacts on sensitive dwellings.
Tamworth Regional Council	16 November 2023 Face-to-face and virtual meeting	- Project team met with Tamworth Regional Council including the Manager Development and the Manager Regional Services to share the Project. - Key area of interest was the VPA and CBF, waste (construction and decommissioning), local roads, water quality and decommissioning.
BCS	4 December 2023 Virtual meeting	- Project team met with BSC to discuss the preliminary project layout and preliminary biodiversity assessment findings. - BCS advised native tree plantings would need to be assessed in the BDAR in accordance with the Planted Native Vegetation Module of the BAM. - PCTs associated with White Box Yellow Box Blakely's Red Gum Woodland have been identified within the Project Area. White Box Yellow Box Blakely's Red Gum Woodland has been identified as an entity at risk of a Serious and Irreversible Impact (SAII). SAII would be assessed in the BDAR that would accompany the EIS.
Transport for NSW	17 January 2024 Virtual meeting	- Project team met with TfNSW to discuss the preliminary project layout, site access and port access options. - TfNSW advised construction workforce transport options would need to be considered in the EIS to ensure any required upgrades are fit-for-purpose. - TfNSW indicated standards and expectations for the traffic assessment, including the OSOM route/s.

5.3.4 Utility providers

Table 5.4 summarises consultation undertaken with TransGrid regarding connection of the Project to the existing 330 kV transmission lines that traverses the Project Area.

Table 5.4 Summary of key utility provider engagement activities

Utility provider	Date / Tools	Engagement summary
TransGrid	July 2023 – ongoing	Proposed connection capacity and the connection configuration have been reviewed by TransGrid and AEMO, along with comprehensive dynamic and steady state studies prepared for the Project.

5.4 Community views

Table 5.5 provides a summary of community and regulator views on the Project.

Table 5.5 Stakeholder views

Stakeholder category	Level of interest / geographic extent ¹	Stakeholder views on the Project				
		Strategic context	Design and alternatives	Statutory issues	Engagement	Key matters for EIS assessment
Community views						
Community	Medium to high / Local to regional	Visual impact	Visual management and mitigation measures (e.g. planting screening) would be adopted to reduce potential impacts on surrounding dwellings. This would be further discussed in the EIS phase.	-	Ongoing as the Project develops and as per guidelines	Visual Amenity: What will be the visual impact from the Project on Loomberah and surrounding neighbours, photomontages.
Landholders	High / Local	Agricultural land	Weed management measures would be considered and discussed further in the EIS phase.	-	Ongoing as the Project develops	Biosecurity: How will Project manage priority weeds.
Community	Medium to high / Local to regional	Goonoo Goonoo Creek and waterways	- The Project would be designed to allow grazing to continue alongside its operations, to minimise loss groundcover, risk of erosion and potential run-off into waterways. - Erosion and sediment control management measures would be considered and discussed further in the EIS phase.	-	Ongoing as the Project develops	Hydrology: How will the Project manage run-off and sediment control from the Project Area.
Community	Medium to high / Local	Community Division	Creating space for community discussion and addressing concerns through information sessions, regular communication and proposed neighbour agreements pending impact.	-	Ongoing as the Project develops	Social: How the community has been engaged with and social license of Project.
Community	Medium to high / Local to regional	Goonoo Goonoo Creek, waterways, Namoi River Catchment	Erosion and sediment control management measures would be considered and discussed further in the EIS phase.	Potential for water access licence	Ongoing as the Project develops	Hydrology: How will the Project protect environmental impact to the catchment area.

Stakeholder category	Level of interest / geographic extent ¹	Stakeholder views on the Project				
		Strategic context	Design and alternatives	Statutory issues	Engagement	Key matters for EIS assessment
Landholders	High / Local	Agricultural land Potential for cumulative impacts that may cause devaluation of properties.	The Project design would be refined based on technical assessments (e.g. visual and noise) and where impacts could not be avoided, management and mitigation measures would be adopted to further reduce potential impacts that may cause devaluation of properties. This would be further discussed in the EIS phase.	-	Ongoing as the Project develops	Agriculture/ Land Use Conflict Risk Assessment: How will the Project demonstrate no negative impact on surrounding property values.
Community	Medium to high / Local to regional	Local Roads Potential for cumulative impact.	Traffic mitigation and management measures would be adopted to reduce potential impacts on local roads and local community. This would be further discussed in the EIS phase.	-	Ongoing as the Project develops	Traffic: How will the Project manage traffic impact. Particularly with the long slow ascent of Moonbi ranges. Many locals commute to Tamworth daily.
Community and Tamworth Regional Council	Medium to high / Local to regional	Local infrastructure (accommodations) Potential for cumulative impact on local infrastructure	- Accommodation and workforce requirements would be considered during EIS phase. - A CBF would be implemented for the operational life of the Project through to decommissioning. The CBF would support the local community programs/events, local businesses, training, and services/infrastructure.	-	Ongoing as the Project develops and as per guidelines	- Social: How the Project workforce will be accommodated during the construction phase. - Employment: Number of jobs to be created and how the local community and local business can be involved in the Project. - Social: Most residents, neighbours and stakeholders were positive towards the economic benefits the Project will generate for their towns.
Community	Medium to high / Local to regional	Ecologically Sustainable Development	Project layout would be refined to further consider the principles of ESD.	-	Ongoing as the Project develops	ESD: How will the Project contribute to ESD.

Stakeholder category	Level of interest / geographic extent ¹	Stakeholder views on the Project				
		Strategic context	Design and alternatives	Statutory issues	Engagement	Key matters for EIS assessment
Community and Tamworth Regional Council	Medium to high / Local to regional	Surrounding dwellings Potential for noise cumulative impact	Noise management and mitigation measures would be adopted to reduce potential impacts on surrounding dwellings. This will be further discussed in the EIS.	-	Ongoing as the Project develops	Noise: What will be the noise impact from the Project on surrounding neighbours.
Regulatory						
Tamworth Regional Council	Medium to high / Local to regional	CBF and VPA	A VPA would document the obligations of the Applicant to make initial and ongoing contributions to a CBF. Discussions with Tamworth Regional Council have started. A CBF would be implemented for the operational life of the Project through to decommissioning. The CBF will support the local community programs/events, local businesses, training, and services/infrastructure.	-	Ongoing as the Project develops and as per guidelines	Social: Community benefits and how this will be managed through a VPA.
Tamworth Regional Council	Medium to high / Local to regional	Local Roads Potential for traffic cumulative impact.	- Traffic mitigation and management measures would be adopted to reduce potential impacts on local roads and local community. This would be further discussed in the EIS phase. - A CBF would be implemented to support local services/infrastructure.	-	Ongoing as the Project develops	Traffic: Infrastructure impacts such as road, traffic.
Tamworth Regional Council	Medium to high / Local to regional	Waste Potential for cumulative impacts	Waste mitigation measures would be investigated to reduce the amount of packaging and consider recycling opportunities as practicable. This would be discussed further in the EIS.	-	Ongoing as the Project develops	Waste: Classification and quantity of waste streams

Stakeholder category	Level of interest / geographic extent ¹	Stakeholder views on the Project				
		Strategic context	Design and alternatives	Statutory issues	Engagement	Key matters for EIS assessment
Tamworth Regional Council	Medium to high / Local to regional	Goonoo Goonoo Creek and waterways	– The Project would be designed to allow grazing to continue alongside its operations, to minimise loss groundcover, risk of erosion and potential run-off into waterways. – Erosion and sediment control management measures would be considered and discussed further in the EIS phase.	-	Ongoing as the Project develops	– Hydrology: How will the Project manage run-off and sediment control from the Project Area.
DPHI	Medium to high / Local to regional	Local Biodiversity	– A BDAR would be undertaken during EIS phase to inform the Project refinement process. The final Project layout and disturbance area, including road upgrades, would aim to avoid areas containing biodiversity values and/ or adopt measures to manage and mitigate potential impacts of the Project.	Potential for EPBC Act referral	Ongoing as the Project develops	– Biodiversity: Impact of the Project on ecology.
DPHI	Medium to high / Local to regional	Potential for visual impacts	– Visual management and mitigation measures (e.g., planting screening) would be adopted to reduce potential impacts on sensitive dwellings. In the EIS phase a detailed assessment and photomontage would be undertaken for the dwellings that may theoretically have views to the Project as identified in the scoping phase.	-	Ongoing as the Project develops	– Visual Amenity: What will be the visual impact from the Project on the surrounding neighbours.

Stakeholder category	Level of interest / geographic extent ¹	Stakeholder views on the Project				
		Strategic context	Design and alternatives	Statutory issues	Engagement	Key matters for EIS assessment
DPHI	Medium to high / Local to State	Local and State roads Potential for traffic cumulative impact.	– Traffic mitigation and management measures would be adopted to reduce potential impacts on local and State roads. This would be further discussed in the EIS phase.	-	Ongoing as the Project develops	– Traffic and Transport: What routes will be used construction traffic and potential impacts of the size, loads, and volumes of vehicles on the road network required to transport components.
DPHI	Medium to high / Local to regional	Agricultural land	– The Project design would be compatible with sheep grazing, allowing continuation of existing agricultural activities within the Project Areas.	-	Ongoing as the Project develops and as per guidelines	– Soil and Agricultural Impact Assessment: What agrisolar opportunities are compatible with the Project
DPHI	Medium / Local	Contaminated land	– Potential sources of contamination including ag chemicals, fuel and asbestos containing material would be considered and further assessed as applicable in the EIS.	-	Ongoing as the Project develops	– Soil and Agricultural Impact Assessment: What agrisolar opportunities are compatible with the Project
DPHI	Medium to high / Local to regional	Potential for noise impacts	– Noise management and mitigation measures have been adopted during scoping phase and further Project refinement would continue during the EIS phase with the aim to reduce potential noise impacts on surrounding dwellings.	-	Ongoing as the Project develops	– Noise: What will be the noise impact from the Project on surrounding neighbours

¹ As specified in the Scoping Report Guidelines - Local <5 km from the Project Area, regional: 5-100 km and state >100 km.

5.5 Future engagement

Engagement with stakeholders would continue to be undertaken during the preparation of the EIS including:

- ongoing meetings with Tamworth Regional Council;
- ongoing consultation with DPHI and other key Government regulators;
- ongoing consultation with State and Federal MPs;
- ongoing meetings with Project community groups, and establishment of a committee or similar (as required);
- ongoing consultation with community and regulatory stakeholders via various channels, including website updates, newsletters, factsheets, meetings, presentations, information sessions, and attendance at community events;
- ongoing monitoring of a project phone hotline and email for feedback from the community;
- creating up to date Project factsheets, based on key areas of community concern, and distribute in person and online;
- regular electronic direct mail and newsletters to stakeholders;
- ongoing media relations to ensure community awareness around Project updates;
- maintaining the Project website and other social media channels for the Project; and
- project updates uploaded to Project website.

The CSMP would also be regularly monitored, reviewed, and adapted over the course of the Project to ensure it remains effective and encourages community participation. The CSMP includes a regular action plan which describes the activities, target audience and timing of actions to ensure smooth delivery of engagement which would be reviewed and adapted post-submission of the EIS.

Engagement to be undertaken during the preparation of the EIS would also consider the following guidelines and their objectives:

- Engagement Guidelines (DPIE, 2022);
- International Association of Public Participation (IAP2) (IAP2, 2022);
- SIA Guideline (DPIE, 2023c); and
- Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010a).

A range of engagement tools, as presented in Table 5.2, would be used to 'Inform', 'Consult', 'Involve', 'Collaborate' and 'Empower' the stakeholders and community during preparation of the EIS. Issues raised during engagement would be documented by the Project team to inform the project design, environmental assessment, and the preparation of the EIS.

6. Assessment of impacts

6.1 Introduction

A review of environmental aspects relevant to the Project has been carried out to assist in the identification of matters that would require further assessment in the EIS and the level of assessment that should be carried out for each matter. In accordance with the Scoping Report Guidelines (DPE, 2022a), the following factors have been considered in the identification of matters needing further assessment for the Project:

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

A summary of the levels of assessment required for each matter is provided in Appendix A.

This chapter has also been prepared in accordance with:

- State Significant Development Guidelines – preparing a scoping report (DPE, 2002d) (Scoping Report Guidelines);
- Large-Scale Solar Energy Guideline (DPE, 2022b) (LSSE Guideline);
- Technical Supplement – Landscape and Visual Impact Assessment (DPE, 2022e) (LVIA Technical Supplement);
- Social Impact Assessment Guideline for State Significant Projects (DPE, 2023d) (SIA Guideline);
- Technical Supplement – Social Impact Assessment Guidelines for State Significant Projects (DPE, 2023c) (SIA Technical Supplement);
- Undertaking Engagement Guidelines for State Significant Projects (DPE, 2022f) (Engagement Guidelines); and
- Cumulative Impact Assessment Guidelines for State Significant Projects (DPE, 2022a) (CIA Guidelines).

6.2 Biodiversity

6.2.1 Background

WaterTech has undertaken a Preliminary Biodiversity Assessment Report (PBAR) for the Project, summarised in this section and provided in full in Appendix B. The PBAR provides an indication of potential ecological constraints that are known to or have the potential to occur in the Project Area, and to assist in defining the layout to avoid and minimise impacts to biodiversity where practicable.

The Project Area has generally been used for agricultural purposes (cropping, livestock grazing) with some residential dwellings and farm infrastructure. As a result of previous agricultural activities, the pastures contain a mixture of native and non-native pasture grasses. Some areas, mainly around creek lines and steep areas, are left in a more natural state with sparse to moderate tree cover and less disturbed understorey.

6.2.2 Preliminary Assessment

6.2.2.1 Plant Community Types and Potential Threatened Ecological Communities

Four EPBC Act listed Threatened Ecological Communities (TECs) were detailed within the Protected Matters Search Tool (PMST) as having the potential to occur within the Project Area. These TECs include:

- Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (Critically Endangered Community);
- New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands (Critically Endangered Community);
- Weeping Myall Woodlands (Endangered Community); and

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered Community).

A review of the state vegetation type mapping was undertaken to assess existing vegetation mapping information within the Project Area. Preliminary field surveys to date consisted of rapid vegetation assessments (BAM plots) across the Project Area and potential disturbance footprint. Additional BAM plot surveys would be undertaken to meet the BAM requirements for the EIS. BAM plot data to date has been used to refine state vegetation type mapping and to identify four PCTs across the Project Area.

The PCTs on site were determined as follows:

- PCT 3521 – Northwest White Box Woodland;
- PCT 3396 – Northwest Flats Box-Blakely's Red Gum Forest;
- PCT 3398 – Northwest Slopes Box-Apple Woodland; and
- PCT 4147 – Northwest White Box Sparse Grassy Woodland.

All of the above PCTs except for PCT 3521 are associated with the following TECs:

- 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, BC Act); and
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered, EPBC Act).

PCTs, non-native vegetation and potential Threatened Ecological Communities (TEC) are shown on Figure 6.1.

Further assessment and analysis during the EIS would be required to confirm these TECs within the development footprint. Fieldwork completed to date has identified areas of potential White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland within the Project Area. For this community to meet the requirements of the EPBC Act TEC, the structure generally needs to be of a woodland community and excludes areas of derived native grassland. Presence of EPBC or BC Act listed TECs would need further assessment and confirmation throughout subsequent survey periods.

6.2.2.2 Threatened Flora and Fauna Species

A review of the NSW BioNet, PMST database records and previous surveys undertaken (NGH, 2022), has provided a list of threatened species that are known to, likely to, or have the potential to occur within the Project Area. A BioNET search identified only two threatened species that have been recorded within a 10 km radius of the site's centre over the past 10 years (Table 6.1). Previous surveys (NGH, 2022) identified a little lorikeet within the Project Area (Table 6.1).

A review of NSW SEED Portal showed that no threatened species have been recorded on the site.

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PCTs within the Project Area

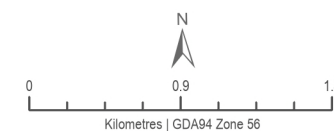
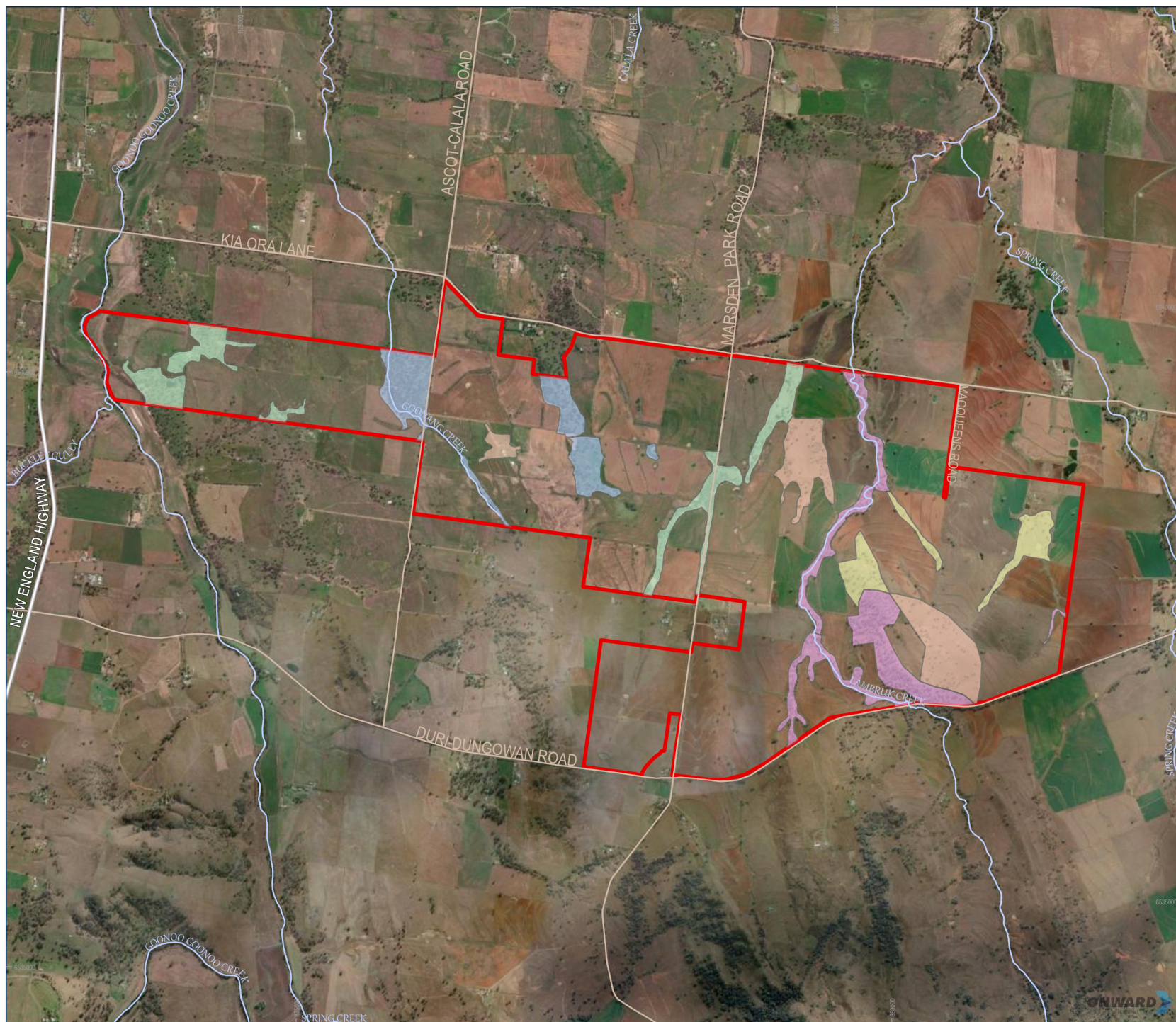
Figure 6.1

LEGEND

- Indicative project area
- Highway
- Local roads
- Named watercourses

Plant community type

- 3396 Northwest Flats Box-Blakelys Red Gum Forest
- 3398 Northwest Slopes Box-Apple Woodland
- 3521 Northwest White Box Woodland
- 4147 Northwest White Box Sparse Grassy Woodland
- To be confirmed



Source: ESRI, Water Technology

Table 6.1 Threatened species records within and surrounding the Project Area

Scientific Name	Common Name	BC Act	EPBC Act	Record location	Recorded during survey
Bluegrass	<i>Dicanthium setosum</i>	V	V	Outside Project Area	N – habitat only
Regent Honeyeater	<i>Anthochaera phrygia</i>	CE	CE	Outside Project Area	N – disturbed habitat only
Little Lorikeet	<i>Glossopsitta pusilla</i>	V	-	In Project Area	N – habitat only

V – Vulnerable

CE – Critically Endangered

The PMST identified the following threatened species which may also occur within the Project Area:

- Five-clawed Worm-skink (*Anomalopus mackayi*), Endangered (BC Act) and Vulnerable (EPBC Act);
- Pink-tailed Worm-lizard (*Aprasia parapulchella*), Vulnerable (EPBC Act and BC Act);
- Grey Snake (*Hemiaspis damelii*), Endangered (EPBC Act and BC Act);
- Western Sawshelled Turtle (*Myuchelys bellii*), Endangered (EPBC Act and BC Act); and
- Border Thick-tailed Gecko (*Uvidicolus sphyrurus*), Vulnerable (EPBC Act and BC Act).

Additional survey effort for threatened flora and fauna would be undertaken to meet the requirements of the BAM, and to inform the EIS. Other threatened species would be identified in the BAM Calculator outputs as Candidate Species, which would be targeted for survey during the EIS.

The Project design has already considered avoidance measures, where practicable, and would further consider biodiversity constraints in the EIS. Mitigation measures to be implemented during construction to avoid these areas would further reduce the risk of potential impacts.

The Project is highly unlikely to impact Ramsar Convention (Ramsar) wetlands identified in the PMST due to the significant distance these wetlands occur upstream (>900 km) from the Project Area. The vehicle and cable crossings would involve works within waterways, with the potential to reduce water quality and impact upon freshwater fish communities that may be present.

The Project has the potential to impact threatened species populations and ecological communities, and therefore a detailed assessment would be undertaken for the EIS to accurately determine the extent of potential biodiversity impacts.

6.2.2.3 Habitat features

Habitat features within and adjacent to the Project Area (Figure 6.2) which may be important for threatened and other native species include:

- a low number of hollow-bearing trees, including stags, containing small to large size hollows;
- fallen timber, logs, solid and hollow providing habitat for invertebrates and terrestrial fauna;
- rocks and woody debris providing habitat for reptilian species; and
- hydrological features including:
 - Goonang Creek (Strahler stream order 3) and Lambruk Creek (Strahler stream order 4). Other unnamed waterways (Strahler stream order 1 and 2);
 - Key Fish Habitat under the FM Act is mapped along all streams of 3rd Strahler order or above including Goonang, Limerick and Goonoo Goonoo Creeks;
 - potential habitat for the eel tailed catfish (*Tandanus tandanus*) endangered population (FM Act) is mapped along Goonoo Creek; and
 - farm dams.

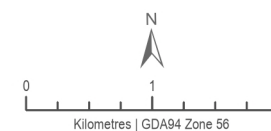
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Habitat Features within the Project Area and
Threatened Species Records within 3 km

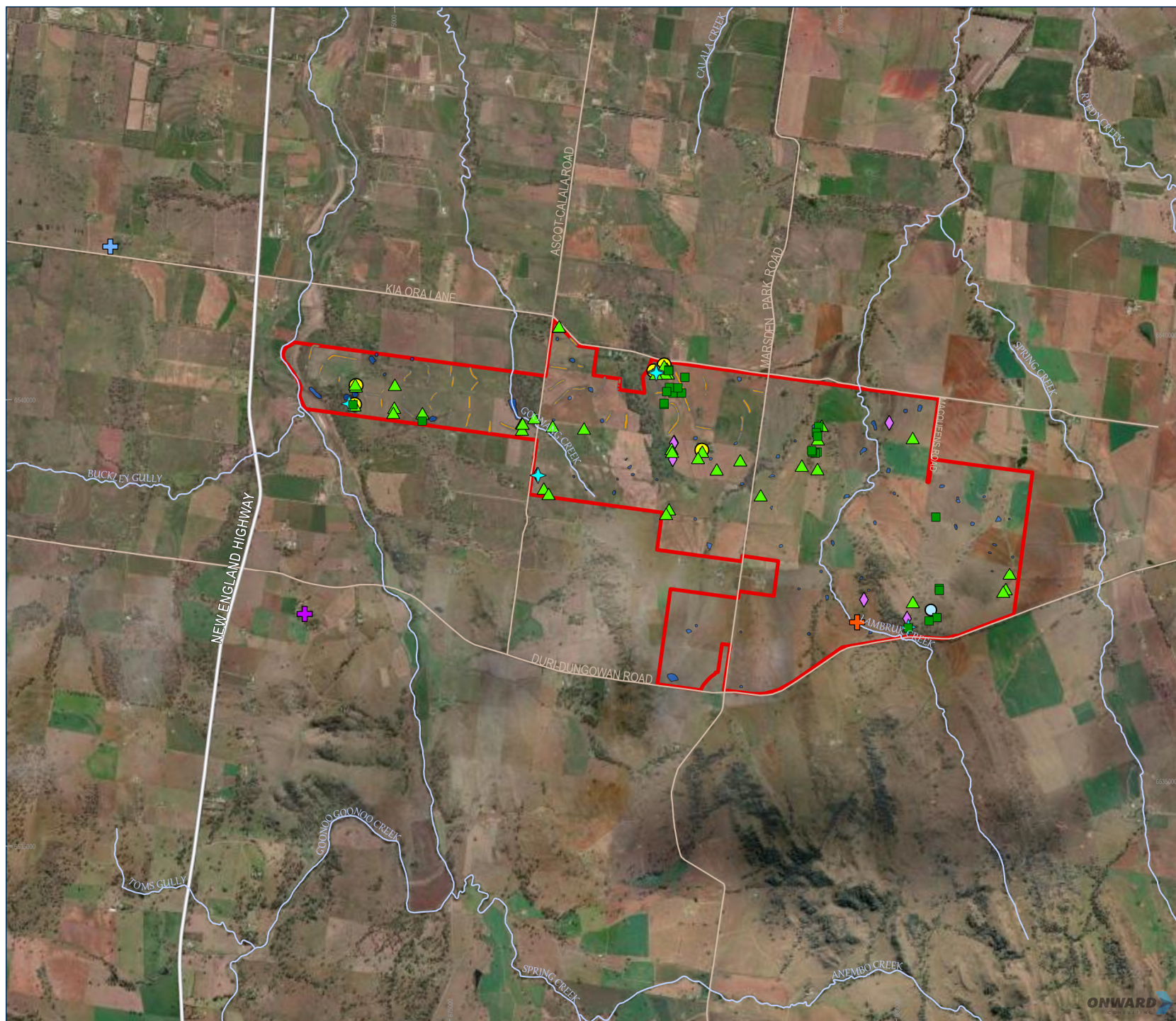
Figure 6.2

LEGEND

- Indicative project area
- Planted vegetation
- Dams
- Highway
- Local roads
- Named watercourses
- Bird's nest
- ◆ Dead stag tree
- Holes/burrows
- ▲ Hollow bearing tree
- ✦ Logs and woody debris
- Rocks
- ✚ Bluegrass
- ✚ Regent Honeyeater
- ✚ Little Lorikeet



Source: ESRI, Water Technology, Bionet(2023), NGH(2022)



6.2.2.4 Planted native vegetation

Planted native vegetation has been planted in rows and clusters on two of the host properties. The plantings have not yet reached maturity, however assessment in accordance the Streamlined Module Assessment Module – Planted Native Vegetation in Appendix D of the BAM would be undertaken in the BDAR prepared for the EIS.

6.2.3 EIS Assessment

The main potential impacts of the Project (during construction and operation) that would need to be assessed include:

- clearing of TECs;
- loss of extant native vegetation communities and associated fauna habitat and the subsequent impacts to local population of native species;
- increased foraging habitat fragmentation;
- loss of farm dams; and
- mortality and injury to fauna species from vehicle strike and vegetation clearing.

The potential biodiversity impacts of the Project would be assessed in accordance with the BAM but would also have regard for matters assessed under both the EPBC Act and the FM Act. The key considerations for the Project are expected to be:

- the value and extent of PCTs and grasslands captured within the indicative Development Footprint, as derived native grasslands can generate a credit liability if they meet minimum condition thresholds; and
- survey requirements for candidate threatened species, as it can influence the project program.

The Project would require a BDAR to be prepared by an accredited assessor in accordance with the BAM. The BDAR would include assessment of biodiversity values, consideration of prescribed impacts (those not quantified by ecosystem or species credits), presentation of mitigation and avoidance measures, quantification of the offsetting requirements and will present a strategy for offset delivery if required.

The project design would seek to minimise and avoid as far as possible, impacts on biodiversity values within the Project Area. Should the final development footprint impact on identified EPBC listed species and habitat, a referral to the DCCEEW may be required. If the Project is likely to significantly affect MNES and requires Commonwealth approval, the Project is expected to be assessed under provisions of the Assessment Bilateral Agreement between the Australian Government and the State of New South Wales



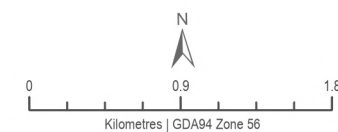
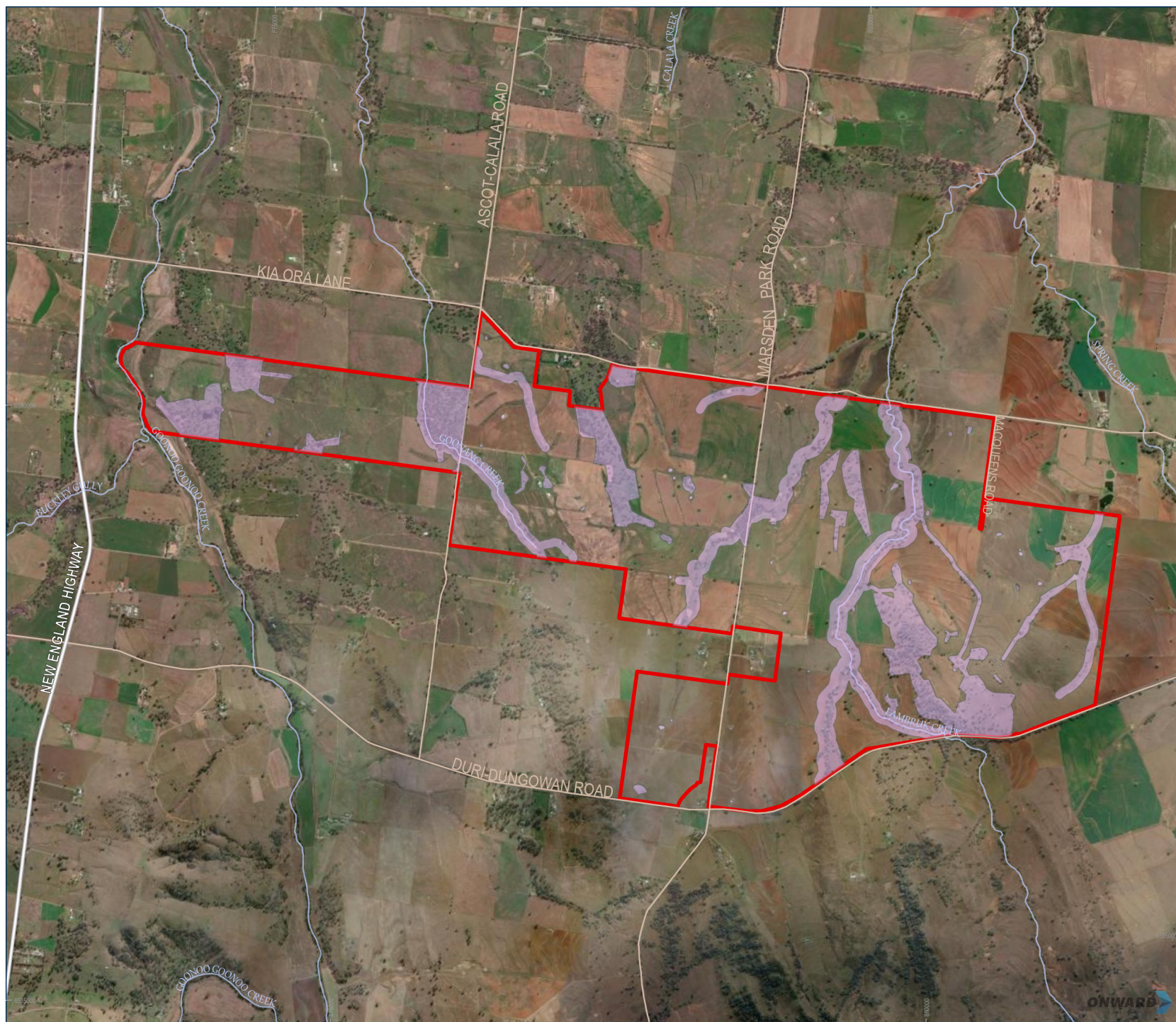
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Known and Potential Biodiversity Constraints within the Project Area

Figure 6.3

LEGEND

-  Indicative project area
-  Biodiversity constraints
-  Highway
-  Local roads
-  Named watercourses



Source: ESRI, Water Technology

6.3 Landscape and visual

6.3.1 Background

A Preliminary Landscape Visual Impact Assessment (PLVIA) has been prepared by Peter Haack Consulting in accordance with the LSSE Guideline (DPE, 2022b) and supporting LVIA Technical Supplement (DPE, 2022e).

The purpose of the PLVIA was to establish the existing landscape character and identify viewpoints that would potentially be impacted by the Project and determine which viewpoints would require detailed assessment in the EIS.

6.3.2 Preliminary assessment

6.3.2.1 Landscape character

The Project Area is located to the south of the Peel River valley and to the north of outlying hills of the Mount Royal Range, part of the Great Dividing Range. The Peel River lies at the foot of the Wentworth Mounds, which rise to approximately 950 mAHD at Goat Mountain, and form the western extent of the Moonbi Range. From the Peel River, the topography gently rises from an average elevation of approximately 400 mAHD, to between 410 mAHD and 480 mAHD along the northern boundary of the Project Area.

The Project Area is located within a flat to slightly undulating landscape comprised primarily of open pasture or cropping land. Dense areas of trees and tall shrubs are found on high points within the landscape as well as along the more significant water courses such as Spring Creek, Goonoo Goonoo Creek and Lambruk Creek. Additionally, taller scattered vegetation lines sections of the surrounding road network and some paddock boundaries.

Although mostly flat to slightly undulating, the Project Area contains a number of rises that are the most northern extension of the Mount Royal Range located to the south. The topography of the Project Area ranges in elevation from approximately 450 mAHD in the northwest corner of the site to 560 mAHD along the tops of ridge lines located to the southeast of the site. Slopes average 2-5% but can be as much as 25% in the steepest locations along water course and near high points.

Localised highpoints external to the Project Area are located at Round Hill (565 mAHD), approximately 4 km to the southwest, and the hill near Marsden Park (677 mAHD), approximately 2.4 km to the south, which extends northwards, progressively reducing in elevation in the Project Area. The relatively few inhabited areas on highly elevated topography, that may allow for overlooking, results in any vegetation within the landscape screening distant views.

The Project Area and surrounding areas are dominated by farming land uses with associated dwellings common. Rural residences are mostly set within surrounding vegetation of varying densities.

The existing 330 kV line which bisects the landscape north to south near the centre of the Project Area, results in a significant modification to the landscape of the setting at the local level.

6.3.2.2 Visual impact assessment

All viewpoints from public roads and rail lines within 2.5 km of the proposed development and any other public and private viewpoints within 4 km of the proposed development were identified in accordance with the LVIA Technical Supplement.

A viewshed map was prepared to identify all theoretical viewpoints and further eliminate the need to assess viewpoints if the analysis shows there is intervening terrain that would block the line of sight from a particular viewpoint based on the Preliminary Assessment Tool (PAT). The theoretical zone of visual influence (TZVI) and reverse viewshed are shown in Figure 6.4 and Figure 6.5, respectively, were prepared based on the Project Area boundary and panel height of up to 8 m. It is a 'bare earth' projection of the mapped topography only and does not account for intervening elements such as vegetation or buildings which would have the potential to obstruct views, therefore presenting the worst-case scenario for visual impacts. Given the relatively low profile of the majority of the components of the Project above ground level, the actual visual catchment will be limited, as vegetation throughout

the landscape and built form in residential areas will contribute to the screening of views towards the Project from most viewpoints.

The analysis identified 152 non-associated receivers within 4 km of the Project Area boundary (Figure 6.4). Six sections along the New England Highway and local roads were identified as potential public viewpoints (Table 6.2).

The PAT provided in the LVIA Technical Supplement was then applied to these potential viewpoints. The PAT is based on the vertical and horizontal field of view that a proposed development is likely to occupy when viewed from each viewpoint, and is influenced by distance, height, change in elevation, and width of a project.

Results for each public road viewpoint and private viewpoint is outlined in Table 6.2. All public viewpoints along the New England Highway and local roads within 2.5 km and 143 private residences within 4 km would require a detailed assessment in the EIS.

Table 6.2 Preliminary Assessment Tool results

Receiver ID	Viewpoint elevation (m)	Relative height difference (m)	Distance from the Project (m)	Vertical field of view (°)	Horizontal field of view (°)	Visible based on viewshed ?	Assessment required?
Public road viewpoints within 2.5 km							
Kia Ora Lane (V3)	412	161	830	4	115	Yes	Yes
Marsden Park Road (V17)	460	113	2,330	2	113	Yes	Yes
Ascot-Calala Road (V16)	452	124	1,670	4	119	Yes	Yes
Loomberah Road (V7)	498	79	1,250	3	65	Yes	Yes
Duri-Dungowan Road (V10)	417	138	1,890	2	125	Yes	Yes
New England Highway (V3)	417	152	580	4	79	Yes	Yes
Other public and private viewpoints within 4 km							
1 (V1)	506	69	205	4	335	Yes	Yes
2	439	135	1,320	4	105	Yes	Yes
3 (V4)	416	155	500	4	135	Yes	Yes
4 (V3)	409	161	740	4	113	Yes	Yes
5 (V3)	412	161	830	4	115	Yes	Yes
6	429	145	865	4	137	Yes	Yes
7	440	132	970	4	142	Yes	Yes
8	441	121	410	4	160	Yes	Yes
9	465	103	400	4	160	Yes	Yes
10	504	69	520	4	159	Yes	Yes
11 (V5)	472	85	200	4	200	Yes	Yes
12	509	58	224	4	180	Yes	Yes
13	526	45	480	4	167	Yes	Yes
14	510	60	675	4	154	Yes	Yes
15	451	32	1,160	1	127	Yes	Yes

Receiver ID	Viewpoint elevation (m)	Relative height difference (m)	Distance from the Project (m)	Vertical field of view (°)	Horizontal field of view (°)	Visible based on viewshed ?	Assessment required?
16	471	97	1,540	3	126	Yes	Yes
17	482	94	1,100	4	141	Yes	Yes
18 (V17)	460	113	2,330	2	113	Yes	Yes
19 (V17)	480	90	2,290	2	115	Yes	Yes
20 (V17)	485	87	2,590	1	106	Yes	Yes
21	433	142	1,770	3	121	Yes	Yes
22	432	143	2,200	3	107	Yes	Yes
23 (V14)	409	161	2,300	3	92	Yes	Yes
24 (V14)	407	164	1,870	4	100	Yes	Yes
25	410	165	715	4	85	Yes	Yes
26	416	160	1,190	4	84	Yes	Yes
27	412	163	1,520	4	80	Yes	Yes
28 (V16)	452	124	1,670	4	119	Yes	Yes
29 (V16)	455	121	1,820	3	116	Yes	Yes
30	464	112	1,950	2	114	Yes	Yes
31	466	109	1,290	4	127	Yes	Yes
32	467	109	1,560	3	123	Yes	Yes
33	488	87	1,900	2	117	Yes	Yes
34	429	147	3,250	2	84	Yes	Yes
35 (V6)	468	107	700	4	112	Yes	Yes
36 (V6)	470	105	720	4	87	Yes	Yes
37 (V7)	492	83	1,160	3	73	Yes	Yes
38 (V7)	498	79	1,250	3	65	Yes	Yes
39	516	60	1,430	2	66	Yes	Yes
40 (V8)	545	75	705	4	143	Yes	Yes
41 (V8)	558	75	830	4	131	Yes	Yes
42	588	87	1,100	3	112	Yes	Yes
43	565	76	370	4	130	Yes	Yes
44	551	75	210	4	138	Yes	Yes
45	530	78	670	4	118	Yes	Yes
46 (V9)	522	76	150	4	131	Yes	Yes
47 (V9)	494	75	320	4	179	Yes	Yes
48	469	101	610	4	140	Yes	Yes
49	459	111	865	4	135	Yes	Yes
50	455	115	1,020	4	139	Yes	Yes
51	451	119	1,570	3	151	Yes	Yes
52	461	108	1,020	4	188	Yes	Yes

Receiver ID	Viewpoint elevation (m)	Relative height difference (m)	Distance from the Project (m)	Vertical field of view (°)	Horizontal field of view (°)	Visible based on viewshed ?	Assessment required?
53	466	104	1,050	4	180	Yes	Yes
54	479	90	790	4	191	Yes	Yes
55 (V2)	492	78	230	4	222	Yes	Yes
56	459	111	605	4	199	Yes	Yes
57	465	105	790	4	190	Yes	Yes
58	443	126	1,200	4	164	Yes	Yes
59 (V10)	424	146	1,800	3	137	Yes	Yes
60 (V10)	452	118	2,240	2	120	Yes	Yes
61	428	141	1,720	4	131	Yes	Yes
62	452	118	80	4	222	Yes	Yes
63	423	146	790	4	143	Yes	Yes
64	418	152	990	4	98	Yes	Yes
65 (V3)	417	152	580	4	79	Yes	Yes
66	413	157	480	4	53	Yes	Yes
67 (V12)	448	122	1,720	3	58	Yes	Yes
68	429	140	2,000	3	56	Yes	Yes
69	444	125	2,620	2	55	Yes	Yes
70 (V13)	433	136	2,850	2	54	Yes	Yes
71 (V13)	409	161	2,510	3	69	Yes	Yes
72	414	155	2,600	2	88	Yes	Yes
73	439	131	2,490	2	101	Yes	Yes
74	438	131	2,500	2	98	Yes	Yes
75	429	141	2,710	2	94	Yes	Yes
76	428	142	2,960	2	90	Yes	Yes
77	441	129	3,140	2	92	No	No
78	434	135	3,300	2	89	Yes	Yes
79	458	111	3,120	1	98	Yes	Yes
80	446	123	3,550	1	89	Yes	Yes
81	450	119	3,590	1	87	Yes	Yes
82 (V21)	438	131	3,740	1	86	Yes	Yes
83 (V21)	446	124	3,920	1	85	Yes	Yes
85	417	152	3,080	2	86	Yes	Yes
86 (V15)	415	154	2,930	2	87	Yes	Yes
87 (V15)	422	148	3,000	2	88	Yes	Yes
88 (V15)	417	152	3,010	2	87	Yes	Yes
89 (V15)	413	157	3,330	2	84	Yes	Yes
90	416	154	3,420	2	82	Yes	Yes

Receiver ID	Viewpoint elevation (m)	Relative height difference (m)	Distance from the Project (m)	Vertical field of view (°)	Horizontal field of view (°)	Visible based on viewshed ?	Assessment required?
91	406	164	3,650	2	86	Yes	Yes
92	403	167	3,680	2	85	Yes	Yes
93	412	158	3,960	2	73	Yes	Yes
95	445	125	2,370	2	70	Yes	Yes
96	455	115	2,510	2	65	Yes	Yes
97 (V7)	482	88	1,750	2	53	Yes	Yes
98 (V7)	476	84	1,840	2	52	Yes	Yes
99	473	96	1,900	2	52	Yes	Yes
100	462	108	2,710	2	41	Yes	Yes
101 (V18)	440	130	2,990	2	60	Yes	Yes
102 (V18)	454	115	3,670	1	64	Yes	No
103	480	90	3,400	1	39	Yes	No
104	487	83	2,250	2	50	Yes	Yes
105	539	31	2,590	1	57	Yes	No
107	475	95	2,070	2	103	Yes	Yes
108 (V19)	516	54	2,650	1	86	No	Yes
109 (V19)	511	58	2,530	1	85	No	Yes
110	482	88	2,520	2	86	No	No
111 (V19)	466	103	3,460	1	75	No	Yes
112	450	120	4,020	1	79	No	Yes
113	421	148	2,440	3	117	Yes	Yes
114	404	165	3,140	2	65	Yes	Yes
115 (V13)	406	160	3,180	2	65	Yes	Yes
116 (V13)	407	160	3,180	2	65	Yes	Yes
117 (V13)	405	160	3,180	2	65	Yes	Yes
118 (V13)	413	160	3,180	2	59	Yes	Yes
119 (V13)	413	160	3,180	2	59	Yes	Yes
120 (V13)	416	160	3,180	2	59	Yes	Yes
121 (V20)	442	128	1,600	3	115	Yes	Yes
122	452	118	2,150	2	110	Yes	Yes
123 (V20)	466	103	2,600	2	93	Yes	Yes
124	496	74	3,390	1	87	Yes	Yes
125	490	80	3,010	1	88	Yes	Yes
126	506	63	3,200	1	99	Yes	Yes
127 (V12)	465	165	2,086	3	35	Yes	Yes
128 (V12)	470	165	2,620	3	34	Yes	Yes
129 (V12)	452	167	2,930	2	30	No	No

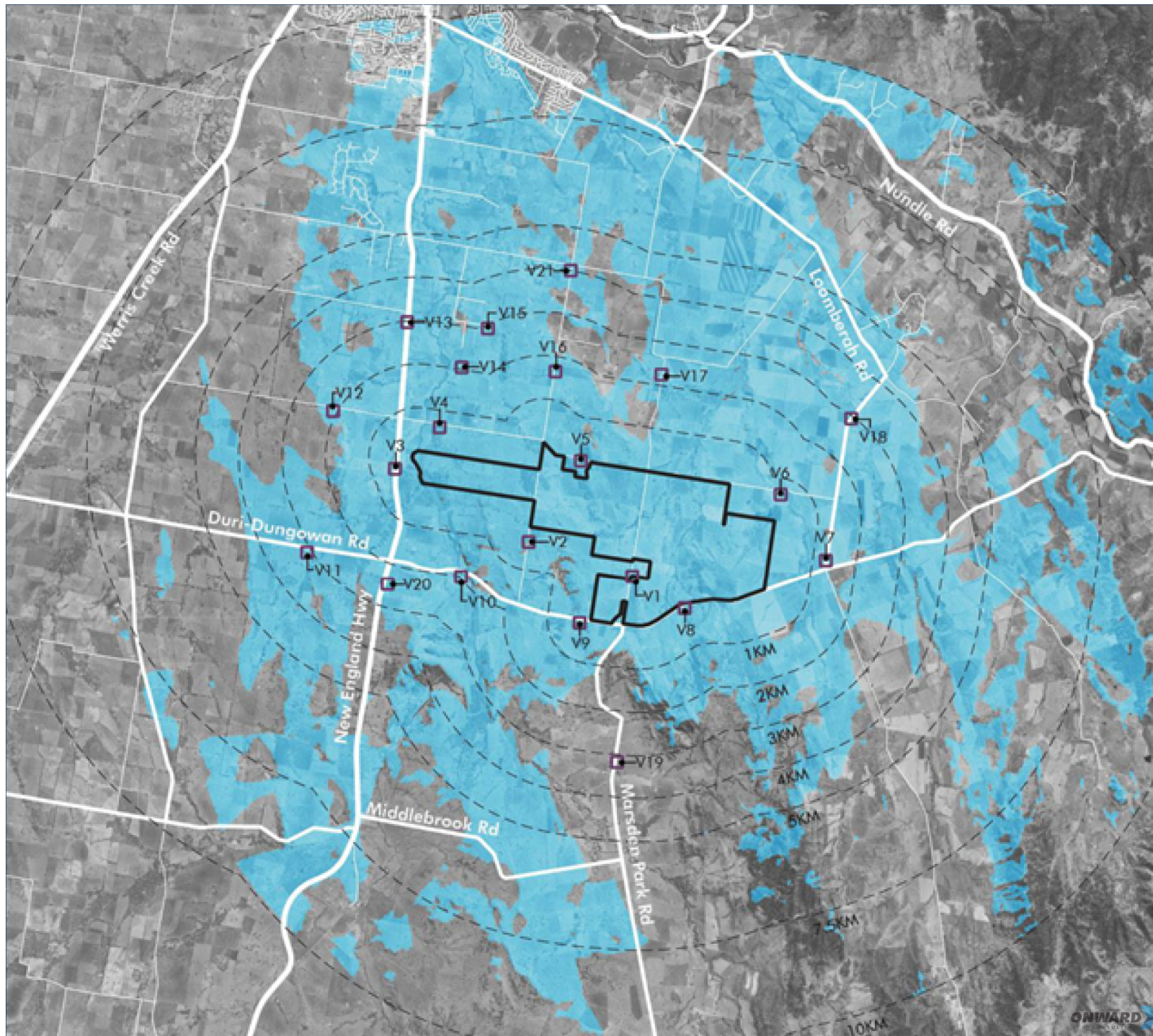
Receiver ID	Viewpoint elevation (m)	Relative height difference (m)	Distance from the Project (m)	Vertical field of view (°)	Horizontal field of view (°)	Visible based on viewshed ?	Assessment required?
130	455	164	1,670	4	54	Yes	Yes
131 (V11)	445	165	3,130	2	53	Yes	Yes
132	445	164	3,160	2	56	Yes	Yes
135	453	165	3,040	2	69	Yes	Yes
136	468	165	3,930	2	66	Yes	Yes
137	506	165	3,870	2	81	No	No
139	429	141	3,450	2	77	Yes	Yes
140	422	147	3,560	2	81	Yes	Yes
141	480	165	3,650	2	39	Yes	Yes
142	470	165	3,490	2	38	Yes	Yes
143	440	165	3,880	2	47	Yes	Yes
144	434	165	3,880	2	49	Yes	Yes
145	462	165	3,880	2	48	Yes	Yes
147	403	168	3,900	2	65	Yes	Yes
148	401	168	3,900	2	64	Yes	Yes
150	474	96	2,320	2	113	No	No
151 (V8)	550	75	730	4	150	Yes	Yes
157	423	165	880	4	66	Yes	Yes
162	612	107	1,450	3	100	Yes	Yes
163	568	73	460	4	140	Yes	Yes
164	464	107	500	4	154	Yes	Yes
165	432	138	1,620	4	158	Yes	Yes
166	448	123	2,240	2	103	Yes	Yes
167	450	121	3,005	2	94	Yes	Yes
168	493	79	3,720	1	68	No	No
169	435	147	3,300	2	82	Yes	Yes

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Preliminary TZVI of the Project Area
Figure 6.4

LEGEND

-  Project Area
-  Theoretical zone of visual influence (TZVI), maximum height 8 m
-  Viewpoints assessed



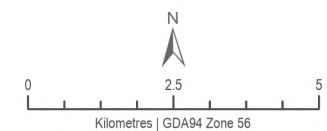
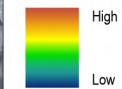
LAMBRUK SOLAR PROJECT

Reverse Viewshed
Figure 6.5

LEGEND

 Project Area

Degree of visibility from residences, assuming project site developed to max. 8 m high



Source: Peter Haack Consulting

6.3.3 EIS Assessment

An assessment of the level of visual impact will be undertaken in accordance with the LVIA Technical Supplement as part of the EIS process and would include viewshed analysis and consideration of the effectiveness of mitigation options. Impacts would be assessed in terms of the change in visual character produced by a development, the degree of contrast produced and the likely sensitivity of receivers to the change.

The EIS will consider the potential for the solar farm to affect local landscape character. Consultation will be undertaken to understand the local values of the area, including visual characteristics valued by the community. Additional engagement with specific affected residences identified as likely to have a view of solar farm infrastructure would be undertaken to identify the nature and significance of impacts and the need for mitigation measures.

Mitigation of low-profile solar farm infrastructure in low relief landscapes is highly feasible. Visual impacts attenuate rapidly with distance in these cases, therefore the focus of mitigation would be on close proximity residences.

A glint and glare assessment will be undertaken as part of the detailed assessment of more detailed design.

6.4 Noise and vibration

6.4.1 Background

A Preliminary Noise Assessment (PNA) was conducted to determine potential noise impacts from the Project which were modelled and assessed based on applicable assessment standards and guidelines (Appendix D). The preliminary assessment considers the worst-case noise propagation conditions based on the indicative Development Footprint.

6.4.1.1 Existing Environment

The Project is in a typical rural area, dominated by natural noise sources such as foliage noise and birdsong. Residential receptors (dwellings) in the area that are relevant to the PNA were identified to be scattered; however, those close to the New England Highway are likely to experience higher ambient noise levels, due to road traffic noise. Background noise monitoring would be undertaken at select dwellings during the EIS stage to determine the existing ambient noise levels in the area.

6.4.1.2 Management Levels and Criteria

Construction is expected to occur during the recommended standard daytime hours outlined in the NSW Interim Construction Noise Guideline (ICNG) (NSW DECC, 2009) and presented in Table 6.3.

Table 6.3 Construction noise management levels

Receiver type and time of day	Daytime Rating Background Level (RBL) dB(A)	Noise affected management level dB(A) $L_{Aeq}(15 \text{ min})$	Highly noise affected management level dB(A) $L_{Aeq}(15 \text{ min})$
Residence – Recommended standard hours ¹	35	45	75

¹ Monday to Friday 7 am to 6 pm; Saturday 8 am to 1 pm; No work on Sundays or public holidays.

In accordance with the Noise Policy for Industry (NPI) (EPA, 2017), the assessment of potential impacts of operational noise considered the intrusiveness noise level and the amenity noise levels in determining achievable noise requirements (Appendix D). The intrusiveness criteria require the energy average noise level over a 15-minute period ($L_{Aeq}(15 \text{ min})$) to not exceed the RBL by more than 5 dB(A). Amenity criteria are based on the energy average noise level over the entire day, evening or night period and can be converted to a project amenity noise level (PANL) (equivalent energy average noise level over a 15-minute period) for assessment purposes. The project noise trigger level (PNTL) provides a benchmark, that if exceeded, would indicate a potential noise impact has occurred and triggers a management response (EPA, 2017). Table 6.4 presents the derivation of the PNTL which is defined as the lower (that is, the more stringent) value of the project intrusiveness noise level (PINL) and project amenity noise level

(ANL). The method for establishing these is detailed in Appendix D. Collectively these set the PNTLs presented in Table 6.4.

Table 6.4 Project noise trigger levels as per the NSW NPI

Receiver	Period	Adopted RBL	PINL dB(A) L_{Aeq} (15 min) (RBL + 5 dB(A))	NPI ANL dB(A) L_{Aeq} (15 min)	Project ANL dB(A) L_{Aeq} (15 min) ²	PNTL dB(A) L_{Aeq} (15 min)	Sleep disturbance L_{Amax}
Residential	Day ³	35	40	50	48	40	-
	Evening	30	35	45	43	35	-
	Night	30	35	40	38	35	52

1 Minimum RBL adopted.

2 Includes a +3 dB adjustment to the amenity period level to convert to a 15-minute assessment period as per Section 2.2 of the NPI.

3 Day - the period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays; Evening – the period from 6 pm to 10 pm; Night - the remaining periods.

The NSW Road Noise Policy (RNP) (DECCW, 2011) sets out noise criteria that provides for a degree of amenity appropriate for the land use and road category. In accordance with the RNP, the preliminary noise impact assessment has adopted the ‘local road’ category for Ascot Calala Road and Marsden Park Road; and the ‘sub-arterial road’ category for Kia Ora Lane and Duri-Dungowan Road. It is acknowledged that the functional classification of Kia Ora Lane and Duri-Dungowan Road is a ‘Collector Road’ in accordance with the Roads and Maritime Noise Criteria Guideline (April 2015). However, the Road Noise Policy does not provide separate noise criteria for Collector Roads but applies the sub-arterial category to all roads that are not classified as local roads. Table 6.5 provides the road traffic noise assessment criteria for road categories relevant to the daytime period for the Project.

Table 6.5 Residential road traffic noise criteria as per the RNP

Road category	Type of development	Assessment criteria dB(A) Day (7 am – 10 pm)
Freeway/arterial/ sub-arterial road	Existing residences affected by additional traffic on existing freeways/sub-arterial/roads generated by land use developments	60 dB $L_{Aeq}(15hr)$
Local road	Existing residences affected by additional traffic on existing local roads generated by land use developments	55 dB $L_{Aeq}(1hr)$

6.4.2 Preliminary Assessment

6.4.2.1 Methodology

A computer model was developed to quantify project noise emissions to neighbouring receivers using DGMR (iNoise, Version 2024) noise modelling software. The model incorporated a three-dimensional digital terrain map giving all relevant topographic information used in the modelling process. Additionally, the model uses relevant noise source data, ground type, attenuation from barrier or buildings and atmospheric information to predict noise levels at the nearest potentially affected non project related receivers. Where relevant, modifying factors in accordance with Fact Sheet C of the NPI have been applied to calculations.

The model calculation method used to predict noise levels was in accordance with ISO 9613:1 and ISO 9613:2 including corrections for meteorological conditions using CONCAWE1.

6.4.2.2 Construction Noise Assessment

Construction activities are proposed to be progressive (trenching, piling and assembly) and would occur at several locations simultaneously. Noise emissions were modelled for four scenarios. Other activities such as road construction, drainage and minor earthworks that are likely to be required, are typically of lower intensity than the piling works and hence, noise emissions from these activities would be lower than the predicted noise levels in this assessment. The assessment has calculated the noise level from all construction teams simultaneously (piling,

trenching, transport and assembly activities) when situated at the nearest point to a receiver. The calculated noise level is representative of the expected highest ($L_{Aeq(15min)}$) noise level at that receiver during the construction phase. Noise emission data and assumptions used in this assessment are summarised in Table 6.6.

Table 6.6 Construction equipment quantity and sound power levels

Noise Source	Total Quantity	Total Predicted Noise Level (L_w dB(A))
Trenching and earthworks	3	103
Piling	4	113
Assembly	6	109
Transport	2	105

For rural residential receiver types, the adopted RBL during standard construction hours is 35 dB LA_{90} , hence the construction noise management level is 45 dB $L_{Aeq(15 min)}$ (RBL + 10 dB). Noise levels were predicted to all identified receivers at 1.5 m above ground level for typical construction activities for standard construction hours. Noise levels are expected to exceed the construction noise management level (45 dB $L_{Aeq(15 min)}$) at 11 receivers outlined below in Table 6.7.

Table 6.7 Predicted construction noise level exceedances

Construction NML L_{Aeq} dB(A)	Predicted Noise Level increase L_{Aeq} dB(A)	Receiver ID
45	4	R3
		R9
		R12
		R13
		R43
		R44
		R55
	8	R11
		R62
	10	R46
	12	R1

Exceedances occur when works are at their nearest proximity to the receiver during standard construction hours. Exceedances are expected from all piling and assembly construction activities, however, would be of a temporary nature and of short duration.

Predicted construction noise levels do not exceed the 75 dBA highly noise affected threshold.

6.4.2.3 Operational Noise Assessment

Operational noise predictions were modelled for a typical worst case operational scenario over a 15-minute assessment period based on the sound power levels in Table 6.8. Plant noise emission data used in modelling for this assessment were obtained from manufacturer data for similar equipment.

Table 6.8 Operational equipment sound power levels

Noise Source/Item	Total Predicted Noise Level (L_w dB(A))
PV Panel Tracking Motor	75
Inverter Station	104

Noise Source/Item	Total Predicted Noise Level (Lw dB(A))
BESS Storage Module	97
Substation	95
Light Vehicle (<10 km/h)	79

Noise levels were predicted at each assessed receiver at a height of 1.5m above ground level during worst case noise enhancing meteorological conditions. Noise levels are expected to satisfy the PNTLs at all non-project related receivers.

A detailed maximum noise level assessment is not required as predicted noise levels for night-time operations do not exceed the maximum noise trigger levels of 40 dB $L_{Aeq(15min)}$ and there are no operational noise sources that generate significant maximum noise events.

6.4.2.4 Road Traffic Noise Assessment

Road traffic noise has been calculated using the Traffic Noise Model (TNM) by the United States Department of Transport, Federal Highway Administration Low Volume Calculation Tool at an offset distance of 25 m representing the closest receivers along the transport route using the parameters presented in Table 6.9.

Table 6.9 Road traffic noise modelling parameters

Noise Source/Item	Predicted Noise Level (Lw dB(A))	Movements/hr	Speed (km/h)	Source Height (m)
Heavy vehicle (rigid, semi-trailer or b-double)	104	10	60	1.5
Light vehicle	96	40	60	0.75

During construction, traffic generated by the Project would include employee/subcontractor and delivery vehicles. The traffic volume over a typical day for standard construction hours is expected to be up to 10 heavy vehicle movements (semi-trailers or B-doubles) per hour and 40 light commercial vehicles or equivalent minibuses for worker transport during the morning and afternoon peak hour periods.

Predicted noise levels from project related construction traffic are presented in Table 6.10. The results presented in Table 6.10 show the calculated noise levels as $L_{Aeq(1hr)}$ for local roads and $L_{Aeq(15hr)}$ for arterial/sub arterial roads to align with RNP (DECCW, 2011) categories and assessment periods.

Table 6.10 Predicted construction road traffic noise levels

Road Type/Name	Offset Distance to Receiver	Predicted Noise Level	RNP Road Traffic Noise Criteria	Compliance Achieved
Arterial, Sub Arterial and Collector Roads				
Duri-Dungowan Road	25 m	52 dB $L_{Aeq(15hr)}$	60 dB $L_{Aeq(15hr)}$	✓
Kia Ora Lane	25 m	52 dB $L_{Aeq(15hr)}$	60 dB $L_{Aeq(15hr)}$	✓
Local Roads				
Ascot Calala Road	25 m	52 dB $L_{Aeq(1hr)}$	55 dB $L_{Aeq(1hr)}$	✓
Marsden Park Road	25 m	52 dB $L_{Aeq(1hr)}$	55 dB $L_{Aeq(1hr)}$	✓

6.4.2.5 Summary of Findings

The results of the PNA demonstrate that noise emissions from the operation would satisfy the relevant PNTLs at all non-project related receivers for all assessment periods.

Furthermore, sleep disturbance is not anticipated, as emissions from night-time operations do not exceed the maximum noise trigger level of 40 dB $L_{Aeq}(15min)$ and there are no operational noise sources that generate significant maximum noise events.

Modelled noise emissions from piling and assembly construction activities are expected to exceed the applicable construction management levels at up to eleven non-project related receivers. However, predicted noise levels do not exceed the 75 dBA highly noise affected threshold.

Predicted noise levels from project related construction traffic noise emissions are expected to satisfy the applicable criteria at the nearest receivers to the transport route for all assessment periods.

6.4.3 EIS Assessment

The EIS noise impact assessment would provide further assessment of project component operational noise as well as other noise related aspects of the Project, as listed below:

- a baseline noise monitoring campaign to quantify existing noise conditions (and meteorological conditions) at select non-associated landholders to establish Project-specific noise limits;
- detailed modelling of the Project's anticipated construction and operational noise emissions;
- reaffirm general construction, operational, and road traffic noise to dwellings;
- vibration impacts (mostly focussed on construction) at dwellings;
- cumulative operational noise impacts associated with other nearby renewable projects or surrounding industry (as relevant); and
- recommendations for noise and vibration reducing mitigation, management measures, safeguards and/or provisions for monitoring.

6.5 Social and economic impacts

6.5.1 Background

A Phase 1 Social Impact Assessment was undertaken for the Project (Appendix E), which involves scoping and a preliminary assessment, identifies the level of assessment to be applied and sets further parameters for the second phase SIA (to be undertaken for the EIS). Accordingly, the first phase SIA includes:

- defining the Project's Social Locality;
- describing the profile of the community in a preliminary social baseline and outlining the potential social impacts; and
- outlining the approach that would be undertaken to complete the second phase SIA.

6.5.1.1 Social locality

The social locality (or area of social influence) for the Project has been defined as the Tamworth Regional LGA (LGA17310), with Tamworth serving as the nearest regional centre to the Project. The Tamworth Regional LGA spans across an area of approximately 9,900 m² and recorded a population of 63,070 in 2021 (ABS, 2021a). The Project Site is also located within the rural locality of Loomberah Suburbs and Localities (SAL), which recorded a population of 552 people in 2021, and to the east of the neighbouring locality of the Timbumburi SAL with 122 residents (ABS, 2021b; ABS, 2021c).

The social locality reflects that the Project has potential to impact surrounding landholders and service centres. Those most likely to be impacted by the Project are the landowners and local community closest to the Project footprint. The rural community of Loomberah, as well as the broader Tamworth LGA, are likely to experience direct and indirect social impacts associated with the construction workforce and accommodation during the construction, operation and decommissioning of the Project.

6.5.1.2 Community profile

Key socio-economic indicators from the 2021 Census for the social locality provide a social baseline and are outlined below in Table 6.11. Where possible, these indicators have been benchmarked against the Rest of NSW (RNSW), which is defined by ABS as encompassing all areas of NSW excluding the Greater Sydney Region.

Table 6.11 Key socio-economic baseline indicators for Tamworth LGA and RNSW (2021 Census data)

Indicator	Profile
Population	In 2021, the social locality was home to approximately 63,070 residents, living in 27,640 dwellings with an average household size of 2.4 persons per dwelling, the same as across RNSW. The usual resident population of the study area increased by 3,407 people between 2016 and 2021, representing an increase of approximately 6% over this period. In 2021, 84.6% of the study area population was born in Australia, compared to 81.3% in RNSW. About 12.7% of the population in the social locality identified as Aboriginal and/or Torres Strait Islander, compared with 6.6% of the population across RNSW.
Median age	The median age of the social locality was 39, younger than RNSW which recorded a median age of 43.
Age profile	There were 12,525 people over the age of 65 living in the social locality in 2021. This equalled about 20% of the overall population, slightly lower than for RNSW with 22%. The social locality had a relatively similar population makeup to RNSW though with a younger population overall, with a higher proportion of residents aged under 39 years (51%) compared to RNSW (47%).
Language spoken at home	6.8% of residents in the social locality spoke a language other than English at home, slightly higher than the 6.6% across RNSW.
Need for assistance	Approximately 6.7% of residents in the social locality required assistance with core activities, similar to 6.8% across RNSW.
Household type	There were 6,726 lone person households in the social locality, or approximately 29% of all households, similar to 28% across RNSW. There was a similar proportions of family households (70% in the social locality and 69% across RNSW).
Household size	About 91% of dwellings in the social locality were occupied, leaving 2,298 unoccupied dwellings. This compared to 89% occupancy across RNSW. A higher proportion (31%) of dwellings in the social locality were rented, than in RNSW (27%). Amongst rented dwellings, 33% were making rent payments greater than 30% of household income, slightly lower than RNSW, which recorded 36%. Amongst mortgaged dwellings, 11% were making repayments greater than 30% of household income, slightly lower than RNSW which recorded 13%.
Income	The median household income was \$1,416 per week in the social locality, which was slightly lower than the \$1,460 across RNSW. The median personal income per week was \$755 in the social locality, which was slightly higher than the \$722 for RNSW.
Work	There were 29,980 residents in the social locality aged 15 and above in the labour force, of which 60.1% worked full-time, 29.7% worked part-time, 5.7% were away from work at 4.5% were unemployed. The unemployment was slightly higher in RNSW (4.6%). Most employed residents in the social locality were employed as Professionals (18%), Labourers (14%), Technicians and Trades Workers (14%), and Managers (13%). The most common industries of employment were Hospitals (except Psychiatric Hospitals) (6%), followed by Secondary Education (3%) and Meat Processing (3%).

6.5.2 Preliminary assessment

6.5.2.1 Social infrastructure overview

Social infrastructure comprises schools and other education institutions, medical services, emergency services, recreational facilities, and community organisations. Some commercial services are also listed under social infrastructure, such as childcare facilities.

Given the proximity of the Project Area to Tamworth, the Timbumburi and Loomberah localities offer limited social services. Social services include the Timbumburi Public School located approximately 800 m northwest of the Project Area, and the Loomberah War Memorial Hall and St Luke's Anglican Church are located approximately 1.4 km to the east.

The nearest major services are in Tamworth. Tamworth Hospital, which is one of the largest regional hospitals in NSW, has an emergency department which is open 24/7. All other emergency services are also based in Tamworth including Fire and Rescue NSW, NSW Police, Ambulance NSW, and the NSW Rural Fire Service. Tamworth has several primary and secondary schools, churches, a wide variety of social services, and a wide variety of retail services including grocery and specialty stores, post offices, hardware stores, service stations and a wide variety of other professional services, and recreational facilities.

6.5.2.2 Potential social impacts

The first phase SIA provides a preliminary desktop assessment of the potential impacts while the second phase SIA develops this preliminary assessment into a full assessment report to be included in the EIS. The full assessment report would provide a detailed analysis of the potential impacts and incorporates key stakeholder feedback.

The scoping of potential social impacts was initially facilitated through consideration of the updated SIA Scoping Tool that complements the SIA Guideline (DPE, 2023d). The scoping tool identifies the social impacts that are considered likely to occur, and the corresponding level of assessment for each social impact. This social impact assessment approach follows the SIA Technical Supplement guidance on evaluating the likely significance of both potential positive and negative social impacts (DPE, 2023c). Use of the updated SIA Scoping Tool also allows for the level of assessment for the potential social impacts to be identified, which in this case was determined to be 'detailed assessment'.

As this is a first phase SIA, this impact assessment is preliminary in nature and makes assumptions based on the desktop assessment and prior solar farm SIA experience. The identified potential impacts listed in Table 6.12 would be ground-truthed, supplemented by key stakeholder feedback, and reviewed against any changes associated with further design development after issuing the SEARs. Further development of this assessment in the second phase SIA would include application of DPHI's social impact significance matrix and an assessment of both pre and post mitigation scenarios.

Early engagement is discussed in Section 5 with evolution of the Project design as a result included at Section 3.4.3.

Table 6.12 Preliminary social impact assessment

Description of impact	Impact categories	Project phase	Level of assessment
Additional employment on site during the construction period would benefit livelihoods.	– Livelihoods	Construction	Standard
Increased demand for goods and services, producing benefits to local businesses as a result of increased economic activity.	– Livelihoods	Construction	Standard
Additional local economic activity through project direct and indirect expenditure on goods could benefit livelihoods.	– Livelihoods	Construction	Detailed

Description of impact	Impact categories	Project phase	Level of assessment
Noise and vibration from construction activities on site could potentially impact adjacent properties, noting the Project's relatively remote location.	– Way of life – Health and wellbeing – Surroundings	Construction	Detailed
Dust from construction activities on site could potentially impact adjacent properties, noting the Project's relatively remote location.	– Way of life – Health and wellbeing – Surroundings	Construction	Detailed
Potential construction impacts on local roads (depending on point of access), causing interruptions to daily life e.g. through road closures or diversions for school buses.	– Way of life – Accessibility	Construction	Detailed
Visual impact of temporary structures required during construction phase could potentially impact adjacent properties, noting the Project Site's relatively remote location.	– Way of life – Surroundings	Construction	Detailed
Reduced availability of housing could result in impacts to local residents' livelihoods, way of life; and access through increased costs and reduced access to housing.	– Livelihoods – Access – Way of life	Construction	Detailed
Increased demand and pressure on social, emergency and recreational services and/or facilities associated with the introduction of a temporary workforce.	– Access – Way of life – Health and wellbeing	Construction	Detailed
Increased demand for labour may reduce labour availability for local services and/or businesses.	– Livelihoods – Way of life	Construction	Detailed
Additional employment on site once operational would benefit livelihoods.	– Livelihoods	Operation	Standard
Additional expenditure by permanent employees on site once operational would benefit livelihoods.	– Livelihoods	Operation	Standard
Benefits to the livelihoods of involved landowners through a diversification of income streams.	– Livelihoods	Operation	Standard
Structures on site would permanently alter the visual landscape for surrounding properties (i.e. through the loss of scenic views or potential glare from solar panels), potentially impacting their way of life and enjoyment of surroundings.	– Way of life – Surroundings	Operation	Detailed
Adjacent accommodation provider may have livelihood impacted by the Project, including through a reduction in natural views from property.	– Livelihoods	Operation	Detailed
Fears about perceived impacts on land/property values, particularly for neighbouring properties.	– Livelihoods	Operation	Detailed
Fears and anxieties around introduction of a new land use and its impact on local agriculture, including through the loss of productive agricultural land.	– Livelihoods – Decision-making systems	Operation	Detailed
As a new land use, the Project may elicit fears around possible ongoing environmental impacts.	– Community – Decision-making systems	Operation	Detailed

Description of impact	Impact categories	Project phase	Level of assessment
Alteration of the landscape has the potential to impact tangible and intangible Aboriginal cultural heritage values.	– Culture – Community	Operation	Detailed
Fears and anxieties of change to local character driven by development.	– Community – Decision-making systems	Operation	Detailed

6.5.3 EIS assessment

The SIA would be prepared to inform the EIS and align with industry best practice, including the SIA Guidelines (DPE, 2023d). The SIA would scope, examine and assess potential impacts and develop mitigation measures to enhance potential positive and minimise negative impacts that may arise from the Project. The SIA would involve three broad stages:

- Establish social baseline and scope for issues by drawing from relevant sources including demographic and socio-economic data, relevant strategic planning policies and document and stakeholder engagement outcomes.
- Identify and assess potential social impacts, both positive and negative and well as direct and indirect impacts. This would include a consideration of cumulative impacts including impacts from other nearby energy projects. The significance of impacts would be evaluated using the social risk matrix method in the SIA Guidelines (DPE, 2023d).
- Identify mitigation measures to minimise potential negative social impacts and maximise benefits. This could include development of a preliminary social impact management framework to support ongoing monitoring and management of impacts.

Potential impacts identified in this Phase 1 SIA would be analysed based on the nature of the impact and its predicted severity and assigned a level of significance in line with Table 6.13.

Table 6.13 Social impact significance matrix adapted from DPE (2023)

		Magnitude level				
		1 Minimal	2 Minor	3 Moderate	4 Major	5 Transformational
Likelihood level	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

Table 6.14 identifies the key inputs that would be required for the future assessment of social impacts. This includes key factors for consideration, alongside information requirements and relevant guidance documents.

Table 6.14 Assessment inputs for the assessment of social impacts

Aspect	Inputs
Key factors for consideration	– Social baseline – Built works – Truck and traffic movements – Temporary construction workforce – Operation workforce – Visual impacts – Community views
Guidance documents	– SIA Guidelines (DPE, 2023d) – SIA Guidelines – Technical Supplement (DPE, 2023c) – LSSE Guideline (DPE, 2022b)
Information requirements	– Stakeholder engagement outcomes – Acoustic assessment – Traffic assessment – Visual impact assessment – Economic impact assessment – Accommodation strategy for temporary workers.
Cumulative impact assessment required?	Yes
Community engagement	– Community values – Feelings and views about the Project – Specific fears and concerns – Business operations.

An Economic Assessment would be undertaken for the EIS, which would review the impacts or benefits of the Project for the region and State as a whole. It would consider any increase in demand and impact on local and regional economy during construction and operation of the Project, as well as reduction in agricultural activity because of the Project development, and other economic issues such as potential impact on land values and regional wages, house prices, tourism, and cumulative impacts.

6.6 Traffic, transport and access

6.6.1 Background

Proposed site access is under investigation and would include Duri-Dungowan Road (sealed) as a direct heavy vehicle and light vehicle access from the New England Highway, with Kia Ora Lane (unsealed) potentially providing some light vehicle access. Marsden Park Road (unsealed) and Ascot-Calala Road (unsealed) are considered potential secondary access points. Final access points and road upgrades (if required) would be determined in the Traffic Impact Assessment (TIA) during the EIS.

New England Highway is a State Road which runs in a north-south alignment adjacent to the site and extends from Newcastle to Yarraman, north of Toowoomba in Queensland. It forms part of the inland route between Brisbane and Sydney and has a speed limit of 100 km/hr at the turnoff to both Duri-Dungowan Road and Kia Ora Lane.

Heavy vehicles would be required for transportation of project equipment and material, while the construction workforce would access the Project using light vehicles and shuttle buses. Construction would require a peak workforce of approximately 350 people. The operational workforce would be up to 15 FTE travelling in light vehicles.

It is anticipated that equipment and material deliveries requiring heavy vehicles would originate from the Port of Newcastle, Port of Brisbane, or Port of Melbourne and be transported by road to the Project. The transport route

would be subject to a Transport Route Assessment to be undertaken as part of the EIS, which would identify the preferred transport route from port to the Project, as well as any required road upgrades. Table 6.15 outlines the potential port options and their approximate distance from the Project. Other minor construction components would be sought from within NSW and Australia.

Table 6.15 Likely port options and distance to the Project Area

Port	City and State	Approx. distance from Project Area (by road)
Port of Newcastle	Newcastle, NSW	269 km
Port of Brisbane	Brisbane, QLD	617 km
Port of Melbourne	Melbourne, VIC	1,131 km

6.6.2 Preliminary assessment

Intersection upgrades, surface upgrades and other improvements to existing roads may be required for safe access to the Project. An assessment of project access would be undertaken as part of the EIS to determine if intersection or road upgrades are necessary to meet Tamworth Regional Council and TfNSW guidelines. If upgrades to existing road infrastructure is required, it would be undertaken in consultation with the relevant road authorities prior to the submission of the EIS.

Internal access roads would be established within the Project Area to facilitate movement during construction and to allow for ongoing maintenance during operation. Internal access roads would be between four metres and six metres wide and comprise of a gravel or sealed surface.

6.6.3 EIS assessment

Project access options would be investigated during the preparation of the EIS. A TIA would be completed in accordance with relevant guidelines, policies and design requirements, including:

- NSW Roads and Traffic Authority: Guide to Traffic Generating Developments 2002;
- Austroads Guides to Road Design (various publications);
- Austroads Guides to Traffic Management – Part 3 Traffic Studies and Analysis (2013);
- Australian Standard AS 2890 Parts 1 and 2; and
- Australian Code for Dangerous Goods Transport.

The content of the TIA would include the following:

- selection of appropriate access option/s based on sight distances, nearby receivers and environmental constraints;
- direct engagement with road authorities (TfNSW and Tamworth Regional Council);
- an assessment of existing traffic volumes and future traffic volumes in consideration of intersection assessments, road condition and safety assessment, cumulative impact assessment with other road users (e.g. bus routes, nearby industry, pedestrian needs);
- assessment of road traffic impact due to the construction and operation of the Lambruk Solar Project; and
- a collation of site-specific mitigation measures that would be developed in consultation with TfNSW and Tamworth Regional Council including but not limited to:
 - a schedule of road upgrades;
 - traffic control measures;
 - a description of road contributions to account for road damage; and
 - communication requirements with nearby projects and/or businesses.

A Traffic Management Plan would be prepared and include mitigation measures and confirmed haulage routes and manage traffic, for safety as well as road pavement conditions would be required.

6.7 Soils and land use

6.7.1 Background

The Project Area is dominated by Chromosols, with the presence of Sodosols at the banks of Lambruk Creek and Spring Creek (Figure 6.4). Chromosols are characterised as having strong contrasting texture, not strongly acidic or sodic in the upper B horizon, highly siliceous, moderate agricultural potential and chemical fertility, moderate water-holding capacity and are susceptible to soil acidification. Sodosols are characterised by having a strong texture contrast with a highly sodic B horizon, not highly acidic (pH > 5.5), highly siliceous, poorly drained, low agricultural potential, poor structure and low permeability and a low to moderate chemical fertility.

The Project Area is mapped as Land and Soil Capability (LSC) Class 4 'Moderate capability land' and Class 5 'Moderate – low capability land', with a small section on the western boundary mapped at Class 3 'Moderate limitations' as per The NSW land and soil capability assessment scheme, 2nd approximation (OEH, 2012). Desktop mapping (DPE, 2013) is shown in Figure 6.6, while limitations of each LSC class are outlined below in Table 6.16.

Table 6.16 Description of LSC classes in the Project Area

LSC	Description
3	LSC class 3 land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. Careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.
4	LSC class 4 land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.
5	LSC class 5 land has high limitations for high-impact land uses and largely restricts land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.

The Development Footprint does not contain mapped BSAL. Approximately 11.5 ha on the western boundary of the Project Area is mapped as BSAL (Figure 6.7) but is not part of the indicative Development Footprint.

Existing land uses in the Project Area according to the NSW Landuse 2017 v1.2 data layer (DPE, 2019) (Figure 6.8) include:

- 3.2.0 Grazing native vegetation;
- 2.1.0 Grazing modified pastures; and
- 3.3.0 Cropping.

A search of the NSW OEH Contaminated Sites Register on 19 October 2023 identified five sites within the Tamworth LGA, none of which are in within or in the vicinity of the Project Area (>10 km) or in the suburb of Loomberah. The Project Area is not on the List of NSW Contaminated Sites notified to the Environment Protection Agency (EPA) (EPA, 2023) as of 9 October 2023. Due to the sites agricultural history there is potential for contamination on site such as sheep dips and buried waste.

No Crown land is present within the Project Area. Goonoo Goonoo Creek, a Crown Waterway is located on the westernmost boundary of the Project Area.

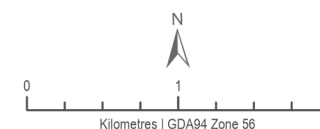
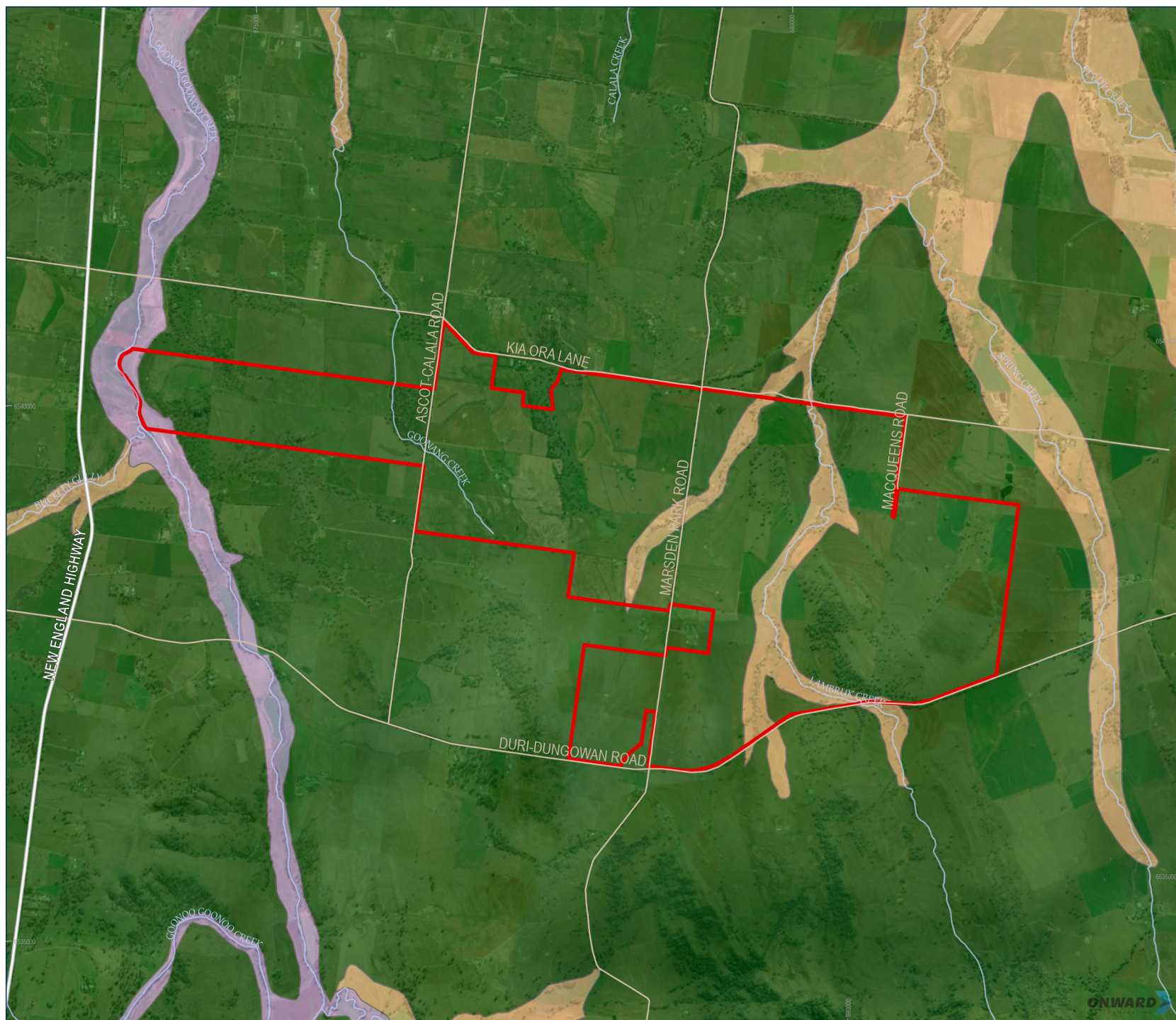
The Project Area is not subject to a mine subsidence district or mapped as a flood prone area or containing acid sulphate soils. No operating mines are located in the locality.

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Australian Soil Classification

Figure 6.6
LEGEND

- Project Area
- Chromosols
- Sodosols
- Vertosols
- Highway
- Local roads
- Named watercourses

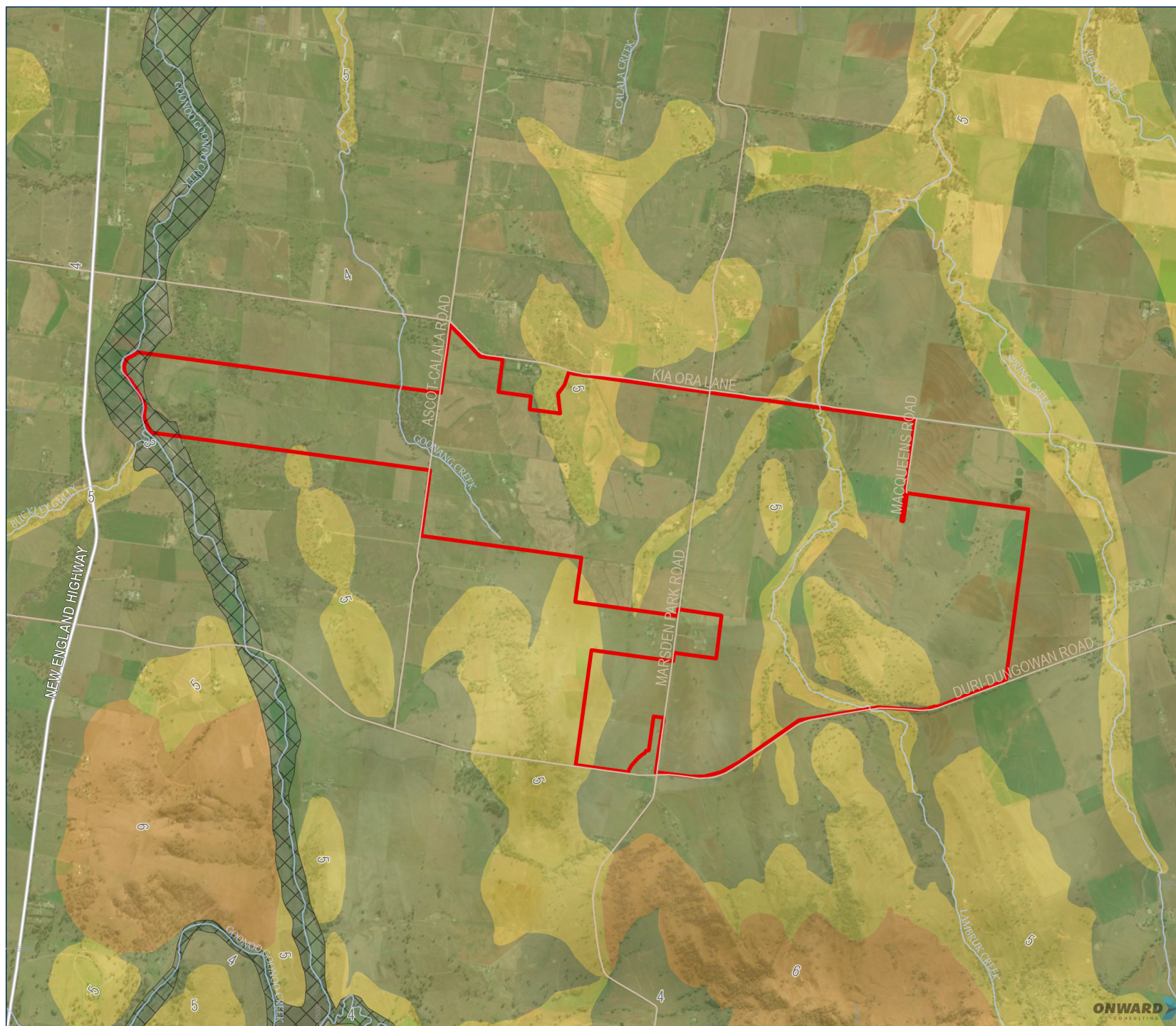


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Land and Soil Capability and BSAL
Figure 6.7

LEGEND

- Project Area
- Biophysical strategic agricultural land
- 3 - Moderate limitations
- 4 - Moderate to severe limitations
- 5 - Severe limitations
- 6 - Very severe limitations
- Highway
- Local roads
- Named watercourses



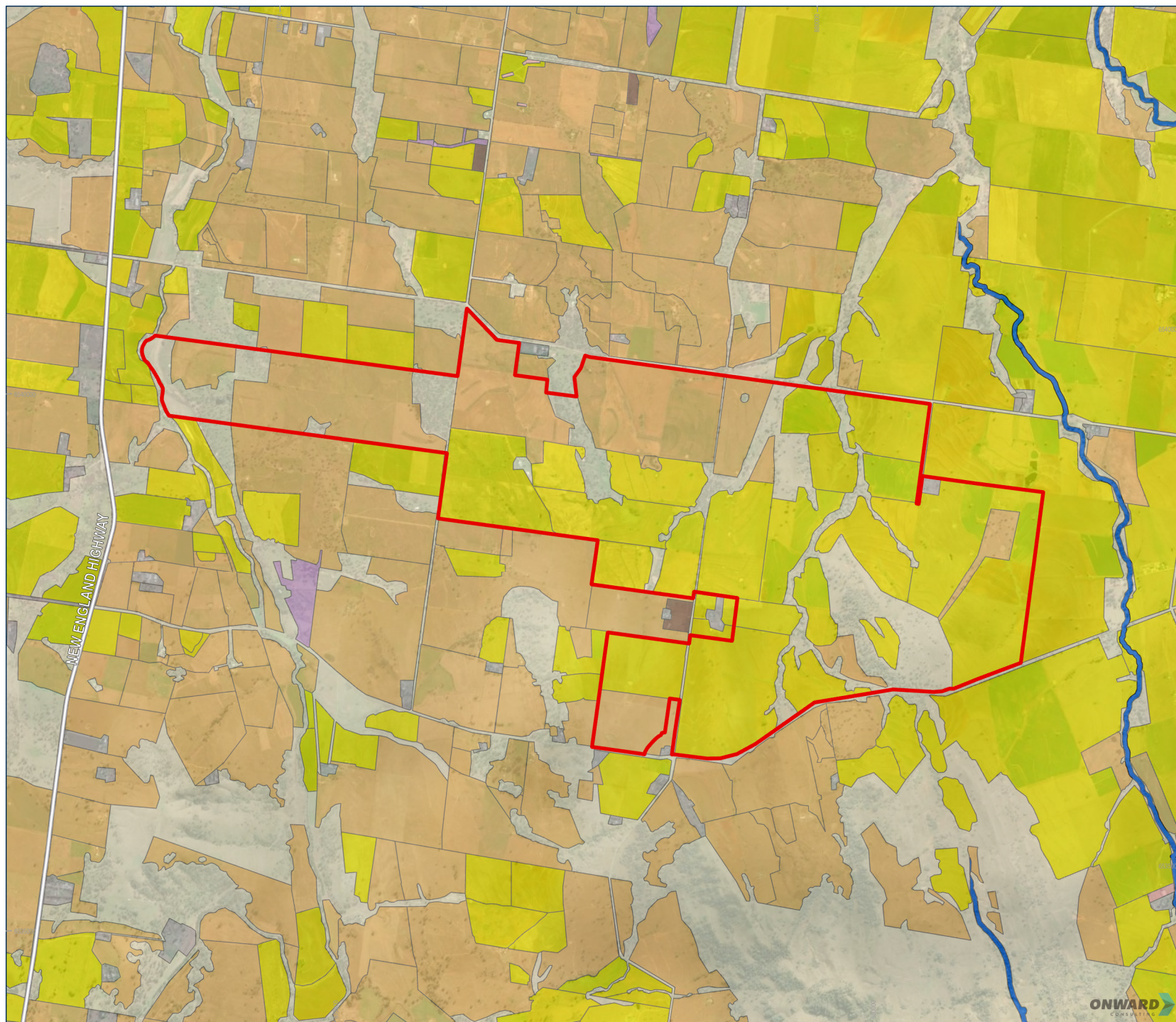
ONWARD
CONSULTING

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Land Use
Figure 6.8

LEGEND

-  Project Area
-  Highway
-  1.2.0 Managed resource protection
-  2.1.0 Grazing native vegetation
-  3.2.0 Grazing modified pastures
-  3.3.0 Cropping
-  3.4.0 Perennial horticulture
-  5.2.0 Intensive animal production
-  5.4.0 Residential and farm infrastructure
-  5.7.0 Transport and communication
-  6.3.0 River



6.7.2 EIS assessment

Consideration of soil and erosion impacts, and proposed mitigation measures for construction, operation and decommissioning of the solar farm would be included within the EIS.

The Project Area is zoned as RU1 and RU4 and contains mapped LSC classes 3 and 4, therefore a site verification assessment would be undertaken in accordance with per the LSSE Guideline (DPE, 2022b). Soil verification, including soils surveys, would verify the agricultural suitability and LSC class of the Project Area and inform the level of agricultural impact assessment, as per LSSE Guideline (DPE, 2022b).

The Project would involve earthworks and ground disturbance, as well as piling. This would be limited to the Project Area, access and transmission lines. The soil testing program would also be utilised to determine the structure of the soil as it relates to stability and referenced in the EIS to establish appropriate erosion and sediment control measures in accordance with the Managing Urban Stormwater: Soils and construction 'Blue book guidance (Landcom, 2004).

The Project Area and surrounding land has historically been used for agricultural, however smaller lifestyle holdings surround the Project Area. A Land Use Conflict Risk Assessment (LUCRA) would be undertaken in accordance with the *Land Use Conflict Risk Assessment Guidelines* (DPE, 2011), in consultation with neighbouring landholders. The LUCRA will identify and dress potential land use conflict issues and recommend strategies to avoid or minimise the potential impacts on neighbouring landholders and agricultural operations.

6.8 Aboriginal heritage

6.8.1 Background

The traditional custodians of the Project Site are the Kamilaroi / Gamilaroi / Gomeroi people. Aboriginal people used the landscape as both a natural and cultural resource. Archaeological evidence suggests the tableland Aboriginal groups traded with groups on the Western slopes and that a range of stone tools such as jagged spears, boomerangs and waddies were developed with local and traded stone and local hardwood (McBryde, 1974). The region is known for ornately carved trees, ceremonial bora grounds and art sites, indicating an intimate spiritual, as well as a physical, attachment to the sacred landscape the Aboriginal people inhabited. The region is also the place of a marked history of conflict between Aboriginal and non-Aboriginal people (NPWS, 1991).

6.8.2 Preliminary assessment

Aboriginal Heritage Information Management System (AHIMS) database provides information concerning previously recorded Aboriginal sites in NSW. An extensive search of the AHIMS was conducted on 20 October 2023 to identify any Aboriginal sites or objects previously identified in the area.

No Aboriginal heritage sites or places were identified within the Project Area. Four Aboriginal sites were identified within 1 km of the Project Area (Table 6.17), while a further 97 Aboriginal sites were identified being within 10 km of the Project Area and are shown in Figure 6.9. As a number of sites have been recorded in the local area, there is potential for Aboriginal objects to exist within the Project Area.

Where native title does exist in relation to the Project Area, it would be a requirement to negotiate with the Native Title holders to comply as appropriate with the provisions of the NT Act. A search of the Register of Native Title Claims identified one Active claim across the Project Area. This claim NC2011/006 over 111,317.60 km² was registered by the Gomeroi People on 20 January 2012 which is currently listed as active, but to date no Native Title has been determined.

Table 6.17 AHIMS sites within 1 km of the Project Area

AHIMS	Site name	Site type	Status of site	Location to the Project Area
29-20009	Moore Creek; Upper Moore Creek	Artefact	Valid	Approximately 370 m south of southern Project Area boundary

AHIMS	Site name	Site type	Status of site	Location to the Project Area
29-20108	Isolated Find	Culturally Modified Tree (Carved or Scarred)	Valid	Approximately 500 m north of northern Project Area boundary
29-20120	Shield Tree	Culturally Modified Tree (Carved or Scarred)	Valid	Approximately 200 m north of northern Project Area boundary
29-20123	Hilltop IF1	Artefact	Valid	Approximately 500 m north of northern Project Area boundary

Using Datum: GDA, Zone 56, Eastings: 301241.0 – 311053.0, Northings: 6546259.0 – 6540341.0, incorporating a buffer of 1 km

6.8.3 EIS assessment

Field inspection of the proposed development area would be undertaken to accurately characterise the Aboriginal heritage potential of the Project Area.

The comprehensive assessment would be through the preparation of an Aboriginal Cultural Heritage Assessment (ACHA), which would be prepared in accordance with relevant regulations and guidelines, including:

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

The ACHA and its associated Aboriginal community consultation would be required to be completed as part of the EIS.

6.9 Historic heritage

6.9.1 Background

The first European visitors to the Nandewar Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion and Peel IBRA Subregion, within which the Project is located, were John Oxley and his exploration party in 1818. Following this, squatters began to occupy the area in the 1830s in search of suitable grazing land (NPWS, 2003).

The gold rush of the 1850s led to the rapid entrenchment of several towns in the Nandewar Bioregion. The Australian Agricultural Company's headquarters became the basis of the town of Tamworth when urban development began to occur in the earnest in the 1850s. Tamworth became a municipality in 1876 and by this time it was a successful town with much industry and facilities such as a hospital, banks and schools. In 1888, after building its electricity generating plant, Tamworth became the first town in Australia to use electric lighting and eventually it serviced much of the north of the state (NSW NPWS, 2003).

Cattle grazing was the dominant land use of the region in the early days of European settlement but by the end of the 1800s sheep grazing was expanded due to improved pastures and better fencing (NPWS, 2003).

6.9.2 Preliminary assessment

Desktop searches were undertaken on 20 October 2023 of the relevant historic heritage registers including:

- Australian Heritage Database;
- NSW State Heritage Inventory; and
- Tamworth Regional LEP.

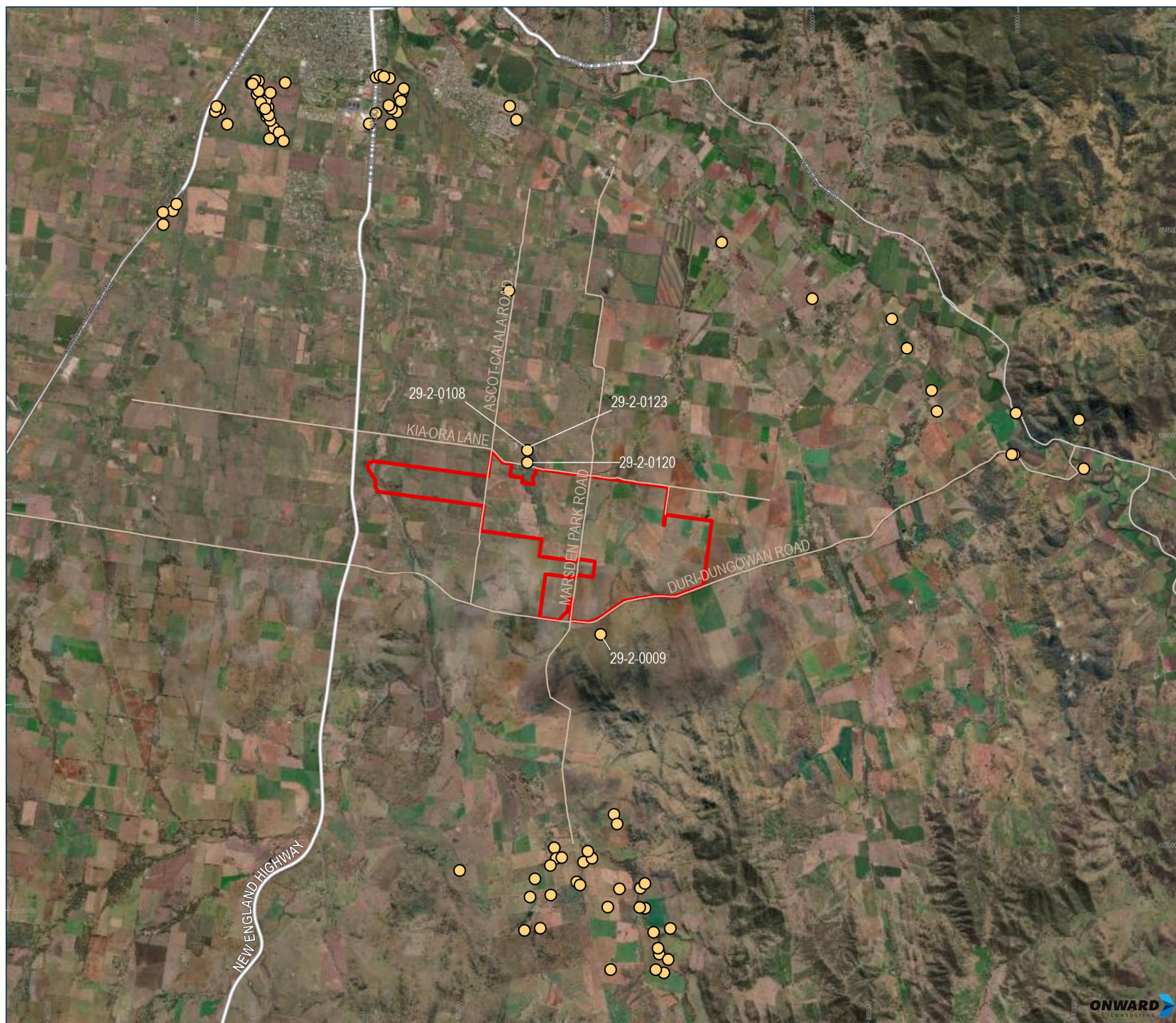
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Registered AHIMS Sites within 10 km of the Project Area

Figure 6.9

LEGEND

-  Project Area
-  Aboriginal site
-  Highway
-  Major roads
-  Local roads



No listed Commonwealth, State or local heritage items were identified within the Project Area boundary. However, two local heritage listed in the Tamworth Regional LEP were identified within the locality. These are the Timbumburi School and Loomberah Memorial Hall located 790 m northwest and 1.3 km east of the Project Area respectively.

6.9.3 EIS assessment

Although the preliminary assessment has not identified that the Project Area contains a registered historic heritage item, there is potential for heritage values to be present. Therefore, a Statement of Heritage Impact (SoHI) would be prepared as part of the EIS, which would consider known and potential heritage values, and potential impacts to built heritage features and areas of historical archaeological sensitivity. The SoHI would also consider any intangible (social) values held by the community or relevant stakeholders.

Preparation of the SoHI would involve detailed historical research, including analysis of historical aerial imagery, and physical inspection of the relevant areas within the Project Area. The preparation of the SoHI would ensure compliance with all statutory obligations and best practice guidelines and would assist in the management of risk associated with inadvertent impact to heritage values.

6.10 Other environmental factors

6.10.1 Hydrology, groundwater and water use

6.10.1.1 Background

The Project Area sits within the Peel River catchment, a major sub-catchment of the Namoi River covering 4,700 km².

Waterways within the Project Area include Goonang Creek, a third order stream, and Lambruk Creek, a third order stream that becomes a fourth order stream at its confluence with an unnamed fourth order stream. Another unnamed third order stream traverses the site before its confluence with Lambruk Creek north of the Project Area boundary, while numerous first and second order streams are located within the Project Area (Figure 6.10). Goonoo Goonoo Creek is a seventh order stream on along the western most boundary.

The Project Area is not within the Tamworth Regional LEP Flood Prone Land map extent, with the nearest flood planning area mapped 2.8 km north of the Project Area along Goonoo Goonoo Creek. Fifty-two paddock dams occur within the Project Area, though not all hold water year-round. Multiple minor streams (Strahler order 2 and 1), drainage traverses the site. Majority of these tributaries discharge into dams onsite.

Several water sharing plans are applicable to this catchment including the Water Sharing Plan for the NSW *Murray Darling Fractured Rock Groundwater Sources 2020* and *Namoi and Peel Unregulated Rivers Water Sources 2012* within the Project Area. Goonoo Goonoo Creek is mapped as medium potential Groundwater Dependent Ecosystem (BOM, 2023a).

Eight groundwater bores are present within the Project Area. Four bores are stock and domestic while the remaining four are water supply. One water supply bore is known to function, while the remaining bore statuses are unknown. A coordinate search of the EPBC Protected Matters Search Tool was undertaken on 19 October 2023 within a 10 km buffer of the site. The search identified three Wetlands of International importance, closest site being 'Riverland' approximately 900 – 1000 km upstream as well as four listed TECs (Appendix B).

A map of biodiversity constraints, including hydrological constraints, is presented in Section 6.2.

6.10.1.2 Preliminary assessment

The WM Act defines waterfront land as the bed of any river, lake or estuary, together with any land within 40 m of the river banks, lake shore or estuary mean high water mark, or lesser distance if prescribed in the NSW *Water Management Regulations 2018*. The PV modules would avoid the most significant watercourse and riparian corridors within the Project Area. Within and along other minor waterways to be identified in the EIS, specific design considerations and mitigation measures would be considered while minimising potential impacts. For impacts that

cannot be avoided such as watercourse crossings for vehicles and cables would be designed and constructed in accordance with relevant guidelines and best practice methods.

Potential impacts to water resources from the Project are expected to include demand for water during the construction of the project, as well as for land management during operations. The Project is not likely to impact groundwater during construction, operation or decommissioning due to the limited amount of subsurface disturbance activities required during the installation and decommissioning of infrastructure. Water used for construction and operation of the Project may be sourced via a combination of existing farm dams, surface water or groundwater abstraction, or trucked in via a third party water source. If surface water or groundwater extraction is required to meet the Project's demand for water, it would be obtained from a licenced source. Impacts of the traffic associated with water trucks would also be assessed in the EIS Traffic Impact Assessment.

6.10.1.3 EIS assessment

The EIS would assess the impacts to waterways and include appropriate mitigation measures, such as buffering these areas for avoidance, where possible, and adherence to best practice guidelines, where avoidance is not possible. The assessment would comprise a qualitative, standard level of assessment and include:

- characterisation of the existing surface water and groundwater environment relevant to the Project;
- water quantities, sources and access for construction and operation;
- review and synthesis of relevant legislation, regulation and guidelines;
- description of potential surface water and groundwater resource modification and impacts, with focus on sensitive receptors;
- description of erosion and sediment control principles and management measures in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004) to be implemented during both project construction and operation;
- flood risk assessment based on consideration of the site layout against flood modelling to be undertaken to define existing flooding conditions;
- high level assessment of potential impacts to groundwater resources and quality;
- estimates of water use and proposed source(s) of supply during construction and operation; and
- proposed management and mitigation measures to minimise impacts to surface water and groundwater resources.

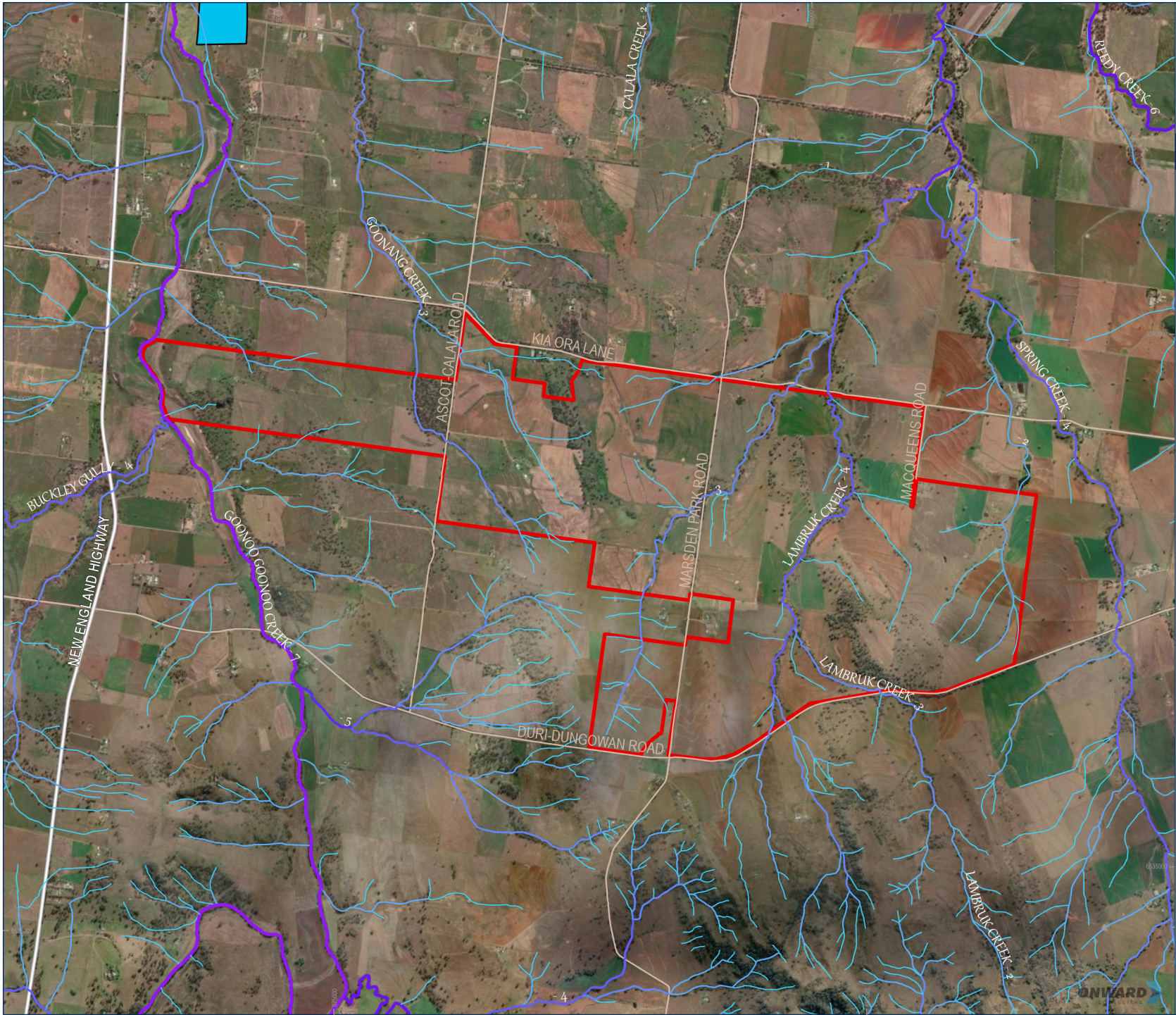
The key issue for flood consideration is locating infrastructure outside of flood hazard areas. Detailed designs to be presented in the EIS would consider avoidance of high-risk flood hazard areas. Confirmation of the hydraulic function of the waterways would be undertaken as part of the EIS, including completion of the specialist flooding analysis to address potential flood risks and impacts of infrastructure on flood behaviour.

6.10.2 Air quality

6.10.2.1 Background

The air quality within and surrounding the Project Area is influenced by existing land use practices which are predominantly agricultural. There are no heavy-emitting industries in proximity to the Project. Air quality in the region is therefore expected to be of good quality and typical of what is expected in a rural setting, due to factors including existing land use, low population density, low traffic volumes, and the absence of heavy-emitting industries.

Existing sources of air pollution are likely related to dust, vehicle and machinery use during agricultural production, and vehicle exhaust emissions from traffic along the New England Highway. During colder months, solid fuel heating may result in a localised reduction in air quality, particularly if temperature inversions operate overnight.



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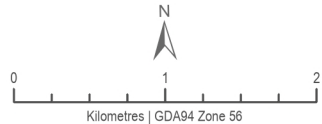
Hydroline and Flood Prone Land
Figure 6.10

LEGEND

-  Project Area
-  Flood Planning Area
-  Highway
-  Local roads

Strahler stream order

-  1
-  2
-  3
-  4
-  5
-  6
-  7



The nearest air quality monitoring station is in Tamworth located approximately 11 km north of the Project Area at an elevation of 405 mAH. This station is associated with the regional NSW air quality monitoring network (DPE, 2021). The following air pollutants and meteorological variables are measured at this station:

- fine particles as PM₁₀;
- fine particles as PM_{2.5};
- wind speed, wind direction and sigma theta;
- ambient temperature; and
- relative humidity.

This station provides hourly pollutant concentration data, 24-hour pollution summary data, and air quality category ratings (AQC). The AQC for Tamworth is generally “good”. The exception to this was during the Black Summer bushfires of 2019–20, when AQC was “extremely poor”.

The nearest operating weather station to the Project Area is the Tamworth Airport AWS (Station No. 055325), located approximately 17.5 km northwest of the Project Area at an elevation of 394.9 mAH. A review of the Australian Bureau of Meteorology (BOM) climatic records (1970 – 2022) for this station indicate a mean summer maximum temperature of 33.0°C in January, and a mean winter minimum temperature of 2.3°C in July. Rainfall records from this same station indicate a mean annual rainfall of 645.5 mm, with the highest monthly maximum occurring in November (82.7 mm) and the lowest monthly maximum occurring in April (25.5 mm) (BOM, 2023b).

The average hourly wind speed experiences mild seasonal variation over the course of the year. The windiest times of the year are from October to February, with average wind speeds of more than 12.7 kilometres per hour (km/h), and the calmest times of the year are from April to July, with an average hourly wind speed of 9.45 km/h (BOM, 2023b).

6.10.2.2 Preliminary assessment

The Project is not expected to have significant impacts on air quality in the region. Emissions to the atmosphere from the Project would be predominantly associated with construction phase activities which would be temporary and limited to:

- localised dust emissions generated by land disturbance; and
- exhaust emissions of civil construction and vehicle, plant and machinery.

During the temporary construction phase, dust particles and other air quality emissions could potentially be released from activities including:

- construction of new / upgraded access tracks and roads;
- vegetation clearing and creation of open exposed areas;
- excavation works and stockpile management;
- mobile concrete batching plants;
- rock crushing;
- transport of material and equipment;
- processing and handling of material;
- construction activities and associated earthmoving and construction equipment;
- transfer points;
- loading and unloading of material; and
- haulage activities along unsealed roads.

During the operations, the Project would generate electricity without directly emitting air pollutants that are known to affect the climate and human health. The Project would contribute to the improvement of air quality through the

displacement of emissions that would otherwise be generated through the burning of fossil fuels used to generate electricity from traditional coal fired power stations.

6.10.2.3 EIS assessment

The EIS would include a qualitative analysis of the potential impacts to air quality and stipulate appropriate management and mitigation measures during the construction, operations and decommissioning phases of the Project. Air quality and dust management would generally be assessed in accordance with relevant guidelines and policies including:

- National Greenhouse Accounts Factors (DCCEEW, 2023b);
- NSW Climate Change Policy Framework (OEH, 2016); and
- Approved methods for the modelling and assessment of air pollutants (EPA, 2022).

6.10.3 Hazards

6.10.3.1 Background

Potential hazardous scenarios and risks associated with the Project include dangerous goods and hazardous substances, exposure to electromagnetic fields and glint and glare impacts. Accordingly, the EIS would include an assessment of potential hazards and risks. The current environment of the Project Area is primarily rural property intersected by waterways.

Tamworth Regional Airport is located approximately 18.5 km northwest of the Project Area. The Project Area is not located directly on either the northwestern or southeastern approaches to the runway. Public airfields and private airstrips are scattered in the region.

Electromagnetic fields (EMFs) are produced within the vicinity of existing powerlines. Additional infrastructure, which form a part of the Project such as connecting powerlines, substation, switchyard, may produce additional EMF.

Additional infrastructure proposed within the Project such as inverters, transformer, connecting powerlines and the substation would produce additional EMF within their vicinity. The EMF levels associated with the proposed solar infrastructure would be below the guideline for public exposure and is not expected to have any adverse impact on human health. Standard design provisions are expected to ensure impacts comply with relevant guidelines together with communication of the issue as required.

6.10.3.2 Preliminary assessment

Solar panels are designed to absorb as much sunlight as possible, therefore reflecting a low percentage of the received light. Due to the design and location of the Project, no glint and glare is anticipated that would impact aviation. Potential for glare and reflections from solar farm infrastructure would be assessed in the EIS as a component of the Landscape and Visual Impact Assessment.

Consultation with Tamworth Regional Council (the operator of Tamworth Regional Airport), Civil Aviation Safety Authority and Air Services Australia would be undertaken as part of the EIS.

EMFs are produced within the vicinity of existing powerlines. Whilst EMF levels associated with solar infrastructure are well below the guideline for public exposure, EMF levels of the Project would be considered against safe exposure levels as part of the EIS. Standard design provisions are expected to ensure impacts comply with relevant guidelines together with communication of the issue as required.

6.10.3.3 EIS assessment

A preliminary hazard analysis would be carried out in the EIS, in consideration with the Hazardous Industry Planning Advisory Paper No. 6, Hazard Analysis and Multi-level Risk Assessment (DoP, 2011).

6.10.4 Bushfire

6.10.4.1 Background

Bushfires present a threat to human life and assets and can adversely impact ecological values. Bushfire risk can be considered in terms of environmental factors that increase the risk of fire (e.g., fuel quantity and type, topography and weather patterns), as well as specific activities (e.g., hot works and construction activities) or infrastructure components that exacerbate combustion or ignition risks (such as transmission lines and other electrical components).

6.10.4.2 Preliminary assessment

A review of the NSW RFS Bushfire Prone Land mapping confirms that the Project Area is entirely mapped as bushfire prone (Figure 6.11). Land mapped as Vegetation Category 1 has the highest risk for bushfire. This vegetation category has the highest combustibility and likelihood of forming fully developed fires including heavy ember production (NSW RFS, 2015). Within the Project Area is generally restricted to areas of remnant vegetation. Larger tracts of Vegetation Category 1 land are located south of the Project Area. The remainder of the Project Area is mapped as Vegetation Category 2 land which is considered to have a lower bushfire risk than Category 1 land, having a lower combustibility and/or limited potential fire hazard due to vegetation area shape and size, land geography and land management practices (NSW RFS, 2015).

6.10.4.3 EIS assessment

The potential to increase risk of bushfire would be assessed in the EIS in accordance with the RFS Planning for Bushfire Protection Guideline 2019 (PBP) (RFS, 2019). Emergency protocols would reflect advice from relevant agencies. A Bushfire Assessment would be undertaken in accordance with PBP, Chapter 8 (Other Development), section 8.3.5 (Wind and Solar Farms). The Bushfire Hazard Assessment would:

- characterise the regional fire weather, vegetation present and slope characteristics of the site and surrounds; and
- identify suitable bushfire protection measures for the Project, in accordance with the applicable requirements of PBP.

Engagement with the NSW RFS and Council would be undertaken during the preparation of the EIS.

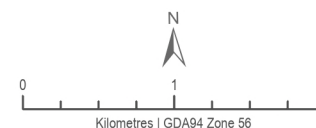
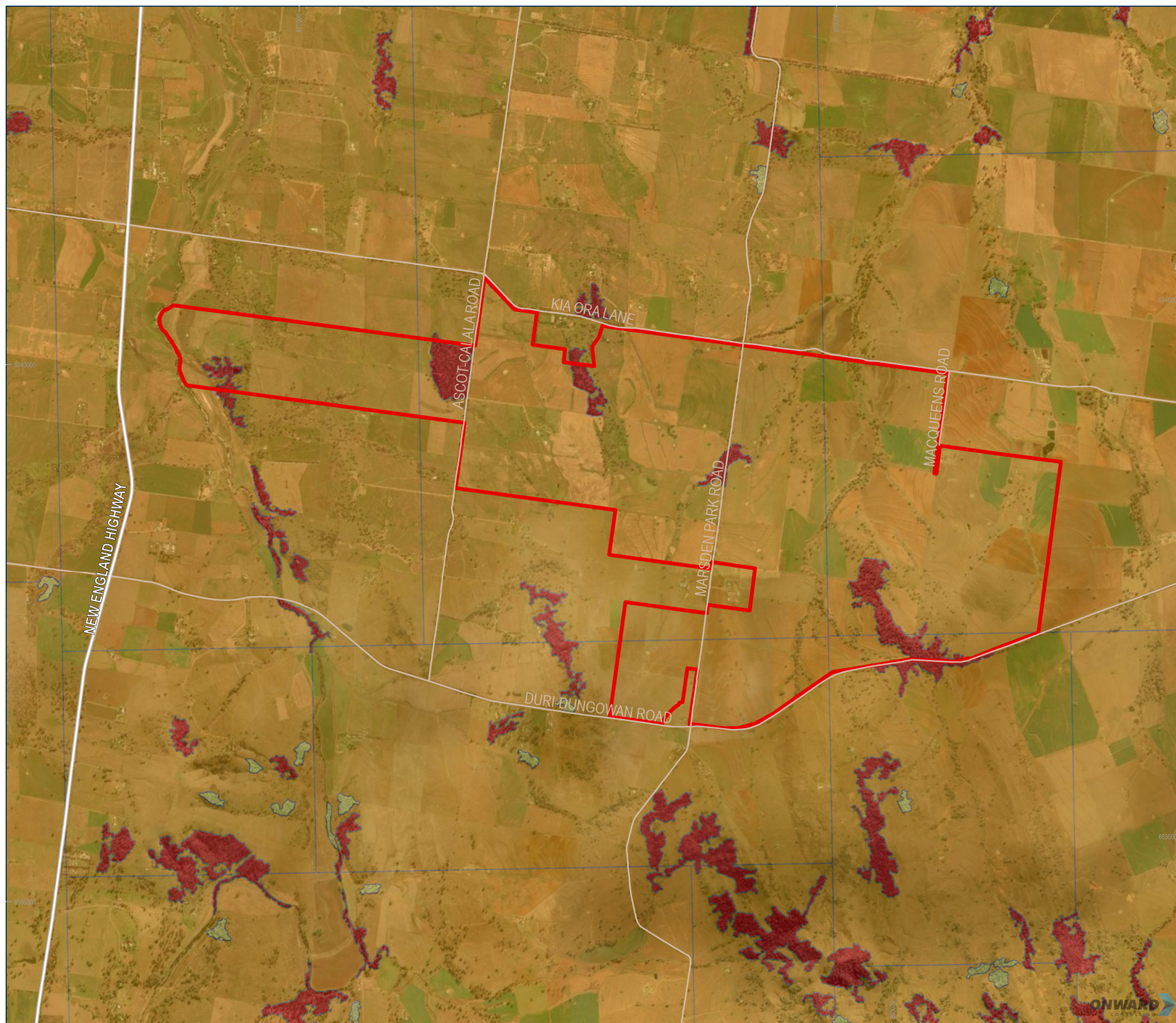
Mitigation measures and emergency response protocols would be developed in consultation with the NSW RFS and Fire and Rescue NSW.

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Bushfire Prone Land

Figure 6.11
LEGEND

-  Project Area
-  Vegetation Category 1
-  Vegetation Category 2
-  Vegetation Category 3
-  Highway
-  Local roads



Source: ESRI, © State Government of NSW and NSW Rural Fire Service 2023

6.10.5 Waste management

The Project would generate several waste streams during the construction phase, including:

- excavated materials (soil);
- packing from solar panels and other infrastructure (cardboard packaging, plastic wrapping, wood pallets etc.); and
- vegetation.

There would be minor quantities of waste generated by the day-to-day operation of the Project. Waste would also be generated as part of the decommissioning at the end of the Project's operational life.

The EIS would quantify and classify the likely waste streams to be generated during construction, operation and decommission phases of the Project.

The EIS would consider the following guidelines and strategies to ensure resources are used effectively and impacts to the environment because of waste generation from the Project are minimised:

- NSW EPA Waste Classification Guidelines – Part 1: classifying waste (EPA, 2014b) and Addendum (EPA, 2016);
- NSW EPA NSW Waste Avoidance and Resource Recovery Strategy 2014-2021 (WARR Strategy) (EPA, 2014a); and
- NSW EPA Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012 (EPA, 2012).

Relevant management and mitigation would be identified as required.

6.11 Cumulative impact assessment

6.11.1 Background

Cumulative impacts relate to the combined potential effects of different impact areas of the Project as well as the potential interaction with other projects in the local area. They may occur concurrently or sequentially. NSW Government's Cumulative Impact Assessment Guidelines for State Significant Projects (DPE, 2022a) sets out the approach for addressing cumulative impacts.

The relevant cumulative impacts are those associated with other known foreseeable developments occurring in proximity to the Project.

6.11.2 Preliminary assessment

SSD undergoing assessment or determined since 1 January 2019 are listed on the Major Projects Register within the Tamworth Regional LGA and surrounding areas within a 100 km radius are shown in Figure 6.12 and Table 6.18. While the majority of potential cumulative impacts would be expected to be highly localised, the radius distance accounts for other impacts that may arise such as traffic and transport.

6.11.3 EIS assessment

Table 6.18 lists the relevant nearby SSD energy projects that may be considered within the cumulative impact assessment for the EIS. The study area for the cumulative impact assessment would be aspect specific. For example, it would vary depending on the specific characteristics of the assessment matter and the scale and nature of the potential impacts.

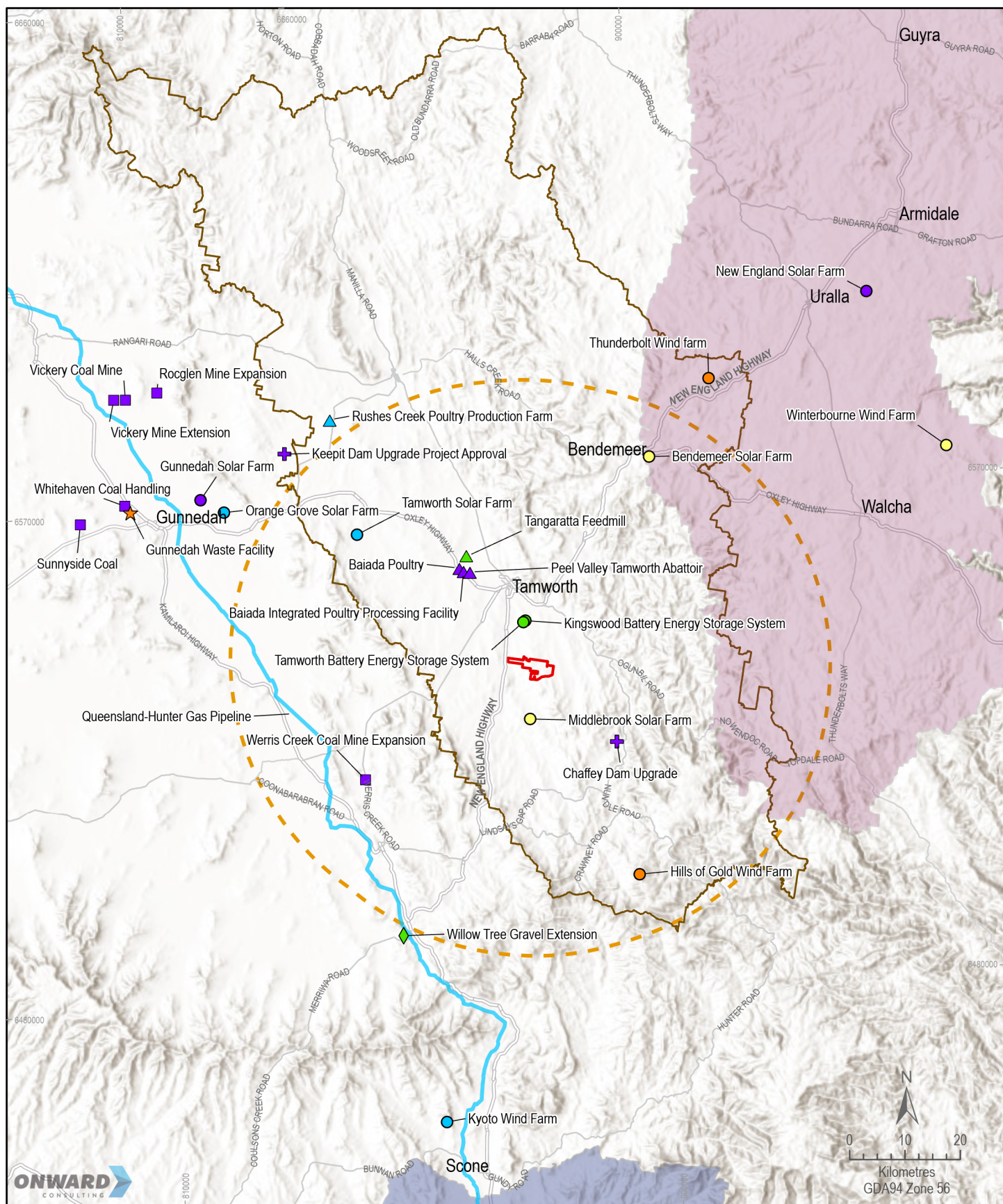
The following matters would require consideration in the EIS cumulative impact assessment:

- visual amenity;
- accommodation;

- waste;
- water;
- biodiversity;
- Aboriginal and Historic heritage;
- traffic;
- social;
- land; and
- noise and vibration.

Benefits to the local communities from the project and other developments in the region through the generation of jobs (during constructions and ongoing operations) and contribution to the local economies associated with the purchase of local goods and services can be subjected to its cumulative benefits.

The timing of works associated with the proposed developments nearby would be monitored throughout the EIS stage to ensure appropriate mitigation measures are implemented, particularly in relation to construction traffic and pressure on local services and facilities within Tamworth.



Source: ESRI, Major projects

LEGEND

- Project Area
- 50 km project area buffer
- Tamworth local government area
- Indicative Hunter-Central Coast Renewable Energy Zone
- Indicative New England Renewable Energy Zone
- Highway
- Major roads

Gas Supply

- Determination

Agricultural

- ▲ Prepare EIS
- ▲ Determination
- ▲ Operational

Coal Mining

- Operational

Extractive industries

- ◆ Prepare EIS

Renewable Energy

- Prepare EIS
- Response to Submissions
- Assessment
- Determination
- Operational

Waste Management

- ★ Assessment

Water Supply

- + Operational



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SSD Projects in the Region
Figure 6.12

Table 6.18 SSD projects within the Tamworth Regional LGA and surrounding LGAs

Project Name	Description	LGA	Current status	Approximate distance (km) ¹
Tamworth Battery Energy Storage System	Development of a 200 MW battery energy storage facility with ancillary infrastructure	Tamworth Regional	Prepare EIS	7
Kingswood Battery Energy Storage System	Development of a battery energy storage system (500 MW / 1,000 MWh) and associated infrastructure.	Tamworth Regional	Prepare EIS	8
Calala Battery Energy Storage System	Development of a battery energy storage system (300 MW / 1,200 MWh) and underground transmission lines connecting to Tamworth substation plus ancillary works.	Tamworth Regional	Prepare EIS	8
Middlebrook Solar Farm	Up to 500 MW proposed solar farm, battery storage (100 MW) and ancillary infrastructure.	Tamworth Regional	Response to submissions	10
Nottingham Park Solar Farm	Development of a 250 MW solar farm, battery storage (300 MW) and associated infrastructure.	Tamworth Regional	Prepare EIS	23
Tamworth Solar Farm	Development of a 65 MW solar farm with energy storage and ancillary infrastructure.	Tamworth Regional	Approved	36
Hills of Gold Wind Farm	Development of a wind farm with up to 65 WTGs each with a generating capacity of approximately 6 MW, BESS up to 100 MW/400 MWh, and ancillary infrastructure.	Tamworth Regional, Liverpool Plains and Upper Hunter Shire	Assessment	42
Bendemeer Solar Farm	Development of a 280 MW solar farm with energy storage of up to 280 MW and associated infrastructure.	Tamworth Regional	Response to submissions	43
Thunderbolt Wind Farm	Development of a 192 MW wind farm, with up to 32 WTGs, as part of the Thunderbolt Energy Hub, with ancillary infrastructure.	Tamworth Regional and Uralla Shire	Assessment	56
Orange Grove Solar Farm	Development of a 110 MW solar farm and ancillary infrastructure.	Gunnedah Shire	Approved	62
Gunnedah Solar Farm	Development of a 153 MW solar farm and ancillary infrastructure.	Gunnedah Shire	Approved	63
Winterbourne Wind Farm	Development of a 700 MW wind farm, with up to 119 WTGs, BESS up to 100 MW/ 200 MWh and ancillary infrastructure.	Walcha Shire and Uralla Shire	Response to Submissions	74
Kyoto Wind Farm	Development of a 137 MW wind and solar farm.	Upper Hunter Shire and Muswellbrook Shire	Approved	87
New England Solar Farm	Development of 720 MW solar farm with energy storage and ancillary infrastructure.	Uralla Shire	Approved	87

¹ Indicative direct-line distances from the Project

Note: Projects listed are those determined since 1 January 2019 and their status as of 7 December 2023

6.12 Matters requiring no further assessment

Matters listed in Appendix B of the Scoping Report Guidelines that are considered to not require further assessment in the EIS are provided in Table 6.19.

Table 6.19 Matters requiring no further assessment in the EIS

Matter	Relevance
Access – rail, port and airport facilities	The site does not contain rail, port and airport facilities. No interactions with such facilities are proposed under the Project other than deliveries of plant to the site.
Air – atmospheric emissions and gases	Vehicles associated with the Project's construction activities would generate atmospheric emissions and gases. These emissions would be minimal compared to existing emissions from traffic travelling on the New England Highway and will also be temporary.
Amenity – odour	The Project would not generate any odorous emissions.
Built environment	The Project would have no impacts on built environment. All works will be undertaken within the site or within existing road reserves.
Biodiversity – conservation areas	There are no conservation areas within the site.
Hazards and risks – biosecurity	The Project would have low risk to biosecurity. Potential introduction of weeds to or from the site would be limited to vehicle movements. These risks can be easily mitigated through the implementation of standard management measures.
Hazards and risks - dams safety	There are no existing dams within the site or within surrounding land that would pose a safety risk. No dams are proposed to be constructed under the Project.
Hazards and risks – coastal hazards	The site is not within a coastal zone.
Hazards and risks – environmental hazards	Environmental hazards relevant to the site are incorporated in other proposed assessments.
Hazards and risks – groundwater contamination	The Project is unlikely to have potential for groundwater contamination. The Project would involve piling to a depth of approximately 3 m and is not anticipated to interact with any aquifer. Impacts to groundwater would be assessed in the water resources assessment.
Hazards and risks – land movement	The site is not within a landslide risk area. Erosion risks would be considered in the water assessment.
Heritage – natural	The site does not have any identified natural heritage significance.
Land – stability	The site is not within a landslide risk area. Erosion risks would be considered in the water assessment.
Land – soil chemistry	The Project would not involve any processes that would alter the soil chemistry of the site.
Land – topography	The Project would not significantly alter the topography of the site.
Social – decision-making systems	The Project would be in accordance with relevant decision-making systems but has no impact on those systems.
Water – water availability	The Project would require water during construction for dust suppression and during operation for landscaping maintenance. Water for construction would be sourced via existing landowner access rights, water access licences, or via town water supply or trucked into site. If required, the Applicant would obtain its own water supply works approval or water access licence.

7. Conclusions

This Scoping Report has outlined the Project and established the strategic and legislative context of the Project. The Project would be assessed under Part 4 of the EP&A Act and classed as SSD under the Planning Systems SEPP.

A referral under the EPBC Act to the Commonwealth Minister for the Environment and Water would be evaluated during the EIS in consideration of detailed biodiversity assessments and design refinements.

As the Project proceeds into the EIS Phase, the Applicant is committed to a strong engagement and communications program, focused on the responsiveness of the Project to what's changed to address concerns, sharing of benefits, community and stakeholder partnerships and ongoing proactive management of issues.

The Applicant requests the DPHI to issue Project-specific SEARs to guide the preparation of the EIS. As well as detailed investigations, the EIS would set out the mitigation measures required to manage the impacts of the Project to an acceptable level and would include further input from the community and other stakeholders through a robust continued engagement process.

8. References

- Australian Bureau of Statistics (ABS). (2021a). *Tamworth Regional – 2021 Census All persons QuickStats*. Retrieved from: <https://abs.gov.au/census/find-census-data/quickstats/2021/LGA17310>
- Australian Bureau of Statistics (ABS). (2021b). *Loomberah – 2021 Census All persons QuickStats*. Retrieved from: <https://abs.gov.au/census/find-census-data/quickstats/2021/LGA17310>
- Australian Bureau of Statistics (ABS). (2021c). *Timbumburi – 2021 Census All persons QuickStats*. Retrieved from: <https://abs.gov.au/census/find-census-data/quickstats/2021/SAL13887>
- Australian Energy Market Commission (AEMC). (2019). *Final Report: Residential Electricity Price Trends 2019*.
- Australian Energy Market Operator (AEMO). (2022a). *2022 Integrated Systems Plan For the National Electricity Market*. Australian Energy Market Operator.
- Australian Energy Market Operator (AEMO). (2022b). *Energy Security Target Monitor Report October 2022*.
- Australian Institute of Landscape Architects (AILA). (2018). *Guidance Note for Landscape and Visual Assessment*.
- Bureau of Meteorology (BOM). (2023a). *Groundwater Dependent Ecosystems Atlas*. Retrieved from: <http://www.bom.gov.au/water/groundwater/gde/>
- Bureau of Meteorology (BOM). (2023b). *Monthly climate statistics – Tamworth Airport AWS*. Retrieved from: http://www.bom.gov.au/climate/averages/tables/cw_055325_All.shtml#other
- Clean Energy Council (CEC). (n.d.). *Renewable Energy Target*. Retrieved from: <https://www.cleanenergycouncil.org.au/advocacy-initiatives/renewable-energy-target>
- Clean Energy Regulator (CER). (2023). *Large-scale Renewable Energy Target*. Retrieved from: <https://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target/How-the-scheme-works/Large-scale-Renewable-Energy-Target>
- Department of Climate Change, Energy, Environment and Water (DCCEEW). (2021). *Affirming Australia's net zero emissions by 2050 target*. Retrieved from <https://www.dcceew.gov.au/about/news/affirming-australias-net-zero-emissions-by-2050-target>
- Department of Climate Change, Energy, the Environment and Water (DCCEEW). (2023a). *Australian Energy Update 2023*.
- Department of Climate Change, Energy, the Environment and Water (DCCEEW). (2023b). *National Greenhouse Accounts Factors: 2023*.
- Energy Corporation of NSW (EnergyCo). (2023). *New England Renewable Energy Zone*. Retrieved from: <https://www.energyco.nsw.gov.au/ne-rez>
- Geological Survey of New South Wales. (2019). *Renewable energy resources of New South Wales*. Retrieved from: <https://meg.resourcesregulator.nsw.gov.au/geoscience/products-and-data/renewable-energy>
- Global Solar Atlas. (2023). *Global Solar Atlas*. Retrieved from: <https://globalsolaratlas.info/map?c=-31.219285,150.930934,13&m=site&s=-31.215248,150.938434>
- International Panel on Climate Change (IPCC). (2022). *Impacts, Adaptation and Vulnerability*. Retrieved from: <https://www.ipcc.ch/report/ar6/wg2/>
- Landcom. (2004). *Managing Urban Stormwater: Soils and construction - Volume 1*.
- Landscape Institute and Institute of Environmental Management & Assessment. (2013). *Guidance for Landscape and Visual Impact Assessment (GLVIA), Third Edition*.
- McBryde, I. (1974). *Aboriginal prehistory in New England: an archaeological survey of northeastern New South Wales*.

National Committee on Soil and Terrain (NCST). (2009). *Australian Soil and Land Survey Handbook Series*.

NSW Department of Environment & Climate Change (DECC). (2009). *Interim Construction Noise Guideline*.

NSW Department of Environment, Climate Change and Water (DECCW). (2010a). *Aboriginal Cultural Heritage Consultation Requirements for Proponents*.

NSW Department of Environment, Climate Change and Water (DECCW). (2010b). *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*.

NSW Department of Environment, Climate Change and Water (DECCW). (2011). *NSW Road Noise Policy*.

NSW Department of Planning (DoP) (2011). *Hazardous Industry Planning Advisory Paper No 6 Hazard Analysis*.

NSW Department of Planning and Environment (DPE) (2011). *Land Use Conflict Risk Assessment Guidelines*.

NSW Department of Planning and Environment (DPE). (2013). *Land and Soil Capability Mapping for NSW*. Retrieved from: <https://datasets.seed.nsw.gov.au/dataset/97fb7a2d-1ce1-4e41-ad4d-b84154bea038>.

NSW Department of Planning and Environment (DPE). (2018). *NSW Transmission Infrastructure Strategy*. Retrieved from <https://www.energy.nsw.gov.au/media/1431/download>

NSW Department of Planning and Environment (DPE). (2019). *NSW Landuse 2017*. Retrieved from: <https://datasets.seed.nsw.gov.au/dataset/91be0aef-e9af-403d-8d4f-e204d829210c>

NSW Department of Planning and Environment (DPE). (2021). *Air quality monitoring in regional and rural NSW*. Retrieved from: <https://www.environment.nsw.gov.au/topics/air/monitoring-air-quality/regional-and-rural-nsw>

NSW Department of Planning and Environment (DPE). (2022a). *Cumulative Impact Assessment Guidelines for State Significant Projects*.

NSW Department of Planning and Environment (DPE). (2022b). *Large-Scale Solar Energy Guideline*.

NSW Department of Planning and Environment (DPE). (2022c). *New England North West Regional Plan 2041*.

NSW Department of Planning and Environment (DPE). (2022d). *State significant development guidelines – preparing a scoping report – Appendix A to the state significant development guidelines*.

NSW Department of Planning and Environment (DPE). (2022e). *Technical Supplement – Landscape and Visual Impact Assessment*.

NSW Department of Planning and Environment (DPE). (2022f). *Undertaking Engagement Guidelines for State Significant Projects*.

NSW Department of Planning and Environment (DPE). (2023a). *Draft Benefit Sharing Guideline*.

NSW Department of Planning and Environment (DPE). (2023b). *Draft Solar Energy Decommissioning Calculator*.

NSW Department of Planning and Environment (DPE). (2023c). *Technical Supplement – Social Impact Assessment Guidelines for State Significant Projects*.

NSW Department of Planning and Environment (DPE). (2023d). *Social Impact Assessment Guidelines for State Significant Projects*.

NSW Department of Planning, Industry and Environment (DPIE). (2019). *NSW Electricity Strategy*.

NSW Department of Planning, Industry and Environment (DPIE). (2020a). *Biodiversity Assessment Method*.

NSW Department of Planning, Industry and Environment (DPIE). (2020b). *Net Zero Plan Stage 1: 2020-2030*.

NSW Department of Planning, Industry and Environment (DPIE). (2020c). *NSW Electricity Infrastructure Roadmap*.

NSW Department of Primary Industry (DPI). (2003). *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings*.

- NSW Department of Primary Industry (DPI). (2013). *Policy and guidelines for Fish Habitat Conservation and Management*.
- NSW Department of Primary Industry (DPI). (2018). *Controlled activities – Guidelines for watercourse crossings on waterfront land*.
- NSW Environment Protection Agency (EPA). (2011). *Road Noise Policy*.
- NSW Environment Protection Agency (EPA). (2012). *Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities*.
- NSW Environment Protection Agency (EPA). (2014b). *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*.
- NSW Environment Protection Agency (EPA). (2014a). *Waste Classification Guidelines*.
- NSW Environment Protection Agency (EPA). (2016). *Waste Classification Guidelines - Addendum*.
- NSW Environment Protection Agency (EPA). (2017). *Noise Policy for Industry*.
- NSW Environment Protection Agency (EPA). (2022). *Approved methods for the modelling and assessment of air pollutants*.
- NSW Environment Protection Agency (EPA). (2023). *Contaminated Land – List of notified sites*.
- NSW Government. (2021). *A 20-year Economic Vision for Regional NSW*.
- NSW National Parks and Wildlife Service (NPWS). (1991). *The Bioregions of New South Wales: Chapter 12 The Nandewar Bioregions*.
- NSW National Parks and Wildlife Service (NPWS). (2003). *The Bioregions of New South Wales: their biodiversity, conservation and history*.
- NSW Rural Fire Service (RFS). (2015). *Guide for bush fire prone land mapping – Version 5b*.
- NSW Rural Fire Service (RFS). (2019). *NSW Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers*.
- NSW Office of Environment and Heritage (OEH). (2011). *Guide to investigation, assessing and reporting on Aboriginal cultural heritage in NSW*.
- NSW Office of Environment and Heritage (OEH). (2012). *The land and soil capability assessment scheme: second approximation*.
- NSW Office of Environment and Heritage (OEH). (2016). *NSW Climate Change Policy Framework*.
- Tamworth Regional Council. (2022a). *Blueprint 100 Our Community Plan 2023-2033*.
- Tamworth Regional Council. (2022b). *Community Profile*. Retrieved from:
<https://www.tamworth.nsw.gov.au/about/ur-community/community-profile>

Appendix A Scoping Summary Table

Table A-1 Scoping summary table

Group	Matter	Level of assessment	CIA	Engagement	Relevant government plans, policies and guidelines	Scoping report reference
Biodiversity	Terrestrial flora and fauna	Detailed	Y	General	– NSW Biosecurity Strategy 20123 – 2021; – Biodiversity (BAM) (DPIE, 2020)	Section 6.2
Amenity	Landscape and visual	Detailed	Y	Specific	– Technical Supplement – Landscape and Visual Impact Assessment (DPIE, 2022); – LSSE Guideline (DPE, 2022).	Section 6.3
Amenity	Noise and vibration	Detailed	Yes	General	– Construction Noise Strategy (Transport for NSW, 2012); – Interim Construction Noise Guideline (Department of Environment, Climate Change and Water, 2009); – NSW Industrial Noise Policy (EPA, 2000); – NSW Road Noise Policy (EPA, 2011); – Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006); – German Standard DIN 4150-3: Structural Vibration – Effects of Vibration on Structures; and – Environmental Noise Management Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006).	Section 6.4
Land	Land capability	Detailed	No	General	– LSSE Guideline (DPE, 2022). – Agricultural Land Use Mapping Resources in NSW; – The Land and Soil Capability Scheme (Office of Environment and Heritage, 2012); and – LEP land zoning.	Section 6.7
Land	Soil stability	Detailed	No	General	– Acid Sulphate Soils Assessment Guidelines (Department of Planning, 2008); – The Land and Soil Capability Scheme (Office of Environment and Heritage, 2012); – Australian Soil and Land Survey Handbook Series (NCST, 2009); – Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004); – Managing Urban Stormwater: Soils and Construction Volume 2 (Department of Environment and Climate Change, 2008); – Agricultural Land Use Mapping Resources in NSW.	Section 6.7

Group	Matter	Level of assessment	CIA	Engagement	Relevant government plans, policies and guidelines	Scoping report reference
Water	Hydrology, water quantity	Detailed	No	General	– Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018); – NSW Water and River Flow Objectives (NSW Government, 2006); – Floodplain Risk Management Guidelines (Department of Environment and Climate Change, 2016); – Floodplain Development Manual: The management of flood liable land (NSW Government, 2005); – Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004); – Managing Urban Stormwater: Soils and Construction Volume 2 (Department of Environment and Climate Change, 2008); – NSW State groundwater dependent ecosystem policy (Department of Land, Water and Climate, 2002)	Section 6.10.1
Access	Traffic	Detailed	Yes	Specific	– Austroads Guidelines for Road Design (Austroads); – Austroads Guidelines for Traffic Management (Austroads); and – Guide to Traffic Management – Part 3 Traffic Studies and Analysis (Austroads, 2013).	Section 6.6
Social	Health and wellbeing	Detailed	Yes	Specific	– Social Impact Assessment Guidelines for State Significant Projects (Department of Planning Industry and Environment, 2021); – Undertaking Engagement Guideline for State Significant Projects (Department of Planning Industry and Environment, 2021).	Section 6.5
Heritage	Aboriginal	Detailed	No	Specific	– Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW 2011; – Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010; – Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW 2010.	Section 6.8

Group	Matter	Level of assessment	CIA	Engagement	Relevant government plans, policies and guidelines	Scoping report reference
Heritage	Historic	Standard	No	Specific	– Commonwealth EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance (Commonwealth of Australia, 2013); – Commonwealth EPBC 1.2 Significant Impact Guidelines – Actions on, or impacting upon, Commonwealth Land and Actions by Commonwealth Agencies (Commonwealth of Australia, 2013) – Assessing Heritage Significance (DPE, 2023) – Statements of Heritage Impact Guidelines (DPE, 2023) – Investigating Heritage Significance (Heritage Council NSW 2022) – Assessing Significance for Historical Archaeological Sites and 'Relics' (NSW Heritage Branch 2009).	Section 6.9
Hazards and risks	Bushfire	Standard	No	General	– Planning for Bushfire Protection (NSW RFS, 2019).	Section 6.10.4
Hazards and risk	EMF	Standard	No	General	– LSSE Guideline (DPE, 2022).	Section 6.10.3
Hazards and risks	Waste management	Standard	No	General	– Waste Classification Guidelines (DECCW, 2009).	Section 6.10.5
Hazards and risks	Hazardous materials	Standard	Yes	General	– Hazardous Industry Planning Advisory Paper No. 6 'Hazard Analysis' (DoP, 2011).	Section 6.10.5

Appendix B Preliminary Biodiversity Assessment Report



Report

Lambruk Solar Project Preliminary Biodiversity Assessment Report

Onward Consulting, on behalf of Venn Energy Pty Ltd

7 December 2023



Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
V1.0	Draft	Michael Aberton	Michael Aberton	27 November 2023
V2.0	Final draft	Michael Aberton	Michael Aberton	30 November 2023
V3.0	Final	Michael Aberton	Michael Aberton	7 December 2023

Project Details

Project Name	Lambruk Solar Project Preliminary Biodiversity Assessment Report
Client	Onward Consulting, on behalf of Venn Energy Pty Ltd
Client Project Manager	Mark Vile
Water Technology Project Manager	Michael Aberton
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Document Number	24010161_R01V03_Lambruk Solar Project

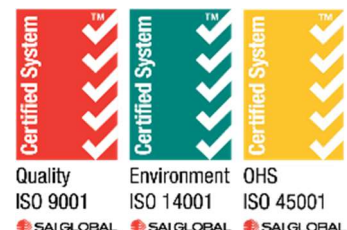


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ACKNOWLEDGEMENT OF COUNTRY

The Board and employees of Water Technology acknowledge and respect the Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of Country throughout Australia. We specifically acknowledge the Traditional Custodians of the land on which our offices reside and where we undertake our work.

We respect the knowledge, skills and lived experiences of Aboriginal and Torres Strait Islander Peoples, who we continue to learn from and collaborate with. We also extend our respect to all First Nations Peoples, their cultures and to their Elders, past and present.





EXECUTIVE SUMMARY

Water Technology has been engaged to undertake a Preliminary Biodiversity Assessment Report (PBAR) for the proposed Lambruk Solar Project on behalf of the client Venn Energy Pty Ltd. The PBAR has been undertaken to assist in defining the layout to avoid and minimise impacts to biodiversity where possible. It is aimed to provide an indication of potential ecological constraints that are known to or have the potential to occur at the project site. The PBAR has been developed in accordance with the Large-Scale Solar Energy Guideline (LSSE Guideline).

The land is predominantly used for agricultural purposes (cropping and livestock grazing) with some residential dwellings and farm infrastructure. Some areas, mainly around creek lines and steep areas, are left in a more natural state with sparse to moderate tree cover and less disturbed understorey.

A combination of desktop assessments and site survey showed that the majority of the project area has been cleared for agricultural use and contains little in the way of valuable biodiversity features, particularly areas which are ploughed and/or cropped, or heavily grazed.

The treed areas predominantly consist of Box Woodlands which are associated with Threatened Ecological Communities (TECs) protected under the *Biodiversity Conservation Act 2016* and the *Environmental Protection and Biodiversity Conservation Act 1999*. The treed areas are subject to varying degrees of disturbance with the groundcover often grazed or heavily modified. Native canopy, midstory and groundcover species were observed throughout the site in non-cropped areas with lower grazing pressure.

Potential habitat on the site include treed areas, riparian areas (creek lines), farm dams, rocky areas, logs and woody debris. Hollow bearing trees were commonly observed on the site, both in living and dead trees.

Two threatened species, Bluegrass (*Dichanthium setosum*) and Regent Honeyeater (*Anthochaera phrygia*), have previously been recorded within 2.5km of the project area but not on the site. Neither of the two species were observed during the site survey. The Regent Honeyeater may use the site occasionally but it is unlikely to be dependent on habitat on the site for breeding as this is not a known breeding site. Targeted searches for Bluegrass may be required to be part of detailed survey for the BDAR and BAM Calculator requirements.

A BDAR is likely to be required as the clearing threshold is expected to be triggered. Further detailed assessment including BAM Plots in appropriate seasonal timing are required across the project site to assess both areas that are proposed for removal and those areas that are suitable for biodiversity conservation and preservation. In addition, to determine the indirect and prescribed impacts on retained vegetation we predict the need for some BAM Plots and targeted species surveys arising from BAM Calculator generated Candidate species. These will be undertaken as part of the Environmental Impact Statement (EIS). These include micro-chiropteran bats, mammals, amphibians, reptiles, threatened birds and threatened grasses that have been generated from the BAM Calculator.



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ABBREVIATIONS

<i>BAM</i>	Biodiversity Assessment Method
<i>BDAR</i>	Biodiversity Development Assessment Report
<i>BESS</i>	Battery Energy Storage System
<i>BOS</i>	Biodiversity Offset Scheme
<i>DCCEEW</i>	Department of Climate Change, Energy, the Environment and Water
<i>DPE</i>	Department of Planning and Environment
<i>DPIE</i>	Department of Primary Industries
<i>EIS</i>	Environmental Impact Statement
<i>EPBC Act</i>	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
<i>IBRA</i>	Interim Biogeographic Regionalisation of Australia
<i>km</i>	Kilometers
<i>LLS</i>	Local Land Services
<i>LSSE Guideline</i>	Large-Scale Solar Energy Guideline
<i>m</i>	Metres
<i>MNES</i>	Matter of National Environmental Significance
<i>NSW</i>	New South Wales
<i>NVR</i>	Native Vegetation Regulatory Map
<i>PCT</i>	Plant Community Type
<i>SAIIs</i>	Serious and Irreversible Impacts
<i>SEED</i>	Sharing and Enabling Environmental Data
<i>Venn</i>	Venn Energy



1 INTRODUCTION

Water Technology Pty Ltd has been engaged to undertake a Preliminary Biodiversity Assessment Report (PBAR) for the proposed Lambruk Solar Project. The report is prepared for Onward Consulting on behalf of the client Venn Energy Pty Ltd (Venn).

The Project would involve the construction, operation and decommissioning of a PV solar facility with a capacity of 500 MW (DC) and 300 MW (AC) that would supply electricity to the NEM, and a BESS with an indicative capacity of up to 300 MW / 1200 MWh.

The Project would include (at least) the following elements:

- up to 850,000 photovoltaic modules;
- up to 178 power conversion units (inverters);
- BESS with a capacity of up to 300 MW / 1200 MWh;
- augmentations to existing 330kV overhead lines that currently traverse the site;
- 330 kV substation;
- 330 kV switchyard;
- reactive plant and other electricity network support equipment;
- temporary facilities including:
 - access tracks;
 - hardstands;
 - laydown areas;
 - site compounds;
 - temporary site offices that may be formalised as operations site offices; and
 - stockpiles.
- permanent infrastructure including operations and maintenance compound, site offices, amenities and workshop/stores buildings, carparks, water tanks, fire-fighting equipment, internal access tracks, perimeter fencing, security and communications systems and other infrastructure;
- weather measurement stations; and
- landscaping, subject to final visual impact outcomes.

The proposed development footprint to include the required components is approximately 950 hectares (ha) within the project site. The land is predominantly used for agricultural purposes (cropping, livestock grazing) with some residential dwellings and farm infrastructure. Some areas, mainly around creek lines and steep areas, are left in a more natural state with sparse to moderate tree cover and less disturbed understorey.

This PBAR has been undertaken to assist in defining the layout to avoid and minimise impacts to biodiversity where possible. The PBAR is aimed to provide an indication of potential ecological constraints that are known to or have the potential to occur at the project site.

Initial assessments of potential biodiversity impacts have been undertaken by NGH in a Biodiversity Technical Report (BTR) (NGH 2022, unpublished draft) and these have been verified and expanded by Water Technology during a preliminary site assessment.

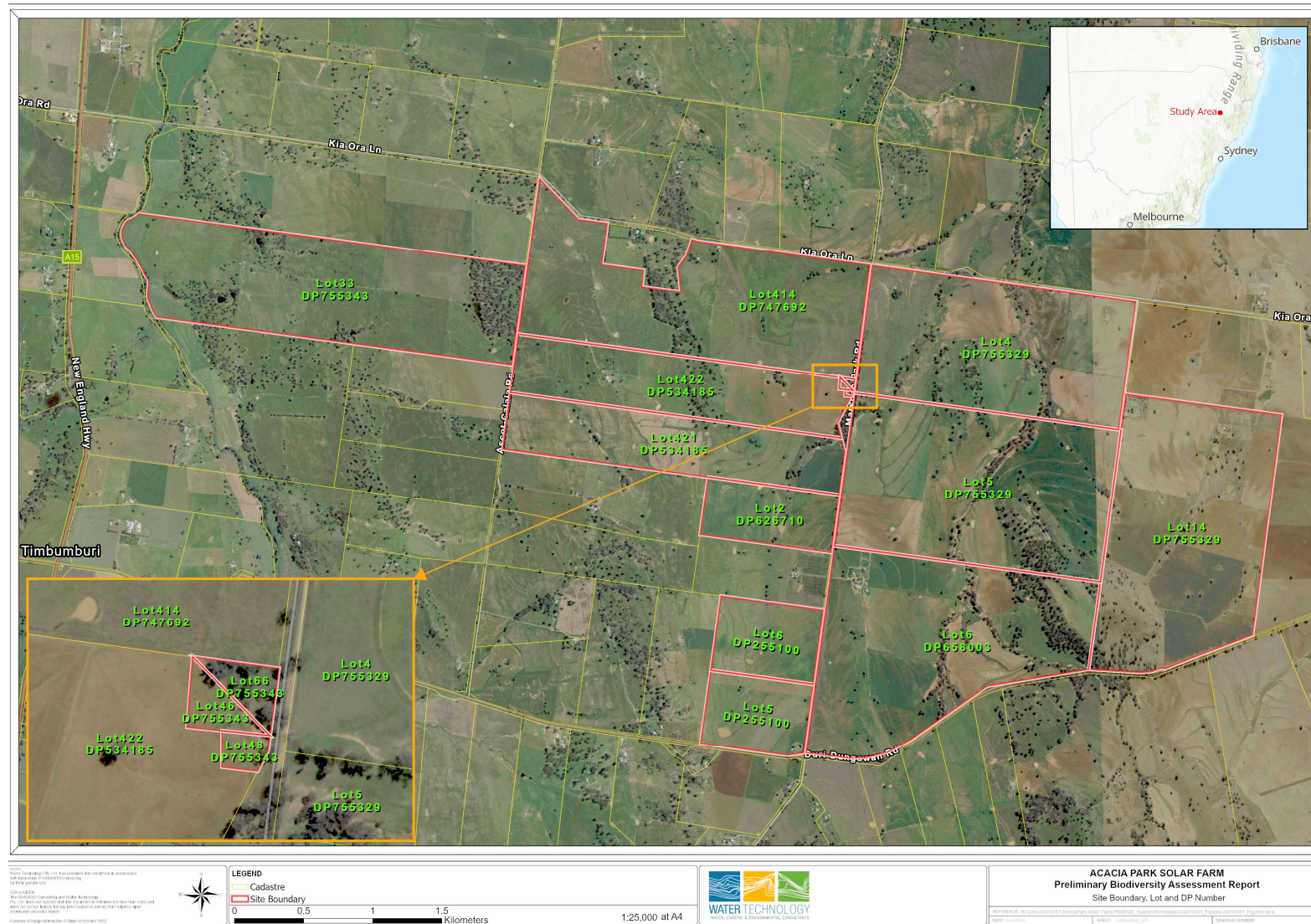


Figure 1-1 Project site



2 EXISTING CONDITIONS

2.1 Desktop Assessment

2.1.1 Site characteristics

A combination of both NSW BioNET database searches, EPBC Protected Matters Search tool, Sharing and Enabling Environmental Data (SEED) vegetation mapping, and vegetation mapping from the NGH BTR were used to determine the potential presence of flora, fauna and Plant Community Type (PCTs) on the project site.

Based on the desktop assessment, the key aspects of the project site can be summarised as follows in accordance with BAM requirements:

- Interim Biogeographic Regionalisation of Australia (IBRA) region: **Nandewar IBRA region**
- IBRA subregion: **Peel IBRA subregion**
- Mitchell Landscape: Majority of the site within **Tamworth - Keepit Slopes and Plains (Tmw)** 64% cleared, and **Peel Channels and Floodplain (Pef)** 84% cleared on the far western boundary of the site.
- Mapped PCTs include various woodlands and grassy woodlands with TEC association. The PCTs are further described below.

The site sits in a landscape of rolling hills at an elevation of approximately 400-560m above sea level (Figure 2-1).

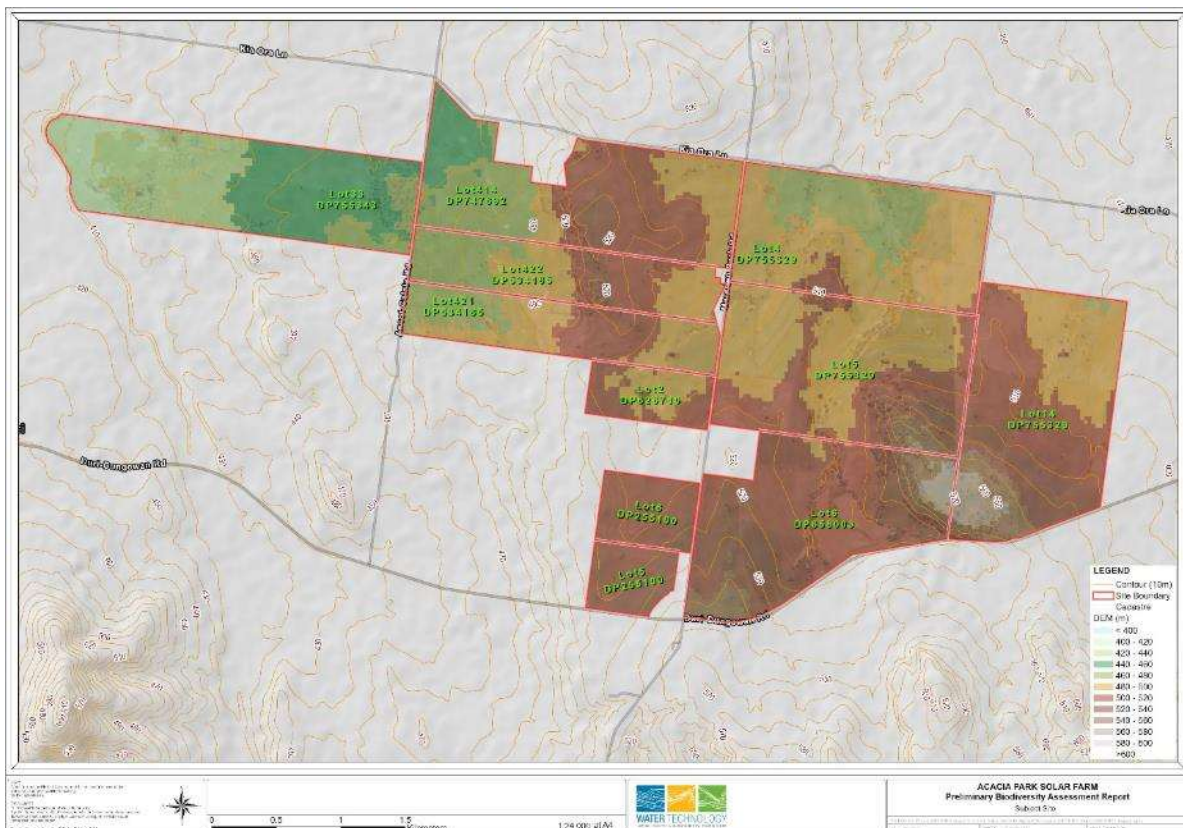


Figure 2-1 Subject site characteristics



2.1.2 Database search results

Searches of databases of threatened species and ecological communities in the project site and the surrounding region were undertaken to identify any species or communities that may result in ecological constraints on project development. The results of the database searches are discussed below. Mapping for the database searches is included in Appendix A.

EPBC Protected Matters Search

An EPBC Protected Matters Search of a 10 km radius from the project site identified the following:

- Four Listed Threatened Ecological Communities that may occur within the site:
 - Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (Critically Endangered Community);
 - New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands (Critically Endangered Community);
 - Weeping Myall Woodlands (Endangered Community); and
 - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered Community).
- 45 listed threatened species, comprising 16 birds, one fish, one frog, nine mammals, five reptiles and 13 plants:
 - There is potential for a number of threatened fauna species to reside and/or use the project site.
 - The 12 threatened flora species are considered less likely to occur within the project site due to the high level of disturbance from agricultural pressures.
- 11 listed threatened migratory species

The results of the Protected Matters Search are provided in Appendix B.

BioNET Search and SEED Portal species sightings review

A BioNET search identified only two threatened species that have been recorded within a 10 km radius of the site's centre over the past 10 years. This includes:

- Bluegrass (*Dichanthium setosum*), Vulnerable (BC Act and EPBC Act), sighted 2.5km southwest of the site; and
- Regent Honeyeater (*Anthochaera phrygia*), Critically Endangered (BC Act and EPBC Act), sighted 2.5km west of the site.

A review of NSW SEED Portal showed that no threatened species have been recorded on the site (Appendix A Figure 7-7).

The two threatened species' likelihood of occurring on site based on habitat on the project site and each species' preferences is discussed in section 2.3.3 below.

State Vegetation Type Mapping (SVTM)

The PCTs as mapped in the SVTM are shown in Figure 7-2 to Figure 7-6 in Appendix A. These PCTs still require validation in field and as such their extent does not reflect the true extent of the PCTs.

PCTs mapped via modelling (not validated in field) on the project site include:



- PCT 599 - Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
- PCT 589 - White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
- PCT 433 - White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, BBS Bioregion PCT1693: Yellow Box - Rough-barked Apple grassy woodland of the upper Hunter and Liverpool Plains
- PCT 84 - River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion

PCTs 433, 589 and 599 are associated with the following TECs:

- 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 under BC Act)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered under EPBC Act)

Biodiversity Values

The Biodiversity Values Map (BV Map) is prepared by the Department of Planning and Environment under Part 7 of the BC Act. It identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing. The map forms part of the Biodiversity Offsets Scheme threshold, which is one of the triggers for determining whether the Biodiversity Offset Scheme applies to a clearing or development proposal. The BV Map also identifies areas with particular Biodiversity Values best avoided.

A review of the Biodiversity Values Threshold Tool Map reveals that areas of mapped biodiversity value are associated with Goonang Creek and Lambruk Creek which traverse the site, and Goonoo Goonoo Creek which runs along the western boundary (Appendix A, Figure 7-1)

Aquatic habitat

All streams of 3rd Strahler order or higher are mapped as Key Fish Habitat under the *Fisheries Management Act 1994* (FM Act) (see Appendix A, Figure 7-8). Goonoo Goonoo Creek is also mapped as potential habitat for the threatened Eel Tailed Catfish (*Tandanus tandanus*).

Groundwater Dependant Ecosystems

Groundwater Dependant Ecosystems (GDE) as mapped by the Commonwealth DCCEEW shows a high to medium likelihood of GDEs occurring on some areas of the site, predominantly along the 3rd and 4th order Strahler streams and in some vegetated areas. See mapping in Appendix A, Figure 7-9.

Summary

In summary, the number of threatened species listed in the BioNet search and the EPBC Protected Matters Search (10 km radius) is relatively low. Although the project site is heavily disturbed, primarily as a result of agricultural practices, some potential habitat features for threatened species do occur, albeit scattered. Therefore, there is potential for some threatened fauna species to be present on the site in addition to those that may utilise the site during transit or when opportunistically foraging. Bluegrass may occur in the areas with native vegetation and in low disturbance locations, however is unlikely to occur on non-native areas which have been used for cropping or livestock grazing. Targeted species surveys for flora and fauna species will be



dependent on the outcomes of habitat searches and Biodiversity Assessment Method (BAM) Calculator outputs.

2.1.3 Biodiversity Technical Report (NGH 2022)

Water Technology undertook a review of the NGH (2022, unpublished draft) Biodiversity Technical Report (BTR) prior to performing desktop analysis and a site scoping exercise. The BTR was undertaken across an initial investigation area of approximately 870ha that contained part of the Project.

A preliminary desktop assessment and site visit of the various lots comprising the proposed project site was carried out to determine ecological opportunities and constraints. The report discusses the approvals pathway, provides an analysis of mapped vegetation communities and threatened species, and discusses the risk of Serious and Irreversible Impacts (SIIIs), as required under the BAM.

The conclusions of the BTR are summarised below:

- A Biodiversity Development Assessment Report (BDAR) is recommended to support the Environmental Impact Statement (EIS) as the project is anticipated to trigger the Biodiversity Offset Scheme (BOS). A Land Categorisation Assessment (LCA) could be used to identify any category 1 land (exempt from assessments and credit generation). Any entities at risk of SIII are assessed using the Biodiversity Assessment Method (BAM) against the SIII criteria.
- Little Lorikeet (*Glossopsitta pusilla*) listed as Vulnerable under the BC Act was incidentally sighted during the site survey.
- Not all areas have been ground-truthed and the PCTs for some areas were extrapolated based on various data sources. Once ground-truthed the vegetation mapping may change. Areas of ground-truthed PCTs are likely to be Category 2 – Sensitive Regulated Land.
- Habitat values within the site includes Box-Gum Woodland, rocks, watercourses and dams, hollow bearing trees (HBTs), woody debris and logs, planted native vegetation, man-made infrastructure, culverts, nests, burrows and dens.
- Aquatic assessments of dams and watercourses showed their conditions to be generally poor, however all water features provide habitat for an array of fauna species.

2.2 Preliminary field assessment

2.2.1 Background

As part of the scoping study, a site assessment comprising broad traverses of the project site was carried out by two experienced ecologists from Water Technology between 6th and 11th November 2023. Dr Michael Aberton is a BAM Accredited Assessor BAAS 18181 and was on site with Petra Arola for the duration of the site visit. The site consists of varying land management practices, however the site is predominately heavily modified grazing land with a large number of dams and various internal fencing configurations. The land used for agricultural purposes is cropped and grazed by cattle, sheep and some horses. The pastures contain a mixture of native and exotic pasture grasses.

The creeks that traverse the site are at least partly fenced off from livestock access, apart from a small number of sheep grazing in some areas. The riparian vegetation of particularly Lambruk Creek has remained in a more natural state with higher species richness and groundcover in less disturbed condition. The creek channels themselves are heavily eroded in many areas. Drainage lines are either partly treed with scattered remnant trees or fully cleared with just modified understorey.



Approximately 70-80% of the project site was accessed for the survey with weather and ground conditions as the main limiting factor, the remaining parts will be assessed as part of the EIS. This is an adequate survey effort for the Scoping stage to inform further assessment during the EIS.

Full species lists for the preliminary site survey is provided in Appendix C.

Habitat features, planted native vegetation and fauna sightings are displayed in Figure 2-3.

2.2.2 Flora

The canopy tree cover across the project site is dominated by White Box (*Eucalyptus albens*) with some patches of Blakely's Red Gum (*E. blakelyi*) and occasional Rough-barked Apple (*Angophora floribunda*). Yellow Box (*E. melliodora*) was occasionally observed on the eastern most portion of the site. Some exotic tree species like Peppercorn (*Schinus molle*) were noted in many of the paddocks. A wide range of other exotic species and planted and naturally occurring native species were observed as detailed in Appendix C. Note that the main focus is on more dominant and commonly occurring flora species. A complete list will be included as part of the EIS.

The understorey across the project site was heavily disturbed as a result of historic agricultural practices. Some fields were ploughed and cropped while others had pasture grasses growing. Areas with less understorey disturbance includes creek lines, areas where the native tree canopy is retained, road verges, areas of steep terrain, residential dwelling and other areas fenced off from livestock access. However, these areas tended to be overgrown with less palatable native grasses such as Spear grasses (*Austrostipa* spp.) and Wire grasses (*Aristida* spp.).

Native trees have been planted in rows and clusters on two of the properties (Figure 2-3). Based on discussions with landowners and displayed Namoi Catchment Management Authorities signs on the fence line the plantings appear to have been carried out for biodiversity purposes and therefore will require a detailed quantified assessment using the BAM. The plantings have not yet reached maturity but will require a streamlined assessment. Conversely, those trees planted for a functional purpose (non-ecological) e.g. horticultural, windbreak or aesthetic purposes generally won't generate any credits. However, an assessment of the planted native vegetation for threatened species habitat value is required as part of the BDAR (DPE 2022).

A particularly species rich area with diverse habitat features was noted along Kia Ora Lane 1.1km west of the Marsden Park intersection. The site of derived grassland contains rocky habitat, some White Box woodland, a dam and some sheds, all of which provide good potential fauna habitat. A wide variety of grassland species were observed here.

The PCTs were assessed during the site survey and it appeared that a change in nomenclature for the modelled PCTs as well as renewed definitions for PCTs result in an updated set of PCTs that better describe the vegetation on site. Notably, the PCTs were assessed as subsets and not in their entirety nor were they zoned into quality areas. The PCTs on site were determined as follows:

- PCT 3521 – Northwest White Box Woodland;
- PCT 3396 – Northwest Flats Box-Blakely's Red Gum Forest;
- PCT 3398 – Northwest Slopes Box-Apple Woodland; and
- PCT 4147 – Northwest White Box Sparse Grassy Woodland.

All of the above PCTs except for PCT 3521 are associated with the following BC Act and EPBC Act listed TECs:

- 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, BC Act)

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered, EPBC Act)

The PCTs as occurring on the site are shown in Figure 2-2.

Some of the vegetated areas still require assessment. Areas determined PCT 4147 may also be a thinned version of PCT 3521 due to grazing. The final determination of PCTs for any vegetation to be removed would be carried out during detailed assessment. Importantly, the entire areas were not assessed so there may be some variation in the communities and different zoning. Therefore, these are not final and may be revised during more detailed survey and assessment in the EIS.

All treed areas are of high biodiversity value, particularly White Box and Blakely's Red Gum woodlands associated with state and federally listed TECs.

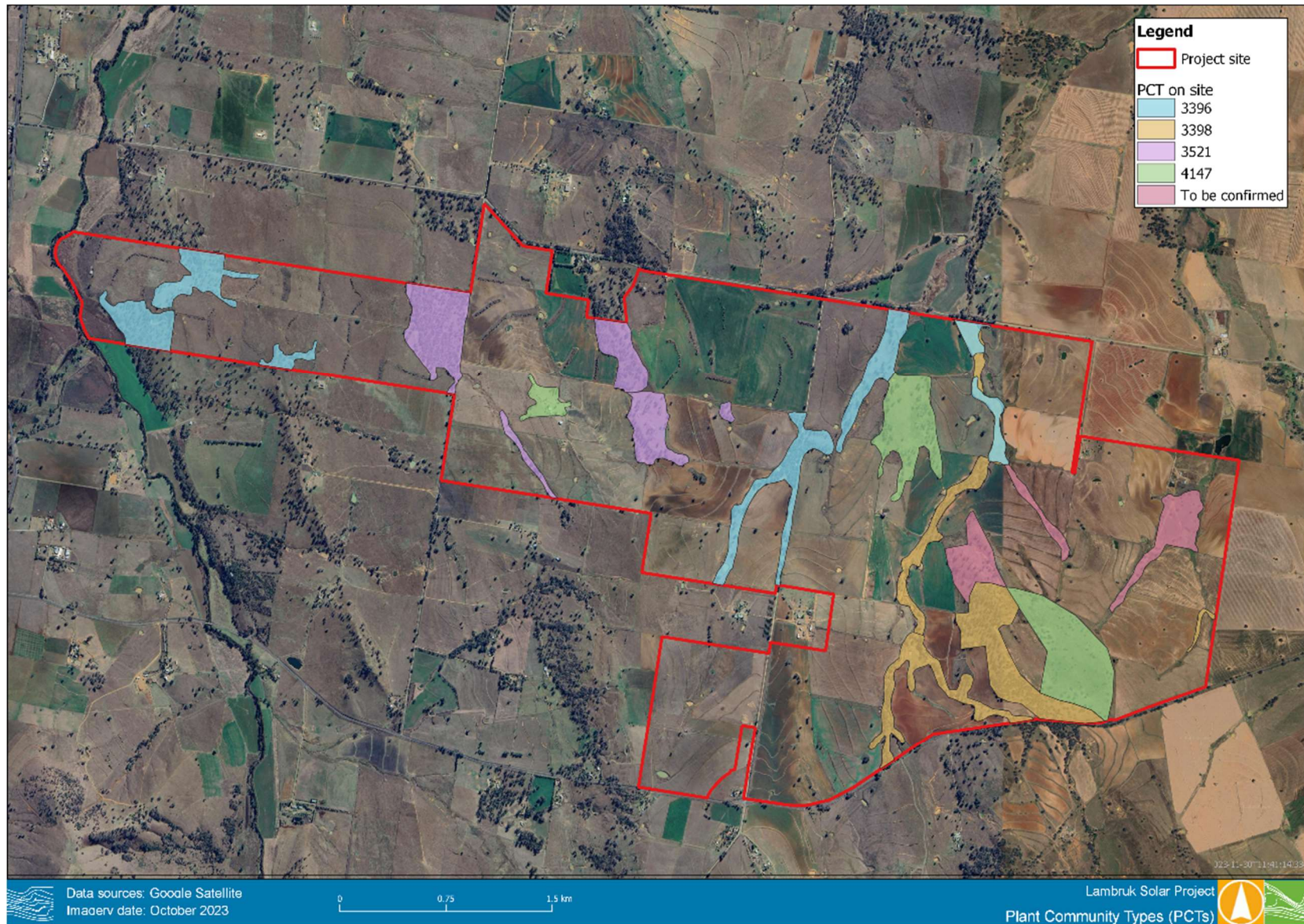


Figure 2-2 PCTs occurring on the site.



2.2.3 Fauna

General

Most of the site is used for cropping, grazing and other agricultural purposes, providing little vertical or horizontal physical structure to provide habitat for fauna. The main habitat features on the site are the grassy woodland areas and creeks lined with riparian trees. Recent dry period prior to the site assessment had depleted some dams and part of the creek lines of water that may otherwise attract a variety of fauna species. Individual paddock trees appeared to be popular nesting spots for birds and goannas, potentially preying on the birds.

The farm dams that are scattered around the project site provide potential habitat for turtles, waterfowl and amphibians and the deeper dams provide an important water source for all wildlife. However, many of these dams did not contain water or had recent water and therefore are not currently containing aquatic flora species. Rock piles, logs and woody debris offer suitable habitat for small reptiles, while anthropogenic infrastructure may provide habitat for species such as micro-chiropteran bats. The derived grassland on the northern boundary of the project site had suitable habitat for particularly birds, reptiles and amphibians.

Fauna observed on site are included in Appendix C.

Reptiles and Amphibians

Both disturbed and undisturbed areas of the site provide habitat for reptiles and amphibians. Some areas of grassland, both native and non-native, which contain cracking clays and/or surface basalt rocks, provide suitable reptile habitat. In some locations, rocks are scattered on the ground surface or collected into pile, often in conjunction with grass tussocks and cracking soils. These rocky areas are preferred reptile habitat. Both reptiles and amphibians also use vegetation like trees or grass as habitat.

An opportunistic search (rock rolling) as well as incidental sightings of reptiles was undertaken as part of the scoping study. Elegant Snake-eyed Skink (*Cryptoblepharus pulcher*) was sighted mainly on White Box trees, no reptiles were sighted under any rocks perhaps due to the overcast conditions. Two Lace Monitors (*Varanus varius*) were sighted on a White Box tree, potentially scaling it for nest foraging. A Blue-tongue Lizard (*Tiliqua scincoides*) was found as roadkill on Kia Ora Lane. No snakes or legless lizards were observed though the former are expected. It is likely that other reptiles utilise habitat near waterways, in grasslands and on man-made infrastructure. There are many isolated areas across the site where fallen tree branches, long grasses and rocky outcrops combine to provide suitable habitat for reptiles.

The searches for reptiles and amphibians were only opportunistic, and further searches would be required as part of the EIS studies. Multiple locations were georeferenced for future targeted searches proposed in early 2024, and during a cooler part of the day when the lizards are less mobile.

Amphibian habitat across the site includes waterways and dams. Trees also provide habitat for some species of frogs. Green Tree Frogs (*Litoria caerulea*) were heard during daytime in a few locations across the project site, generally calling from hollows with trees. Dams across the project site were generally poorly vegetated and lacking in floating, emergent, fringing or submerged vegetation. A large number of dams were also dry. Only one sighting of turtles (unidentified species) occurred throughout the survey, located within a dam that is proposed to be retained. A night time survey for frogs was conducted on 9th November between 9-10pm during heavy rainfall on roadways abutting the project area. Three species of frog were identified including Spotted Marsh Frog (*Limnodynastes tasmaniensis*), Eastern Banjo Frog (*Limnodynastes dumerlii*) and Peron's Tree Frog (*Litoria peronii*).



Birds

The project site has bird habitat present including woodlands and riparian zones. Birds may use both native and exotic vegetation as habitat and forage in cropped areas and farmland. However, the majority of the site is void of suitable habitat. Hollow bearing trees are distributed across the site, both in vegetation patches and as individual paddock trees, as most trees of greater maturity had hollows. There are also a number of dead trees present, most with prolific hollows. Many of the trees also had stick nests.

A wide variety of birds were observed across the proposed project site, usually coinciding with tree habitat and dams. Tree hollow size often coincided with the type of bird species present. Red-rumped parrots (*Psephotus haematonotus*) and Striated Pardalotes (*Pardalotus striatus*) were commonly observed utilising trees with small hollows, while Galahs (*Eolophus roseicapilla*) were observed nesting in slightly larger hollows. Large hollows suitable for owls were not commonly observed.

Red-rumped parrots and Galahs were recorded in numerous pairs utilising hollows of White Box trees and flying to grassland to feed. Eastern Rosellas (*Platycercus eximius*) were also commonly observed or heard flying from treetop to treetop. Australian Magpie (*Gymnorhina tibicen*) and Magpie Larks (*Grallina cyanoleuca*) were also common.

At least two Wedge-tailed Eagles (*Aquila audax*) were observed on the western portion of the project area and conversation with the land owners confirmed the eagles had been nesting on the property for some time. The nest itself was not observed, however, a couple of potential locations were recorded based on the eagles' flight patterns and it appeared they were within an area that will not be developed. These are marked in Figure 2-3. Wedge-tailed Eagle and nest with juveniles were also observed during the BTR survey in 2022 on the southeast portion of the site.

Dams often had the presence of common water birds, but generally habitat was poor around dam edges with a lack of aquatic emergent and fringing species. Australasian Grebe (*Tachybaptus novaehollandiae*) was commonly sighted in dams and a suspected Pacific Black Duck (*Anas superciliosa*) was also observed.

Regent Honeyeater, listed as Critically Endangered, has been sighted approximately 2.5km west of the project area in 2003. Due to the presence of suitable habitat, foraging species and the nearby breeding populations it is possible that the species uses the site. The Threatened Species section below provides further detail about the likelihood of Regent Honeyeater occurring on site.

Mammals

The proposed project site consists predominantly of pasture grass with some remnant tree patches, vegetated creek lines, scattered individual trees and dams. The pasture grasses provide minimal habitat for mammals, although it may be used by species passing through as protection. There is also potential for some species utilising the site for hunting. A less disturbed site on a hill in the southeast portion of the project area contained fauna markings and paths within the grasses of unknown origins. Short-beaked Echidna (*Tachyglossus aculeatus*) was observed and diggings across the properties indicate presence.

Tree hollows are common in treed areas and may be inhabited by possums, micro chiropteran bats and small mammals. These species are largely nocturnal and consequently no hollow dwelling fauna mammals were observed during the daytime site survey. Common Brushtail Possum (*Trichosurus vulpecula*) scats were found in one location. Further targeted assessment by stag watching and spotlighting in warmer seasonal conditions would be undertaken during the EIS to identify mammalian species residing in hollows.

The site is suited to large macropods such as the Eastern Grey Kangaroo (*Macropus giganteus*), Red-necked Wallabies (*Notamacropus rufogriseus*) and Wallaroos (*Osphranter robustus*). Eastern Grey Kangaroo was recorded daily across the project site during the site survey. No burrows were recorded except for rabbit burrows and some small holes in overgrown grassland which may have been from mice. Introduced mammals



observed included European Rabbit (*Oryctolagus cuniculus*) and Red Fox (*Vulpes vulpes*). Feral pigs (*Sus scrofa*) were observed in multiple locations across the project area including one dead.

Multiple species of micro chiropteran bats could be expected to utilise the project site for shelter, as a source of food and/or as a temporary stopping location when travelling between sites of preference. Watercourses may be used as flight paths and foraging grounds particularly by insectivore species. There are scattered dead trees within the project site that contain hollows which may provide some nesting opportunities for micro chiropteran bats. Due to being nocturnal no bat species were recorded during the site survey, and further acoustic and night time surveys would be undertaken during the EIS to identify any bat species present onsite.

There is generally an absence of available habitat structure within cultivated grasslands to support small ground-dwelling mammals. Some small mammals would be expected to be present using hollows and/or fringing vegetation, for example Planigales, Dunnarts and Antechinus.

2.2.4 Threatened Species

Two threatened species, Bluegrass and regent Honeyeater, have previously been recorded within 2.5km of the project area but not on the site. Neither of the two species were observed during the site survey. The site has Bluegrass habitat present and the related Queensland bluegrass (*Dichanthium sericeum*) was observed in a few different locations within the project site. Targeted searches for Bluegrass may be required to be part of detailed survey for the BDAR and BAM Calculator requirements.

Regent Honeyeater inhabits dry open forests and woodlands, particularly Box-Ironbark woodland, and riparian forests of River Sheoak (*Casuarina cunninghamiana*), and both White Box and Yellow Box for part of its key feed species. The project site has patches of suitable habitat present, however the level of disturbance is high. Considering that it is located in between the two main known breeding colonies in NSW in Capertee Valley and Bundarra-Barraba region it can be considered it is an area mapped as important habitat. The Regent Honeyeater may use the site occasionally but it is unlikely to be dependent on habitat on the site for breeding.

Little Lorikeet was sighted during the ecology surveys in 2022 (NGH 2022). This species depends on woodlands and small hollows and there is suitable habitat present throughout treed parts of the site.

Reptile species may be of particular interest, species found in the Protected Matters Search include:

- Five-clawed Worm-skink (*Anomalopus mackayi*), Vulnerable
- Pink-tailed Worm-lizard (*Aprasia parapulchella*), Vulnerable
- Grey Snake (*Hemiaspis damelii*), Endangered
- Western Sawshelled Turtle (*Myuchelys bellii*), Endangered
- Border Thick-tailed Gecko (*Uvidicolus sphyrurus*), Vulnerable

Other threatened species will be identified in BAM Calculator outputs as Candidate Species during the surveys for the EIS. Some of these are identified in Section 5.

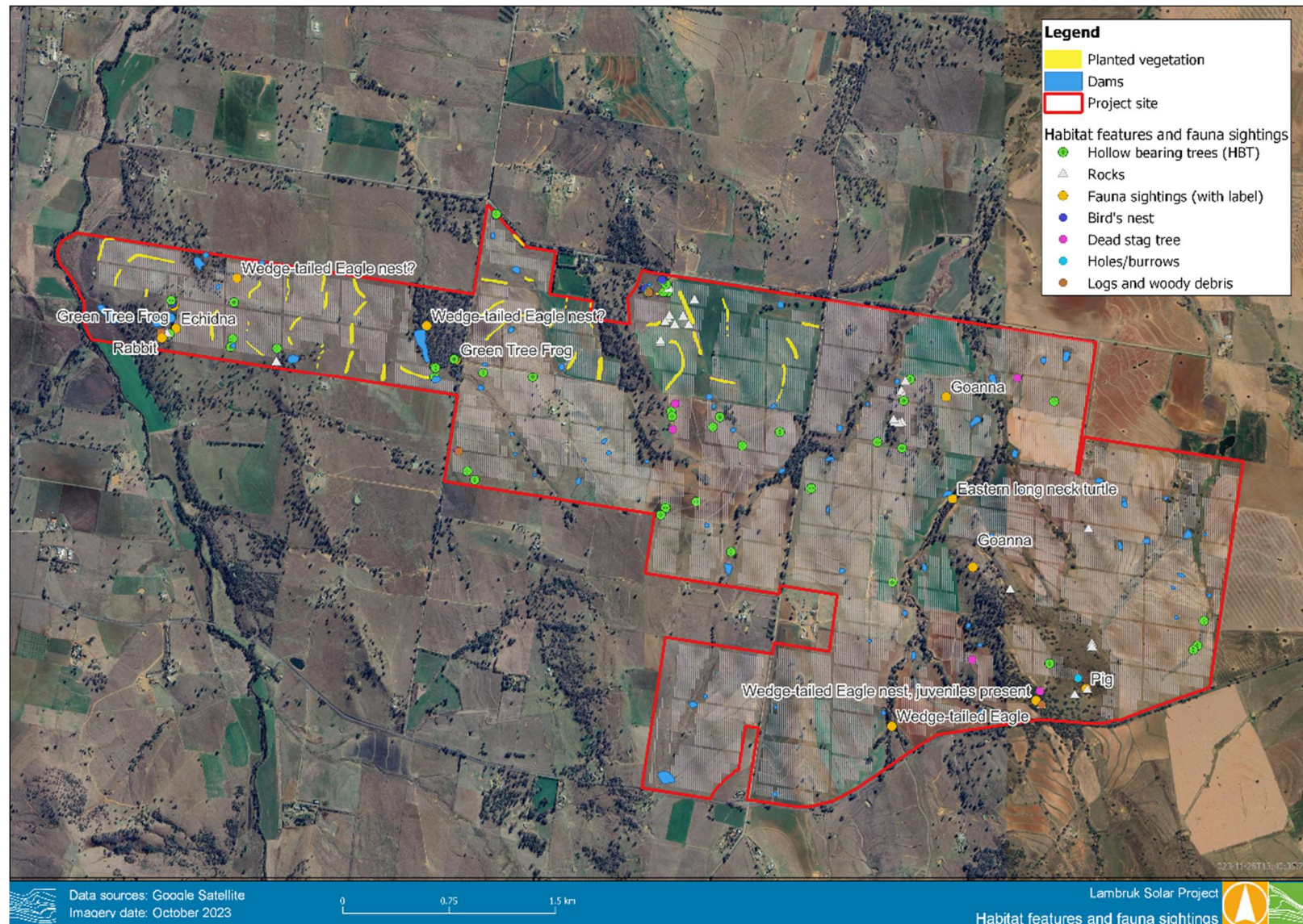


Figure 2-3 Habitat features and fauna sightings (with labels)



3 PRELIMINARY IMPACT ASSESSMENT AND MANAGEMENT

The construction of the solar project may result in some impact on PCTs of a Box Woodland character with high biodiversity value vegetation. These PCTs are associated with TECs under both the BC Act and EPBC Act as described in the desktop assessment. Due to ongoing disturbance from agriculture on the sites over a long period of time the PCTs have been altered and fragmented. Also individual trees that do not form part of PCTs or plantings carried out for biodiversity purposes have lower biodiversity value. Species rich derived grassland habitats are more a minority, with most of the grasses derived, low species richness and considered to be Category 1 Land classification. Further information of the categorisation is on order however was not available at the time this report was prepared.

Complete avoidance of PCTs may not be practicable, however larger, significant areas of the same PCT will be avoided. Individual trees should be retained where practicable, especially hollow bearing trees or trees close to other treed areas, but some paddock trees are likely to be removed. Other areas to avoid include treed creeks and drainage lines and dams exhibiting wetland habitat. Dams with high biodiversity value and which hold water year round (or close to) that cannot be avoided would be subject to ecological supervision during dam dewatering.

The proposed project development has already been adapted to avoid areas of high biodiversity value such as treed areas, creeks, and some drainage lines and dams. Venn would look for further avoidance and minimisation measures during the development of the project design and in consideration of further detailed biodiversity assessment during the EIS.

Some threatened species that appeared in database searches and one threatened species sighted onsite have potential to be impacted by habitat loss, due to the large scale of the project footprint. It is anticipated that fauna species such as birds and potentially micro chiropteran bats, reptiles and amphibians may be impacted but have mobility to be dispersed and/or relocated to adjacent habitat-areas being retained. During the EIS, habitat mapping will be undertaken and appropriate management plans and mitigation guidelines will be developed to minimise potential impacts on threatened species, should their habitat be removed. These potential impacts and their management will be analysed within the scope of the BDAR.

Loss and/or modification of habitat for reptile, bird and bat species that utilise the site is likely to occur as a result of:

- The removal of habitat including tree areas, scattered trees, grassland, rock shelters and woody debris;
- The placement of solar panels over areas that would have otherwise been freely foraged upon or as basking locations, including grasses; and
- The loss of farms dams if dewatered to accommodate project infrastructure.

To reduce native vegetation loss, some areas of habitat will be retained allowing fauna corridors along waterways such as Lambruk Creek, Goonang Creek and the upper tributaries of Spring Creek, basalt rock refugia, derived grassland and larger areas of PCT Box Woodland communities.



4 OPPORTUNITIES AND CONSTRAINTS

Based on the site survey and existing satellite imagery (Google Satellite 2023) the opportunities for development and biodiversity constraints across the project site have been identified and mapped. The results of the mapping are shown in Figure 4-1. Valuable biodiversity features include:

- Box woodlands;
- Derived grasslands;
- Some individual scattered dead stag trees;
- Creek lines with trees (mainly 3rd and 4th order Strahler but also a few 1st and 2nd order streams); and
- Dams.

The mapping of habitat features also contains some fauna sightings, rocks and HBT from the BTR surveys in 2022, however not all records were included. All habitat and fauna sighting records available will be utilised in the detailed assessments.

Not all dams have been marked for retention as some of them have a higher biodiversity value than others. All dams have not been surveyed at this stage and the recommendations regarding retention of some dams may change pending further detailed surveys.

Bands of vegetation planted for biodiversity purposes will need to be considered in the detailed assessment during the EIS to determine if biodiversity credits would be generated.

All areas that are not identified as a biodiversity constraint can be used for the installation of solar panels without significant risk of impacts on biodiversity. Any removal of native vegetation as a consequence of solar panel installation would be subject to offsetting as identified in the BDAR.

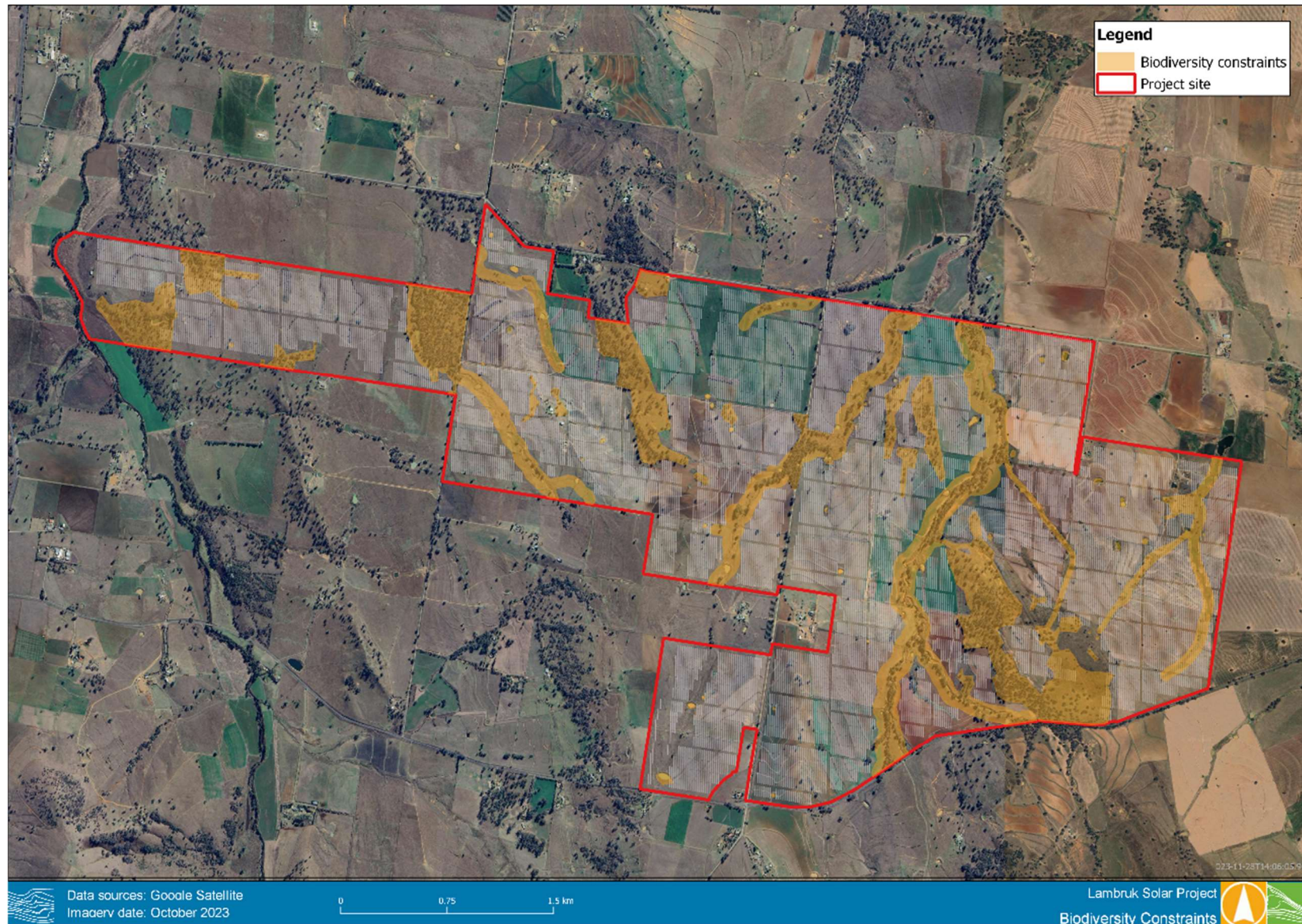


Figure 4-1 Biodiversity constraints as confirmed by site visit.



5 LIMITATIONS AND NEED FOR FURTHER ASSESSMENT

The majority of the site was accessed during the surveys so that sections of the vegetation could be assessed against other supplied mapping. However, as the site is very large not all areas could be assessed in detail and they may have some variation in both PCT and condition. Access to some areas were also restricted due to ground conditions and weather. The entire project area would be surveyed during the EIS to verify PCTs and vegetation cover onsite. However, the vegetation is expected to be similar to that of the surrounding areas.

Further detailed assessment including BAM Plots are required across the project site to assess both areas that are proposed for removal and those areas that are suitable for biodiversity conservation and preservation. In addition, it is important to determine what impacts occur on areas that may be indirectly impacted for the placement of infrastructure. As the project necessitates the removal of native vegetation is anticipated to be greater than 1.0 ha, and numerous scattered paddock trees will require removal, thus it is expected that a BDAR will be required via application of the BAM and BOS.

The Local Land Services (LLS) Native Vegetation Regulatory Map (NVR) was not included as part of this assessment as it is still in a draft stage and was not available at the time of reporting. This will be included as part of the EIS biodiversity assessment and will help determine the level of effort required for assessment.

Category 1 Land will be exempt from the BDAR but must be considered in the prescribed impacts if it provides habitat for threatened species. Grasslands assessed as Category 1 land need to be assessed by desktop and aerial photography to ensure they do not qualify for offsetting if in natural condition. Derived native grasslands may form part of the TECs associated with Box woodland. The November field survey identified a poor-quality representation with low species richness in the ground cover stratum for most of the project area. Further ground truthing in areas not yet accessed are required for confirmation. Uncropped drainage areas may provide some resemblance to original PCT's.

Scattered, isolated trees provide some habitat for arboreal species and stick nests were observed, indicating some use of trees for breeding. These features need to be assessed as habitat for threatened species, including dead stags. There is some potential for threatened birds and bats to utilise tree hollows. Many of the trees likely to be removed, predominantly scattered paddock trees, and some trees for retention were assessed during the scoping study, however due to the size of the area a number of trees still require assessment.

Targeted species surveys are required to be undertaken for threatened species identified as having potential to utilise the site. These have been identified from BioNet searches, an EPBC Protected Matters Search and onsite sightings. This includes surveys on Category 1 land as this may provide habitat for threatened species such as Bluegrass and potentially threatened reptile species. Any recently or historically cropped areas are not likely to require assessment. Although a large proportion of the site is heavily modified as a result of agricultural use, there is potentially habitat present for threatened species that have been able to adapt to derived and grazing areas. By mapping habitat accurately and performing targeted species surveys to determine their presence, information can be collected about the presence/absence of these species and determine prescribed impacts.

Not all dams were assessed in the scoping study and further biodiversity assessment of dams is required. In their current state they do not provide optimum habitat but they must be considered as potential habitat for some species. Similarly, all areas of planted vegetation for the purpose of biodiversity require detailed assessment under the BOS.

Seasonal surveys for other threatened fauna will be determined by the potential presence of their habitat and associated survey requirements and seasonal timing. Threatened species surveys at correct timing are likely to be required to inform the EIS. Targeted species surveys in appropriate seasons during flowering events for threatened flora are also required to be undertaken to determine their occurrence on the site. Multiple surveys may be necessary to cover the flowering period of threatened flora species. Species that are derived from the



BAM Calculator of the proposed project disturbance areas will be required to meet the seasonal survey requirements of the BC Act 2016 and BAM (2020). This is especially if flora or fauna is presumed to be present, in which case the mapping of the habitat requires polygons and shape files. Some candidate species can be assumed to be present, and this will be calculated within the BAM assessment as part of the BDAR process. Polygons of species assumptions will be a requirement of the BDAR.

Future targeted species survey requirements

This list is not complete, other species may come up in candidate species during the input of data into the BAM Calculator.

Mammals

- Threatened micro-chiropteran bat species with the use of songmeters set up in potential habitat areas that are being retained (woodland) and those being removed (scattered paddock trees, edge of forested areas and dams). Species that may be generated include:
 - -Large Bent-wing bat (*Miniopterus orianae oceanensis*)

Other mammals:

- Koala (*Phascolarctos cinereus*) which may utilise connected vegetation such as creek and drainage corridors. These can be assessed year-round. Some preferred feeding trees are present on the project site. No evidence of their presence was detected in November 2023 field visits
- Eastern Pygmy-possum (*Cercartetus nanus*). Assessed from October-March, probably low habitat value onsite.
- Squirrel Glider (*Petaurus norfolcensis*) Can be assessed all year. These are potentially present where vegetation is connected, particularly along water courses and abutting the Duri-Dungowan Road.

Threatened grassland species

- (Bluegrass) assessment period early November-May
- Finger Panic Grass (*Digitaria porrecta*) associated with Kangaroo Grass so may need further targeted surveys if these areas are to be removed. The window of opportunity for these assessments is January-February.

Amphibians and reptiles

- Booroolong Frog (*Litoria booroolongensis*) assessment October-December. This species has potential along the stream zone of creek lines of which all are proposed to be avoided. However, it may be one species that is subject to prescribed disturbance, particularly where Kia Ora Lane is bisected.
- Pink-tailed Legless Lizard (*Aprasia parapulchella*) Potential in areas with scattered rocks and cracking clays. This species should be assessed for from September-November.
- Border Thick-tailed Gecko (*Uvidicolus sphyrurus*) Stone piles and rocky areas across the site provide some potential habitat for this species. As there is a likelihood of some disturbance to habitat for this species it requires targeted species assessment sometime in the months from November-March.

Birds

Various bird species are associated with White Box Woodland and these would require assessment to ascertain prescribed impacts. Some specific species include:

- Bush Stone-curlew (*Burhinus grallarius*) probably unlikely to occur due to current disturbed conditions (year round assessment)



- Gang-gang Cockatoo (*Callocephalon fimbriatum*) October-January. Some habitat potential in woodlands and along creek lines.
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*) associated with large tree hollows and *Allocasuarina* spp. This species can be assessed January to December.



6 MANAGEMENT RECOMMENDATIONS

The construction and operation of the solar project will be managed to minimise disturbance to biodiversity values and where practical, significantly sized areas of high biodiversity value vegetation will be avoided. The primary objective is to avoid impact on biodiversity features, and where impacts cannot be avoided, they should be minimised and mitigated to the degree possible. Any removal of native vegetation in excess of the trigger will require assessment under the BOS and appropriate mitigation and losses to be offset.

6.1 Construction Phase

During habitat removal, fauna spotters will be required to carry out a pre-clearance inspection and be present on site to retrieve/relocate fauna. Tree removal (and more generally habitat removal) will occur where possible outside the spring breeding season. It is expected that most fauna species will disperse from the area during construction and require an alternative source of habitat. Therefore, consideration of designated relocation areas and their protection should be considered as a requirement of the mitigation of construction impacts.

There is potential also that the introduction of weed species will result from disturbances to the development area. Standard weed management practices will be adopted and will be outlined in the EIS which will recommend a pro-active weed management plan. A pest management plan is also recommended for feral animal control.

Animal strike as a result of increased traffic (particularly dusk and dawn) as workers arrive and depart during construction is another potential impact. Fauna such as Wombats, Possums, large macropods and nocturnal birds may be impacted as a result of increased vehicular movements to and from the proposed project development.

6.2 Operational Phase

The ongoing operation of the solar project is not likely to cause a significantly greater disruption to fauna species than is already caused by the operation of the existing farming practices. However, as predatory animal and weedy plant species (both native and pests) are at risk of increase as a result of the disturbances caused by the solar project, considerable effort will be required to keep pests and weeds under control. Factors such as the use of lights can attract native fauna and increase the risk of their predation. Therefore, auxiliary lighting should be minimised, and not projected onto areas of fauna habitat.

Artificial nest boxes are one alternative to reduce the impact of hollows lost during tree removal. These would be most effective on the edges of existing retained vegetation where there is a lack of hollows (e.g. riparian areas where hollows haven't established). When appropriately designed artificial nest boxes can provide a substitute for hollows but do require ongoing maintenance, preventing establishment of exotic species and bees. A more permanent management option would be to include native species in planting of screening vegetation to provide habitat for birds via a corridor. This could also include planting the same tree and shrub species as those proposed to be removed (particularly White Box) to ensure these tree species persist on the site.

Weed and pest monitoring and control will form part of the recommendations of the weed and pest management plan.



7 REFERENCES

DCCEEW (2023) EPBC Protected Matters Search Tool [Online tool] Accessed 22/11/2023. Available at:

<https://pmst.awe.gov.au/#/map?lng=131.52832031250003&lat=-28.6905876542507&zoom=5&baseLayers=Imagery>

DPE (2022) Streamlined assessment module planted native vegetation Biodiversity Assessment Method operational manual. Department of Planning and Environment. State of NSW and Department of Planning and Environment. December 2022

DPE (2022b) Large-Scale Solar Energy Guideline Department of Planning and Environment. State of NSW and Department of Planning and Environment. August 2022

DPIE (2020) Biodiversity Assessment Method State of NSW and Department of Planning, Industry and Environment. October 2020

NGH (2022). Biodiversity Technical Report.

NSW DPE (2023) Biodiversity Values Map [Online tool] Accessed 13/10/23. Available at:

<https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap>

NSW DPE (2023) State Vegetation Type Map [Online tool] Accessed 21/11/2023. Available at:

<https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map>

NSW OEH (2023) BioNet Vegetation Classification [Online tool] Accessed 20/11/2023. Available at:

<https://www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx>

NSW OEH (2023) BioNet Atlas of NSW Wildlife [Online tool] Accessed 23/11/2023. Available at:

https://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_AtlasSearch.aspx

NSW OEH (2023) Threatened biodiversity profile search [Online tool] Accessed 23/11/2023. Available at:

<https://www.environment.nsw.gov.au/threatenedspeciesapp/>

NSW DPI (2023) Key Fish Habitat Mapping [Online tool] Accessed 22/11/2023. Available at:

https://webmap.industry.nsw.gov.au/Html5Viewer/index.html?viewer=Fisheries_Data_Portal

NSW Sixmaps (2023) Spatial area tool. [Online tool] Accessed 20/11/2023. Available at:

<https://maps.six.nsw.gov.au/>

NSW DPE (2023) NSW Planning Portal. [Online tool] Accessed 20/11/2023. Available at:

<https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address>



APPENDIX A DESKTOP ASSESSMENT - MAPPING



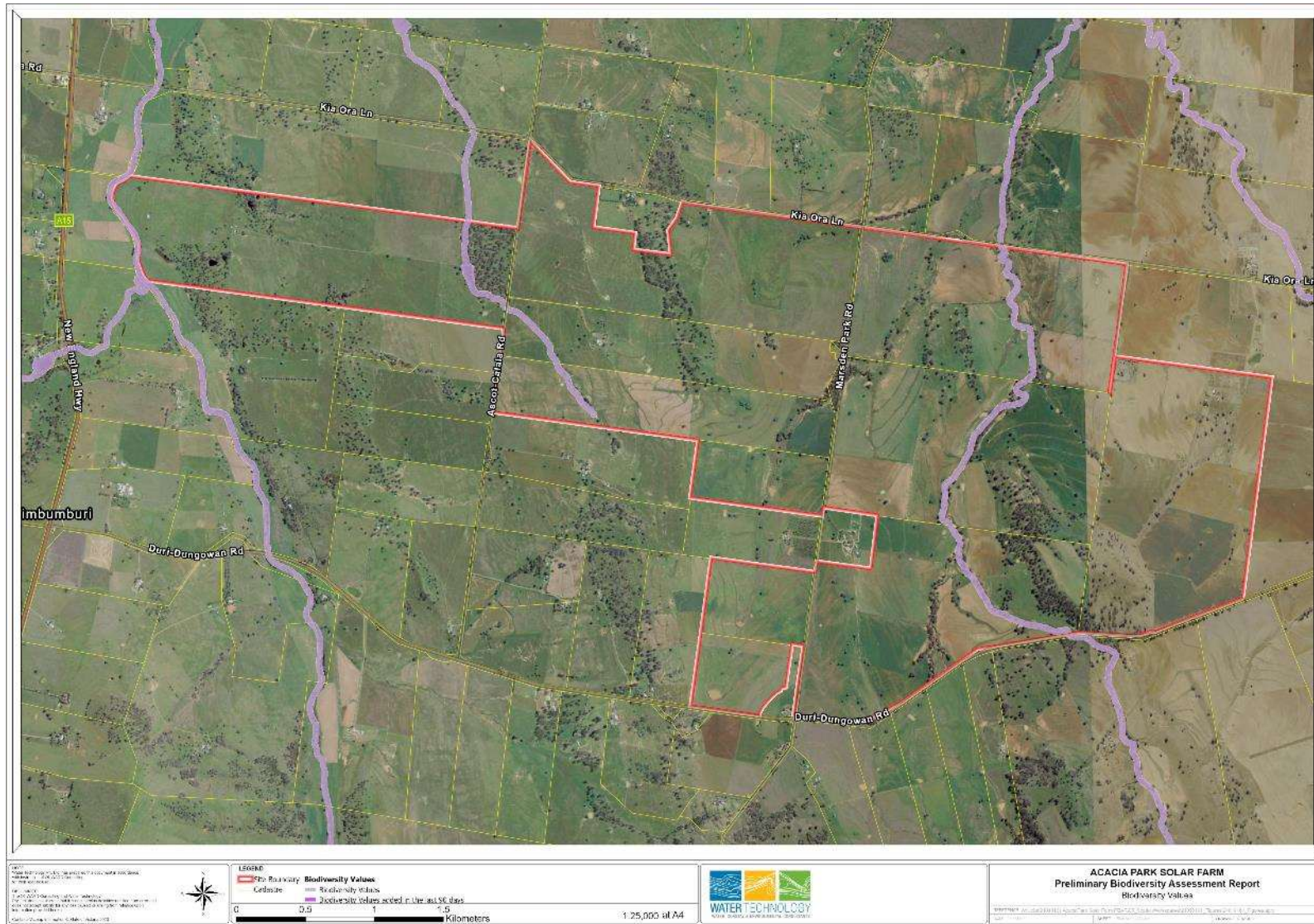


Figure 7-1 Biodiversity Values mapping

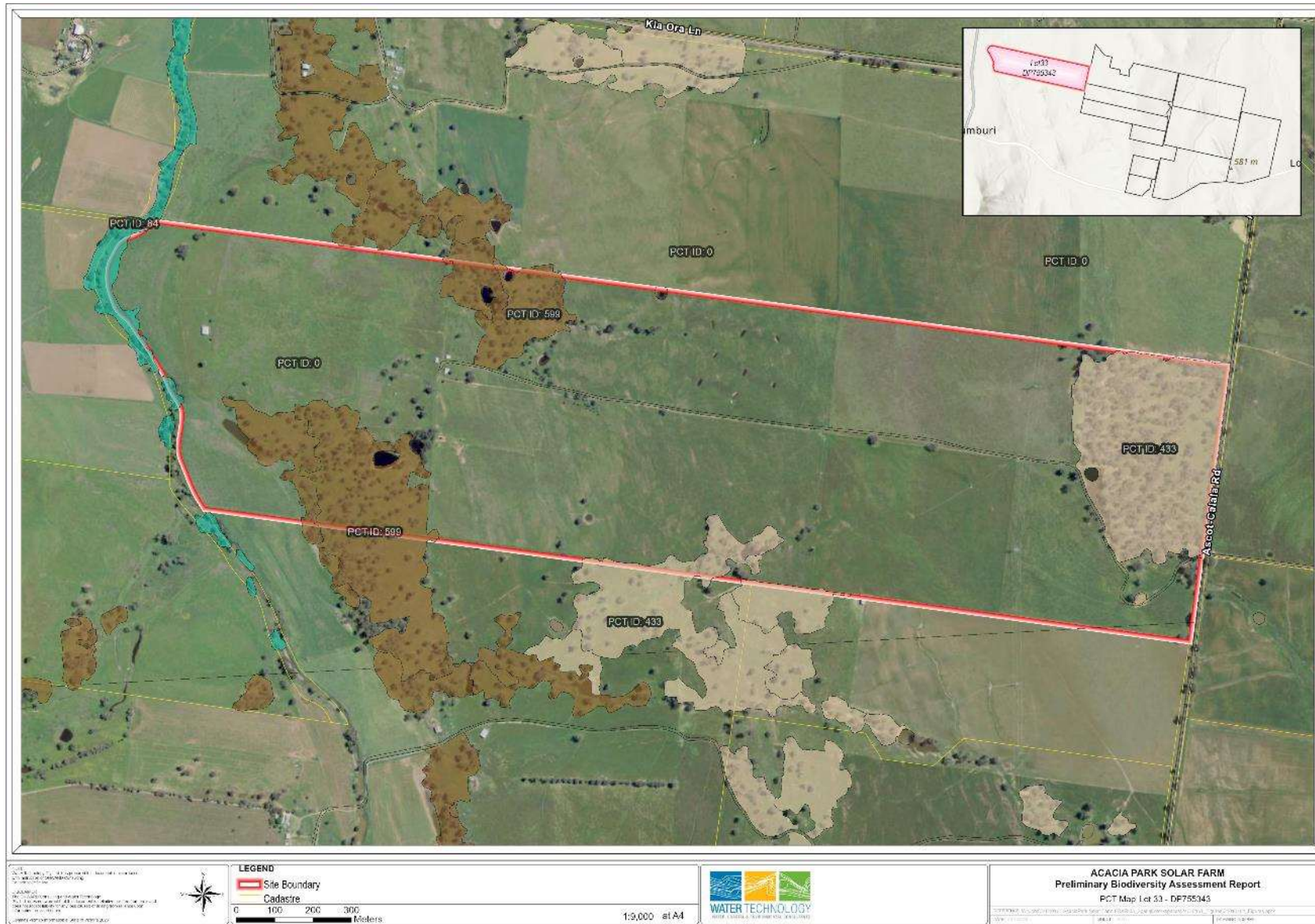


Figure 7-2 PCT mapping (1 of 5)

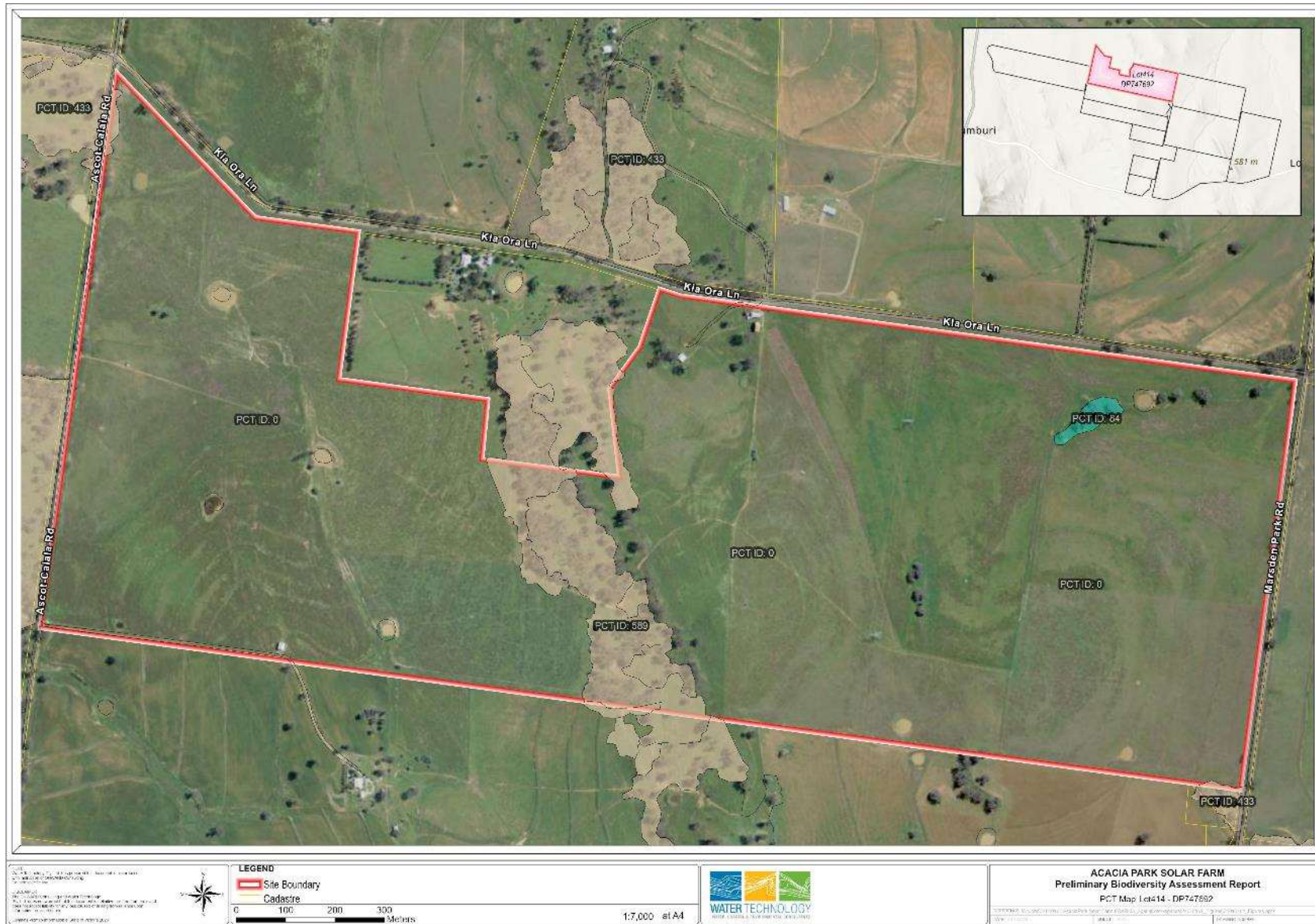


Figure 7-3 PCT mapping (2 of 5)

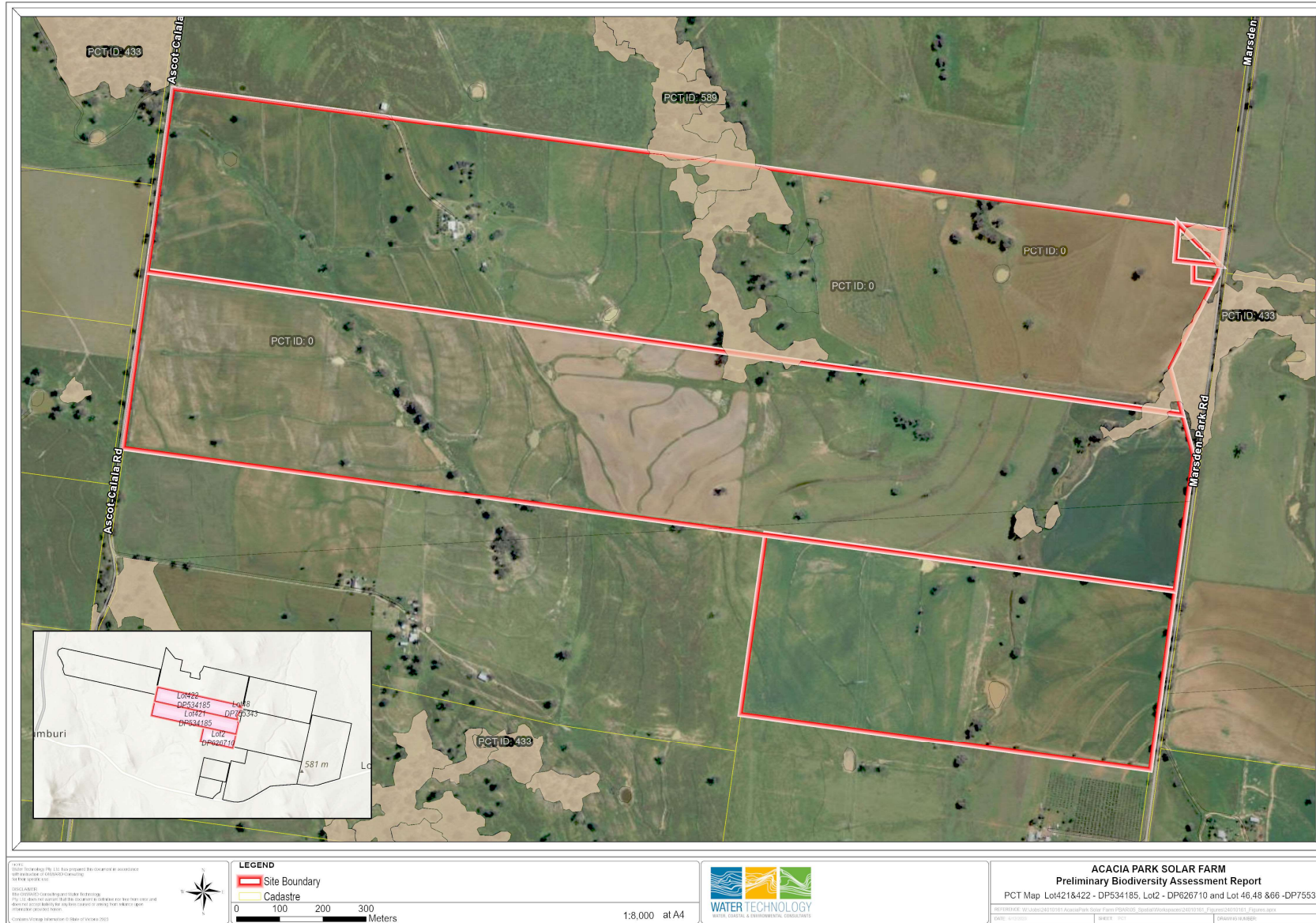


Figure 7-4 PCT mapping (3 of 5)

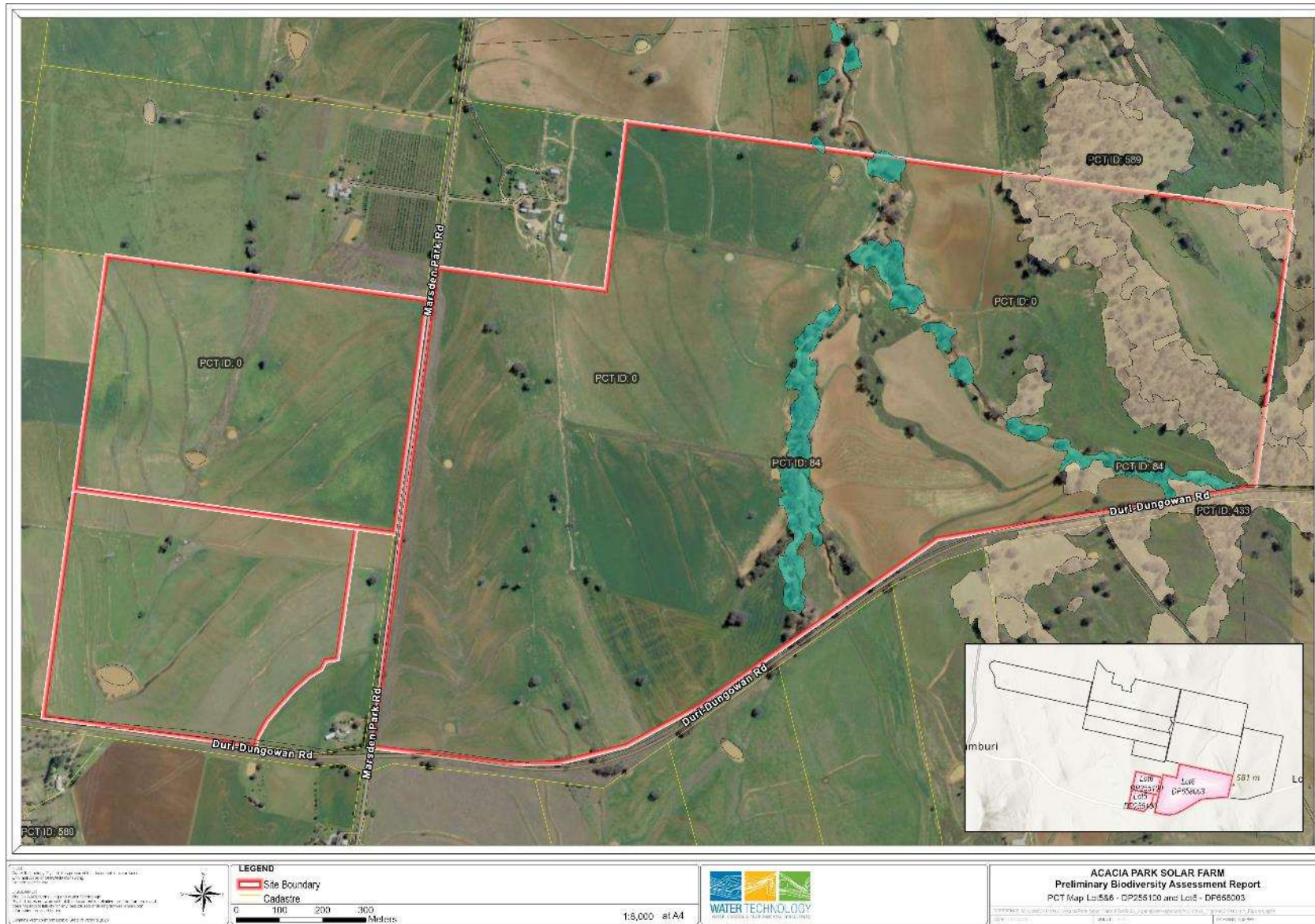


Figure 7-5 PCT mapping (4 of 5)

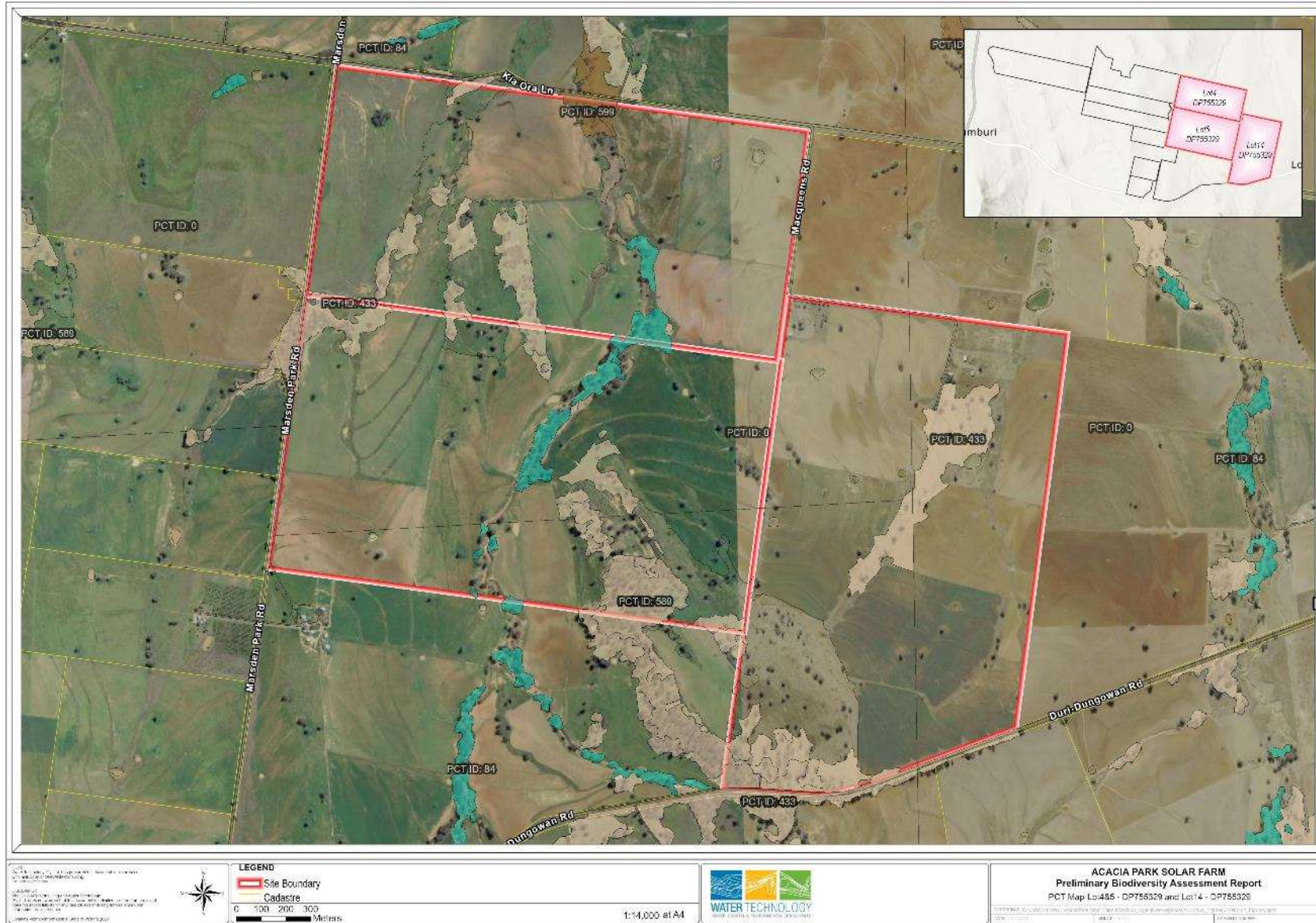


Figure 7-6 PCT mapping (5 of 5)



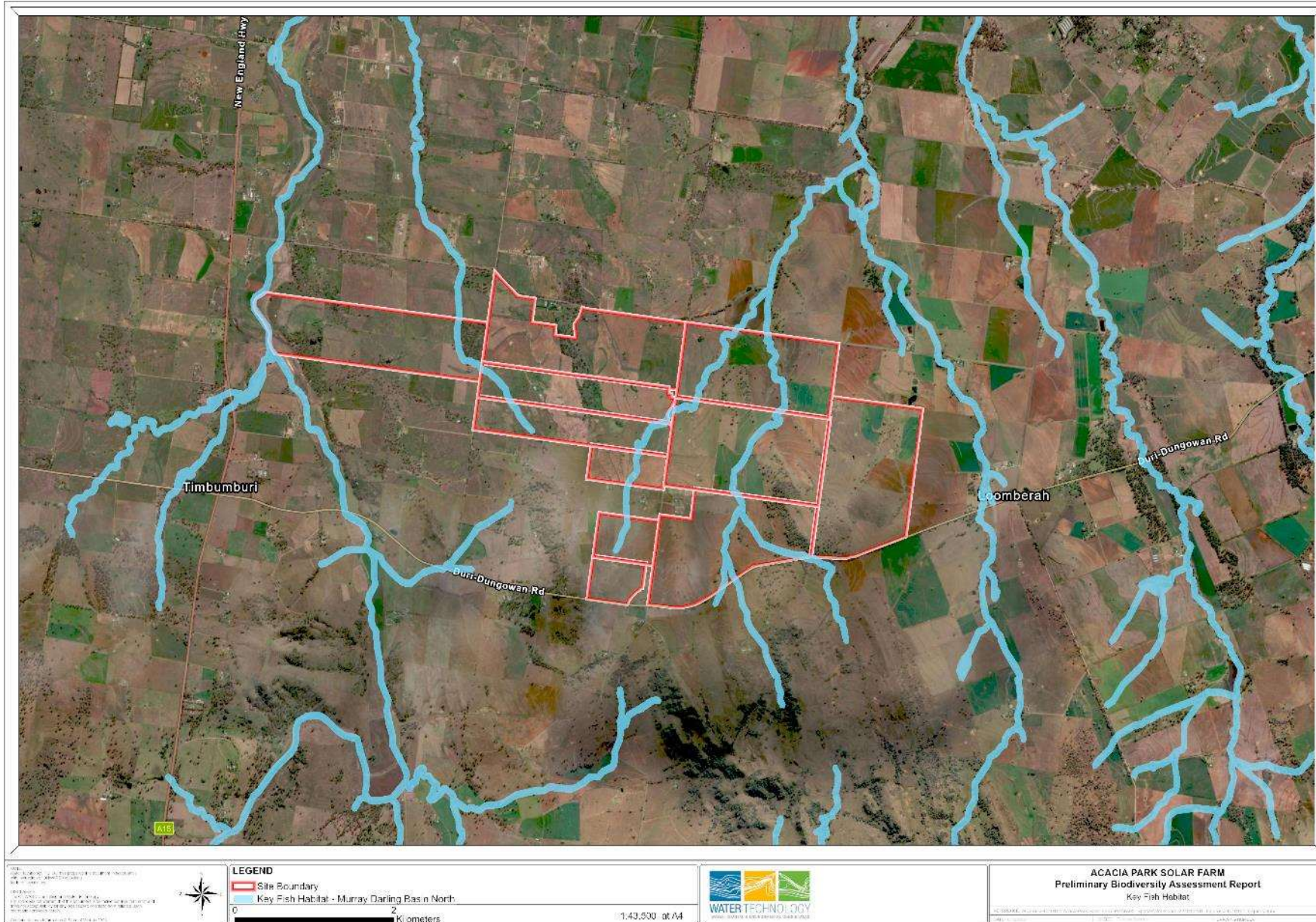


Figure 7-8 Key Fish Habitat Mapping

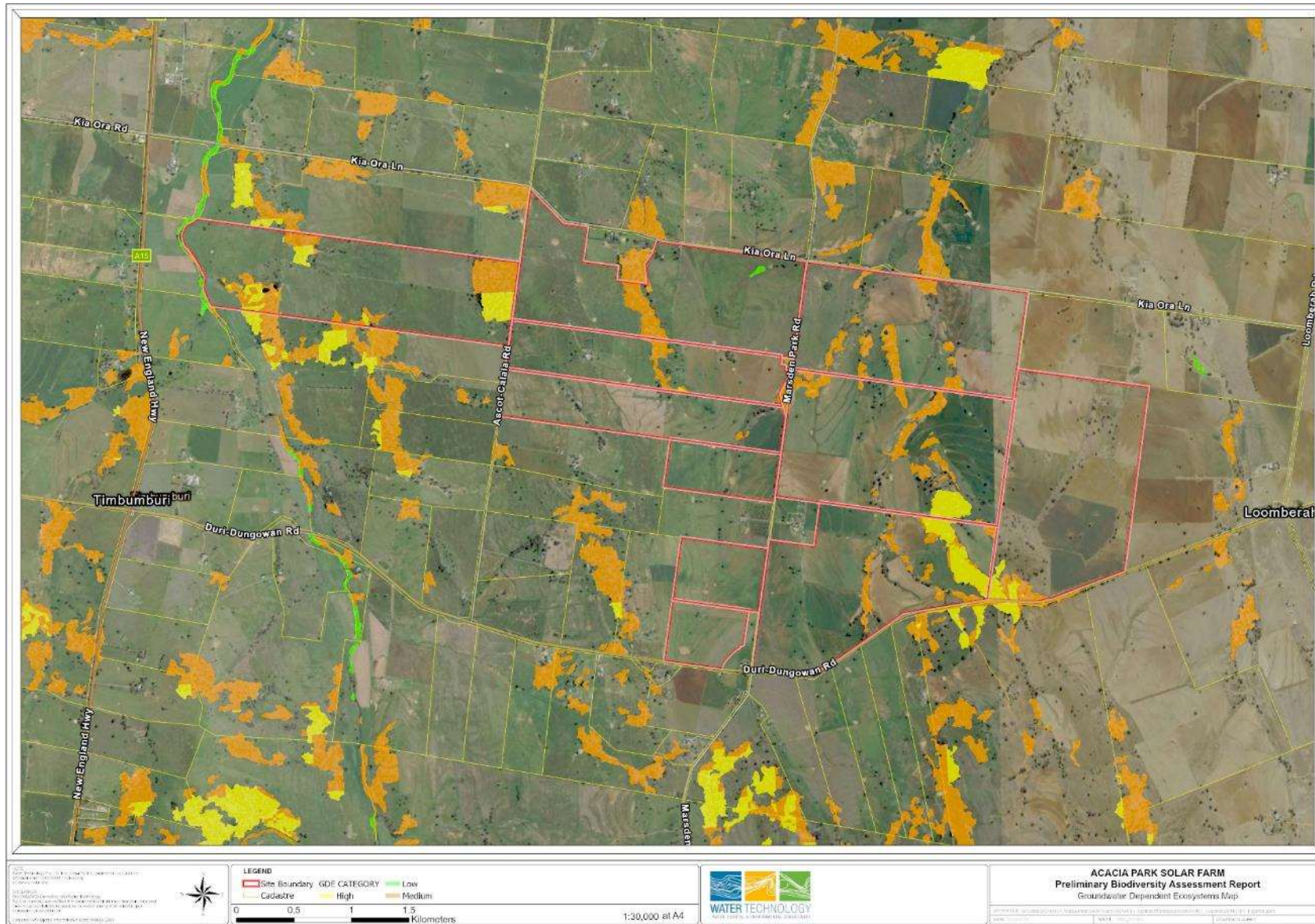


Figure 7-9 Groundwater Dependent Ecosystems mapping (Commonwealth DCCEEW)





APPENDIX B PROTECTED MATTERS SEARCH





Australian Government

Department of Climate Change, Energy,
the Environment and Water

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: 22-Nov-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	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	45
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:	21
Commonwealth Heritage Places:	None
Listed Marine Species:	19
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:	None
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	9
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	1000 - 1100km upstream from Ramsar site	In feature area
Riverland	900 - 1000km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	1100 - 1200km 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
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area	In feature area
New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands	Critically Endangered	Community may occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community may 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			
Anthochaera phrygia			
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely 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
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely 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
Erythroriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In buffer area only
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 likely 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 likely 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat may occur within area	In feature area
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			
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In feature area
FROG			
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat known to occur within area	In feature area
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat likely 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
Notamacropus parma Parma Wallaby [89289]	Vulnerable	Species or species habitat may occur within area	In buffer area only
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
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may 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 known to occur within area	In feature area
PLANT			
Acacia pubifolia Velvet Wattle [19799]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Callistemon pungens [55581]	Vulnerable	Species or species habitat may occur within area	In feature area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eucalyptus nicholii Narrow-leaved Peppermint, Narrow-leaved Black Peppermint [20992]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium monoplacoides Winged Pepper-cress [9190]	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 feature area
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 feature area
REPTILE			
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat may occur within area	In feature area
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat may occur within area	In feature area
Myuchelys bellii Western Sawshelled Turtle [86075]	Endangered	Species or species habitat may occur within area	In buffer area only
Uvidicolus sphyrurus Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat known to 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
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely 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 may 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
Commonwealth Bank of Australia		

Commonwealth Land - Commonwealth Bank of Australia [12980]	NSW	In buffer area only
--	-----	---------------------

Commonwealth Trading Bank of Australia

Commonwealth Land - Commonwealth Trading Bank of Australia [16080]	NSW	In buffer area only
--	-----	---------------------

Communications, Information Technology and the Arts - Telstra Corporation Limited

Commonwealth Land - Australian Telecommunications Commission [12950]	NSW	In buffer area only
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Commonwealth Land - Telstra Corporation Limited [15957]	NSW	In buffer area only
---	-----	---------------------

Defence

Commonwealth Land - Defence Service Homes Corporation [12951]	NSW	In buffer area only
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Commonwealth Land - Defence Service Homes Corporation [12979]	NSW	In buffer area only
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Commonwealth Land - Director of Defence Service Homes [12978]	NSW	In buffer area only
---	-----	---------------------

Defence - Defence Housing Authority

Commonwealth Land - Defence Housing Authority [16101]	NSW	In buffer area only
---	-----	---------------------

Commonwealth Land - Defence Housing Authority [16070]	NSW	In buffer area only
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Commonwealth Land - Defence Housing Authority [16103]	NSW	In buffer area only
---	-----	---------------------

Commonwealth Land - Defence Housing Authority [12976]	NSW	In buffer area only
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Commonwealth Land - Defence Housing Authority [16100]	NSW	In buffer area only
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Commonwealth Land - Defence Housing Authority [16158]	NSW	In buffer area only
---	-----	---------------------

Commonwealth Land - Defence Housing Authority [15427]	NSW	In buffer area only
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Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Defence Housing Authority [15429]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16102]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [12981]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [12977]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [16069]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [15428]	NSW	In buffer area only
Commonwealth Land - Director of War Service Homes [12974]	NSW	In buffer area only

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
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 likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely 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 likely 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 likely 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
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely 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

Regional Forest Agreements
[[Resource Information](#)]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
North East NSW RFA	New South Wales	In buffer area only

EPBC Act Referrals [Resource Information]				
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Chaffey Dam Pipeline Project	2022/09314		Completed	In buffer area only
Dungowan Dam Project	2020/8655		Assessment	In buffer area only

Controlled action				
One Tree Hill Estate - Stage 13	2003/1142	Controlled Action	Post-Approval	In feature area
Operation of Peel River Drought Protection Works	2019/8590	Controlled Action	Post-Approval	In buffer area only

Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV,	2015/7522	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
sthrn two thirds of Australia				
Replacement Pipeline between Dungowan Village and Calala	2021/9091	Not Controlled Action	Completed	In buffer area only
Residential Development & Assoc Infrastructure 31 & 41 Panorama Road	2005/2115	Not Controlled Action	Completed	In feature area
Residential Subdivision, Warramunga Avenue	2005/2201	Not Controlled Action	Completed	In buffer area only
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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APPENDIX C SPECIES LISTS





Table 7-1 Commonly observed flora species within the project area

Scientific Name	Common Name
NATIVE SPECIES	
Canopy Species	
<i>Angophora floribunda</i>	Rough-barked Apple
<i>Brachychiton populneus</i>	Kurrajong
<i>Eucalyptus albens</i>	White Box
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark
<i>Eucalyptus melliodora</i>	Yellow Box
Midstorey Species	
<i>Maireana</i> spp.	Bluebush
Groundcover Species	
<i>Aristida</i> spp.	Wire grasses
<i>Arthropodium strictum</i>	Chocolate Lily
<i>Austrodanthonia</i> spp.	Wallaby Grass
<i>Austrostipa aristiglumis</i>	Plains Grass
<i>Austrostipa bigeniculata</i>	Yanganbil
<i>Austrostipa</i> spp.	Spear grass
<i>Cheilanthes austrotenuifolia</i>	Rock Fern
<i>Chrysocephalum semipapposum</i>	Clustered Everlasting
<i>Cynodon dactylon</i>	Couch Grass
<i>Dichanthium sericeum</i>	Queensland bluegrass
<i>Dichondra repens</i>	Kidney Weed
<i>Einadia nutans</i>	Climbing Saltbush
<i>Elymus scaber</i>	Common Wheat Grass
<i>Eragrostis infecunda</i>	Cane Grass
<i>Euchiton sphaericus</i>	Cudweed
<i>Glycine latrobeana</i>	Clover Glycine
<i>Goodenia ovata</i>	Hop Goodenia
<i>Juncus</i> spp.	Rushes
<i>Lachnagrostis filiformis</i>	Blown Grass
<i>Lomandra</i> spp.	Lomandra
<i>Malva</i> spp.	Mallow
<i>Marrubium vulgare</i>	Horehound
<i>Poa labillardieri</i>	Common Tussock Grass



Scientific Name	Common Name
<i>Sida rhombifolia</i>	Arrowleaf sida
<i>Themeda triandra</i>	Kangaroo Grass
<i>Trifolium campestre</i>	Hop clover
<i>Wahlenbergia stricta</i>	Australian Bluebell
Other	
<i>Amyema</i> spp.	Mistletoe
EXOTIC SPECIES	
Canopy Species	
<i>Schinus molle</i>	Peppercorn
Midstorey Species	
<i>Lycium ferocissimum</i>	African Box Thorn
<i>Opuntia</i> spp.	Prickly Pear
Groundcover species	
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass
<i>Avena fatua</i>	Wild Oat
<i>Bromus diandrus</i>	Brome grass
<i>Bromus hordeaceus</i>	Soft Brome
<i>Carthamus lanatus</i>	Saffron Thistle
<i>Centaurea solstitialis</i>	St Barnaby's Thistle
<i>Cirsium vulgare</i>	Spear Thistle
<i>Echium plantagineum</i>	Paterson's Curse
<i>Hypericum perforatum</i>	St John's Wort
<i>Lolium rigidum</i>	Rye Grass
<i>Onopordum acanthium</i>	Scotch Thistle
<i>Paspalum</i> spp.	Paspalum
<i>Silybum marianum</i>	Variegated Thistle
<i>Verbena bonariensis</i>	Purpletop
<i>Artemisia</i> spp.	Sagebush
<i>Rumex</i> spp.	Sorrel
<i>Briza</i> spp.	Quaking Grass



Scientific Name	Common Name
<i>Anas superciliosa</i>	Pacific Black Duck
<i>Aquila audax</i>	Wedge-tailed Eagles
<i>Cherax destructor</i>	Yabbie
<i>Cryptoblepharus pulcher</i>	Elegant Snake-eyed Skink
<i>Eolophus roseicapilla</i>	Galahs
<i>Grallina cyanoleuca</i>	Magpie Larks
<i>Gymnorhina tibicen</i>	Australian Magpie
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog
<i>Litoria caerulea</i>	Green Tree Frogs
<i>Litoria peronii</i>	Peron's Tree Frog
<i>Limnodynastes dumerlii</i>	Eastern Banjo Frog
<i>Macropus giganteus</i>	Eastern Grey Kangaroo
<i>Oryctolagus cuniculus</i>	European Rabbit
<i>Pardalotus striatus</i>	Striated Pardalotes
<i>Platycercus eximius</i>	Eastern Rosellas
<i>Psephotus haematonotus</i>	Red-rumped parrots
<i>Rhipidura leucophrys</i>	Willie Wagtail
<i>Sus scrofa</i>	Feral pigs*
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna
<i>Tiliqua scincoides</i>	Blue-tongue Lizard
<i>Trichosurus vulpecula</i>	Common Brushtail Possum (scats)
<i>Vulpes vulpes</i>	Red Fox*

Table 7-2 Fauna species observed opportunistically within the project area

*Introduced species

Melbourne

15 Business Park Drive
Notting Hill VIC 3168
Telephone (03) 8526 0800

Sydney

Suite 3, Level 1, 20 Wentworth Street
Parramatta NSW 2150
Telephone (02) 9354 0300

Brisbane

Level 5, 43 Peel Street
South Brisbane QLD 4101
Telephone (07) 3105 1460

Adelaide

1/198 Greenhill Road
Eastwood SA 5063
Telephone (08) 8378 8000

Perth

Ground Floor, 430 Roberts Road
Subiaco WA 6008
Telephone (08) 6555 0105

New Zealand

7/3 Empire Street
Cambridge New Zealand 3434
Telephone +64 27 777 0989

Wangaratta

First Floor, 40 Rowan Street
Wangaratta VIC 3677
Telephone (03) 5721 2650

Geelong

51 Little Fyans Street
Geelong VIC 3220
Telephone (03) 8526 0800

Wimmera

597 Joel South Road
Stawell VIC 3380
Telephone 0438 510 240

Gold Coast

Suite 37, Level 4, 194 Varsity Parade
Varsity Lakes QLD 4227
Telephone (07) 5676 7602

watertech.com.au



Appendix C Preliminary Landscape and Visual Impact Assessment



**PETER HAACK
CONSULTING**



Lambruk Solar Project

Landscape and Visual Impact - Preliminary Assessment Report

15th January 2024

THIS REPORT HAS BEEN PREPARED FOR ONWARD CONSULTING ON
BEHALF OF VENN ENERGY PTY LTD.

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Quality Assurance

File Name	Version	Version Date	Details	Reviewed and Approved	
20240115_Lambruk SF_PLVIA FINAL	FINAL	15 th January 2024	For issue	Peter Haack Josie Alvaro	 

1 INTRODUCTION

The Proponent, Venn Arbitir Group (Venn), plans to develop a solar farm, the Lambruk Solar Project (the Project), at Loomberah, New South Wales.

The rural locality of Loomberah is approximately 15 kilometres (km) south of Tamworth (refer to **Figure 1**).

The Project Site is comprised of a contiguous area of approximately 1,523 hectares (ha) and involves the construction approximately 850,000 photovoltaic (PV) modules and associated infrastructure including inverters, substations, switchyards and new overhead transmission lines.

This report has been prepared by Peter Haack Consulting to provide a preliminary landscape and visual impact assessment (PLVIA) for inclusion in the Project's Scoping Report to facilitate the issue of Secretary's environmental assessment requirements (SEARs).

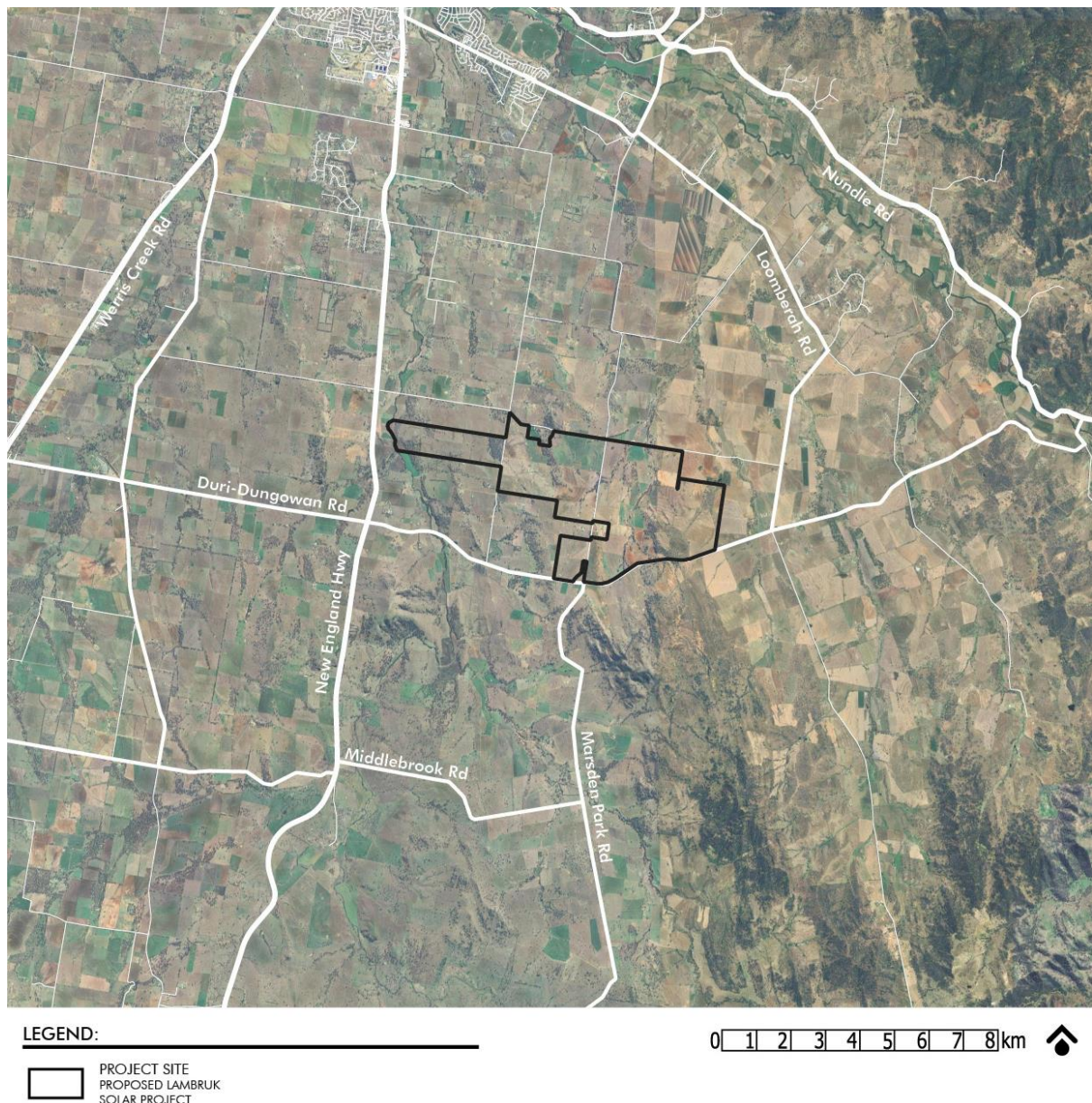


Figure 1 - Project location (Source: Google Maps).

2 METHODOLOGY

This preliminary assessment report considers how the proposed components of the Project may impact on surrounding visually sensitive receptors. Additionally, it provides guidance on the potential placement of Project components to reduce potential visual impacts.

The methodology, as outlined below, only relates to tasks required to be undertaken at the Preliminary assessment stage.

2.1 Approach

The approach utilises a quantitative study methodology in accordance with the Department of Planning and Environment's (DPE) Technical Supplement - Landscape and Visual Impact Assessment Large- Scale Solar Energy Guideline (August 2022) (the Guideline).

The PLVIA also includes a high-level assessment of the existing landscape character, scenic quality and visibility of the Project.

Visual influence zones have been established from viewpoints and sensitive receptors and assessed against visual performance objectives outlined in the Guideline.

The following methodology components from the Guideline, as well as other best practice methodologies, were included as part of this preliminary assessment:

- Review the Project with regard to potential visual prominence, or magnitude, based on an assessment of the vertical and horizontal field of view occupied.
- Characterise of the existing landscape character through the identification of landscape character zones.
- Define the scenic quality of the landscape.
- Define potential night-lighting impacts.
- Propose initial visual impact mitigation and management measures.

2.1.1 Vertical and horizontal field of view

This tool is designed to identify sensitive viewpoints that require further assessment but to eliminate viewpoints that are likely to experience very low impacts. This is based on the vertical and horizontal field of view that a development is likely to occupy when viewed from each viewpoint and is influenced by distance, the height and width of a project, and elevation changes (refer to **Table 1**).

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

Table 1 – Preliminary assessment tool (Source: DPE).

2.1.2 Visual sensitivity

Visual sensitivity is a measure of how critically a change to the existing environment would be viewed from various land uses. Different activities have different sensitivity levels. For example, tourists on holiday would generally view changes to a landscape more critically than industrial workers in the same area. Similarly, individuals would view changes to the visual setting of their homes more critically than changes to the broader area in which they travel or work (refer to **Table 2**).

As the distance increases from a proposed development to a sensitive land use area, the level of viewer sensitivity decreases based on a perceptual dis-association based on a reduction in relative proximity.



Viewpoint type	Very low viewpoint sensitivity	Low viewpoint sensitivity	Moderate viewpoint sensitivity	High viewpoint sensitivity
Residential	No place of residence present	Secondary view from dwellings in rural areas (zoned RU1, RU2, RU3, RU4 and RU6), large lot residential areas (zoned R5) and in environmental or conservation areas (zoned C2, C3 and C4)	Primary view from dwellings in rural areas (zoned RU1, RU2, RU3, RU4 and RU6), large lot residential areas (zoned R5) and in environmental or conservation areas (zoned C2, C3 and C4)	Dwellings in residential areas and rural villages (land zoned R1, R2, R3, R4 and RU5) Historic rural homesteads/ residences on the national, state or local heritage list
Transport / infrastructure	Local sealed and unsealed roads Passenger rail lines with daily daylight services State highways, freeways and classified main roads Walking tracks and navigable waterways	Tourist roads and scenic drives Walking tracks and navigable waterways	N/A	N/A
Social / cultural	Private recreation areas and sporting fields (defined as land zoned RE2)	Cemeteries, memorial parks	Tourist and visitor accommodation and places of worship (such as bed and breakfasts, motels, hotels) Tourist uses in tourist areas (zoned SP3) Publicly accessible green and open spaces including picnic areas, parks, public recreation areas Town centres and central business districts	N/A

Table 2 - Typical Viewer (visual) Sensitivity Levels (Source: DPE).

2.1.3 Landscape character assessment

Although not specifically required at the preliminary assessment stage, an initial assessment of landscape character types has been undertaken to guide the proponent in the early planning of the Project.

The Guideline states:

The EIS must include an assessment of how the project will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. Landscape character assessment can help the community, applicants and consent authorities understand the sensitivities of a landscape and to determine the overall impact of a project on an area's character and sense of place.

2.1.4 Scenic quality

Although not specifically required at the preliminary assessment stage, an initial assessment of scenic quality has been undertaken to guide the proponent in early project planning and design.

The Guideline states:

Scenic quality refers to the relative scenic, cultural or aesthetic value of the landscape within the viewshed based on the presence or absence of key landscape features known to be associated with community perceptions of low, moderate, or high scenic quality. It is typically a complex process undertaken by experts in visual impact assessment and must take community values into consideration.

The initial analysis and landscape character assessment has inform the classification of scenic quality values.

2.2 Lighting impacts

AS-NZS-4282-2019 Control of the Obtrusive Effects of Outdoor Lighting provides standards for the assessment and limitation of lighting impacts. The standard identifies four environmental zones for exterior lighting which are categorised by the degree of artificial lighting within an area. For example, national parks would be categorised as an intrinsically dark landscape (Category A1), whereas a city centre with high levels of night-time activity would be categorised as a high district brightness area (Category A4).

The standard is aimed at the minimisation of light spill. Regardless of the existing brightness of a particular setting, it is a widely accepted principle that light spill, particularly upward light spill, be minimised wherever possible.

2.2.1 Lighting impact scenarios

Glow

Light glow is typically an upward projection of light that results in illumination of the night sky above a lighting source. It is intensified, or more visually apparent when foggy or cloudy as the light reflects or disperses of water droplets in the atmosphere. Glow is visible over significant distances.

Spill

Spill is light that falls on adjacent sensitive surfaces, both vertical and horizontal, and is most intrusive where it illuminates private open spaces or spills through windows.

Hot spots

Hot spots relate to concentrated areas of bright light in an otherwise less well illuminated setting. Hot spots will be most visible where are elevated.

Kinetic / movement

Lights that change colour or flash can draw the attention of a viewer. As the speed of the colour change or blink increases in speed, so too will its prominence of ability to draw attention.

2.3 Glare and glint impacts

Photovoltaic panels are designed to absorb sunlight and convert it to electricity. Minimising the light reflected from the panels is a goal of panel design, manufacture, and installation. The dark, non-reflective nature of a solar array is generally considered to help minimise their visual contrast with the surrounding landscape.

Green glare has a low potential to cause an after-image when observed prior to a typical blink response time.

Yellow glare has the potential to cause an after-image when observed prior to a typical blink response time.

The analysis does not consider obstacles between the observation points and the proposed solar array that may obstruct observed glare, such as trees, topography and, buildings, etc., and can, therefore, be considered a worst-case scenario.

A glint and glare assessment will be undertaken as part of the detailed assessment of a final design layout.

3 PROJECT CONTEXT AND SETTING APPRAISAL

3.1 Project context

The Project is comprised of adjoining parcels of land located between Kia Ora Lane to the north and Duri-Dungowan Road to the south, and the New England Highway to the west and Loomberah Road to the east (refer to **Figure 2**).

The Project Site and surrounding areas are dominated by farming land uses with associated dwellings common.

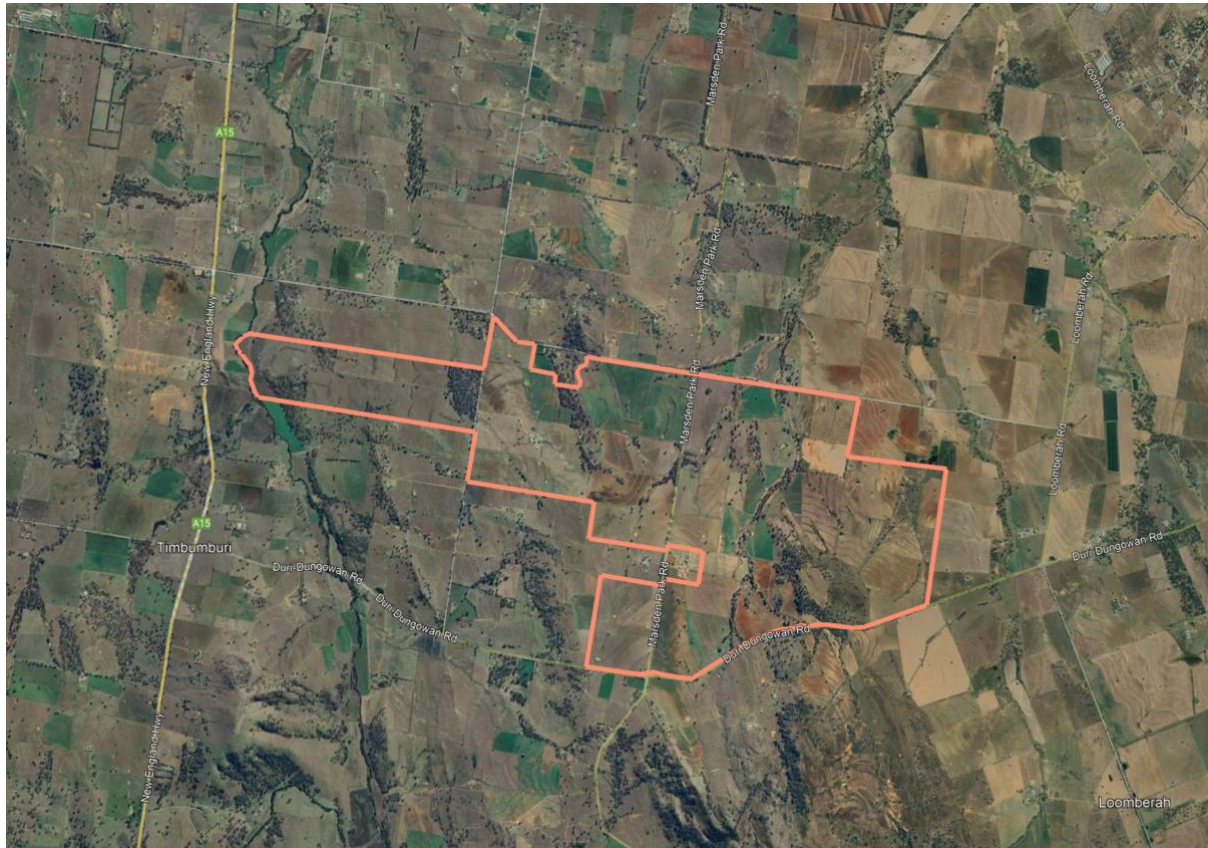


Figure 2 – Project context (Source: Google Earth).

3.2 Land use and zoning

3.2.1 Land use

The land use of the Project Site and surrounds is predominately cropping and grazing (refer to **Figure 3**).

High voltage (HV) transmission lines traverse the landscape in a north to south direction, roughly through the centre of the Project Site (refer to **Figure 4**).

The most visually sensitive road in the vicinity of the Project Site is the New England Highway, an “A” category road, which is located, at its closest, approximately 320 m to the west of the western project boundary (refer to **Figure 5**). A number of lower sensitivity local rural roads traverse the Project Site.

A concentration of rural residences is located along Whitehouse Lane to the north, with the closest being located approximately 4 km from the Project (refer to **Figure 6**).

The outlying suburb of Kingswood, comprised of a mixture of standard and lower density residential development, is located approximately 4 km to the northwest of the Project.



Figure 3 - The land uses of the Project Site and surrounds are primarily cropping and grazing activities.



Figure 4 – HV powerlines traverse the landscape, running to the west of Marsden Park Road through the centre of the Project Site.



Figure 5 – The New England Highway is located approximately 320 km to the west of the Project boundary.



Figure 6 – A concentration of rural residences is located to the north of the Project Site along Whitehouse Lane (Source: Google Earth).

3.2.2 Land use zoning

The Project is located within the Tamworth Regional Council. The part of the Project Site located to the east of Marsden Park Road is zoned Primary Production (RU1) and the part to the west is zoned Primary Production Small Lots (RU4) within the Local Environmental Plan 2010 (refer to **Figure 7**).

The LEP does not make any reference to landscape and visual matters for either of these zones, nor in any other sections which may be applicable to the project site or surrounds.

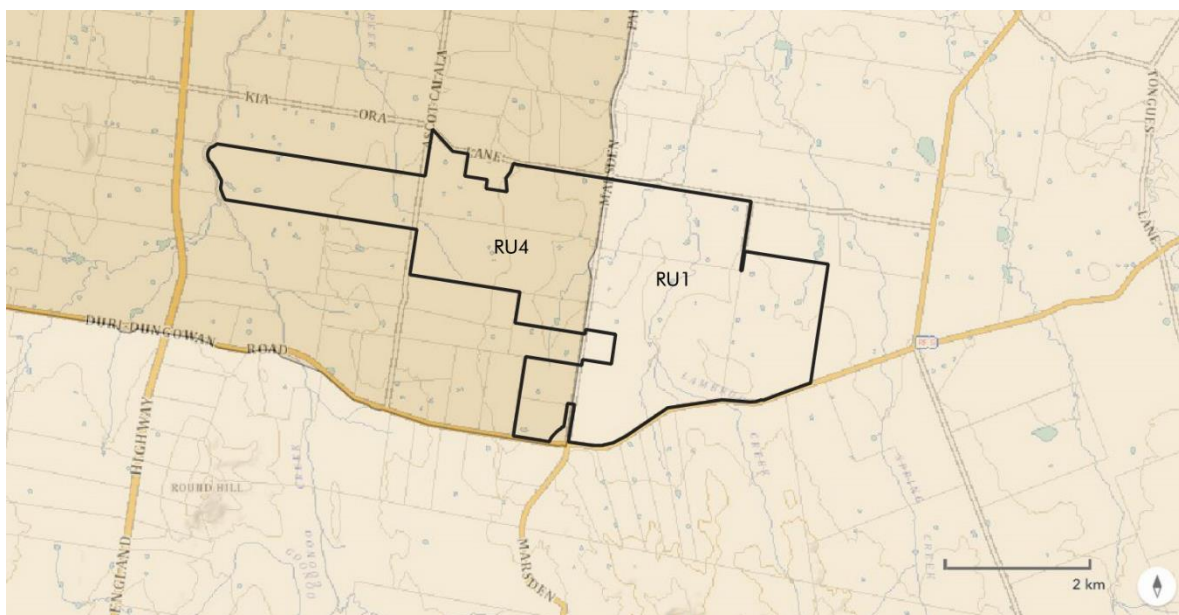


Figure 7 – Land use zoning with the Project site outlined (Source: NSW Planning Portal).

3.3 Vegetation and landscape form

The Project Site is located to the south of the Peel River valley and to the north of outlying hills of the Mount Royal Range, part of the Great Dividing Range.

The Peel River lies at the foot of the Wentworth Mounds, which rise to approximately 950m AHD at Goat Mountain, and form the western extent of the Moonbi Range.

From the Peel River, the topography gently rises from an average elevation of approximately 400m AHD, to between 410m AHD and 480m AHD along the northern boundary of the Project Site.

The Project Site is located within a flat to slightly undulating landscape comprised primarily of open pasture or cropping land. Dense areas of trees and tall shrubs are found on high points within the landscape as well as along the more significant water courses such as Spring Creek, Goonoo Goonoo Creek and Lambruk Creek (refer to **Figure 8**). Additionally, taller scattered vegetation lines sections of the surrounding road network and some paddock boundaries (refer to **Figure 9**).

Rural residences are mostly set within surrounding vegetation of varying densities (refer to **Figure 10**).



Figure 8 – View north to Lambruk Creek from Kia Ora Lane.



Figure 9 - Dense vegetation lines some parts of the surrounding road network.



Figure 10 – Residences on surrounding roads are mostly surrounded by vegetation which provides varying levels of screening to views to the Project Site.

Although mostly flat to slightly undulating, the Project Site contains a number of rises that are the most northern extension of the Mount Royal Range located to the south (refer to **Figure 11**).

The topography of the Project Site ranges in elevation from approximately 410m AHD at Goonoo Goonoo Creek at the western edge of the Project Site, to approximately 575m AHD on the north to south ridge line located near the southeastern corner of the Project Site (refer to **Figure 12**). Slopes average 2-5% but can be as much as 25% in the steepest locations along water course and near high points.

Localised highpoints external to the Project Site are located at Round Hill (565m AHD), approximately 4 km to the south west, and the hill near Marsden Park (677m AHD), approximately 2.4km to the south, which extends northwards, progressively reducing in elevation in the Project Site (refer to **Figure 13**).

The relatively few inhabited areas on highly elevated topography, that may allow for overlooking, results in any vegetation within the landscape screening distant views.

The existing HV line which bisects the landscape north to south near the centre of the Project Site, results in a significant modification to the landscape of the setting at the local level.



Figure 11 – Oblique aerial view with 2 x vertical exaggeration to demonstrate the topographic form of the Project Site (Source: Google Earth).

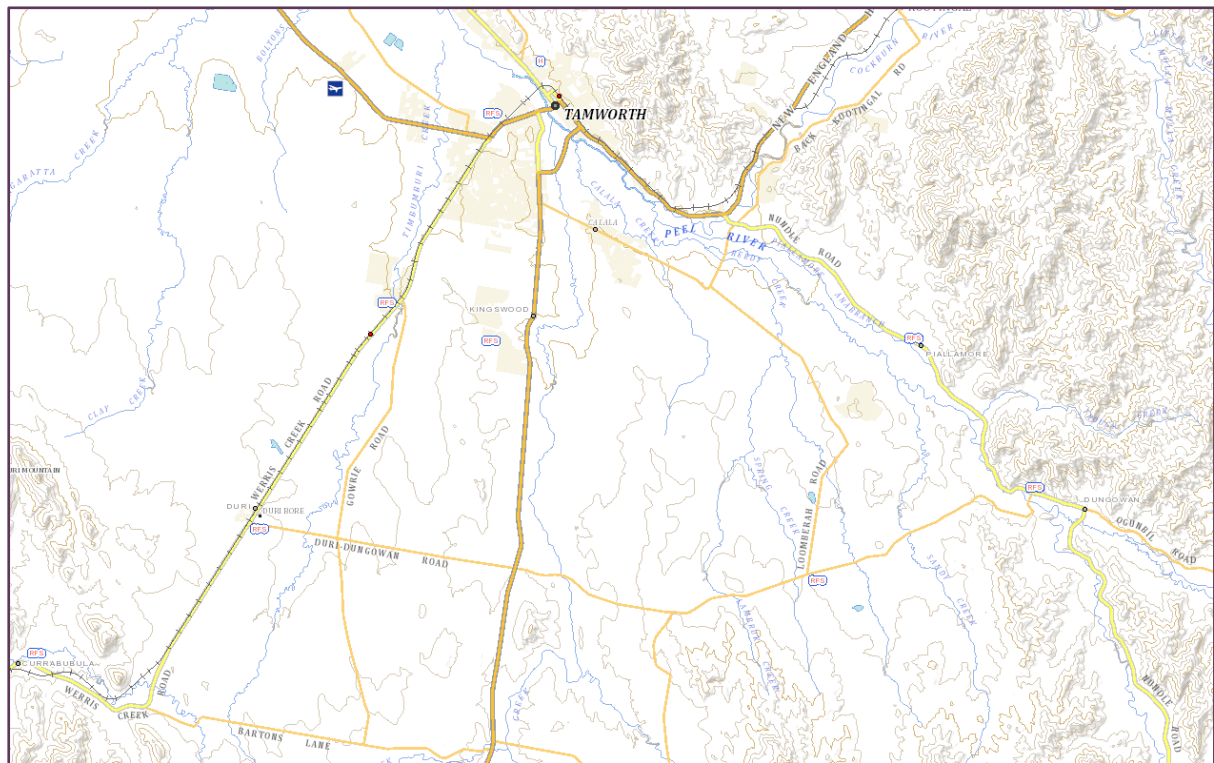


Figure 12 – Topography of Project Site and broader setting (Source: NSW Planning Portal).

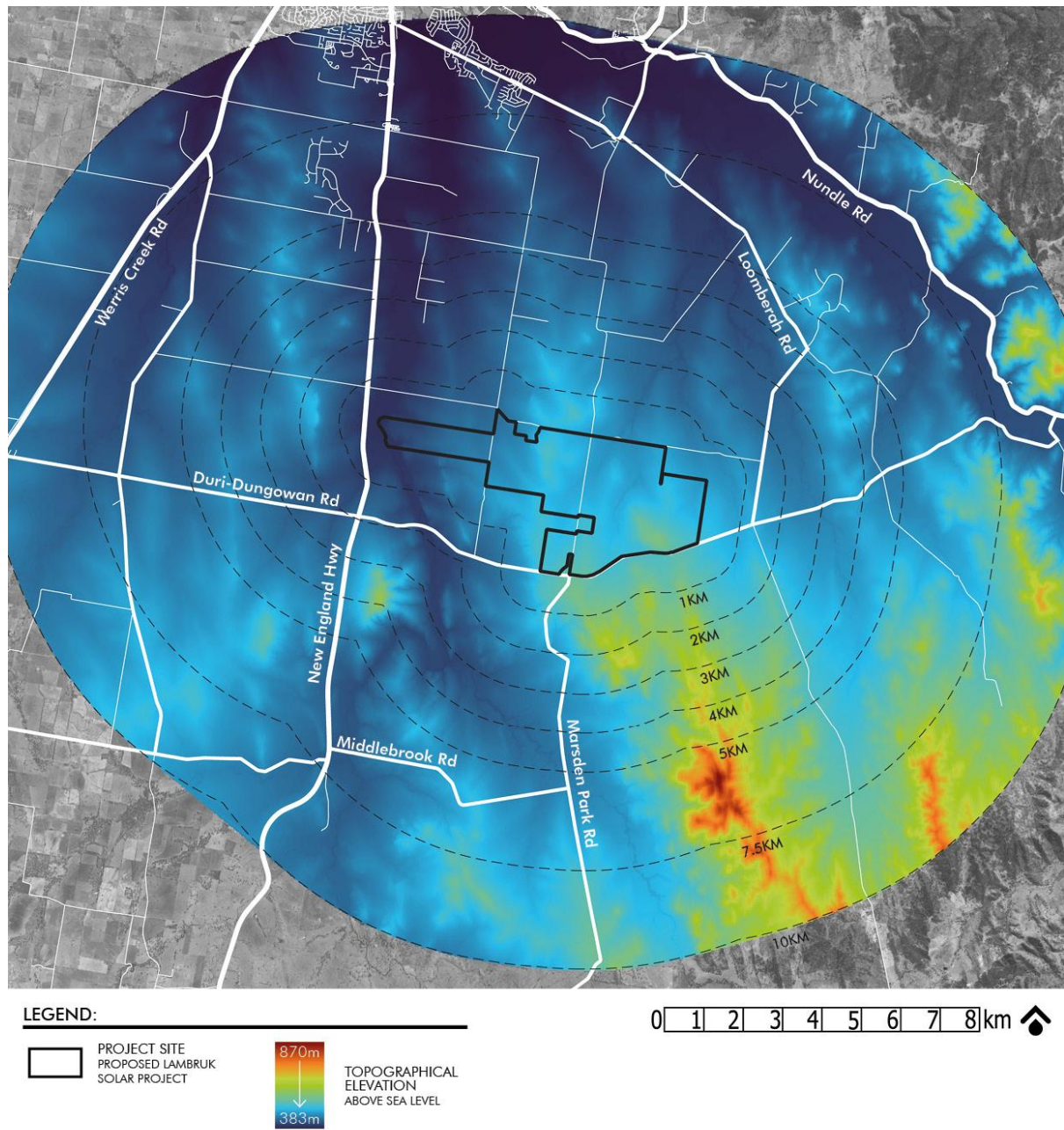


Figure 13 – Elevation of the Project area and broader setting.

3.4 Landscape character

Within the regional setting of the Project, the characteristics that contribute to landscape character are described broadly in the assessment undertaken in Descriptions for NSW Landscapes (2002)¹.

The Project is located within:

Tamworth – Keepit Slopes and Plains.

It is described as:

Extensive area of undulating to rolling slopes and plains with low hills and low ranges forming the western fall of the New England plateau. Complex geology of folded and faulted sedimentary and metamorphic rocks with minor interbedded volcanics. Rock types include; Silurian-Devonian chert, slate, phyllite, tuff, schist and Carboniferous conglomerate, sandstone, mudstone, andesite and small areas of limestone. General elevation 500 to 800m, local relief 250m, with some peaks reaching 1100m. Shallow stony soils on ridges. Texture- contrast soils on almost all slopes shifting in colour from red-brown on upper slopes to yellow with harsh subsoils prone to gully development on lower slopes. White box (Eucalyptus albens) grassy woodlands, with yellow box (Eucalyptus melliodora), Blakely's red gum (Eucalyptus blakelyi), cooba (Acacia salicina) and lightwood (Acacia implexa) on lower slopes. Rough barked apple (Angophora floribunda) and yellow box (Eucalyptus melliodora) on flats. River oak (Casuarina cunninghamiana) along major streams with river red gum (Eucalyptus camaldulensis) increasing to the west. Patches of red stringybark (Eucalyptus macrorhyncha) and red ironbark (Eucalyptus sideroxylon) on steeper slopes in the east.

Within this broader zone, the Project Site and surrounding setting includes a number of finer grained landscape character units (refer to **Figure 14**). These are:

- Peel River Valley;
- Rolling Slopes; and
- Folded Hills.

¹ Descriptions for NSW (Mitchell) Landscapes Version 2. Peter Mitchell (2002).

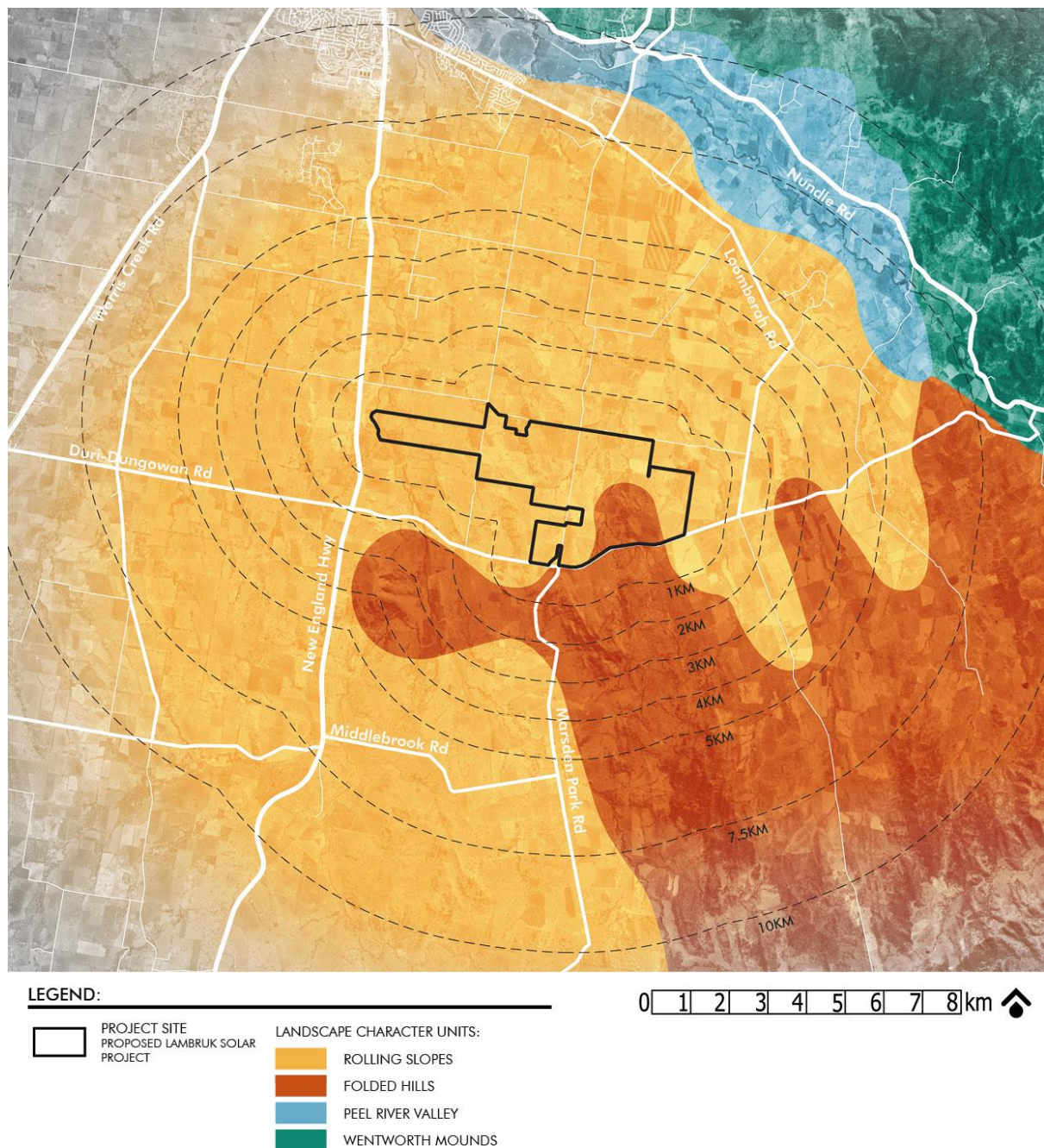


Figure 14 - Landscape character units.

3.4.1 Peel River Valley unit

Description

The Peel River Valley unit extends from the foot slope of the Wentworth Mounds, south to the Rolling Slopes unit, and comprises the Peel River and its valley.

The unit is comprised of mostly flat to slightly undulating topography that is mostly cleared for pastoral or cropping purposes.

Topographic relief is limited and slopes average 1%.

Vegetation has been extensively cleared to accommodate the primarily cropping and pastoral land use, although some remnant indigenous vegetation remains along watercourse and roadsides.

Native vegetation has been established along paddock boundaries, around rural residences and along roadsides.



Figure 15 - Typical character of the Peel River Valley landscape unit.

3.4.2 Rolling Slopes unit

Description

The Rolling Slopes unit extends from the Peel River Valley unit south to the Folded Hills unit and includes the majority of the Project Site.

The unit is comprised of gently undulating topography that has been cleared for agricultural purposes.

Slopes across the unit average 3% and there are localised areas with significant topographic relief and slopes up to 10%.

The rolling topography is often crossed by north to south aligned watercourses flowing to the Peel River.

Vegetation has been extensively cleared to accommodate the primarily cropping and pastoral land use, although some remnant indigenous vegetation remains along watercourse and roadsides.

Native vegetation has been established along paddock boundaries, around rural residences and along roadsides.



Figure 16 – Typical character of the Rolling Slopes landscape unit.

3.4.1 Folded Hills unit

Description

The Folded Hills unit extends south from the Rolling Slopes unit and includes the outlying foothills of the Mount Royal Range, which is part of the Great Dividing Range.

The topography is elevated and has significant topographic relief, notably Round Hill (565m AHD) and the hill near Marsden Park (677m AHD).

Slopes are typically 7% with the steepest being 25%.

Vegetation is typically dense on the steeper side slopes, and clear for agricultural purposes on the lower slopes.



Figure 17 – Typical character of the Folded Hills landscape unit.

3.5 Scenic Quality

Scenic quality is somewhat subjective, but typically is a combination of a range of factors that have been found to contribute to the human appreciation of landscape. These factors are:

- Topographic variation and ruggedness;
- Strong patterning of vegetation; and
- The presence of water.

Agricultural landscapes are particularly subject to divergent opinions as to what constitutes scenic values. However, basic principles relating to diversity of topography, patterning of vegetation and the presence of water remain contributing factors to a higher level of scenic quality.

The typical attributes for scenic quality/sensitivity are described in the Guideline and shown in **Table 3**).

Viewpoint type	Very low viewpoint sensitivity	Low viewpoint sensitivity	Moderate viewpoint sensitivity
Landform			
Vegetation			
Waterbodies			
Social / Cultural			
Human Presence			

Table 3 - Visual reference for scenic quality values (Source: DPE).

The assessed scenic quality of the landscape units of the Subject Site and its setting are (refer to **Table 4**):

- Peel River Valley Unit – Low to moderate.
- Rolling Slopes Unit – Low to moderate
- Folded Hills Unit - Moderate

Description	High Scenic Quality	Moderate Scenic Quality	Low Scenic Quality
Landforms	Isolated peaks or ranges with distinctive form and colour that become focal points. Rock outcroppings.	Rounded hills, ridges and peaks which are not visually dominant. Broad shallow valleys.	Large expanses of indistinctly dissected landform that provide few landmarks which to orient.
Vegetation	Strongly defined patterns resulting from eucalypt forest and some exposed rock visible in clearings.	Predominately open forest or woodland combined with some natural openings that offer some visual relief. Vegetative stands that exhibit a range of size, texture and colour.	Extensive areas of similar vegetation and very limited variation in texture and colour.
Waterforms	Waterforms absent	Waterforms present	Waterforms absent

Table 4 – Scenic quality of the Project Site and surrounds.

3.6 Absorptive Capability

The definition of landscape absorptive capability quality is closely related to that of visual modification levels. It is generally applied at a broader scale than visual modification and is an assessment of how well a landscape setting is able to accommodate change or a development.

The key factors considered in determining absorptive capability are topography and vegetation. In areas of flatter topography, overlooking is not possible and a low and thin band of vegetation is able to screen views to a development from a given viewpoint. In areas of undulating or elevated topography, overlooking can occur and vegetation needs to be higher and denser to achieve effective screening. Intervening undulating topography also has the potential to block views in certain landscapes.

The landscape setting of the Project and immediate surrounds (up to 2km distant) is generally flat to slightly undulating with vegetation confined to a broken rectilinear pattern reflecting property boundaries and roads.

Within this landscape, overlooking is generally not possible from most sensitive viewpoints, and even relatively low vegetation (up to eye-height) is effective at screening views. Although there is elevated land to the southwest of the Project Site, there is only a relatively small number of rural residences located here and many have their views screened by the topography.

Topography – High capability for the Peel River Valley unit and Rolling Slopes unit, due to mostly flat topography, with minimal potential for overlooking within a 2km radius. Moderate to low capability for the Folded Hills unit.

Existing Vegetation – Generally low for cleared agricultural areas. Moderate to high capability where vegetation exists.

4 COMPONENTS OF THE PROJECT

At this preliminary assessment phase, a resolved design is not assessed. Rather, this assessment considers how the proposed components of the Project may impact on surrounding visually sensitive receptors. Additionally, it provides guidance on the placement of Project components to reduce potential visual impacts.

The Project involves the development of a large-scale solar energy facility and BESS on the approximately 1,523ha site area (refer to **Figure 18**).

4.1 Key features

The works and components associated with the Project include:

- Approximately 850,000 tracking solar panels arranged in a generally regular, rectilinear pattern comprised of modules of multiple panels;
- A battery energy storage system (BESS);
- Solar inverters;
- BESS inverters;
- A substation and switching yard;
- Overhead 33kV powerlines;
- An operations and maintenance facility;
- All Installation of an all-weather access road (minimum width of 5 metres) around the site to provide access to panels, inverters and transformers;
- Perimeter security fencing; and
- Visual amelioration screen planting.

Lighting is not required for normal operations of the solar panels. However, localised security lighting may be required for the BESS and sub/switching stations.

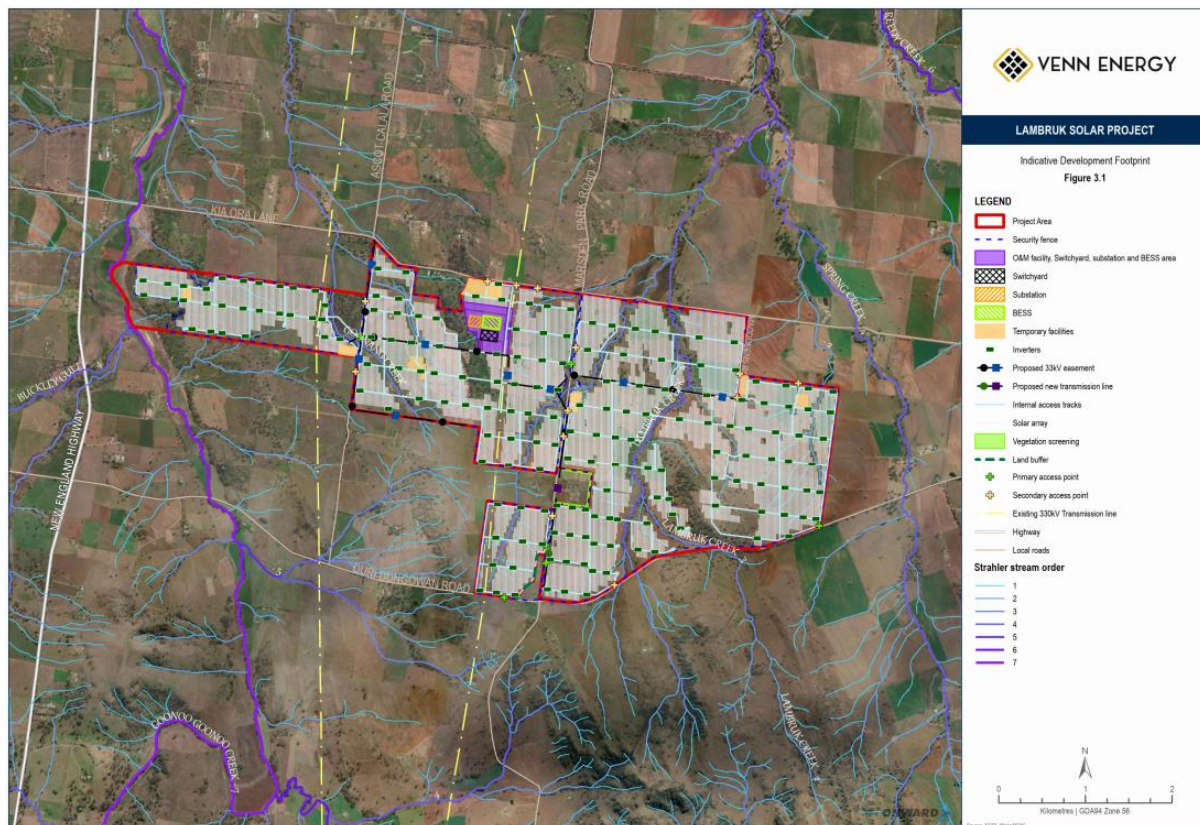


Figure 18 – Indicative development footprint of the Project.

4.2 Detail of project components

The most visible components of the project that may result in visual impacts to surrounding sensitive receptors are outlined below.

4.2.1 Solar Panels

Solar PV panels will be installed across the Project attached onto a single axis tracker. Once mounted on the frames and fully tilted the panels will be capable of reaching an overall height of no more than approximately 8 metres above ground level. There will be approximately 850,000 modules.

The glass surfaced panels are coated to maximise daylight absorption, and thus minimise glare potential. Other materials are an encapsulant, a rear layer and a frame around the outer edge.



Figure 19- Mounted single axis bifacial tilting panels.

4.2.2 Transformer and Inverter

The panels generate Direct Current (DC) electricity which must be converted into Alternating Current (AC) before being fed into the local electricity grid network.

The transformer transforms electrical energy from one circuit to another and allows for the energy generated to be fed into the local grid network.

The inverters and transformers are housed in cabin-like structures mounted on a concrete base.



Figure 20 – Typical transformer – Side elevation

4.2.3 BESS compounds

Installation of batteries housed inside a structure with the appearance of a shipping container constructed of steel, with indicative dimensions of 9.3m (length) x 1.7m (width) x 2.6m (height).



Figure 21 – Typical BESS containers.

4.2.4 Switching station

Typical switching/substations have a footprint of approximately 70m x 70m and a maximum height of approximately 18m.



Figure 22 – Typical switching/substation.

5 PRELIMINARY VISUAL IMPACT ASSESSMENT

5.1 Visibility of the proposal

The visual catchment or viewshed is the area from which a proposed development may be visible.

Figure 23 indicates the theoretical visual catchment of the Project, or theoretical zone of visual influence (TZVI).

Given the early stage of the Project's design development, the TZVI and reverse TZVI have been generated based on a typical maximum tilted height of 8m for the solar panels.

It should be noted that both the TZVI are based on topography only and does not consider the screening effects of vegetation or built form throughout the landscape. As a result, it is essentially demonstrating a theoretical or worst-case scenario.

Given the relatively low profile of the majority of the components of the Project above ground level, the actual visual catchment will be limited, as vegetation throughout the landscape and built form in residential areas will contribute to the screening of views towards the Project from most viewpoints.

The locations selected for photography and initial assessment are within the public realm and proximate to sensitive, privately owned land use areas.

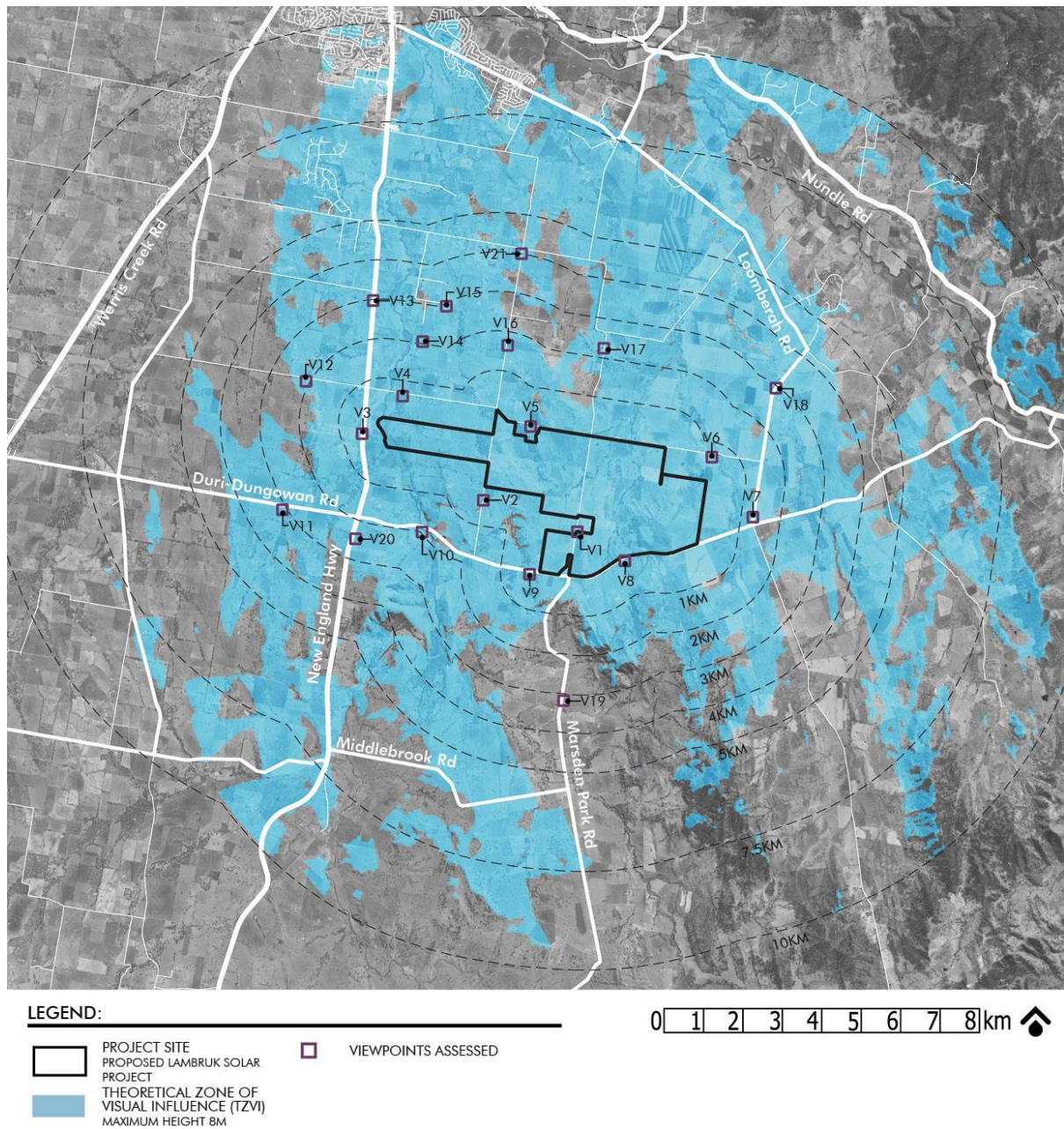


Figure 23 – Preliminary TZVI of the Project.

The reverse TZVI shows the relative visibility of the Project Site as viewed from surrounding sensitive viewpoints (refer to **Figure 24**). The warmer colours signify locations where the largest number of viewpoints can see that part of the Project Site, and the cooler colours the least number of viewpoints that can see that part of the Project Site.

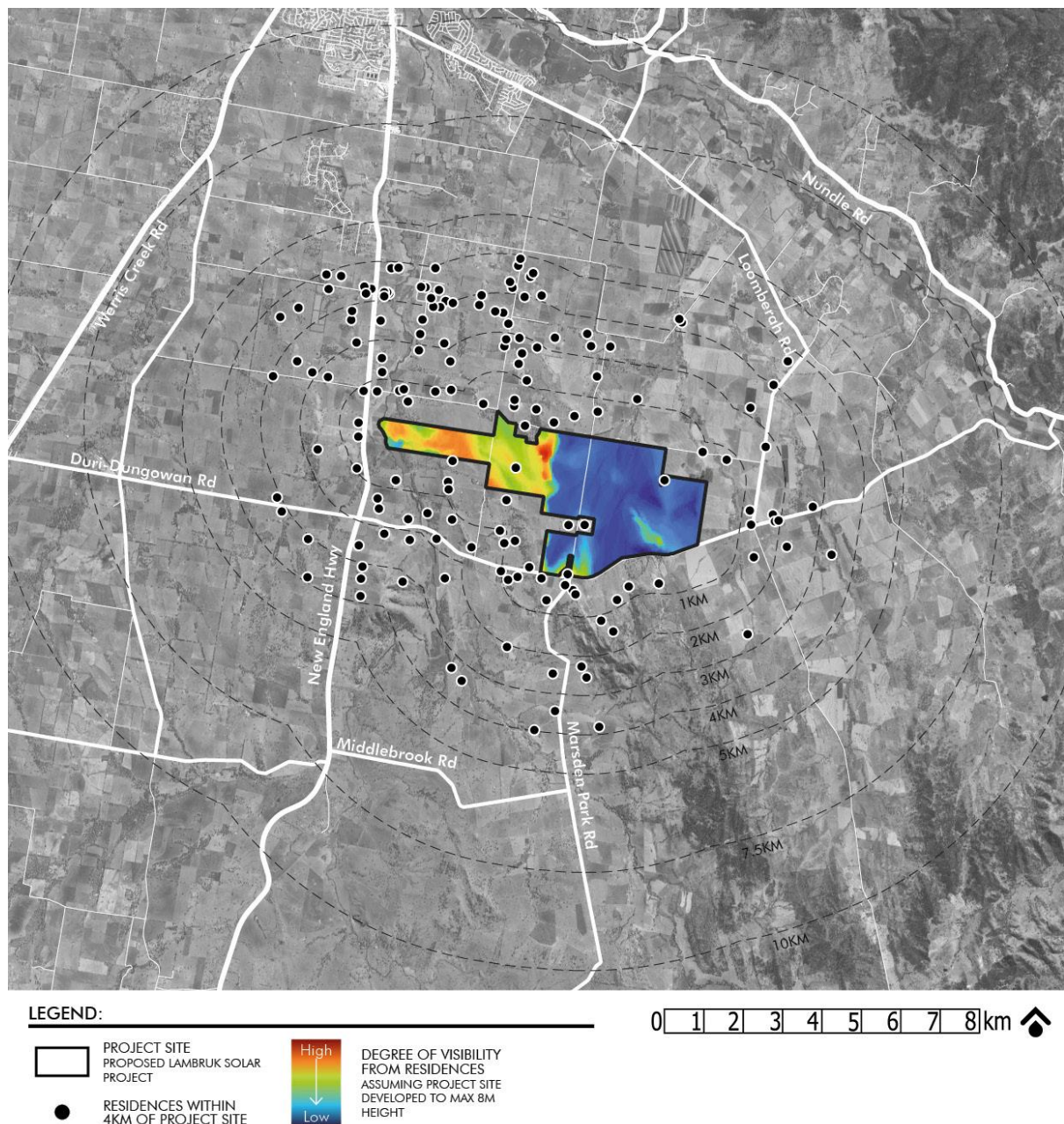


Figure 24 – Preliminary Reverse TZVI of the Project

5.2 Sensitive land uses

Due to the typically low-profile form of the Project, and associated low vertical visual prominence level, the assessment is confined to sensitive locations within 4 km of the Project, the area within which the Project will be most visible.

The land uses of relevance to this assessment are those considered to be of higher visual sensitivity, such as:

- Rural residences.
- Major Highways/Tourist roads.

Table 2 shows the visual sensitivity levels of uses within the broader visual catchment of the Project, outside of 4kms. Given the effect of distance, viewpoints beyond 4km of the Project will typically have a low level of visual sensitivity and therefore have not been assessed as their resulting visual impact would be low.

5.3 The preliminary assessment tool – Vertical field of view

The Guideline identifies the extent of assessment required for the visual catchment based on the vertical and horizontal field of view occupied by the Project (refer to **Table 5**).

Based on an 8m high panel, the vertical field of view would be 4 degrees at a distance of 115 m from the Project and less than 0.5 degrees at a distance of 1km.

In accordance with the guideline the height of the Project PV panels to not necessitate an assessment.

However, given the extensive footprint of the Project, at approximately 8.5km by 3.5km, the horizontal field of view and associated level of visual prominence will be the key driver for the visual impact assessment. Elevation over the Project site ranges from 410m AHD to 575m AHD.

The horizontal field of view for viewpoints to the north and south will be greater than for those to the east and west. As a result, the assessment assesses sensitive viewpoints within 4km of the Project Site.

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

Table 5 - Preliminary visual assessment tool for visual prominence (Source: DPE).



The Guideline requires that an assessment of the vertical field of view be undertaken for public road and rail viewpoints within 2.5km and residential viewpoints within 4km of the project boundary (refer to **Figure 25**, **Figure 26**, **Figure 27** and **Figure 28**).

The vertical field of view has been calculated utilising the DPE Preliminary visual assessment tool – vertical field of view (MS Excel spreadsheet), based on criteria for determining the relative elevation between the viewpoint and the lowest and highest points of the Project Site (refer to **Figure 29**).

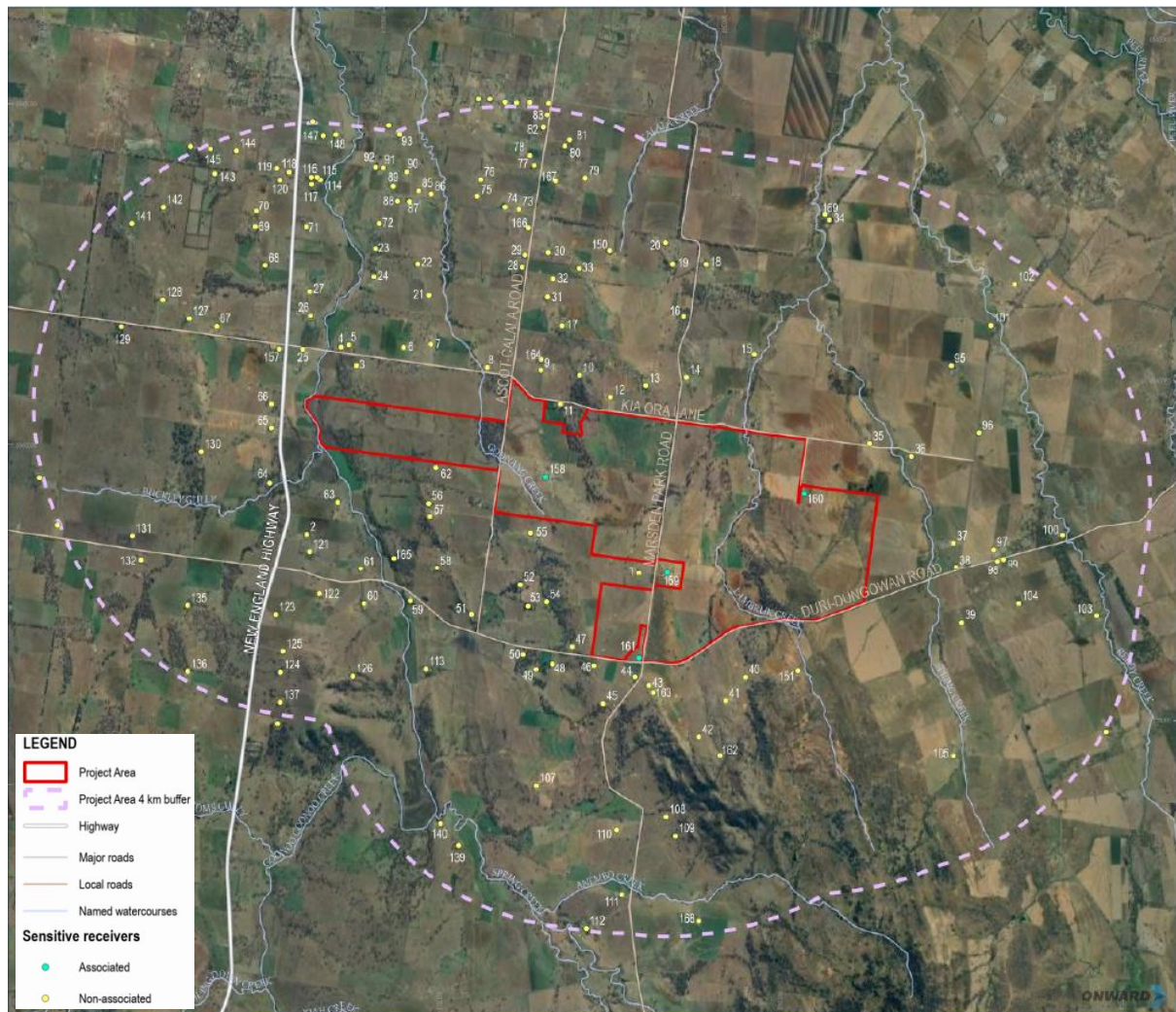


Figure 25 – Sensitive receptors within 4km of the Project boundary (Source: Onward Consulting).

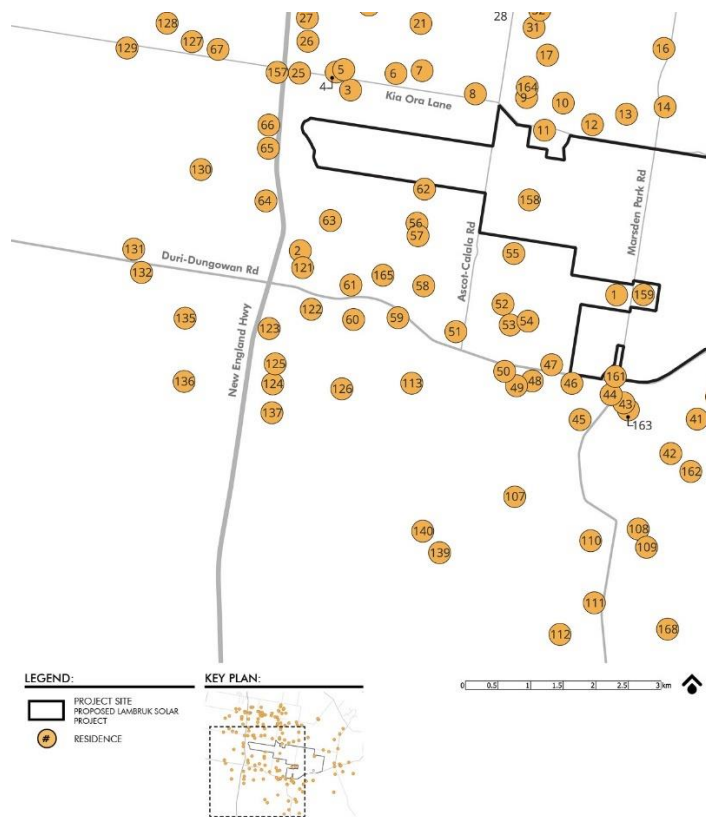


Figure 26 – Detail - Receptor locations – west.

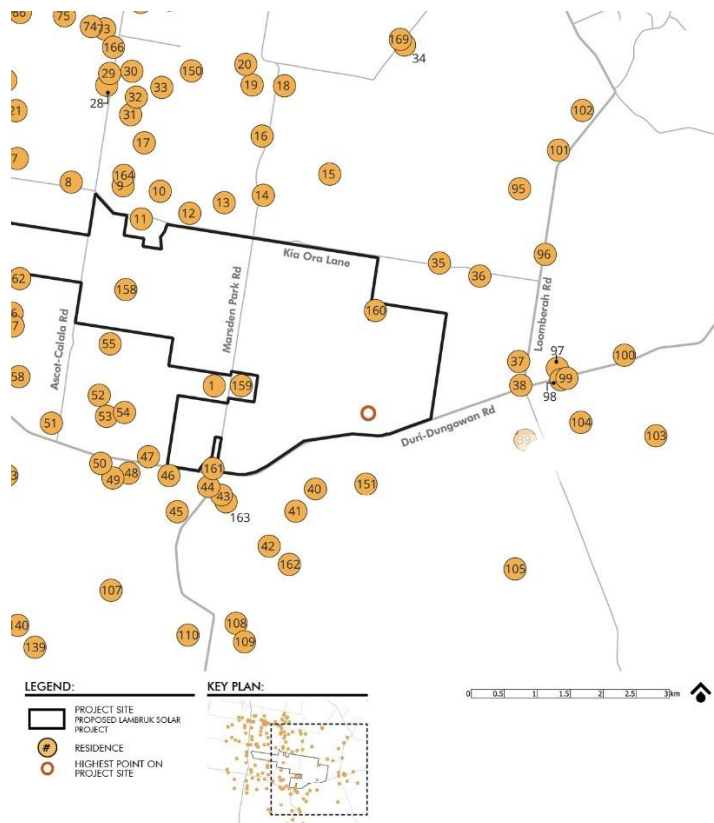
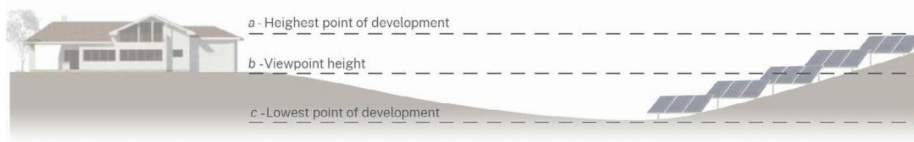


Figure 27 – Detail - Receptor locations – east.

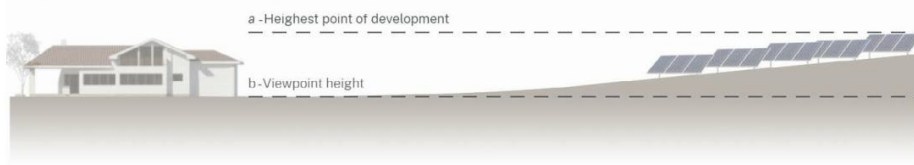


Figure 28 – Detail - Receptor locations – northwest.

Project located above and below viewpoint (a - c)



Project located above viewpoint (a - b)



Project located below viewpoint (b - c)

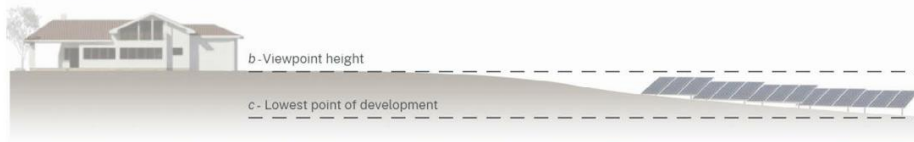


Figure 29 – Vertical field of view - Calculating relative height difference (Source: DPE).

The results of the vertical field of view assessment are shown in **Table 6** and plotted graphically in **Figure 30** and **Figure 31**.



Table 6 - Preliminary visual assessment tool findings.

Receptor ID	Elevation of receptor (m AHD)	Relative height difference (m)	Distance from viewpoint (m)	Vertical angle of view (degrees)	Horizontal angle of View (degrees)	Visible in viewshed	Detailed assessment required?
(V1) 1	506	69	205	4	335	Yes	Yes
2	439	135	1320	4	105	Yes	Yes
(V4) 3	416	155	500	4	135	Yes	Yes
(V3) 4	409	161	740	4	113	Yes	Yes
(V3) 5	412	161	830	4	115	Yes	Yes
(V3) Kia Ora Lane	412	161	830	4	115	Yes	Yes
6	429	145	865	4	137	Yes	Yes
7	440	132	970	4	142	Yes	Yes
8	441	121	410	4	160	Yes	Yes
9	465	103	400	4	160	Yes	Yes
10	504	69	520	4	159	Yes	Yes
(V5) 11	472	85	200	4	200	Yes	Yes
12	509	58	224	4	180	Yes	Yes
13	526	45	480	4	167	Yes	Yes
14	510	60	675	4	154	Yes	Yes
15	451	32	1160	1	127	Yes	Yes
16	471	97	1540	3	126	Yes	Yes
17	482	94	1100	4	141	Yes	Yes
(V17) 18	460	113	2330	2	113	Yes	Yes
Marsden Park Rd (V17)	460	113	2330	2	113	Yes	Yes
(V17) 19	480	90	2290	2	115	Yes	Yes
(V17) 20	485	87	2590	1	106	Yes	Yes
21	433	142	1770	3	121	Yes	Yes
22	432	143	2200	3	107	Yes	Yes
(V14) 23	409	161	2300	3	92	Yes	Yes
(V14) 24	407	164	1870	4	100	Yes	Yes
25	410	165	715	4	85	Yes	Yes
26	416	160	1190	4	84	Yes	Yes
27	412	163	1520	4	80	Yes	Yes
(V16) 28	452	124	1670	4	119	Yes	Yes
(V16) Ascot Calala Road	452	124	1670	4	119	Yes	Yes
(V16) 29	455	121	1820	3	116	Yes	Yes
30	464	112	1950	2	114	Yes	Yes
31	466	109	1290	4	127	Yes	Yes
32	467	109	1560	3	123	Yes	Yes
33	488	87	1900	2	117	Yes	Yes
34	429	147	3250	2	84	Yes	Yes



Receptor ID	Elevation of receptor (m AHD)	Relative height difference (m)	Distance from viewpoint (m)	Vertical angle of view (degrees)	Horizontal angle of View (degrees)	Visible in viewshed	Detailed assessment required?
(V6) 35	468	107	700	4	112	Yes	Yes
(V6) 36	470	105	720	4	87	Yes	Yes
(V7) 37	492	83	1160	3	73	Yes	Yes
(V7) 38	498	79	1250	3	65	Yes	Yes
(V7) Loomberah Road	498	79	1250	3	65	Yes	Yes
39	516	60	1430	2	66	Yes	Yes
(V8) 40	545	75	705	4	143	Yes	Yes
(V8) 41	558	75	830	4	131	Yes	Yes
42	588	87	1100	3	112	Yes	Yes
43	565	76	370	4	130	Yes	Yes
44	551	75	210	4	138	Yes	Yes
45	530	78	670	4	118	Yes	Yes
(V9) 46	522	76	150	4	131	Yes	Yes
(V9) 47	494	75	320	4	179	Yes	Yes
48	469	101	610	4	140	Yes	Yes
49	459	111	865	4	135	Yes	Yes
50	455	115	1020	4	139	Yes	Yes
51	451	119	1570	3	151	Yes	Yes
52	461	108	1020	4	188	Yes	Yes
53	466	104	1050	4	180	Yes	Yes
54	479	90	790	4	191	Yes	Yes
(V2) 55	492	78	230	4	222	Yes	Yes
56	459	111	605	4	199	Yes	Yes
57	465	105	790	4	190	Yes	Yes
58	443	126	1200	4	164	Yes	Yes
(V10) 59	424	146	1800	3	137	Yes	Yes
(V10) 60	452	118	2240	2	120	Yes	Yes
Duri Dungowan Road (V10)	417	138	1890	2	125	Yes	Yes
61	428	141	1720	4	131	Yes	Yes
62	452	118	80	4	222	Yes	Yes
63	423	146	790	4	143	Yes	Yes
64	418	152	990	4	98	Yes	Yes
65	417	152	580	4	79	Yes	Yes
New England Hwy (V3)	417	152	580	4	79	Yes	Yes
66	413	157	480	4	53	Yes	Yes
(V12) 67	448	122	1720	3	58	Yes	Yes
68	429	140	2000	3	56	Yes	Yes
69	444	125	2620	2	55	Yes	Yes
(V13) 70	433	136	2850	2	54	Yes	Yes
(V13) 71	409	161	2510	3	69	Yes	Yes



Receptor ID	Elevation of receptor (m AHD)	Relative height difference (m)	Distance from viewpoint (m)	Vertical angle of view (degrees)	Horizontal angle of View (degrees)	Visible in viewshed	Detailed assessment required?
72	414	155	2600	2	88	Yes	Yes
73	439	131	2490	2	101	Yes	Yes
74	438	131	2500	2	98	Yes	Yes
75	429	141	2710	2	94	Yes	Yes
76	428	142	2960	2	90	Yes	Yes
77	441	129	3140	2	92	No	No
78	434	135	3300	2	89	Yes	Yes
79	458	111	3120	1	98	Yes	Yes
80	446	123	3550	1	89	Yes	Yes
81	450	119	3590	1	87	Yes	Yes
(V21) 82	438	131	3740	1	86	Yes	Yes
(V21) 83	446	124	3920	1	85	Yes	Yes
(V15) 85	417	152	3080	2	86	Yes	Yes
(V15) 86	415	154	2930	2	87	Yes	Yes
(V15) 87	422	148	3000	2	88	Yes	Yes
(V15) 88	417	152	3010	2	87	Yes	Yes
(V15) 89	413	157	3330	2	84	Yes	Yes
90	416	154	3420	2	82	Yes	Yes
91	406	164	3650	2	86	Yes	Yes
92	403	167	3680	2	85	Yes	Yes
93	412	158	3960	2	73	Yes	Yes
95	445	125	2370	2	70	Yes	Yes
96	455	115	2510	2	65	Yes	Yes
(V7) 97	482	88	1750	2	53	Yes	Yes
(V7) 98	476	84	1840	2	52	Yes	Yes
99	473	96	1900	2	52	Yes	Yes
100	462	108	2710	2	41	Yes	Yes
(V18) 101	440	130	2990	2	60	Yes	Yes
(V18) 102	454	115	3670	1	64	Yes	No
103	480	90	3400	1	39	Yes	No
104	487	83	2250	2	50	Yes	Yes
105	539	31	2590	1	57	Yes	No
107	475	95	2070	2	103	Yes	Yes
(V19) 108	516	54	2650	1	86	No	No
(V19) 109	511	58	2530	1	85	No	No
110	482	88	2520	2	86	No	No
(V19) 111	466	103	3460	1	75	No	No
112	450	120	4020	1	79	No	No
113	421	148	2440	3	117	Yes	Yes
(V13) 114	404	165	3140	2	65	Yes	Yes
(V13) 115	406	160	3180	2	65	Yes	Yes



Receptor ID	Elevation of receptor (m AHD)	Relative height difference (m)	Distance from viewpoint (m)	Vertical angle of view (degrees)	Horizontal angle of View (degrees)	Visible in viewshed	Detailed assessment required?
(V13) 116	407	160	3180	2	65	Yes	Yes
(V13) 117	405	160	3180	2	65	Yes	Yes
(V13) 118	413	160	3180	2	59	Yes	Yes
(V13) 119	413	160	3180	2	59	Yes	Yes
(V13) 120	416	160	3180	2	59	Yes	Yes
(V20) 121	442	128	1600	3	115	Yes	Yes
122	452	118	2150	2	110	Yes	Yes
(v20) 123	466	103	2600	2	93	Yes	Yes
124	496	74	3390	1	87	Yes	Yes
125	490	80	3010	1	88	Yes	Yes
126	506	63	3200	1	99	Yes	Yes
(V12) 127	465	165	2086	3	35	Yes	Yes
(V12) 128	470	165	2620	3	34	Yes	Yes
(V12) 129	452	167	2930	2	30	No	No
130	455	164	1670	4	54	Yes	Yes
(V11) 131	445	165	3130	2	53	Yes	Yes
132	445	164	3160	2	56	Yes	Yes
135	453	165	3040	2	69	Yes	Yes
136	468	165	3930	2	66	Yes	Yes
137	506	165	3870	2	81	No	No
139	429	141	3450	2	77	Yes	Yes
140	422	147	3560	2	81	Yes	Yes
141	480	165	3650	2	39	Yes	Yes
142	470	165	3490	2	38	Yes	Yes
143	440	165	3880	2	47	Yes	Yes
144	434	165	3880	2	49	Yes	Yes
145	462	165	3880	2	48	Yes	Yes
147	403	168	3900	2	65	Yes	Yes
148	401	168	3900	2	64	Yes	Yes
150	474	96	2320	2	113	No	No
(V8) 151	550	75	730	4	150	Yes	Yes
157	423	165	880	4	66	Yes	Yes
162	612	107	1450	3	100	Yes	Yes
163	568	73	460	4	140	Yes	Yes
164	464	107	500	4	154	Yes	Yes
165	432	138	1620	4	158	Yes	Yes
166	448	123	2240	2	103	Yes	Yes
167	450	121	3005	2	94	Yes	Yes
168	493	79	3720	1	68	No	No
169	435	147	3300	2	82	Yes	Yes

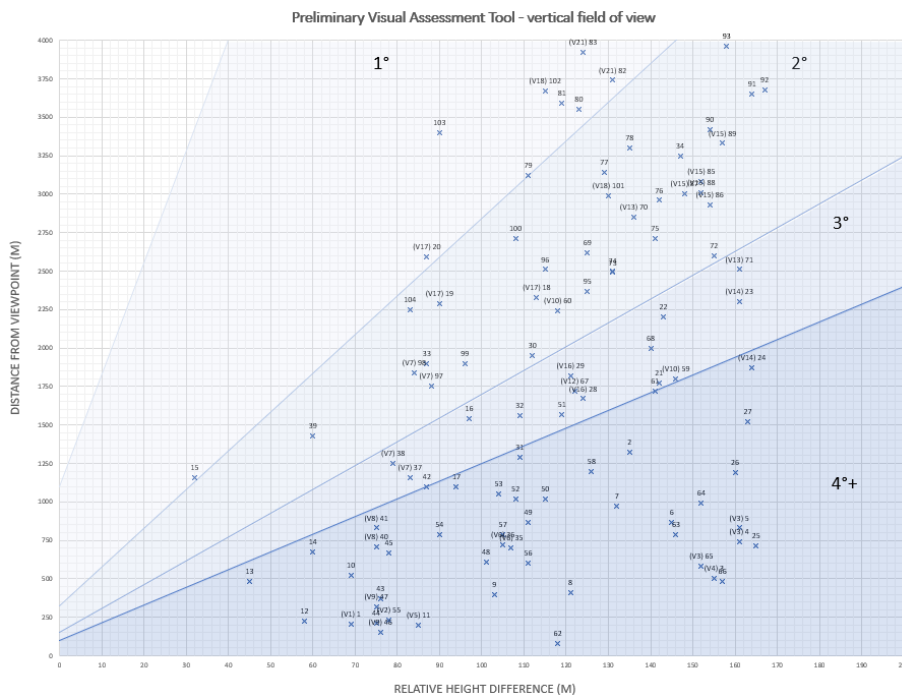


Figure 30 – Angle of vertical field of view - Receptors 1-104 (Source: DPE analysis tool).

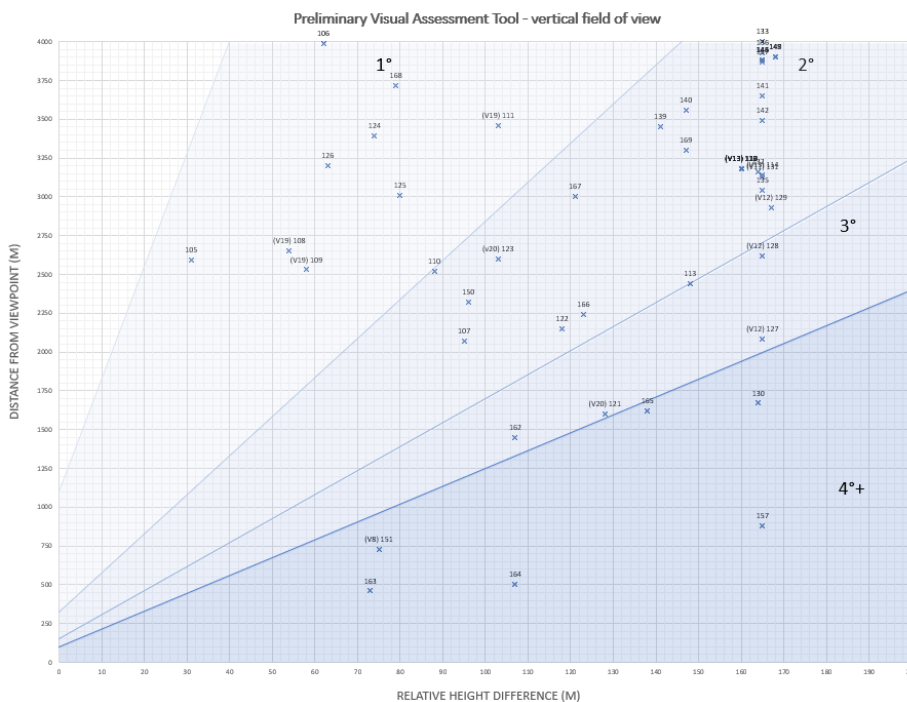


Figure 31 - Angle of vertical field of view - Receptors 105-169 (Source: DPE analysis tool).

5.3.1.1 Summary

The analysis shows that viewpoints to the west of the Project are more likely to potentially view the greatest height difference over the Project area.

This is due to the lowest part of the Project area, at approximately 410m AHD, being located at the very edge of the western boundary, below the elevation of most viewpoints.

5.4 The effect of rural residential vegetation on visual screening

To provide protection from the influences of the environment, particularly sun and wind, Australian rural residential gardens have traditionally developed a dense band of vegetation to surround an intimate and protected home yard. The effect of this in many instances has been to effectively contain the viewshed from the house and surrounding yard itself, screening views to the distance. The presence of foreground vegetation has a direct impact on the visibility of the Project and the context in which it will be viewed.

Vegetation within the landscape distant from the residence that may provide additional screening of views is not considered at this time. However, it is considered as part of the detailed viewpoint assessment.

5.4.1 Residential viewpoint landscape setting typologies

Throughout the visual catchment, most residences sit within a landscape that is comprised of medium to tall vegetation, with varying levels of density depending on either the extent of clearing or extent of planting.

The height and density of vegetation has a direct relationship to the visual exposure of the residence to the proposed development.

The following three setting typologies have been developed to assist the understanding of the influence of vegetation on the screening of views from residences.

The assessment has considered the overall screening effect of vegetation as it relates to the direction of views towards the Project. For example, if the vegetation at the perimeter of the residence is sparse on the side away from the direction of views to the Project and dense on the side where there may be potential views, the effect of screening vegetation reflects the side with views. The same applies for the converse situation.

5.4.1.1 Typology 1 - Rural Residential – Open or scattered tall vegetation

Views to external areas are minimally to partially filtered by scattered tall trees.

Influence on visibility and potential impact

Partial to open views of the proposed development will be possible over open pasture or below and between tall, scattered trees. The potential exists for visual impact (refer to **Figure 32**).

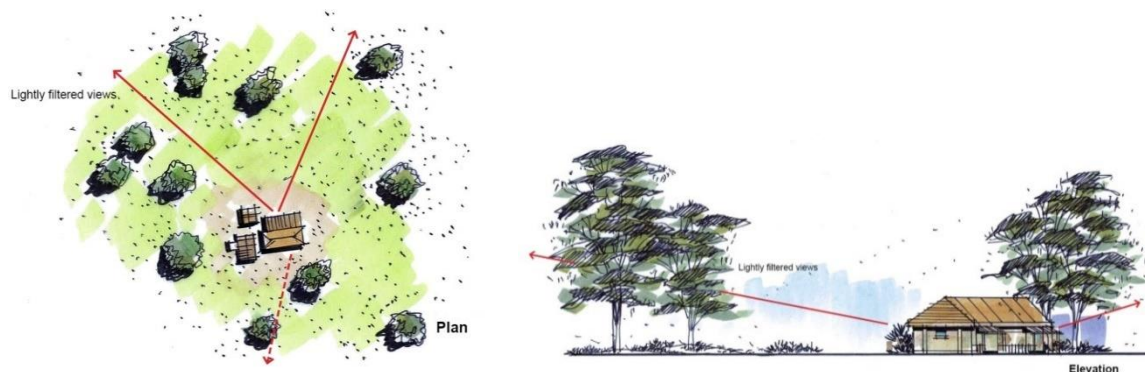


Figure 32 - Typology 1 – Typical plan and elevation.



5.4.1.2 Typology 2 - Rural Residential – Semi open tall vegetation

Views to external areas are partially to heavily screened by semi open, tall vegetation.

Influence on visibility and potential impact

Partial to fully screened views of the proposed development will only be possible where limited breaks in vegetation occur. The potential for visual impact is significantly reduced (refer to **Figure 33**).



Figure 33 - Typology 2 – Typical plan and elevation.

5.4.1.3 Typology 3 - Rural Residential – Dense Tall Vegetation

Views to external areas heavily to fully screened by dense, tall vegetation.

Influence on visibility and potential impact

Views of the proposed development will not be possible and therefore any impacts are highly unlikely (refer to **Figure 34**).

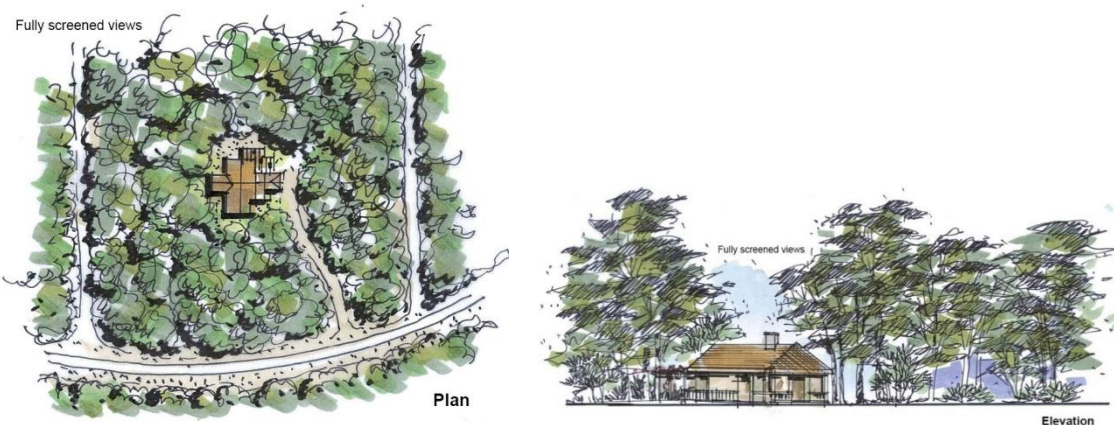


Figure 34 - Typology 3 – Typical plan and elevation.

5.4.2 Overview Assessment of Views from Residences

A desktop assessment was undertaken based on aerial photography and field surveys, of the potential degree of visibility from residences surrounding the Project, considering the following factors (refer to **Figure 35**):

- Proximity to the Project:
 - 0-4 km from Project boundary.
- Whether views are theoretically possible due to topography. Where topography provides screening, no assessment has been undertaken.
- Degree of vegetation present around the residence
 - Highly screened.
 - Partially screened.
 - Minimally screened.



LEGEND:

- | | | | |
|---|---|---|-------------------------------------|
|  | PROJECT SITE
PROPOSED LAMBRUK SOLAR
PROJECT |  | FULLY SCREENED
BY TOPOGRAPHY |
|  | |  | HEAVILY SCREENED
BY VEGETATION |
|  | |  | PARTIALLY SCREENED
BY VEGETATION |
| | |  | MINIMALLY SCREENED
BY VEGETATION |

0 1 2 3 4 5 6 7 8 km 

Figure 35 - Relative level of vegetation screening surrounding residences where views are theoretically possible (excludes intervening vegetation) (Source: Google Earth).

5.5 Lighting impacts

The BESS and switching/substation require security lighting. Some other components may have external lights which are only likely to be used for urgent maintenance works during hours of darkness and would not be permanently illuminated.

The applicable environmental lighting zone for the Project area based on AS-NZS-4282-2019 is Category A2 – Low District Brightness lighting area, which applies to inhabited rural and semi-rural areas.

The Tamworth and Kingston residential areas are Category A3 - Medium District Brightness.

Within the Category A2 area the Project does not result in an increased lighting impact due to there being a limited requirement for operational lighting.

6 PRELIMINARY AMELIORATION STRATEGIES

Actions exist to potentially ameliorate the landscape and visual impacts of the Project. These are outlined in the following sections.

6.1 On-Site Actions

On-site actions relate to initiatives which can be undertaken within the boundaries of the Project area.

6.1.1 Project layout

Arranging the components of the Project so that they respond to sensitive, visually exposed interfaces, is a proactive measure to reduce visual impacts from the outset and lessen the reliance on amelioration measures.

Where possible, taller components, such as transmission poles and the switching station, should be located away from sensitive viewpoints to reduce their visual prominence. As a result, ameliorative landscaping does not need to be as tall and will achieve visual screening in a shorter period.

Where tall built elements of a similar character exist within the setting, consideration should be given to locating Project components as close as possible to them. This concentration, or colocation, reduces the visual modification level by placing a new form with an existing form. Visual impacts are reduced by minimising the dispersal of highly visible forms throughout the landscape.

Given their typically high level of visual exposure, placing Project components on the relatively steep slopes of the hill should be avoided if possible.

6.1.2 Perimeter screen planting

The most effective way to ameliorate views from high sensitivity viewpoints is to establish screen planting around the perimeter of the Project where vegetation is lacking. The Project has exposed boundaries to a number of equally exposed sensitive residential uses. Adjacent Project boundaries could potentially be planted with screening species to ameliorate localised views.

The low-profile form of the majority of the Project components will ensure that planting will be able to provide screening within a relatively short period of time.

Being a taller element, it will take longer for planting to ameliorate the impacts of the substation. However, collocation with other existing infrastructure, such as the HV powerline pylons, will reduce the impact on the setting and sensitive viewpoints.

6.1.3 Material selection

Although the majority of the Project is of a low profile, non-reflective materials, finished in a natural or neutral colour, as found in the landscape of the setting, should be used.

6.2 Off-Site Actions

These actions relate to initiatives which can be undertaken outside of the Project Site and would require the consent of relevant landowners, utilities or authorities. Although there is adequate space on the site to achieve significant amelioration, off-site actions may be appropriate following detailed assessment and landowner engagement.

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Appendix D Preliminary Noise Assessment

Preliminary Noise Assessment

Lambruk Solar Project

Prepared for: Onward Consulting Pty Ltd
November 2023
MAC231979-01RP1V1



Document Information

Preliminary Noise Assessment

Lambruk Solar Project

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DOCUMENT ID	DATE	PREPARED	SIGNED	REVIEWED	SIGNED
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APPENDIX A – GLOSSARY OF TERMS		

1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Onward Consulting Pty Ltd to prepare a Preliminary Noise Assessment (PNA) to quantify emissions from the proposed Lambruk Solar Project located approximately 15 kilometres south of Tamworth, NSW (the project).

The PNA has quantified potential construction, traffic, operational and sleep disturbance noise emissions from the project and recommends reasonable and feasible noise controls where required.

This assessment has been undertaken in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI) 2017;
- NSW Environment Protection Authority (EPA), Approved Methods for the measurement and analysis of environmental noise in NSW, 2022;
- NSW Department of Environment and Climate Change (DECCW) – NSW Interim Construction Noise Guideline (ICNG), July 2009;
- NSW Department of Environment, Climate Change and Water (DECCW) – NSW Road Noise Policy (RNP), March 2011;
- Standards Australia AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures;
- International Organisation for Standardisation (ISO) 9613-1:1993 (ISO9613:1) - Acoustics - Attenuation of Sound During Propagation Outdoors - Part 1: Calculation of the Absorption of Sound by the Atmosphere;
- International Organisation for Standardisation (ISO) 9613-2:1996 (ISO9613:2) - Acoustics - Attenuation of Sound during Propagation Outdoors - Part 2: General Method of Calculation; and
- ISO/TR 17534-3 - Acoustics — Software for the calculation of sound outdoors — Part 3: Recommendations for quality assured implementation of ISO 9613-2 in software according to ISO 17534-1.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Project Description

2.1 Background

The project is a proposed 500 megawatt (MW) solar energy development, with a 300 -1,200 MWh Battery Energy Storage System (BESS). The key components and characteristics of the project are understood to be:

- 850,000 Photovoltaic modules;
- 178 power conversion units (inverters);
- new low, medium and high voltage transmission lines, installed underground or overhead;
- high to medium voltage substation;
- 330 kV switchyard;
- temporary facilities including access tracks, hardstands and laydown areas during construction; and
- permanent infrastructure including operations and maintenance compound, site offices, amenities and workshop/stores buildings, carparks, water tanks, fire-fighting equipment, internal access tracks, perimeter fencing, security and communications systems and other infrastructure.

2.2 Description of Proposed Construction Works

The project includes installation of groups of north-south aligned Photovoltaic (PV) modules on mounting structures of 1.3m to 8m in height. Approximately 850,000 individual PV solar panels will be installed using a single axis tracking system, following the sun from east to west during the day. The PV mounting structure would comprise steel posts driven into the ground using a small pile driver. Additional support structures would be attached to the piles, which would then support the PV panels.

Where cabling of each PV array/module to inverters is required to be underground, earthworks will primarily involve trenching. Other minor earthworks would be completed for the preparation of the site and in most cases a concrete slab would be required to support the ancillary infrastructure, BESS foundations and associated cabling connections. Most of the infrastructure would be prefabricated off-site, delivered, and assembled on-site. Construction activities associated with the BESS would involve the placement of battery units at the appropriate location (by crane or crane truck) and is a negligible noise source/event.

It is anticipated that the project would be constructed over approximately 24-month period, with a peak workforce of approximately 350 people working standard construction hours from 7am to 6pm, Monday to Friday.

Proposed access during construction and operation to the Project is under investigation, but may include the following:

- heavy vehicle access off the New England Highway via the existing sealed Duri- Dungowan Road to the south of the project;
- secondary access may include points on Ascot-Calala Road and Marsden Park Road, which are local and unsealed roads; and
- light vehicle and emergency access/egress via Kia Ora Lane Access to the north of the Project off the New England Highway.

During construction, traffic generated by the project would include employee and delivery vehicles. During the peak construction period, the daily traffic volume is expected to be up to five heavy vehicles (semi-trailers or B-doubles) per hour and 40 light commercial vehicle movements per hour or equivalent for worker transport during the morning and afternoon peaks.

2.3 Description of Proposed Operation

PV infrastructure on site will comprise of groups of PV panels installed in rows. The PV modules will be on a single axis tracker system which will follow the sun from east to west during the day. Electrical cabling would be attached beneath the modules and would connect the individual PV modules to each other, and the inverters distributed across the project site. The BESS, substation and switchyard will be located centrally and connected by underground cables. The project will be contained solely within the site as shown in **Figure 1**.

The project would operate 24 hours a day, 7 days a week, with no permanent staff on site. During operation, the PV panels would generate electricity which would be fed into the power grid via the adjacent existing powerline with excess solar energy from the PV system being stored in the BESS for night-time usage.

Key noise emissions from the operation of the project are associated with the inverter and transformer(s). The BESS typically consists of a lithium-ion battery rack within a container fitted with relevant switches, controllers. As this equipment generates heat, a Heating Ventilation and Air Conditioning (HVAC) system is required to provide cooling and is the significant noise source associated with the BESS. The HVAC system consists of an air conditioner, heat exchanger and ventilation fans.

When required, maintenance activities will occur during standard working hours (except for emergencies) and are expected to include:

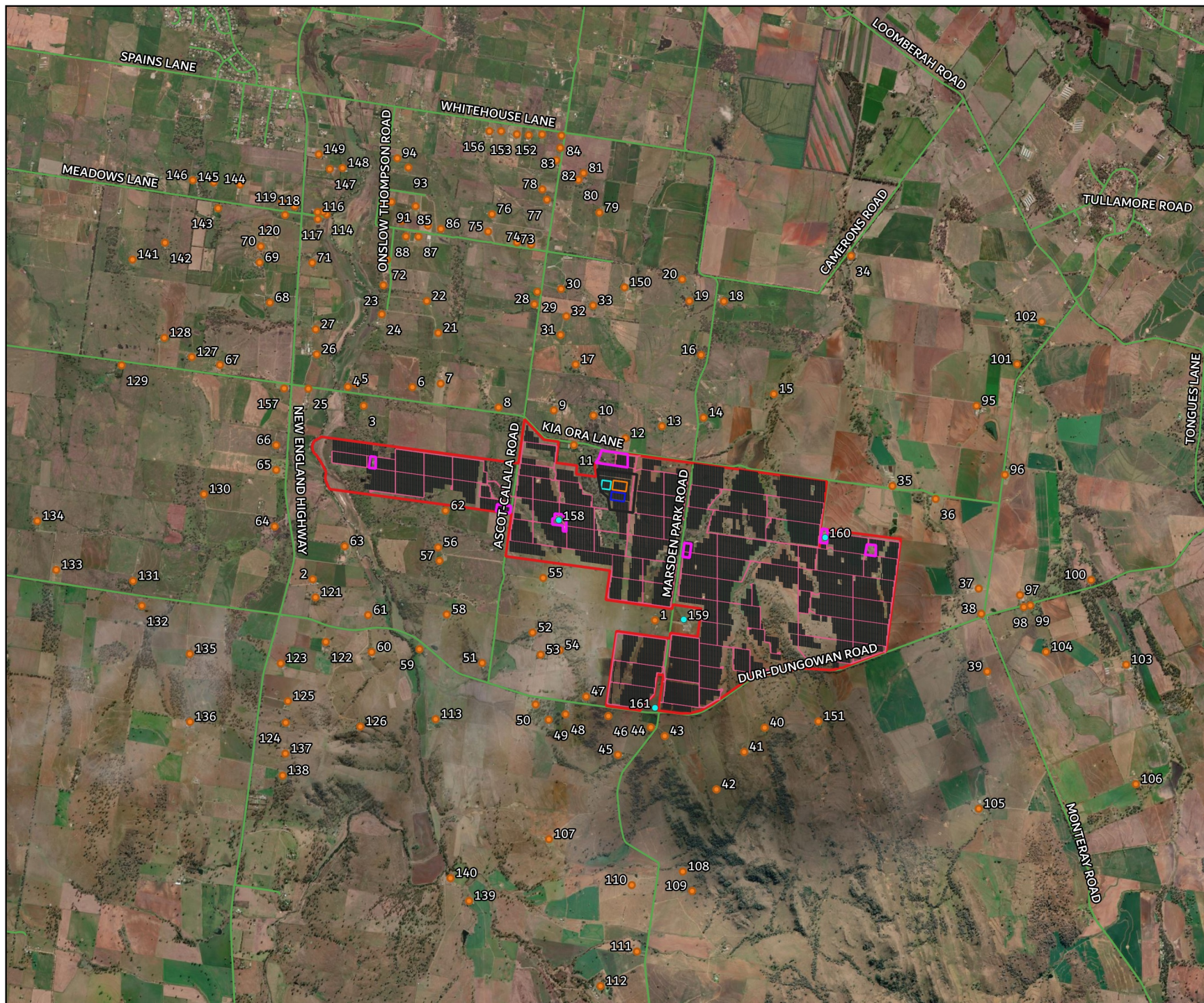
- panel cleaning;
- repairs or replacement of infrastructure, as required; and
- land management including mowing to control vegetation as required.

Typical noise sources associated with maintenance activities may include light vehicle movements on site and maintenance of equipment.

2.3.1 Receiver Review

A review of residential receivers in proximity to the project has been. **Figure 1** provides a locality plan showing the position of these receivers in relation to the project.

FIGURE 1
Project Layout
MAC231979-01
Lambruk Solar Project



KEY

- Receiver
- Project Related Receiver
- Temporary Facilities
- Electrical Infrastructure
- BESS
- Substation
- Switchyard
- Solar Panels
- Project Boundary



3 Noise Policy and Guidelines

3.1 Noise Policy for Industry

The EPA released the Noise Policy for Industry (NPI) in October 2017 which provides a process for establishing noise criteria for consents and licenses enabling the EPA to regulate noise emissions from scheduled premises under the Protection of the Environment Operations Act 1997.

The objectives of the NPI are to:

- provide noise criteria that is used to assess the change in both short term and long-term noise levels;
- provide a clear and consistent framework for assessing environmental noise impacts from industrial premises and industrial development proposals;
- promote the use of best-practice noise mitigation measures that are feasible and reasonable where potential impacts have been identified; and
- support a process to guide the determination of achievable noise limits for planning approvals and/or licences, considering the matters that must be considered under the relevant legislation (such as the economic and social benefits and impacts of industrial development).

The policy sets out a process for industrial noise management involving the following key steps:

1. Determine the Project Noise Trigger Levels (PNTLs) (ie criteria) for a development. These are the levels (criteria), above which noise management measures are required to be considered. They are derived by considering two factors: shorter-term intrusiveness due to changes in the noise environment; and maintaining the noise amenity of an area.
2. Predict or measure the noise levels produced by the development with regard to the presence of annoying noise characteristics and meteorological effects such as temperature inversions and wind.
3. Compare the predicted or measured noise level with the PNTL, assessing impacts and the need for noise mitigation and management measures.

4. Consider residual noise impacts - that is, where noise levels exceed the PNTLs after the application of feasible and reasonable noise mitigation measures. This may involve balancing economic, social and environmental costs and benefits from the proposed development against the noise impacts, including consultation with the affected community where impacts are expected to be significant.
5. Set statutory compliance levels that reflect the best achievable and agreed noise limits for the development.
6. Monitor and report environmental noise levels from the development.

3.1.1 Project Noise Trigger Levels (PNTL)

The policy sets out the procedure to determine the PNTLs relevant to an industrial development. The PNTL is the lower (ie, the more stringent) of the **Project Intrusiveness Noise Level** (PINL) and **Project Amenity Noise Level** (PANL) determined in accordance with Section 2.3 and Section 2.4 of the NPI.

3.1.2 Rating Background Level (RBL)

The Rating Background Level (RBL) is a parameter determined from noise monitoring and is used for assessment purposes. As per the NPI, the RBL is an overall single figure background level representing each assessment period (day, evening and night) over the noise monitoring period. For low noise environments, such as rural environments, minimum assumed RBLs apply within the NPI can be adopted in lieu of completing background noise measurements. This is considered the most conservative method for establishing noise criteria for a project. The minimum assumed RBLs are as follows:

- Minimum Day RBL = 35dBA;
- Minimum Evening RBL = 30dBA; and
- Minimum Night RBL = 30dBA.

3.1.3 Project Intrusiveness Noise Level (PINL)

The PINL ($LA_{eq}(15min)$) is the RBL + 5dB and seeks to limit the degree of change a new noise source introduces to an existing environment. Hence, when assessing intrusiveness, background noise levels need to be measured.

3.1.4 Project Amenity Noise Level (PANL)

The PANL is relevant to a specific land use or locality. To limit continuing increases in intrusiveness levels, the ambient noise level within an area from all combined industrial sources should remain below the recommended Amenity Noise Levels specified in Table 2.2 (of the NPI). The NPI defines two categories of Amenity Noise Levels:

- **Amenity Noise Levels (ANL)** – are determined considering all current and future industrial noise within a receiver area; and
- **Project Amenity Noise Level (PANL)** – is the recommended level for a receiver area, specifically focusing the project being assessed.

Additionally, Section 2.4 of the NPI states: “to ensure that industrial noise levels (existing plus new) remain within the recommended Amenity Noise Levels for an area, a Project Amenity Noise Level applies for each new source of industrial noise as follows”:

PANL for new industrial developments = recommended **ANL** minus 5dBA.

The following exceptions apply when deriving the PANL:

- areas with high traffic noise levels;
- proposed developments in major industrial clusters;
- existing industrial noise and cumulative industrial noise effects; and
- greenfield sites.

Where relevant this assessment has considered influences of traffic with respect to Amenity Noise Levels (ie areas where existing traffic noise levels are 10dB greater than the recommended ANL).

Furthermore, Section 2.4 of the NPI states “*where the Project Amenity Noise Level applies and it can be met, no additional consideration of cumulative industrial noise is required.*”

The recommended Amenity Noise Levels as per Table 2.2 of the NPI are reproduced in **Table 1**.

Table 1 Amenity Noise Levels

Receiver Type	Noise Amenity Area	Time of day ¹	Recommended Amenity Noise Level dB LAeq(period)
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks.	See column 4	See column 4	5dB above the recommended Amenity Noise Level for a residence for the relevant noise amenity area and time of day
School Classroom	All	Noisiest 1-hour period when in use	35 (internal) 45 (external)
Hospital ward			
- internal	All	Noisiest 1-hour	35
- external	All	Noisiest 1-hour	50
Place of worship			
- internal	All	When in use	40
Passive Recreation	All	When in use	50
Active Recreation	All	When in use	55
Commercial premises	All	When in use	65
Industrial	All	When in use	70

Notes: The recommended Amenity Noise Levels refer only to noise from industrial noise sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated.

Types of receivers are defined as rural residential; suburban residential; urban residential; industrial interface; commercial; industrial – see Table 2.3 and Section 2.7 of the NPI.

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

3.1.5 Maximum Noise Assessment Trigger Levels

The potential for sleep disturbance from maximum noise level events from a project during the night-time period needs to be considered. The NPI considers sleep disturbance to be both awakenings and disturbance to sleep stages.

Where night-time noise levels from a development/premises at a residential location exceed the following criteria, a detailed maximum noise level event assessment should be undertaken:

- LAeq(15min) 40dB or the prevailing RBL plus 5dBA, whichever is the greater; and/or
- LAmax 52dB or the prevailing RBL plus 15dBA, whichever is the greater.

A detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

Other factors that may be important in assessing the impacts on sleep disturbance include:

- how often the events would occur;
- the distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the development;
- whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods); and
- current understanding of effects of maximum noise level events at night.

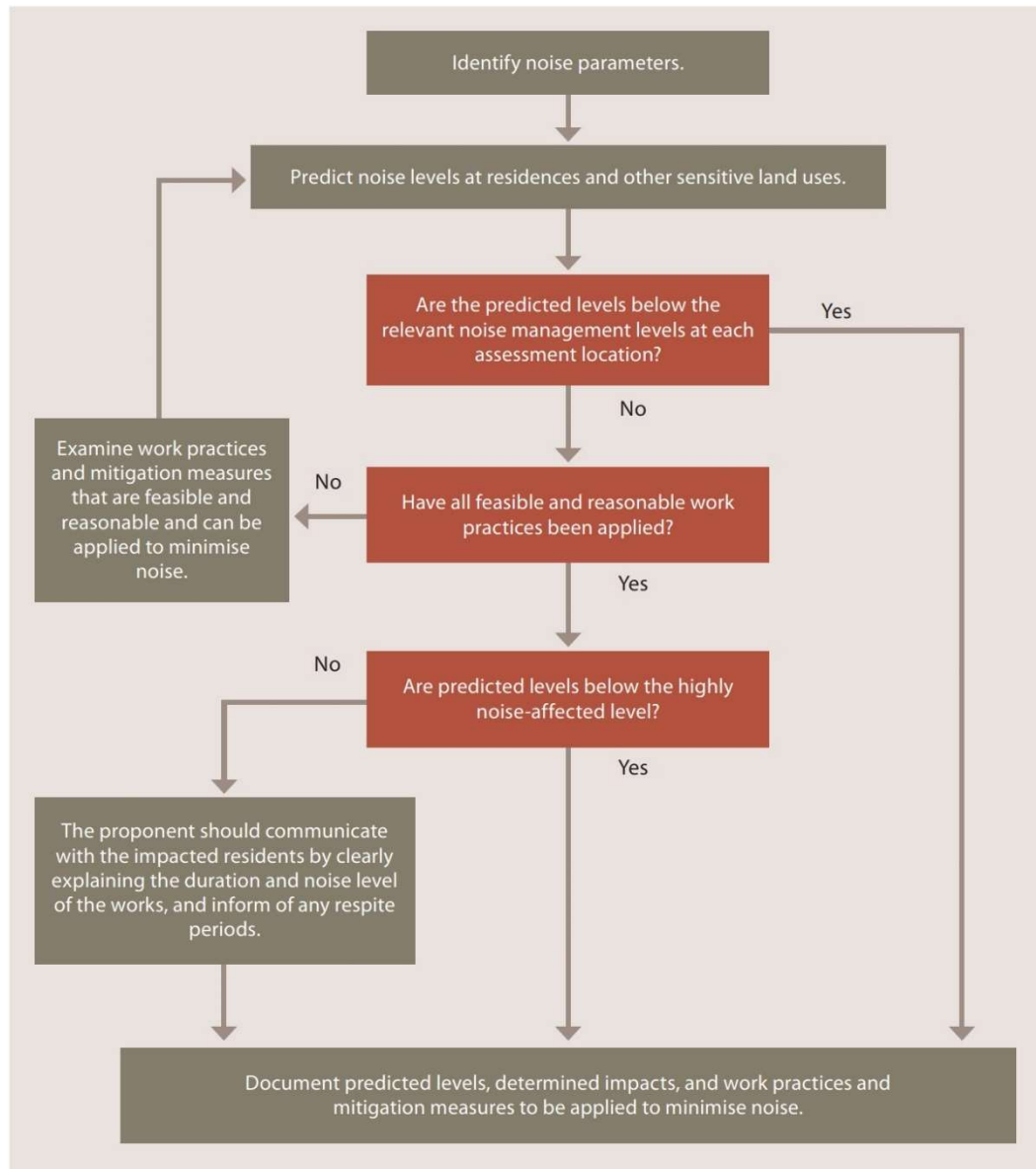
3.2 Interim Construction Noise Guideline

The ICNG sets out procedures to identify and address the impacts of construction noise on residences and other sensitive land uses. This section provides a summary of noise objectives that are applicable to the assessment. The ICNG provides two methodologies for the assessment of construction noise emissions:

- quantitative, which is suited to major construction projects with typical durations of more than three weeks; and
- qualitative, which is suited to short term infrastructure maintenance (< three weeks).

The qualitative assessment methodology is a more simplified approach that relies on noise management strategies. This PNA has adopted a quantitative assessment approach which is summarised in **Figure 2**. The quantitative approach includes identification of potentially affected receivers, derivation of the construction noise management levels, quantification of potential noise impact at receivers via predictive modelling and, provides management and mitigation recommendations.

Figure 2 Quantitative Assessment Processes for Assessing and Managing Construction Noise



Source: Department of Environment and Climate Change, 2009.

3.2.1 Standard Hours for Construction

Table 2 presents the ICNG recommended standard hours for construction works.

Table 2 Recommended Standard Hours for Construction	
Daytime	Construction Hours
Monday to Friday	7am to 6pm
Saturdays	8am to 1pm
Sundays or Public Holidays	No construction

These recommended hours do not apply in the event of direction from police, or other relevant authorities, for safety reasons or where required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

Construction activities are anticipated to be undertaken during standard construction hours.

3.2.2 Construction Noise Management Levels

Section 4 of the ICNG details the quantitative assessment method involving predicting noise levels and comparing them with the Noise Management Level (NML) and are important indicators of the potential level of construction noise impact. **Table 3** reproduces the ICNG Noise Management Level for residential receivers. The NML is determined by adding 10dB (standard hours) or 5dB for Out of Hours (OOH) to the Rating Background Level (RBL) for each specific assessment period.

Table 3 Noise Management Levels

Time of Day	Management Level		How to Apply
	LAeq(15min) ¹		
Recommended standard hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or public holidays.	Noise affected RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq(15min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of work to be carried out, the expected noise levels and duration, as well as contact details.	
	Highly Noise Affected 75dBA (HNA)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account times identified by the community when they are less sensitive to noise such as before and after school for work near schools, or mid-morning or mid-afternoon for work near residences; and if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.	
Outside recommended standard hours.	Noise affected RBL + 5dB	A strong justification would typically be required for work outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dBA above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see Section 7.2.2 of the ICNG.	

Note 1: The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the construction noise management levels for noise assessment purposes and is the median of the ABL's.

3.3 Road Noise Policy

The road traffic noise criteria are provided in the Road Noise Policy (RNP), 2011. The policy sets out noise criteria applicable to different road classifications for the purpose of quantifying traffic noise impacts. Road noise criteria relevant to this assessment are presented in detail in **Section 4.5**.

4 Assessment Criteria

4.1 Background Noise levels

The assessment has adopted the minimum assumed Rating Background Noise Levels outlined in Section 2.3 of the Noise Policy for Industry (NPI, 2017) and are reproduced in **Table 4**.

Table 4 Minimum Applicable RBLs

Period ¹	Adopted RBL, dB LA90
Day	35
Evening	30
Night	30

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.2 Operational Noise Trigger Levels (Criteria)

This section outlines the determination of PNTLs and Maximum Noise Assessment Trigger Levels in accordance with NPI methodology. All receivers are categorised as rural residential in accordance with NPI methodology.

4.2.1 Intrusiveness Noise Levels

The PINL are presented in **Table 5** and have been determined based on the RBL +5dBA and only apply to residential receivers.

Table 5 Project Intrusiveness Noise Levels

Location	Receiver Type	Period ¹	Measured RBL dB LA90	Adopted RBL dB LA90	PINL dB LAeq(15min)
Rural	Residential	Day	35	35	40
		Evening	30	30	35
		Night	30	30	35

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.2.2 Amenity Noise Levels and Project Amenity Noise Levels

The PANL for residential receivers and other receiver types (ie non-residential) potentially affected by the project are presented in **Table 6**.

Table 6 Amenity Noise Levels and Project Amenity Noise Levels					
Receiver Type	Noise Amenity Area	Assessment Period ¹	NPI Recommended ANL	ANL	PANL
			dB LAeq(period)	dB LAeq(period) ²	dB LAeq(15min) ³
Residential	Rural	Day	50	45	48
		Evening	45	40	43
		Night	40	35	38

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note 2: Project Amenity Noise Level equals the Amenity Noise Level -5dB as there is other industry in the area.

Note 3: Includes a +3dB adjustment to the amenity period level to convert to a 15-minute assessment period as per Section 2.2 of the NPI.

4.2.3 Project Noise Trigger Levels

The PNTL are the lower of either the PINL or the PANL. **Table 7** presents the derivation of the PNTLs in accordance with the methodologies outlined in the NPI.

Table 7 Project Noise Trigger Levels					
Receiver Type	Noise Amenity Area	Assessment Period ¹	PINL	PANL	PNTL
			dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)
Residential	Rural	Day	40	48	40
		Evening	35	43	35
		Night	35	38	35

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.2.4 Maximum Noise Trigger Levels

The maximum noise trigger levels shown in **Table 8** are based on night-time RBLs and trigger levels as per Section 2.5 of the NPI. The trigger levels will be applied to transient noise events that have the potential to cause sleep disturbance.

Table 8 Maximum Noise Trigger Levels (Night)			
Residential Receivers			
LAeq(15min)		LAmax	
40dB LAeq(15min) or RBL + 5dB		52dB LAmax or RBL + 15dB	
Trigger	40	Trigger	52
RBL +5dB	35	RBL +15dB	45
Highest	40	Highest	52

Note: Monday to Saturday; Night 10pm to 7am. On Sundays and Public Holidays Night 10pm to 8am.

Note: NPI identifies that maximum of the two values is to be adopted which is shown in bold font.

4.3 Construction Noise Management Levels

The relevant NMLs for standard construction hours are presented in **Table 9**.

Table 9 Construction Noise Management Levels			
Receiver Type	Assessment Period ¹	Adopted RBL	NML
		dB LA90	dB LAeq(15min)
Rural Residential	Standard Hours	35	45 (RBL+10dBA) ²

Note 1: Refer to **Table 2** for Standard Recommended Hours for Construction.

4.4 Construction Vibration

Department of Environment and Conservation (DEC) 2006, *Assessing Vibration: A Technical Guideline* (the guideline) provides guidance on determining effects of vibration on buildings occupants. The guideline does not address vibration induced damage to structures, blast induced vibration effects or structure borne noise effects.

A qualitative assessment of potential vibration impacts has been completed. Due to the nature of the works proposed and distances to potential vibration sensitive receivers, vibration impacts from the project would be negligible.

The Construction Noise & Vibration Strategy (V4.1 Transport for NSW, 2019) sets out safe working distances to achieve the human response criteria for vibration. The key vibration generating source proposed to be used is a vibratory pile driver used for installing the supports for the PV panels during construction. For a vibratory pile driver, the Construction Noise Strategy sets a safe working distance of 20m to achieve the residential human response criteria for continuous vibration. Therefore, as the nearest receivers to the project are greater than 20m, human exposure to vibration is anticipated to be minimal. Furthermore, where the human response criteria are satisfied, the structural or cosmetic criteria for sensitive receivers will be achieved. Therefore, vibration impacts are not considered to be a significant issue and have not been considered further in this assessment.

4.5 Road Traffic Noise

Table 10 presents the road traffic noise assessment criteria reproduced from the RNP relevant to this assessment.

Table 10 Road Traffic Noise Assessment Criteria			
Road category	Type of project/development	Assessment Criteria – dBA	
		Day (7am to 10pm)	Night (10pm to 7am)
Freeways/arterial/ sub-arterial Roads	Existing residences affected by additional traffic on freeways/arterial/sub-arterial roads generated by land use developments	60dB LAeq(15hr)	55dB LAeq(9hr)
Local roads	Existing residences affected by additional traffic on local roads generated by land use developments	55dB LAeq(1hr)	50dB LAeq(1hr)
School Classrooms		40dB LAeq(1hr) (internal) when in use	N/A
Hospital Wards		35dB LAeq(1hr) (internal)	35dB LAeq(1hr) (internal)
Places of Worship		40dB LAeq(1hr) (internal)	40dB LAeq(1hr) (internal)
Open Space (active use)		60dB LAeq(1hr)	N/A
Open Space (passive use)	Proposed road projects and traffic generating developments	55dB LAeq(1hr)	N/A
Isolated residences in commercial or industrial zones		Refer to AS2107 for internal levels	
Mixed Use development		Each component to be considered separately	
Childcare Facilities		Sleeping rooms 35dB LAeq(1hr) (internal) Indoor play areas 40dB LAeq(1hr) (internal) Outdoor play areas 55dB LAeq(1hr) (external)	

Additionally, the RNP states where existing road traffic noise criteria are already exceeded, any additional increase in total traffic noise level should be limited to 2dBA, which is generally accepted as the threshold of perceptibility to a change in noise level.

The road traffic noise criteria are provided in the RNP. For this assessment, the 'local road' category, as specified in the RNP, has been adopted for Ascot Calala Road and Marsden Park Road; and the 'sub arterial road' category for Kia Ora Lane and Duri-Dungowan Road. It is acknowledged that the functional classification of Kia Ora Lane and Duri-Dungowan Road is a 'Collector Road' in accordance with the Roads and Maritime Noise Criteria Guideline (April 2015). However, the Road Noise Policy does not provide separate noise criteria for Collector Roads but applies the sub-arterial category to all roads that are not classified as local roads.

5 Modelling Methodology

A computer model was developed to quantify project noise emissions to neighbouring receivers using DGMR (iNoise, Version 2024) noise modelling software. iNoise is an intuitive and quality assured software for industrial noise calculations in the environment. 3D noise modelling is considered industry best practice for assessing noise emissions from projects.

The model incorporated a three-dimensional digital terrain map giving all relevant topographic information used in the modelling process. Additionally, the model uses relevant noise source data, ground type, attenuation from barrier or buildings and atmospheric information to predict noise levels at the nearest potentially affected non project related receivers. Where relevant, modifying factors in accordance with Fact Sheet C of the NPI have been applied to calculations.

The model calculation method used to predict noise levels was in accordance with ISO 9613:1 and ISO 9613:2 including corrections for meteorological conditions using CONCAWE¹. The ISO 9613 standards are the most used noise prediction method worldwide. Many countries refer to ISO 9613 in their noise legislation. However, the ISO 9613 standard does not contain guidelines for quality assured software implementation, which leads to differences between applications in calculated results. In 2015 this changed with the release of ISO/TR 17534-3. This quality standard gives clear recommendations for interpreting the ISO 9613 method. iNoise fully supports these recommendations. The models and results for the 19 test cases are included in the software.

5.1 Construction Assessment Methodology

Construction activities are proposed to be progressive (trenching, piling and assembly) and will occur at several locations simultaneously. Noise emissions were modelled for the following acoustically significant activities:

- earthworks involving trenching for cabling;
- piling of panel supports;
- transportation of components to work areas; and
- assembly of the panels.

Other activities such as road construction, drainage and minor earthworks that are likely to required, are typically of lower intensity than the piling works and hence, noise emissions from these activities would be lower than the predicted noise levels in this assessment.

¹ Report no. 4/18, "the propagation of noise from petroleum and petrochemical complexes to neighbouring communities", Prepared by C.J. Manning, M.Sc., M.I.O.A. Acoustic Technology Limited (Ref.AT 931), CONCAWE, Den Haag May 1981

It is anticipated that the solar farm would be constructed over a 24-month period, with construction activities occurring concurrently across the project site. Therefore, the assessment has calculated the noise level from all construction teams simultaneously (piling, trenching, transport, and assembly activities) when situated at the nearest point to a receiver. The calculated noise level is representative of the expected highest ($L_{Aeq}(15min)$) noise level at that receiver during the construction phase.

Noise emission data and assumptions used in this assessment are summarised in **Table 11**. All significant noise generating construction activities will be limited to standard construction hours. Where low intensity construction activities are required to be undertaken outside standard construction hours, such as cabling, minor assembly, use of hand tools etc, they will be managed such that they are not audible at non project related receivers.

Table 11 Construction Team Sound Power Levels, L_w dBA (re 10^{-12} Watts)				
Noise Source/Item	Utilisation %	Quantity	L_w /Item	Total L_w
Trenching & Earthworks Team				
Backhoe	80	1	104	103
Light vehicle	25	2	76	73
Total – Trenching & Earthworks				103
Piling Team				
Piling rig (hydraulic)	80	1	113	112
Tele-handler	75	1	106	105
Light vehicle	25	2	76	73
Total – Piling				113
Assembly Team				
Mobile crane/HIAB	75	1	104	103
Tele-handler	75	1	106	105
Light vehicle	25	2	76	73
Hand tools/Power tools	50	1	102	99
Welder	50	1	105	102
Total – Assembly				109
Transport Team (on site)				
Heavy vehicle	40	1	104	101
Tele-handler	50	1	106	103
Total – Transport				105

5.2 Operational Assessment Methodology

For this assessment, operational noise predictions were modelled for a typical worst case operational scenario over a 15-minute assessment period based on the operational assumptions and sound power levels in **Table 12**. Plant noise emission data used in modelling for this assessment were obtained from manufacturer data for similar equipment. Where relevant, modifying factors in accordance with Section 3.3 and Fact Sheet D of the NPI have been applied to calculations.

Table 12 Operational Equipment Sound Power Levels, Lw dBA (re 10⁻¹² Watts)

Noise				Adjustments, dB				Total Lw
				Duration per 15 minutes	Quantity	Mitigation	Penalty	
PV Panel Tracking Motor	Area	50	15,000	-12 ¹	42	-5 ¹	--	75
Inverter Station (SUN Powermax M400 2kVA)	Point	77	178	Constant	23		5 ²	104
BESS Storage Module (SolBank S1K51K3A01/ S1K5650A01)	Area (Centralised)	84	150	Constant	--	8 ³	5 ²	97
Substation	Area	90	1	Constant	--	--	5 ²	95
Light Vehicle (<10km/h)	Point	76	2	Constant	3	--	--	79

Note 1: Tracking motor is situated underneath the PV panel, -5dB attenuation applied to account for shielding provided by the panel. Tracking motor operates 1 minute per 15 minutes.

Note 2: Modifying factor penalty of +5dB added for low frequency and tonality at 50Hz.

Note 3: For the centralised BESS option, the battery storage modules are co- and -8dB attenuation applied to account for shielding provided by BESS housing structures.

During the day, the panels track the sun from east to west, operating less than one minute every fifteen minutes. At sundown or before sunrise, the trackers reposition from a 60-degree tilt in the west to a 30-degree tilt in the east to the east. The worst-case emissions scenario is when the panels reposition or reset requiring all trackers to operation simultaneously for two minutes.

5.3 Meteorological Analysis

Noise emissions can be influenced by prevailing weather conditions. Light stable winds (<3m/s) and temperature inversions have the potential to increase noise at a receiver.

Fact Sheet D of the NPI provides two options when considering meteorological effects:

- adopt the noise enhancing conditions for all assessment periods without an assessment of how often the conditions occur – a conservative approach that considers a source to receiver winds for all receivers and F class temperature inversions with wind speeds up to 2m/s at night; or
- determine the significance of noise enhancing conditions. This requires assessing the significance of temperature inversions (F and G Class stability categories) for the night-time period and the significance of light winds up to 3m/s for all assessment periods during stability categories other than E, F or G.

Standard meteorological conditions and noise-enhancing meteorological conditions as defined in Table D1 of the NPI are reproduced in **Table 13**.

Table 13 Standard and Noise-Enhancing Meteorological Conditions	
Meteorological Conditions	Meteorological Parameters
Standard Meteorological Conditions	Day/evening/night: stability categories A–D with wind speed up to 0.5m/s at 10m AGL.
Noise Enhancing Meteorological Conditions	Daytime/evening: stability categories A–D with light winds (up to 3 m/s at 10m AGL). Night-time: stability categories A–D with light winds (up to 3m/s at 10m AGL) and/or stability category F with winds up to 2m/s at 10 m AGL.

A detailed analysis of the significance of noise enhancing conditions has not been undertaken and hence, the NPI noise enhancing meteorological conditions have been applied to the noise modelling assessment are presented in **Table 14**.

Table 14 Modelled Meteorological Parameters				
Assessment Condition ¹	Temperature	Wind Speed ² / Direction	Relative Humidity	Stability Class ²
Day	20°C	3m/s all directions	50%	D
Evening	10°C	3m/s all directions	50%	D
Night	10°C	2m/s all directions	50%	F

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note 2: Implemented using CONCAWE meteorological corrections.

5.4 NPI Very Noise Enhancing Conditions

Fact Sheet D of the NPI also states:

'Noise limits derived for consents and licences will apply under the meteorological conditions used in the environmental assessment process, that is, standard or noise-enhancing meteorological conditions. For 'very noise-enhancing meteorological conditions' (see glossary²) a limit is set based on the limit derived under standard or noise-enhancing conditions (whichever is adopted in the assessment) plus 5dB. In this way a development is subject to noise limits under all meteorological conditions.'

Essentially, this means a limiting criterion of PNTL +5dB is applicable for meteorological conditions outside that adopted in the assessment. In the context of the project, this means that the operation would need to comply with PNTL +5dB for any prevailing wind or temperature inversion conditions.

5.5 Road Traffic Noise Assessment Methodology

Due to the low traffic volume generated by the project over a typical day during the construction phase, road traffic noise calculation methods such as Calculation of Road Traffic Noise (CRTN - ISBN 0 11 550847 3) by Department of Transport (UK) 1988 or Traffic Noise Model (TNM) by the United States Department of Transport, Federal Highway Administration are not considered appropriate as they are primarily intended to calculate noise emissions from motorways and highways.

Therefore, road traffic noise has been calculated using the Traffic Noise Model (TNM) by the United States Department of Transport, Federal Highway Administration Low Volume Calculation Tool at an offset distance of 25m representing the closest receivers along the transport route using the parameters presented in **Table 15**.

Table 15 Road Traffic Noise Modelling Parameters

Noise Source/Item	Lw dBA re 10 ⁻¹² W	Movements/hr	Speed, km/h	Source Height, m ¹
Heavy vehicle (rigid, semi-trailer or b-double)	104	10	60	1.5
Light vehicle	96	40	60	0.75

Note 1: Height above ground level.

² Meteorological conditions outside of the range of either standard or noise-enhancing meteorological conditions as adopted in the noise impact assessment following the procedures in Fact Sheet D.

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6 Noise Assessment Results

This assessment has quantified operational noise levels at non project related receivers for the construction and operational phases of the project.

6.1 Construction Noise Assessment

Noise levels were predicted to all identified receivers at 1.5m above ground level for typical construction activities for standard construction hours. **Figure 3** presents the highest predicted noise level as noise contours for all construction activities occurring simultaneously (trenching, piling and assembly) when at their nearest point to identified receivers.

Noise levels are expected to exceed the NMLs at 11 receivers:

- by up to 4dB at R3, R9, R12, R13, R43, R44, and R55;
- by up to 8dB at R11 and R62;
- by 10dB at R46; and
- by 12dB at R1.

Exceedances occur when works are at their nearest proximity to the receiver during standard construction hours. Exceedances are expected from all piling and assembly construction activities, however, would be of a temporary nature and of short duration. Notwithstanding, noise control recommendations during construction are provided in **Section 7** for consideration.

Predicted noise levels do not exceed the 75dBA highly noise affected threshold.

6.2 Operational Noise Assessment

Noise levels were predicted at each assessed receiver at a height of 1.5m above ground level during worst case noise enhancing meteorological conditions. Noise contours for typical operational noise levels are presented in **Figure 4**, inclusive of tracking motor resetting during the night-time period. Noise levels are expected to satisfy the PNTLs at all non-project related receivers.

6.3 Maximum Noise Level Assessment

A detailed maximum noise level assessment is not required as predicted noise levels for night-time operations do not exceed the maximum noise trigger levels of 40dB LAeq(15min) and there are no operational noise sources that generate significant maximum noise events and therefore sleep disturbance is not anticipated.

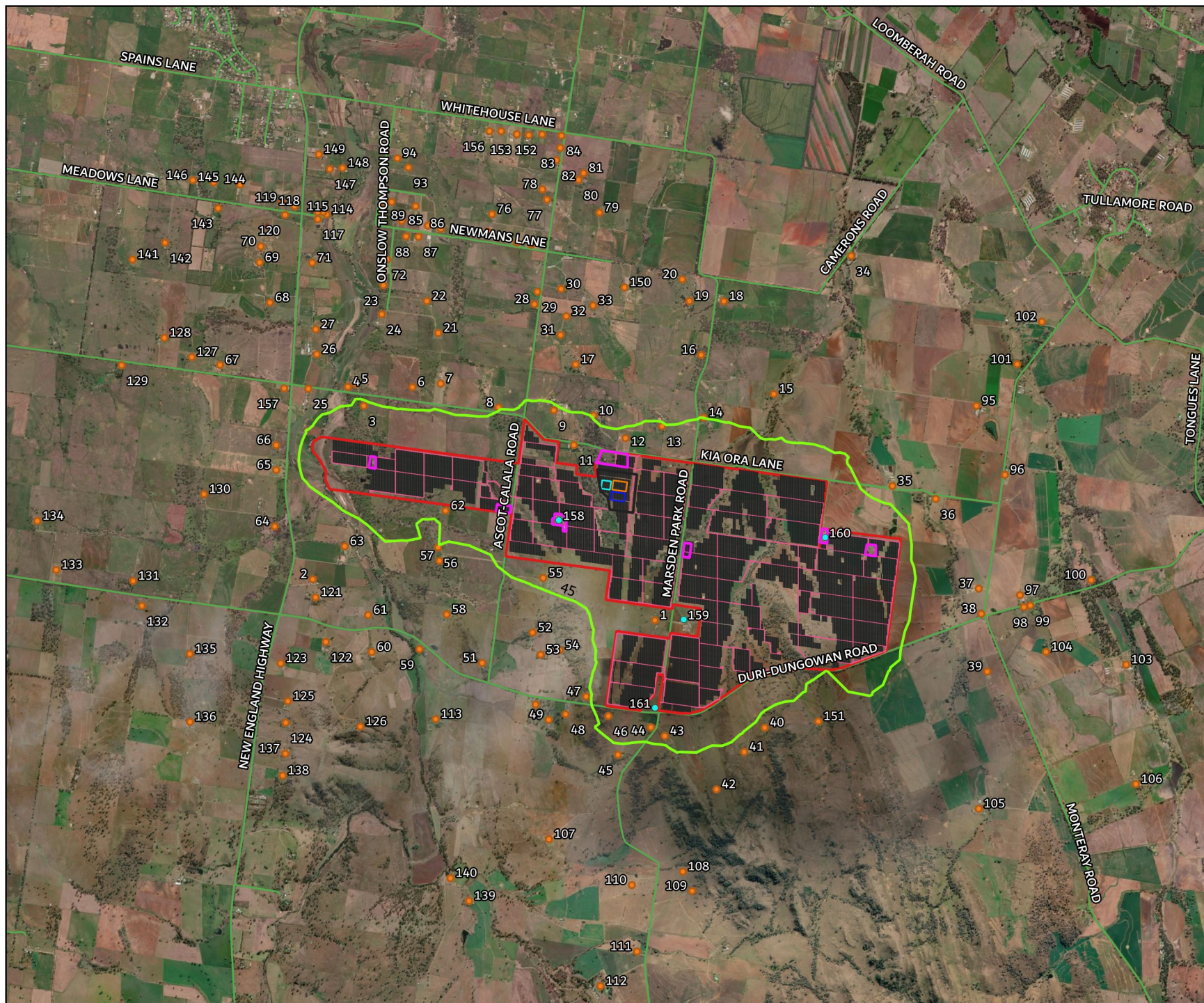


FIGURE 3
Predicted Noise Levels
Construction
MAC231979-01
Lambruk Solar Project

KEY

- Receiver
- Project Related Receiver
- Temporary Facilities
- Electrical Infrastructure
- BESS
- Substation
- Switchyard
- Solar Panels
- Project Boundary

dB LAeq(15min)

45

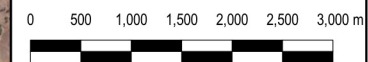
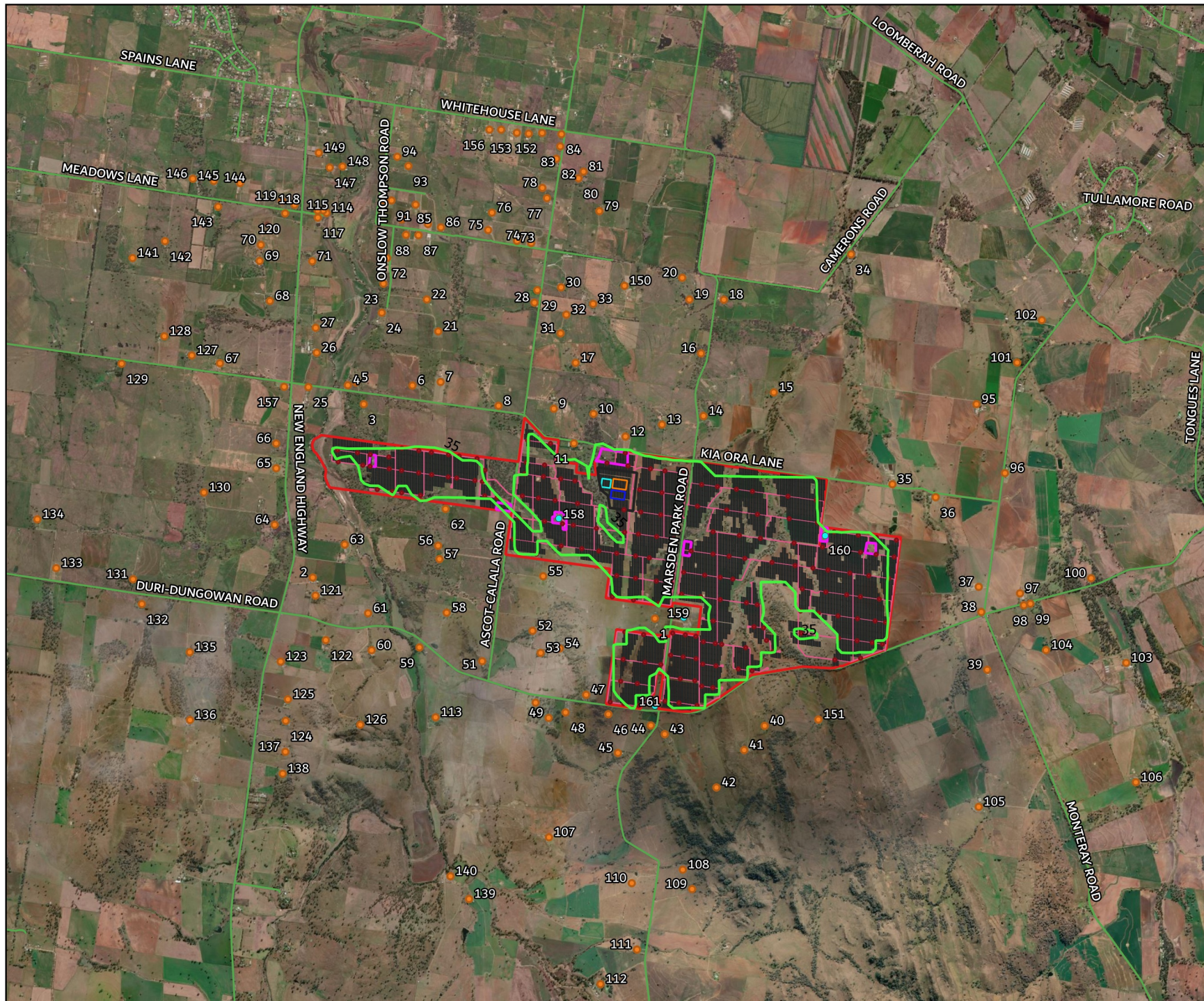
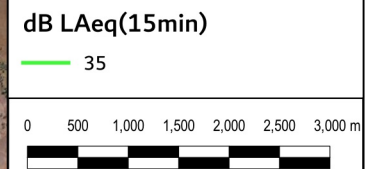


FIGURE 4
Predicted Noise Levels
Night Time
Noise Enhancing Conditions
MAC231979-01
Lambruk Solar Project



KEY

- Receiver
- Project Related Receiver
- Temporary Facilities
- Electrical Infrastructure
- BESS
- Substation
- Switchyard
- Solar Panels
- Project Boundary



6.4 Road Traffic Noise Assessment

During construction, traffic generated by the project include employee/subcontractor and delivery vehicles. The traffic volume over a typical day for standard construction hours is expected to be up to 10 heavy vehicle movements (semi-trailers or B-doubles) per hour and 20 light commercial vehicles or equivalent minibuses for worker transport during the morning and afternoon peak hour periods.

Predicted noise levels from project related construction traffic has been calculated using the methodology described in **Section 5.5** and the parameters presented in **Table 15**. The results presented in **Table 16** show the calculated noise levels as $LA_{eq}(1hr)$ for local roads and $LA_{eq}(15hr)$ for arterial/sub arterial roads to align with RNP categories and assessment periods.

Table 16 Predicted Construction Road Traffic Noise Levels

Road Type/Name	Offset Distance to Receiver	Predicted Noise Level	RTN Criteria	Compliance Achieved
Arterial, Sub Arterial and Collector Roads				
Kia Ora Lane	25m	52dB $LA_{eq}(15hr)$	60dB $LA_{eq}(15hr)$	✓
Duri-Dungowan Road				
Local Roads				
Ascot Calala Road	25m	52dB $LA_{eq}(1hr)$	55dB $LA_{eq}(1hr)$	✓
Marsden Park Road				

Results demonstrate that project construction traffic noise levels would comply with the relevant RNP criteria.

Existing road traffic flows on the New England Highway are not available. The project proposes to add an additional 20 light vehicles per hour during the morning and afternoon peak, and 100 heavy vehicle movements per day over the construction period, which would be considered a negligible increase to existing traffic flows resulting in a negligible increase in road traffic noise.

Therefore, it is concluded that project related road traffic noise levels would satisfy the relevant RNP criteria at any residential receiver along the proposed transport routes and not increase existing noise levels by more than 2dB.

7 Recommendations

7.1 Construction Noise Recommendations

It is noted that construction noise emissions are anticipated to exceed the relevant NMLs depending on the type of construction and proximity of activities to receivers. The following noise mitigation measures should be considered during the construction phase to reduce emissions to the surrounding community:

- a construction noise management protocol to minimise noise emissions, manage out of hours (minor) works to be inaudible, and to respond to potential concerns from the community;
- where possible use localised mobile screens or construction hoarding around piling rig/plant to act as barriers between construction works and receivers, particularly where equipment is near the site boundary and/or a residential receiver including areas in constant or regular use (eg unloading and laydown areas);
- operating plant in a conservative manner (no over-revving), shutdown when not in use, and be parked/started at farthest point from relevant assessment locations;
- selection of the quietest suitable machinery available for each activity;
- minimise noisy plant/machinery working simultaneously where practicable;
- minimise impact noise wherever possible;
- utilise a broadband reverse alarm in lieu of the traditional high frequency type reverse alarm;
- provide toolbox meetings, training and education to drivers and contractors visiting the site during construction so they are aware of the location of noise sensitive receivers and to be cognisant of any noise generating activities;
- signage is to be placed at the front entrance advising truck drivers of their requirement to minimise noise both on and off-site; and
- utilise project related community consultation forums to notify residences within proximity of the site with project progress, proposed/upcoming potentially noise generating works, its duration and nature and complaint procedure.

The reduction achieved from the mitigation measures will depend on the specific measures implemented. Monitoring with and without the measures in place will provide an indication of the reduction achieved.

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8 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Preliminary Noise Assessment (PNA) to quantify emissions from the proposed Lambruk Solar Project located approximately 15 kilometres south of Tamworth, NSW.

The assessment has quantified potential noise emissions from the construction and operational phases of the project.

The results of the Preliminary Noise Assessment demonstrate that noise emissions from the operation would satisfy the relevant Project Noise Trigger Levels at all non-project related receivers for all assessment periods.

Furthermore, sleep disturbance is not anticipated, as emissions from night-time operations do not exceed the maximum noise trigger level of 40dB LAeq(15min) and there are no operational noise sources that generate significant maximum noise events.

Modelled noise emissions from piling and assembly construction activities are expected to exceed the applicable construction management levels at all up to eleven (11) non-project related receivers. Recommendations have been provided to minimise the potential noise impacts from construction, albeit of a temporary nature during the daytime. Predicted noise levels do not exceed the 75dBA highly noise affected threshold.

Predicted noise levels from project related construction traffic noise emissions are expected to satisfy the applicable criteria at the nearest receivers to the transport route for all assessment periods.

In summary, the Preliminary Noise Assessment supports the Scoping Report for the project.

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Appendix A – Glossary of Terms

A number of technical terms have been used in this report and are explained in **Table A1**.

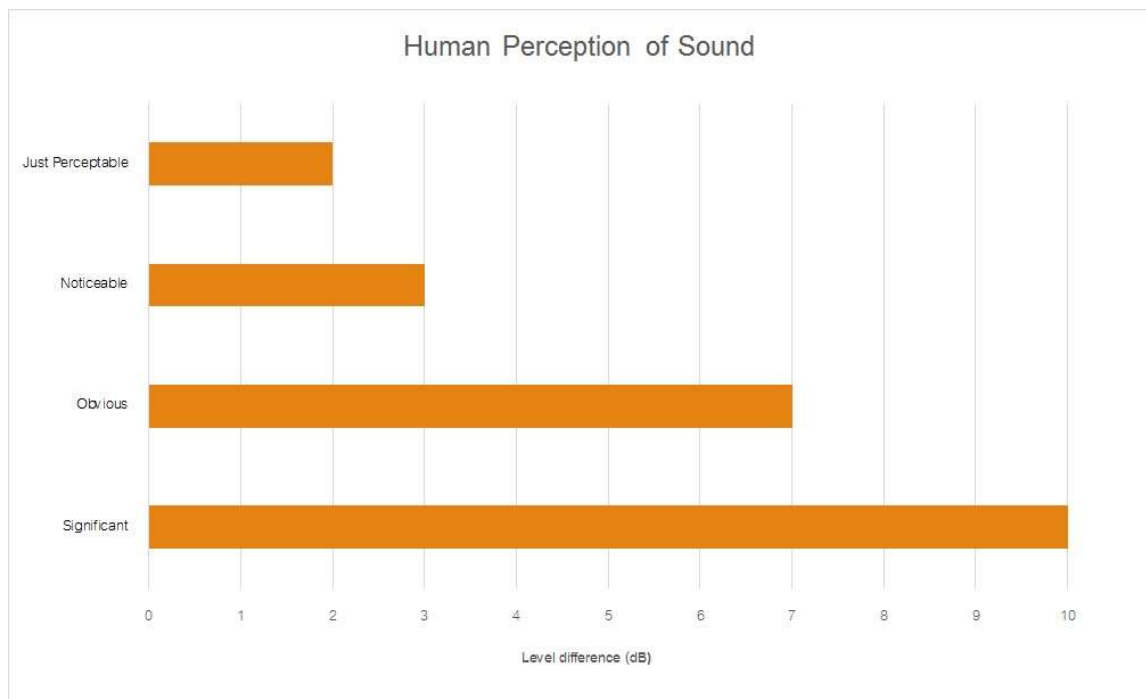
Table A1 Glossary of Acoustical Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAm _{ax}	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (L _w or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by $10 \cdot \log_{10} (W/W_0)$. Where W is the sound power in watts to the reference level of 10^{-12} watts.
Sound pressure level (L _p or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from L _w in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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Appendix E Phase 1 Social Impact Assessment

LAMBRUK SOLAR PROJECT

Phase 1 Social Impact Assessment



Prepared for Onward Consulting

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Acronyms and abbreviations

ABS	Australian Bureau of Statistics
BESS	Battery Energy Storage System
DPE	Department of Planning and Environment
EIS	Environmental Impact Statement
ha	hectares
LGA	Local Government Area
MW	Megawatt
MWh	Megawatt hour
NSW	New South Wales
RNSW	Rest of New South Wales
SAL	Suburbs and Localities
SIA	Social Impact Assessment

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Quality control

This document is for discussion purposes only unless signed and dated by a HillPDA Project Director.

Reviewer

Signature		Dated	6 December 2023
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Report details

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1.0 INTRODUCTION

HillPDA has been engaged by Onward Consulting to prepare a Phase 1 Social Impact Assessment (SIA) for the Lambruk Solar Project (the Project). The Project is a proposed 500 MW (DC), 300MW (AC) solar energy development and 300-1,200 megawatt hour (MWh) battery energy storage system (BESS) located approximately 15 kilometres south of Tamworth, New South Wales (the Project Area). The regional context of the Project Area is displayed in Figure 1.

This Phase 1 SIA has been prepared in accordance with the following:

- Social Impact Assessment Guideline for State Significant Projects (DPE, 2023)
- Technical Supplement – Social Impact Assessment Guideline for State Significant Projects (DPE, 2023).

1.1 Project description

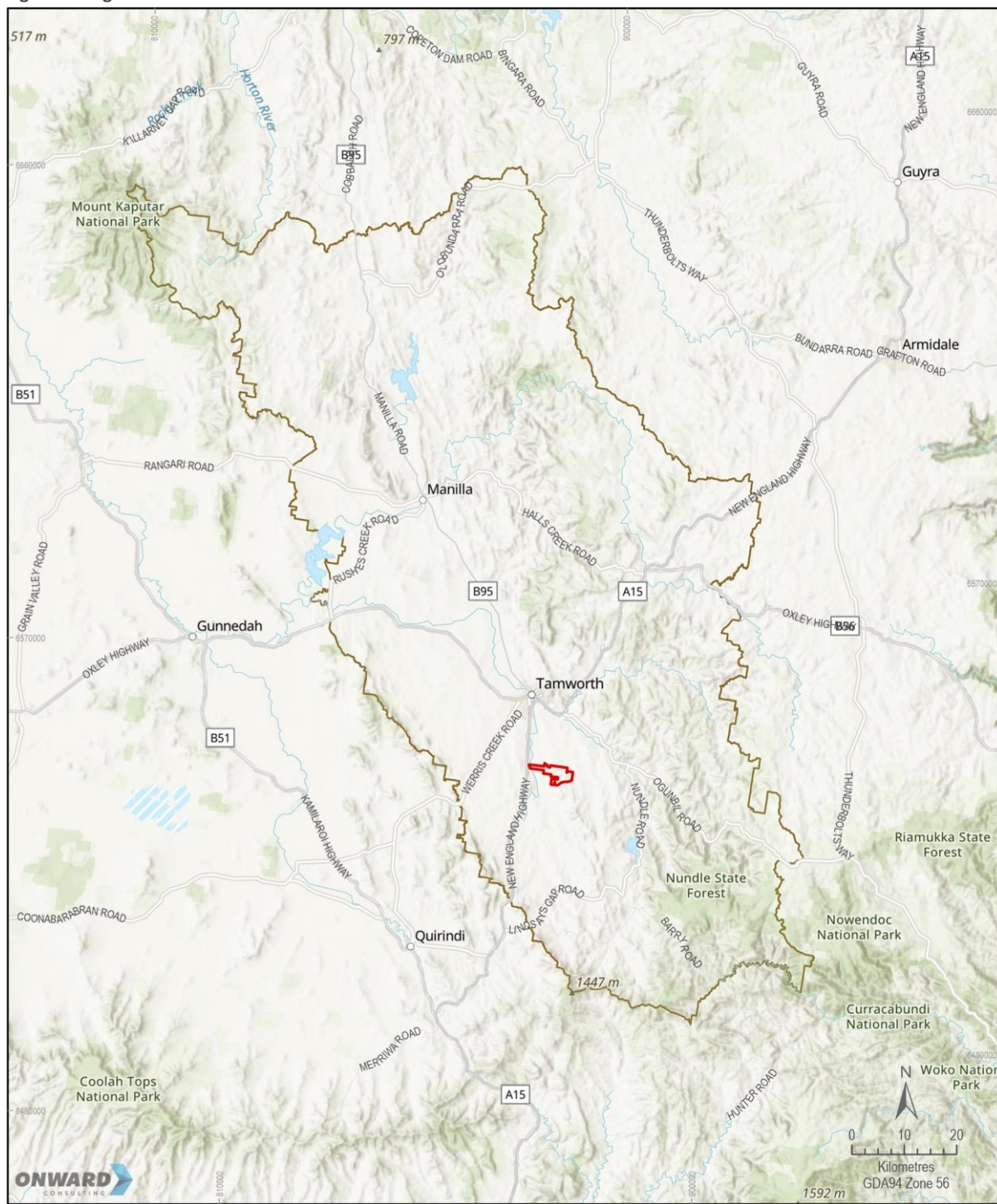
Key components and characteristics of the Project include:

- Up to 850,000 photovoltaic modules
- Up to 120 power conversion units (inverters)
- 330kV voltage substation onsite with HV/MV
- 330kV switchyard
- Augmentations to local 330kV overhead lines that currently traverse the site
- Reactive plant and other electricity network support equipment
- Temporary facilities including:
 - Access tracks
 - Hardstands
 - Laydown areas
 - Site compounds
 - Temporary site offices that may be formalised as operations site offices
 - Stockpiles.
- Permanent infrastructure including operations and maintenance compound, site offices, amenities and workshop/stores buildings, carparks, water tanks, fire-fighting equipment, internal access tracks, perimeter fencing, security and communications systems and other infrastructure
- Weather measurement stations
- Landscaping, subject to final visual impact outcomes.

The development footprint to include the required components is approximately 950 hectares (ha) within a Project Area of approximately 1,500 ha (Figure 2). The Project Area is zoned RU1 Primary Production and RU4 Primary Production Small Lots under the Tamworth Regional Local Environmental Plan 2010.

Existing access to the Project Area is via Kia Ora Lane, Ascot-Calala Road, Marsden Park Road and Duri-Dungowan Road. Access to the National Highway network is via Duri-Dungowan Road and Kia Ora Lane to the New England Highway.

Figure 1: Regional context



LEGEND

- ▭ Project Area
- ▭ Tamworth Regional Council
- ▬ Highway
- ▬ Major roads

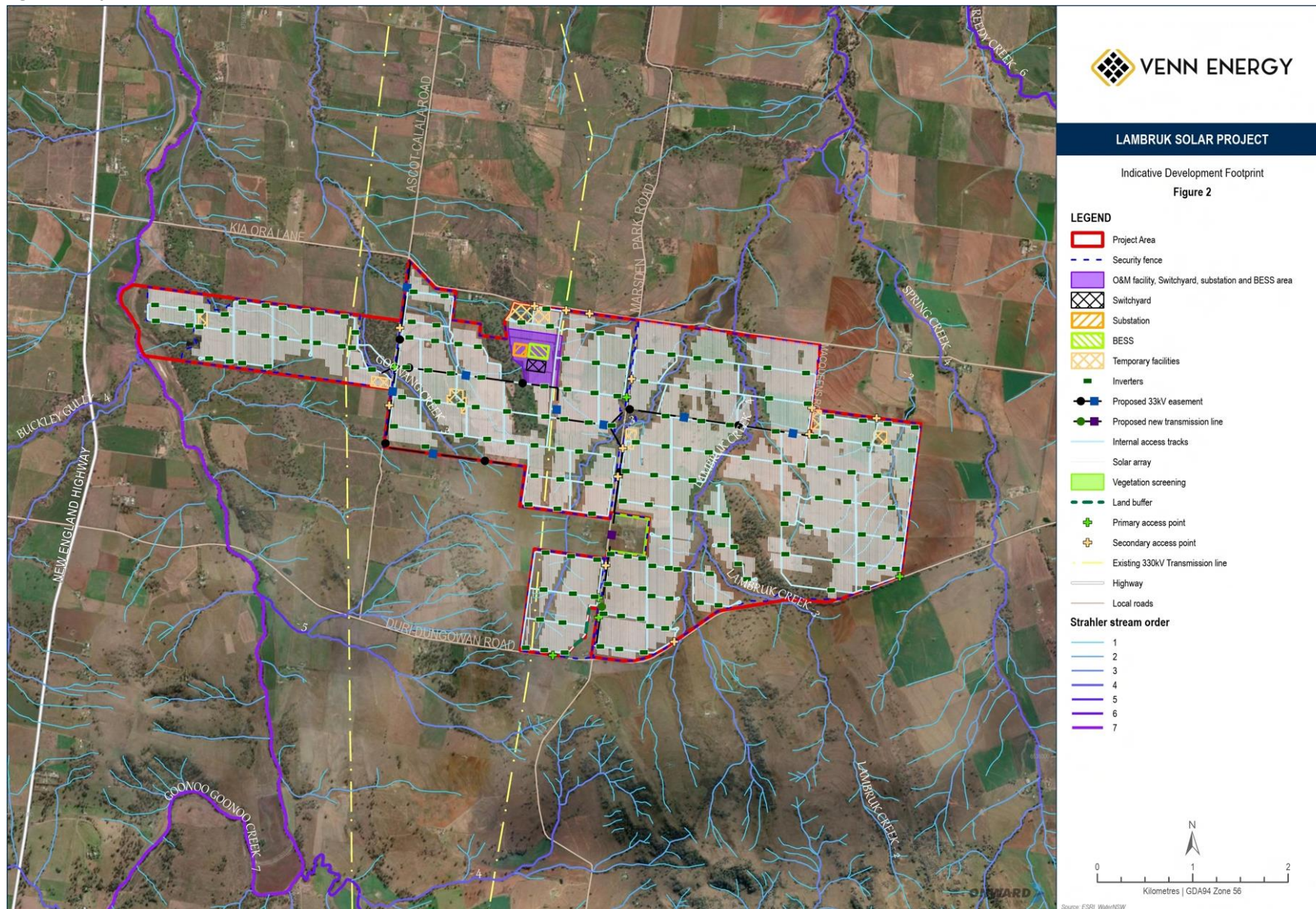


LAMBRUK SOLAR PROJECT

Regional Context of the Project Area

Source: Onward Consulting (2023)

Figure 2: Project Area



Source: Onward Consulting (2023)

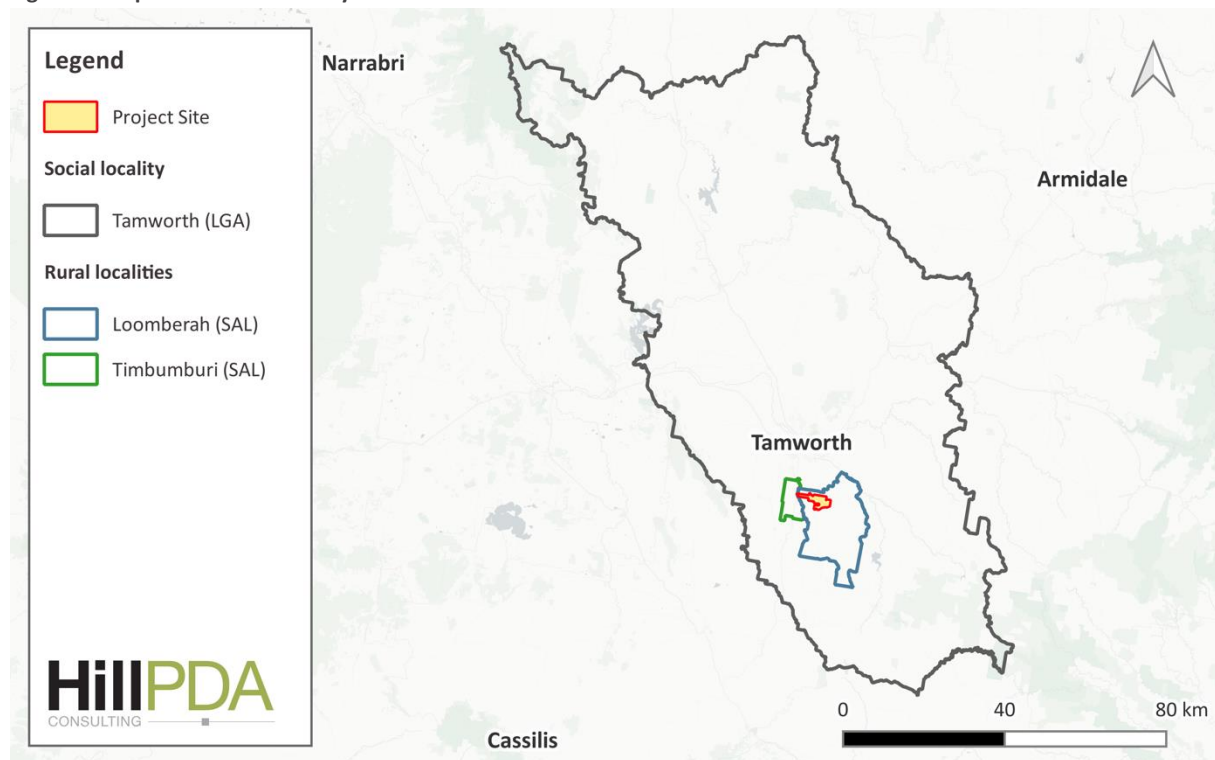
2.0 EXISTING ENVIRONMENT

2.1 Social locality

Through reference to Australian Bureau of Statistics (ABS) geographic areas, an area of social influence (social locality) for the Project has been defined as the Tamworth local government area (LGA). The Tamworth LGA spans across an area of approximately 9,900 square metres with a population of 63,070 in 2021. The social locality includes Tamworth, the nearest regional town to the Project Area. A map of the social locality is shown in Figure 3.

The Project has potential to impact surrounding landholders and localities. Those most likely to be impacted by the Project are the landowners and local communities closest to the Project footprint. The Project Area is also situated within the rural locality of Loomberah Suburbs and Localities (SAL) with 522 residents, and to the east of the neighbouring locality of Timbumburi (SAL) with 122 residents.¹ These communities, as well as the broader Tamworth LGA, are likely to experience positive and negative (direct and indirect) social impacts during the construction, operation, and decommissioning stages of the Project.

Figure 3: Map of the social locality



Source: HillPDA, ABS (2023)

2.2 Community profile

Key socio-economic indicators for the social locality from the 2021 Census are provided in Table 1. Where possible, these indicators have been benchmarked against the Rest of NSW (RNSW), which is defined by ABS as encompassing all areas of NSW excluding the Greater Sydney Region.

¹ Australian Bureau of Statistics (ABS) (2021), *Quickstats*

Table 1: Socio-economic baseline indicators (ABS, 2021)

	Population	In 2021, the social locality was home to approximately 63,070 residents, living in 27,640 dwellings. It recorded the same average household size as RNSW, at 2.4 persons per dwelling. The usual resident population of the social locality increased by 3,407 people between 2016 and 2021. This represents a total increase of approximately 5.7 per cent over the five-year period, or a growth rate of approximately 1.1 per cent per annum. In 2021, 84.6% of the population in the social locality was born in Australia, compared to 81.3% in the Rest of NSW. About 12.7% of the population in the social locality identified as Aboriginal and/or Torres Strait Islander, compared with 6.6% of the population across RNSW.
	Median age	In 2021, the median age of the social locality was 39, younger than RNSW which recorded a median age of 43.
	Age profile	There were 12,525 people over the age of 65 living in the social locality in 2021. This equalled about 20% of the overall population, slightly lower than for RNSW with 22%. The social locality had a relatively similar population makeup to RNSW though with a younger population overall, with a higher proportion of residents aged under 39 years (51%) compared to RNSW (47%).
	Language spoken at home	Approximately 6.8% of residents in the social locality spoke a language other than English at home, slightly higher than the 6.6% across RNSW.
	Need for assistance	Approximately 6.7% of residents in the social locality required assistance with core activities, compared to 6.8% across RNSW.
	Household type	There were 6,726 lone person households in the social locality, or approximately 29% of all households, compared to 28% across RNSW. There was a similar proportions of family households (70% in the social locality and 69% across RNSW).
	Household size	About 91% of dwellings in the social locality were occupied, leaving 2,298 unoccupied dwellings. This compared to 89% occupancy across RNSW. 31% of dwellings in the social locality were rented, which was higher than RNSW with 27%. Amongst rented dwellings, 33% were making rent payments greater than 30% of household income, slightly lower than RNSW, which recorded 36%. Amongst mortgaged dwellings, 11% were making repayments greater than 30% of household income, slightly lower than RNSW which recorded 13%.
	Income	The median household income was \$1,416 in the social locality, which was slightly lower than the \$1,460 across RNSW. The median personal income was \$755 in the social locality, which was slightly higher than the \$722 for RNSW.
	Work	There were 29,980 residents in the social locality aged 15 and above in the labour force, of which 60.1% worked full-time, 29.7% worked part-time, 5.7% were away from work at 4.5% were unemployed. The unemployment was slightly higher in RNSW (4.6%). Most employed residents in the social locality were employed as Professionals (18%), Labourers (14%), Technicians and Trades Workers (14%), and Managers (13%). The most common industries of employment were Hospitals (except Psychiatric Hospitals) (6%), followed by Secondary Education (3%) and Meat Processing (3%).

Source: Australian Bureau of Statistics (ABS) (2021), *Community profiles*

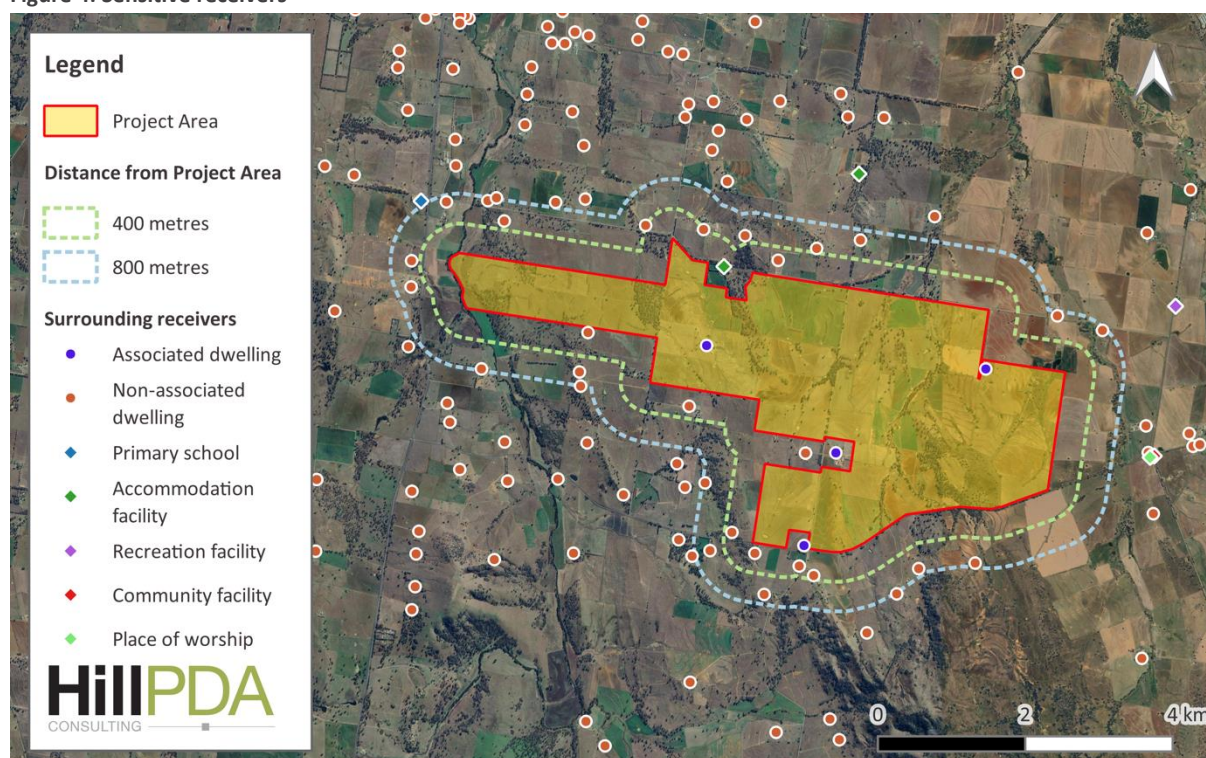
2.3 Surrounding receivers

Sensitive receivers include residential properties but may also include child care centres, places of worship, community and recreational facilities, or businesses (such as accommodation or food providers) that rely on the amenity of a locality to attract customers. Sensitive receivers located in proximity to the Project Area are identified in Table 2 and Figure 4, and include dwellings (associated and non-associated), two accommodation facilities, a school, place of worship, community facility, and recreational facility. These sensitive receivers have the potential to experience direct impacts from the Project due to their proximity to the Project Area.

Table 2: Surrounding receivers

Facility	Category	Description
Non-associated dwellings	Residence	There are 30 non-associated dwellings within an approximate 800 metre radius of the Project Area.
Associated dwellings	Residence	There are 4 associated dwellings situated throughout the Project Area.
Ivanhoe Park Homestead	Accommodation facility	A neighbouring bed and breakfast facility located at 972 Kia Ora Lane, Loomberah, adjacent to the Project Area. The accommodation facility can accommodate up to 6 guests in 3 separate bedrooms.
Timbumburi Public School	Primary school	Timbumburi Public School is located at 542 Kia Ora Lane, approximately 800 metres northwest of the Project Area. The primary school recorded 154 enrolments in 2022, with Indigenous students comprising approximately 10% of the student population.
St Luke's Loomberah	Place of worship	An Anglican church located at 1 Monteray Road, Loomberah, approximately 1.3 kilometres east of the Project Area.
Loomberah War Memorial Hall	Community facility	A memorial hall located at 1210 Loomberah Road, Loomberah, approximately 1.4 kilometres east of the Project Area. The hall was constructed in 1957 and consists of a single storey brick building.
Ranjen Farm Stay and Stables	Accommodation facility	A farm stay located at 658 Marsden Park Rd, Calala, approximately 1.5km north of the Project Area.
Tamworth Clay Target Club	Recreational facility	A gun club located on Loomberah Road, Loomberah, approximately 1.7 kilometres northeast of the Project Area.

Figure 4: Sensitive receivers



Source: HillPDA; Onward Consulting (2023) [Note: The use of a 400 metre (approx. 5 minute walk) and 800 metre (approx. 10 minute walk) catchment was informed following the initial assessment of the Project Area and is generally considered best practice].

3.0 POTENTIAL SOCIAL IMPACTS

The Department of Planning and Environment's (DPE's) Social Impact Scoping Tool has been completed to provide a preliminary consideration of potential social impacts that may arise from the Project (refer Appendix A: SIA Scoping Worksheet). Both positive and negative social impacts have been identified, which are summarised within this section and in Table 3. Impacts have been considered separately for the construction and operational phases of the Project, noting that some impacts are likely to be experienced throughout the life of the Project.

3.1 Construction

Positive impacts

Construction of the Project is likely to create social benefits for surrounding communities, stemming from:

- Increased economic activity associated with the temporary workforce as well as project construction, benefitting livelihoods. This would arise from expenditure on local materials and labour as needed for project materials, as well as indirect expenditure created by additional income to local merchants.
- Additional local employment opportunities, which would also drive indirect expenditure at local businesses, as workers purchase local goods and services.
- The possibility of new workers to the region remaining in the area long-term, contributing to local population growth with potential flow on benefits to the wider community.

While impacts to livelihood are diffuse in how they are experienced, the benefits could be magnified and focussed through local procurement and employment policies that would prioritise the local sourcing of goods and workers to maximise the benefits of construction to the area. Opportunities could be explored through the development of mitigation measures to maximise the benefits of the Project for local employment.

Negative impacts

Construction of the Project may generate a range of localised disruptions associated with:

- Dust and noise, impacting local amenity and capacity for occupants surrounding the Project Area to enjoy their surroundings.
- Possible visual disruptions arising from temporary changes to the surrounding rural landscape as works are carried out.
- Vehicle movements and congestion or delays in traffic flows, which may arise as materials and construction workers access the Project Area, generating localised noise impacts and involving changed access arrangements.
- Localised congestion impacts on the road network, potentially affecting residents and businesses undertaking their day-to-day activities (delays).
- Possible impacts to the amenity and appeal of the neighbouring accommodation facility (homestead), which could consequently have impacts on the livelihoods of the operator.

Most impacts arising from potentially disruptive construction activities on the immediate surrounds could be mitigated and managed through design refinements or construction management planning.

Additionally, impacts to the wider community may arise from the introduction of a temporary workforce during construction, which could:

- Place additional demands on local housing and accommodation services, as well as local social infrastructure and facilities. This increased demand could present a risk of displacing existing residents from rental accommodation and possibly increasing housing unaffordability through added demand.

- Impact upon cohesion within the existing community and contribute to fear that workers may engage in anti-social or unacceptable behaviours.

Strategies to manage potential impacts arising from the introduction of the temporary construction workforce should be carefully considered as part of the detailed assessment of social impacts.

3.2 Operation

Positive impacts

Once operational, the Project is likely to generate some economic activity for surrounding communities, benefitting livelihoods through:

- Local employment in operations and maintenance, as well as indirect expenditure by those workers.
- A diversification of income streams for involved landowners, which has flow on effects via greater expenditure in the local area.
- The introduction of new industries that may support the upskilling of the local workforce.
- Potential support for a community benefit fund or local grants or other types of support for community initiatives, which could enhance community cohesion.
- Indirect expenditure with local businesses as workers purchase local goods and services.
- Increased ongoing local investment from maintenance works and the development of spin-off industries

Opportunities to maximise the above benefits could be considered as part of any mitigation measures.

Negative impacts

Once operational, the Project will permanently alter the landscape near the Project Area and may contribute to negative social impacts by:

- Introducing new structures that may be considered incompatible with the existing character of the surrounding rural environment.
- Modifying the visual amenity of surrounding properties overlooking the Project Area, which could potentially be impacted by glare from the solar panels.
- Creating fears and anxieties surrounding the introduction of a new land use and its impact on local agriculture, including through the loss of productive agricultural land.
- Eliciting fears around potential ongoing environmental impacts or impacts to Aboriginal cultural heritage.
- Impacting on the livelihoods of the neighbouring accommodation facility through a reduction in natural views from the property and reduced appeal as a tourist destination and accommodation option.
- Creating fears and anxieties for landowners in the vicinity of the Project Area, who may be concerned that the Project could affect the value of their property and affect their long term wealth.
- Inducing residents to feel less connected to their surroundings or feel a sense of loss as their environment changes.

The Project will need to consider strategies to mitigate real or perceived risks of visual impact as part of the design process. Engagement with surrounding occupants and the wider community will assist in building trust and allaying any concerns around perceived risks, while also potentially yielding further strategies to mitigate potential impacts.

3.3 Summary

The potential social impacts of the Project are summarised in Table 3 below, including the impact categories, relevant Project phase, and level of assessment required for each impact listed. It should be noted that some impacts are likely to exist across the entire life of the project, throughout both the construction and operational

phases. Further detail on each impact is provided in the Scoping Worksheet (refer Appendix A: SIA Scoping Worksheet).

Table 3: Preliminary social impact assessment

Description of impact	Impact categories	Key phase	Level of assessment
Additional employment on site during the construction period would benefit livelihoods.	Livelihoods	Construction	Standard assessment
Increased demand for goods and services, producing benefits to local businesses as a result of increased economic activity.	Livelihoods	Construction	Standard assessment
Additional local economic activity through project direct and indirect expenditure on goods could benefit livelihoods.	Livelihoods	Construction	Standard assessment
Noise and vibration from construction activities on site could potentially impact adjacent properties, noting the Project Area's relatively remote location.	- Health and wellbeing - Surroundings - Way of life	Construction	Detailed assessment
Dust from construction activities on site could potentially impact adjacent properties, noting the Project Area's relatively remote location.	- Health and wellbeing - Surroundings - Way of life	Construction	Detailed assessment
Potential construction impacts on local roads (depending on point of access), causing interruptions to daily life e.g. through road closures or diversions for school buses.	- Access - Way of life	Construction	Detailed assessment
Visual impact of temporary structures required during construction phase could potentially impact adjacent properties, noting the Project Area's relatively remote location.	- Livelihoods - Surroundings - Way of life	Construction	Detailed assessment
Reduced availability of housing could result in impacts to local residents' livelihoods, way of life; and access through increased costs and reduced access to housing.	- Access - Livelihoods - Way of life	Construction	Detailed assessment
Increased demand and pressure on social, emergency and recreational services and/or facilities associated with the introduction of a temporary workforce.	- Access - Health and wellbeing - Way of life	Construction	Detailed assessment
Increased demand for labour may reduce labour availability for local services and/or businesses.	- Livelihoods - Way of life	Construction	Detailed assessment
Additional employment on site once operational would benefit livelihoods.	Livelihoods	Operation	Standard assessment
Additional expenditure by permanent employees on site once operational would benefit livelihoods.	Livelihoods	Operation	Standard assessment
Benefits to the livelihoods of involved landowners through a diversification of income streams.	Livelihoods	Operation	Standard assessment
Structures on site will permanently alter the visual landscape for surrounding properties (i.e. through the loss of scenic views or potential glare from solar panels), potentially impacting their way of life and enjoyment of surroundings.	- Livelihoods - Surroundings - Way of life	Operation	Detailed assessment
Adjacent accommodation provider may have livelihood impacted by the Project, including through a reduction in natural views from property.	Livelihoods	Operation	Detailed assessment

Description of impact	Impact categories	Key phase	Level of assessment
Fears about perceived impacts on land/property values, particularly for neighbouring properties.	Livelihoods	Operation	Detailed assessment
Fears and anxieties around introduction of a new land use and its impact on local agriculture, including through the loss of productive agricultural land.	- Decision-making systems - Livelihoods	Operation	Detailed assessment
As a new land use, the Project may elicit fears around possible ongoing environmental impacts.	- Community - Decision-making systems	Operation	Detailed assessment
Alteration of the landscape has the potential to impact tangible and intangible Aboriginal cultural heritage values.	- Community - Culture	Operation	Detailed assessment
Fears and anxieties of change to local character driven by development.	- Community - Decision-making systems	Operation	Detailed assessment

4.0 ASSESSMENT APPROACH

The SIA would be prepared to inform the Environmental Impact Statement (EIS) and align with industry best practice, including the DPE's *Social Impact Assessment Guideline for State Significant Development Applications* (2023). The SIA would scope, examine and assess potential impacts and develop mitigation measures to enhance potential positive and minimise negative impacts that may arise from the Project. The SIA would involve three broad stages:

- Establish social baseline and scope for issues by drawing from relevant sources including demographic and socio-economic data, relevant strategic planning policies and document and stakeholder engagement outcomes.
- Identify and assess potential social impacts, both positive and negative and well as direct and indirect impacts. This would include a consideration of cumulative impacts including impacts from other nearby energy projects. The significance of impacts would be evaluated using the social risk matrix method in the DPE's Guideline.
- Identify mitigation measures to minimise potential negative social impacts and maximise benefits. This could include development of a preliminary social impact management framework to support ongoing monitoring and management of impacts.

Social impacts may occur across a range of aspects of an individual's and a community's life, as shown below.

Figure 5: Types of social impact

<i>way of life</i>	how people live, how they get around, how they work, how they play, and how they interact on a daily basis
<i>community</i>	composition, character, cohesion, function, and sense of place
<i>access</i>	how people access and use infrastructure, services and facilities, whether provided by local, state, or federal governments, or by for-profit or not-for-profit organisations or groups
<i>culture</i>	both Aboriginal and non-Aboriginal culture, including shared beliefs, customs, values, and stories, and connections to country, land, waterways, places, and buildings
<i>health and wellbeing</i>	physical and mental health, especially for those who are highly vulnerable to social exclusion or substantial change, plus wellbeing of individuals and communities
<i>surroundings</i>	access to, and use of, services that ecosystems provide, public safety and security, access to and use of the natural and built environment, and its aesthetic value and amenity
<i>livelihoods</i>	people's capacity to sustain themselves, whether they experience personal breach or disadvantage, and the distributive equity of impacts and benefits
<i>decision-making systems</i>	whether people experience procedural fairness; can make informed decisions; have power to influence decisions; and can access complaint, remedy and grievance mechanisms

Source: Adapted from DPE (2023), *Social Impact Assessment Guideline*.

Potential impacts identified in this Phase 1 SIA will be analysed based on the nature of the impact and its predicted severity and assigned a level of significance in line with Table 4.

Table 4: Social impact significance matrix

		Magnitude				
		Minimal	Minor	Moderate	Major	Transformational
Likelihood	Almost certain	Low	Medium	High	Very high	Very high
	Likely	Low	Medium	High	High	Very high
	Possible	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	High
	Very unlikely	Low	Low	Low	Medium	Medium

Source: Adapted from DPE (2023), *Social Impact Assessment Guideline*.

Table 5 identifies the key inputs that would be required for the future assessment of social impacts. This includes key factors for consideration, alongside information requirements and relevant guidance documents.

Table 5: Assessment inputs for the assessment of social impacts

Aspect	Inputs
Key factors for consideration	• Social baseline • Built works • Truck and traffic movements • Temporary construction workforce • Operation workforce • Visual impacts • Community views
Guidance documents	• Social Impact Assessment Guideline for State Significant Projects (DPE, 2023) • Technical Supplement – Social Impact Assessment Guideline for State Significant Projects (DPE, 2023) • Large-Scale Solar Energy Guideline (DPE, 2022)
Information requirements	• Stakeholder engagement outcomes • Acoustic assessment • Traffic assessment • Visual impact assessment • Economic impact assessment • Accommodation strategy for temporary workers.
Cumulative assessment required?	Yes
Community engagement	• Community values • Feelings and views about the Project • Specific fears and concerns • Business operations.

APPENDIX A: SIA SCOPING WORKSHEET

Social Impact Assessment (SIA) Worksheet

Project Activities	Categories of Social Impacts	Potential Impacts on People		Previous Investigation of Impact		Cumulative Impacts		Elements of Impacts - Based on preliminary investigation					Assessment Level for Each Impact			Project Refinement	Mitigation / Enhancement Measures	
Which project activity / activities could produce social impacts?	What social impact categories could be affected by the project activities?	What impacts are likely, and what concerns/aspirations have people expressed about the impact? Summarise how each relevant stakeholder group might experience the impact. NB. Where there are multiple stakeholder groups affected differently by an impact, or more than one impact from the activity, please add an additional row.	Is the impact expected to be positive or negative	Has this impact previously been investigated (on this or other project/s)?	If "yes - this project," briefly describe the previous investigation. If "yes - other project," identify the other project and investigation	Will this impact combine with others from this project (think about when and where), and/or with impacts from other projects (cumulative)?	If yes, identify which other impacts and/or projects	Will the project activity (without mitigation or enhancement) cause a material social impact in terms of its: You can also consider the various magnitudes of these characteristics					Level of assessment for each social impact	What methods and data sources will be used to investigate this impact?			Has the project been refined in response to preliminary impact evaluation or stakeholder feedback?	What mitigation / enhancement measures are being considered?
								extent i.e. number of people potentially affected?	duration of expected impacts? (i.e. construction vs operational phase)	intensity of expected impacts i.e. scale or degree of change?	sensitivity or vulnerability of people potentially affected?	level of concern/interest of people potentially affected?		Secondary data	Primary Data - Consultation	Primary Data - Research		
Construction employment (direct)	Livelihoods	Additional employment on site during the construction period would benefit livelihoods.	Positive	No		Yes	The broader increase in economic activity and employment would likely all affect local businesses	Yes	No	No	No	Unknown	Standard assessment	Required	Broad consultation	Potentially targeted research		Local industry participation plan, focusing on local training and employment Partner with local training provider
Indirect expenditure (workers)	Livelihoods	Increased demand for goods and services, producing benefits to local businesses as a result of increased economic activity	Positive	No		Yes	The broader increase in economic activity and employment would likely all affect local businesses	Yes	No	No	No	Unknown	Standard assessment	Required	Broad consultation	Potentially targeted research		Engagement or partnership with local business groups (e.g. chamber of commerce)
Local expenditure from project	Livelihoods	Additional local economic activity through project direct and indirect expenditure on goods could benefit livelihoods.	Positive	No		Yes	The broader increase in economic activity and employment would likely all affect local businesses	Yes	No	No	No	Unknown	Standard assessment	Required	Broad consultation	Potentially targeted research		Engagement or partnership with local business groups (e.g. chamber of commerce)
Construction noise and vibration	Health and wellbeing; Surroundings; Way of life	Noise and vibration from construction activities on site could potentially impact adjacent properties, noting the site's relatively remote location	Negative	No		Yes	Construction impacts (noise, dust, visual and changes to access are generally concentrated close to the site, but would likely all be experienced by those receivers)	No	No	Yes	Yes	Unknown	Detailed assessment	Required	Targeted consultation	Targeted research		Construction Management Plan
Construction dust	Way of life; Surroundings; Health and wellbeing	Dust from construction activities on site could potentially impact adjacent properties, noting the site's relatively remote location	Negative	No		Yes	Construction impacts (noise, dust, visual and changes to access are generally concentrated close to the site, but would likely all be experienced by those receivers)	No	No	Yes	Yes	Unknown	Detailed assessment	Required	Targeted consultation	Targeted research		Construction Management Plan
Construction vehicle movements	Access; Way of life	Potential construction impacts on local roads (depending on point of access), causing interruptions to daily life e.g. through road closures or diversions for school buses.	Negative	No		Yes	Construction impacts (noise, dust, visual and changes to access are generally concentrated close to the site, but would likely all be experienced by those receivers)	Unknown	No	Unknown	Yes	Unknown	Detailed assessment	Required	Targeted consultation	Targeted research		Construction Management Plan/Construction Transport Management Plan
Visual impacts - construction	Livelihoods; Surroundings; Way of life	Visual impact of temporary structures required during construction phase could potentially impact adjacent properties, noting the site's relatively remote location	Negative	No		Yes	Construction impacts (noise, dust, visual and changes to access are generally concentrated close to the site, but would likely all be experienced by those receivers)	No	No	Unknown	Yes	Yes	Detailed assessment	Required	Targeted consultation	Targeted research		Construction Management Plan

Project Activities	Categories of Social Impacts	Potential Impacts on People		Previous Investigation of Impact		Cumulative Impacts		Elements of Impacts - Based on preliminary investigation					Assessment Level for Each Impact				Project Refinement	Mitigation / Enhancement Measures
Which project activity / activities could produce social impacts?	What social impact categories could be affected by the project activities?	What impacts are likely, and what concerns/aspirations have people expressed about the impact? Summarise how each relevant stakeholder group might experience the impact. NB. Where there are multiple stakeholder groups affected differently by an impact, or more than one impact from the activity, please add an additional row.	Is the impact expected to be positive or negative	Has this impact previously been investigated (on this or other project/s)?	If "yes - this project," briefly describe the previous investigation. If "yes - other project," identify the other project and investigation	Will this impact combine with others from this project (think about when and where), and/or with impacts from other projects (cumulative)?	If yes, identify which other impacts and/or projects	Will the project activity (without mitigation or enhancement) cause a material social impact in terms of its: You can also consider the various magnitudes of these characteristics					Level of assessment for each social impact	What methods and data sources will be used to investigate this impact?			Has the project been refined in response to preliminary impact evaluation or stakeholder feedback?	What mitigation / enhancement measures are being considered?
								extent i.e. number of people potentially affected?	duration of expected impacts? (i.e. construction vs operational phase)	intensity of expected impacts i.e. scale or degree of change?	sensitivity or vulnerability of people potentially affected?	level of concern/interest of people potentially affected?		Secondary data	Primary Data - Consultation	Primary Data - Research		
Temporary construction workforce - demand for housing	Access; Livelihoods; Way of life	Reduced availability of housing could result in impacts to local residents' livelihoods, way of life; and access though increased costs and reduced access to housing	Negative	No		Yes	Workforce impacts are likely to impact lower income community members more (those who rely on social services and rely on more affordable housing). May be exacerbated through combination with other infrastructure projects in region.	No	Yes	No	Yes	Yes	Detailed assessment	Required	Targeted consultation	Targeted research		Develop an Accommodation Strategy in conjunction with Council
Temporary construction workforce - demand for social infrastructure and services	Access; Health and wellbeing; Way of life	Increased demand and pressure on social, emergency and recreational services and/or facilities associated with the introduction of a temporary workforce	Negative	No		Yes	Workforce impacts are likely to impact lower income community members more (those who rely on social services and rely on more affordable housing). May be exacerbated through combination with other infrastructure projects in region.	No	Yes	No	Yes	Yes	Detailed assessment	Required	Targeted consultation	Targeted research		Engagement with Council and local service providers. Where capacity is constrained, identification of alternatives (e.g. telehealth)
Temporary construction workforce - labour availability for local services/businesses	Livelihoods; Way of life	Increased demand for labour may reduce labour availability for local services and/or businesses	Negative	No		Yes	Workforce impacts are likely to impact lower income community members more (those who rely on social services and rely on more affordable housing). May be exacerbated through combination with other infrastructure projects in region.	No	Yes	No	Yes	Unknown	Detailed assessment	Required	Targeted consultation	Targeted research		Engagement with Council and local businesses
Operational phase - jobs on site	Livelihoods	Additional employment on site once operational would benefit livelihoods.	Positive	No		Yes	The broader increase in economic activity and employment would likely all affect local businesses	Yes	Yes	No	No	Unknown	Standard assessment	Required	Broad consultation	Potentially targeted research		Local industry participation plan, focusing on local training and employment Partner with local training provider
Operational workforce - direct and indirect expenditure	Livelihoods	Additional expenditure by permanent employees on site once operational would benefit livelihoods.	Positive	No		No	Not required	Yes	Yes	No	No	Unknown	Standard assessment	Required	Broad consultation	Potentially targeted research		Engagement or partnership with local business groups (e.g. chamber of commerce)
Diversification of income streams for involved landowners	Livelihoods	Benefits to the livelihoods of involved landowners through a diversification of income streams.	Positive	No		No	Not required	Yes	Yes	No	No	Unknown	Standard assessment	Required	Broad consultation	Potentially targeted research		None required

Project Activities	Categories of Social Impacts	Potential Impacts on People		Previous Investigation of Impact		Cumulative Impacts		Elements of Impacts - Based on preliminary investigation					Assessment Level for Each Impact				Project Refinement	Mitigation / Enhancement Measures
Which project activity / activities could produce social impacts?	What social impact categories could be affected by the project activities?	What impacts are likely, and what concerns/aspirations have people expressed about the impact? Summarise how each relevant stakeholder group might experience the impact. NB. Where there are multiple stakeholder groups affected differently by an impact, or more than one impact from the activity, please add an additional row.	Is the impact expected to be positive or negative	Has this impact previously been investigated (on this or other project/s)?	If "yes - this project," briefly describe the previous investigation. If "yes - other project," identify the other project and investigation	Will this impact combine with others from this project (think about when and where), and/or with impacts from other projects (cumulative)?	If yes, identify which other impacts and/or projects	Will the project activity (without mitigation or enhancement) cause a material social impact in terms of its: You can also consider the various magnitudes of these characteristics					Level of assessment for each social impact	What methods and data sources will be used to investigate this impact?			Has the project been refined in response to preliminary impact evaluation or stakeholder feedback?	What mitigation / enhancement measures are being considered?
								extent i.e. number of people potentially affected?	duration of expected impacts? (i.e. construction vs operational phase)	intensity of expected impacts i.e. scale or degree of change?	sensitivity or vulnerability of people potentially affected?	level of concern/interest of people potentially affected?		Secondary data	Primary Data - Consultation	Primary Data - Research		
Permanent changes to visual amenity on and around site	Livelihoods; Surroundings; Way of life	Structures on site will permanently alter the visual landscape for surrounding properties (i.e. through the loss of scenic views or potential glare from solar panels), potentially impacting their way of life and enjoyment of surroundings	Negative	No		Yes	Permanent changes to the surroundings has the potential to negatively impact on the livelihoods and way life of neighbouring properties	No	Yes	Yes	Yes	Yes	Detailed assessment	Required	Targeted consultation	Targeted research		Robust engagement with neighbours Landscape plan Glint and glare assessment to be prepared in accordance with the requirements outlined in the Large-Scale Solar Energy Guideline (DPIE, 2022)
Impacts to the livelihoods of adjacent accommodation provider(s)	Livelihoods	Adjacent accommodation provider may have livelihood impacted by the Project, including through a reduction in natural views from property.	Negative	No		Yes	Permanent changes to the surroundings has the potential to negatively impact on the livelihoods and way life of neighbouring properties	No	Yes	Yes	Yes	Yes	Detailed assessment	Required	Targeted consultation	Targeted research		Robust engagement with neighbours Landscape plan
Fears about potential impacts on land/property values	Livelihoods	Fears about perceived impacts on land/property values, particularly for neighbouring properties.	Negative	No		Yes	Permanent changes to the surroundings has the potential to negatively impact on the livelihoods and way life of neighbouring properties	Unknown	Unknown	No	Yes	Yes	Detailed assessment	Required	Targeted consultation	Targeted research		Robust engagement with neighbours and wider community
Fears of land use conflicts with agriculture	Decision-making systems; Livelihoods	Fears and anxieties around introduction of a new land use and its impact on local agriculture, including through the loss of productive agricultural land	Negative	No		Yes	Permanent changes to the surroundings has the potential to negatively impact on the livelihoods and way life of neighbouring properties	Unknown	Unknown	No	Yes	Unknown	Detailed assessment	Required	Targeted consultation	Targeted research		Robust engagement with neighbours and wider community Explore possible agricultural uses within site
Fears about new land use and possible ongoing environmental impacts	Community; Decision-making systems	As a new land use, the proposal may elicit fears around possible ongoing environmental impacts	Negative	No		No	Not required	Unknown	Unknown	No	Yes	Unknown	Detailed assessment	Required	Targeted consultation	Targeted research		Early and comprehensive community engagement throughout process Bush management and regeneration plan
Fears of impacts to culture through alteration of the landscape	Community; Culture	Alteration of the landscape has the potential to impact tangible and intangible Aboriginal cultural heritage values	Negative	No		No	Not required	Unknown	Unknown	No	Yes	Unknown	Detailed assessment	Required	Targeted consultation	Targeted research		Early and comprehensive engagement with LALC and Aboriginal stakeholders
Fears of change to local character	Community; Decision-making systems	Fears and anxieties of change to local character driven by development	Negative	No		No	Not required	Unknown	Unknown	No	Yes	Unknown	Detailed assessment	Required	Targeted consultation	Targeted research		Early and comprehensive community engagement throughout process

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Appendix F Community and Stakeholder Management Plan



Lambruk Solar Project

Community and Stakeholder
Management Plan

December, 2023

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Executive Summary

Venn Energy Pty Ltd ('Venn Energy') is an Australian renewable energy development company, founded by Canadian developer Venn Energy Inc., and Aira Group, an owner operator of renewable energy systems in Turkey and Europe.

Venn Energy is proposing to develop the Lambruk Solar Project (the Project), approximately 15 kilometres (km) south of Tamworth, NSW. The Project would include photovoltaic (PV) solar arrays, a switchyard, a Battery Energy Storage System (BESS), internal access tracks, an office and amenities building(s) and onsite transmission lines.

Venn Energy has developed this Community and Stakeholder Management Plan (CSMP) to outline and document the process of community and stakeholder engagement for its proposed 300MW solar farm project (the Project) in the locality of Loomberah, NSW.

The plan includes a project overview, the objectives of the plan and Venn Energy's approach to engaging with targeted stakeholders. There are several key stakeholder risks that are identified along with mitigation strategies.

Within the Plan, there has been an initial stakeholder mapping activity completed, which outlines the key landowners on the project. Key engagement principles have been outlined within the plan, as well as an overview of the International Association of Public Participation's (IAP2) Engagement Spectrum and recommended guidelines to inform the community and stakeholders of the project.

Community engagement will be focused on providing clear communication regarding the project context, project scope and how any impacts as a result of the project will be addressed and mitigated. Engagement activities will also align and adhere to the relevant legislative guidelines that inform engagement of State Significant Developments (SSD).

Venn Energy is committed to building long-term relationships and trust with the whole surrounding communities and believes this is an integral part of ensuring the development is sustainable in the long term.

Strong community engagement creates mutual benefits for developers and communities, including outcomes such as:

- The establishment of respectful relationships, which can foster community support for and identification with project operations and goals
- Decreased levels of misinformation about the project and renewable energy
- Reduced reputational damage
- Mitigated risk to projects
- Reduced financial and legal costs for developers.

Therefore, Venn Energy is committed to having the necessary activities and infrastructure in place to:

- Deliver a robust and consistent approach to community engagement
- Develop effective engagement processes and tools
- Build trust and constructive relations between the company and local communities
- Build confidence in communities about the benefit of the solar energy project
- Improve the industry's credibility and reputation

- Provide a consistent and agreed mechanism for accountability for community engagement practices across the industry
- Allow effective community input to the project.

This CSMP aims to achieve the following objectives and metrics to support the Proposal and the communities surrounding it:

Objectives	Measures
– Produce clear information on the Proposal, potential impact and benefits	– Delivery of high-quality communications across all targeted channels
– Deliver a highly accessible engagement process	– % of locals that participate in the process
– Develop a sense of local ownership in the Proposal	– Number of local advocates
– Proactively identify and address issues and concerns from stakeholder raised during consultation activities	– Identification of issues and likely mitigations prior to EIS phase
– Demonstrate compliance with the SSD assessment process	– SSD assessment process
– Demonstrate sharing of Proposal benefits	– Creation of a successful community led Community Benefit Program
– Deliver best practice engagement (e.g. Clean Energy Council Community Engagement Guidelines)	– Evaluation against industry benchmarks and recognition (e.g. Clean Energy Council, IAP2 Core Values Awards (Infrastructure))
– Maintain a positive corporate image for Venn Energy and the renewable energy industry	– Development of social licence to operate – Management of social and reputational risks

Community and stakeholder engagement is important during the six key stages of the project lifecycle:

1. Site Selection
2. Feasibility and pre-development
3. Planning and approvals
4. Construction
5. Commissioning and operations
6. Decommissioning.

This CSMP will be reviewed, evaluated and updated as necessary, depending on the needs of each stage and will offer practical advice for action.

Introduction

Venn Energy Pty Ltd ('Venn Energy') is an Australian renewable energy development company, founded by Canadian developer Venn Energy Inc., and Aira Group, an owner operator of renewable energy systems in Turkey and Europe.

Venn Energy is proposing to develop the Lambruk Solar Project (the Project), approximately 15 kilometres (km) south of Tamworth, NSW. The Project would include photovoltaic (PV) solar arrays, a switchyard, a Battery Energy Storage System (BESS), internal access tracks, an office and amenities building(s) and onsite transmission lines.

The Project aims to provide a contribution to NSW's transition to renewable energy in accordance with Federal, State and local emission reduction policies. The increase in renewable energy generation, supported by appropriate storage and transmission infrastructure, will reduce Australia's reliance on fossil fuels for electricity generation and the adverse impacts of climate change.

Venn Energy's principal activities for the Project include development approvals, construction, operation and asset management. With a commitment to sustainability, Venn Energy's mission is to develop and support sustainable green projects by supplying clean renewable energy into the grid. Venn Energy has a pipeline of more than 1 GW in renewable energy projects in Australia.

The Project will require the support of a range of stakeholders, initially the host landowners to ensure the required land area is available for the development. The stakeholder liaison activities will extend to neighbouring properties, community groups and government agencies.

This Community and Stakeholder Management Plan (CSMP) aims to break down the recommended approach and implementation timeline of the stakeholder engagement process, using established frameworks developed by the International Association of Public Participation's (IAP2) Engagement Spectrum. The potential risks and engagement issues will be evaluated, and mitigating strategies developed.

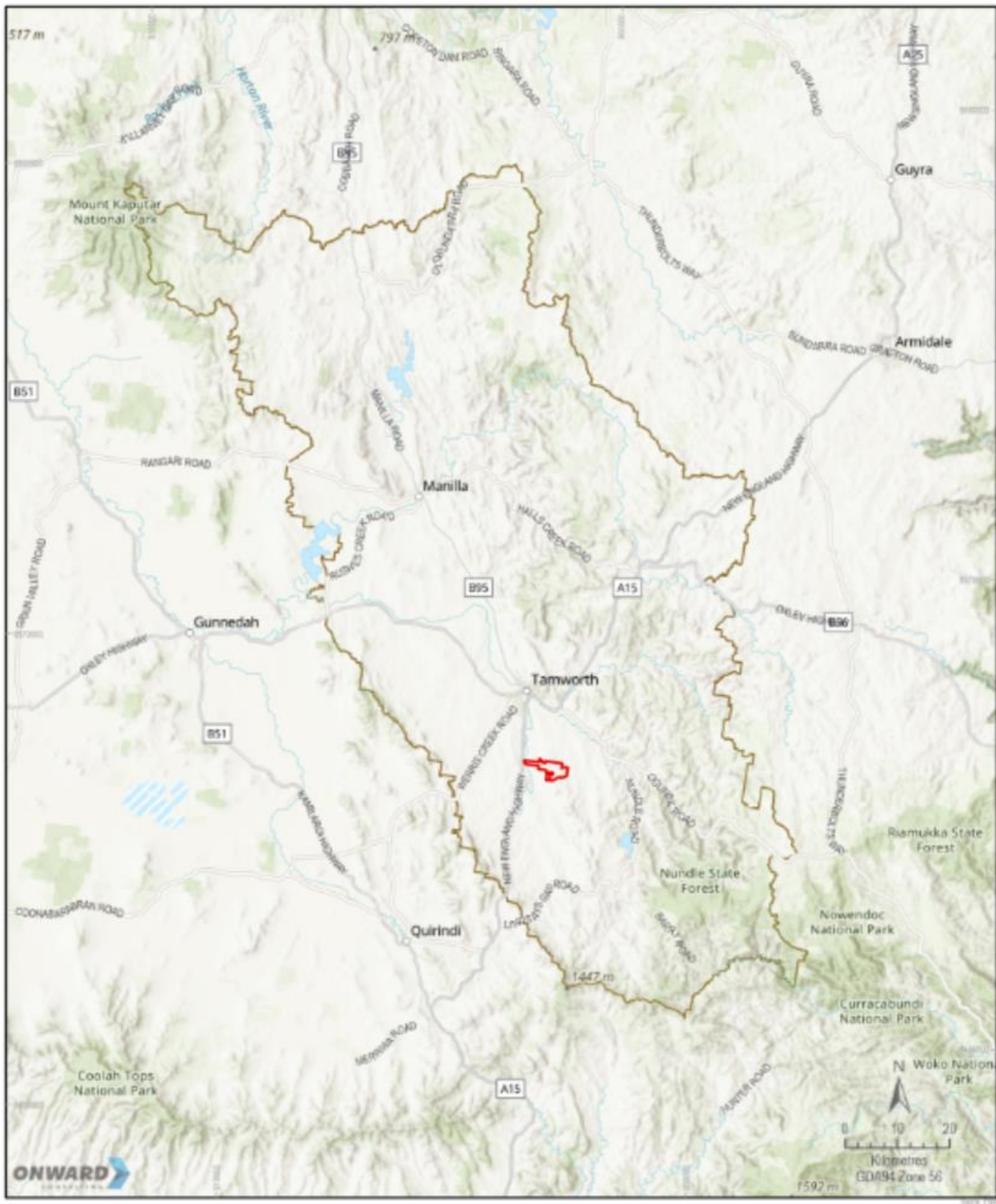
This CSMP has been developed to support Venn Energy's Lambruk Solar Project (the Proposal) and the impact on relevant stakeholders, and encompasses community and stakeholder engagement, communications, liaison, and consultation activities.

Project Overview

Venn Energy is in the initial stages of developing a proposed solar farm and battery storage. The proposed site is between Kia Ora Lane and Duri-Dungowan Road approximately 15 km southeast of Tamworth, NSW within the locality of Loomberah and Timbumburi. The Project lot boundaries cover approximately 1,528 ha within the Tamworth Regional Council Local Government Area (LGA) and is zoned Primary Production (RU1), with the inclusion of some smaller Primary Production Small Lots (RU4), which were rezoned from RU1 under the Tamworth Regional Local Environment Plan 2010. The Lambruk Solar Project footprint has a disturbance of approximately 1,003 ha of the total 1,528 ha Project Area.

Lease agreements and freehold purchases have already been secured for the solar farm development. The development will include the construction of solar panels, switchyard, access roads (upgrading of existing roads and creating new roads), and operations and maintenance facilities.

The Project is a proposed 300 megawatt (MWac) solar energy development, and 300MW battery energy storage system.


LEGEND

-  Project Area
-  Tamworth Regional Council
-  Highway
-  Major roads

Figure 1: Lambruk Solar Project location

Proposal drivers

During the site selection process, this site was preferred through consideration due to the following:

- The area has excellent solar exposure.
- An existing transmission line on site, allows for easy connectivity to the grid, and means additional transmission line construction outside of the project are will not be needed.
- The site has already been largely cleared of native vegetation and heavily disturbed by previous cultivation and cropping.
- The proposed layout allows for the minimal disturbance of native vegetation and wildlife.

The project will provide benefits through the following:

- The Proposal will significantly contribute towards the NSW Government's aim of reaching net-zero emissions by 2050, by supplying clean renewable energy into the grid.
- This clean energy is critical to replace the fossil energy from nearby coal-fired power plants, which will be decommissioned progressively from 2023 onwards.
- The Proposal will leverage the momentum created by and contribute to the outputs of the New England Renewable Energy Zone (REZ). By connecting multiple generators and storage in the same location, REZs capitalise on economies of scale to deliver cheap, reliable, and clean electricity for homes and businesses in NSW¹.
- To deliver sustainable long term energy solutions that benefit the community and the environment.

¹ Sourced from <https://www.energy.nsw.gov.au/renewables/renewable-energy-zones>

Relevant Guidelines and their requirements

DPE SSD guidelines

The NSW Department of Planning and Environment (DPE) has developed a range of guidelines to inform engagement around and assessment of State Significant Developments. These guidelines for State Significant Development (SSD) provide insight into the engagement and social impact considerations that the DPE will use to review this Proposal and therefore, the requirements that we need to keep in mind in building this management plan.

Guidelines	Requirements
Undertaking Engagement Guidelines for State Significant Projects (DPIE, 2022)	Effective engagement underpins a transparent and fair environmental assessment. Careful consideration of diverse viewpoints can help achieve good planning outcomes and avoid unintended negative impacts on communities, the environment, the economy or Government. The proponent is required to engage with the community, councils and government agencies on State Significant Development (SSD) projects. Engagement related to SSDs should be: — Open and inclusive — Easy to access — Relevant — Timely, and — Meaningful. To facilitate effective engagement, proponents will be expected to: — Provide clear and concise information about the Proposal and its impacts — Implement activities that encourage and facilitate participation — Report back on what was heard, what has or hasn't changed, and why.
Large-Scale Solar Energy Guideline (DPIE, 2022)	Applicants are encouraged to engage with relevant stakeholders at all stages of the environmental impact assessment of State significant solar energy development, from scoping through to post-approval. Proposal specific "Secretary's Environmental Assessment Requirements (SEARs) and consent conditions may also include consultation requirements that must be complied with. Within the Assessment issues section of this guide, the following relevant items are included: — Visual impacts: The impacts on landscape character and values and the visual amenity of landholders and communities. — Land use conflicts: While this is typically informed by Zoning, it may be considered through the lens of community concerns regarding conflicts with lifestyle blocks in addition to concerns regarding impacts on 'prime agricultural land'. — Social and economic impacts: Impacts, both positive and negative (including how they are distributed), of the proposed development on potentially affected people and groups. This includes workforce accommodation, job creation opportunities, and flow-on economic impacts to local communities. — Public interest: including the public interest in renewable energy, the objects of the EP&A Act and the principles of ecologically sustainable development. — Cumulative impacts: Any cumulative impacts from any other developments (proposed, approved and operating), especially biodiversity, visual impacts, socio-economic and construction traffic impacts. This needs to be considered in light of the multiple solar proposals in the area.

Guidelines	Requirements
Social Impact Assessment Guideline (DPE, 2023)	The new guideline (February 2023) provides a rigorous framework to identify, evaluate and respond to social impacts. Taking effect in February 2023, it focuses on predicting impacts; refining the Proposal to avoid negative impacts and enhance benefits; minimising then mitigating negative impacts and maximising benefits; and finally managing impacts. Importantly, it notes the need to engage early to identify issues that can inform the social impact assessment and work to identify reasonable and achievable mitigations for these (which may include Proposal modifications) prior to submitting the Scoping Report.

Other industry guidelines

The following guidelines were developed by industry and advocacy bodies to help guide the planning and delivery of community benefits and establishment of trust for large scale renewable energy projects, including transmission corridors. A snapshot of their recommendations is included below.

Publication	Relevant inclusions
A Guide to Benefit Sharing Options for Renewable Energy Projects – Clean Energy Council (2019)	Includes methods for developing a benefit sharing strategy and working in partnership with local communities. It outlines ways to: – Calculate a benefit sharing budget – Develop a theory of change to deliver the desired impact – Undertake social feasibility to refine and test the strategy in the community – Implement, monitor and evaluate the project in the community.
Re-Alliance Community Benefits Handbook, September 2021	The purpose of this handbook is to equip local community leaders with information and ideas to get started thinking big about how to leverage the renewables boom into local opportunities that address local needs and desires. It covers what kinds of benefits regional communities are already seeing in different parts of the country from large-scale renewables and begins to picture what these might look like on a bigger scale with industry investment concentrated across a region.
Re-Alliance Building Trust for Transmission – Earning the social licence needed to plug in Australia’s Renewable Energy Zones, July 2021	Re-Alliance recommends that consideration of the social and environmental impacts of new transmission infrastructure be included within the planning process. They propose that there should be early engagement with stakeholders: – Landholders and asset owners along potential transmission line routes – Local community members and groups – Local Councils and State Planning Departments – First Nations, environment, and other special interest groups. This early engagement may reveal the level of challenge associated with this project and the possible strategies to mitigate community concerns, such as alternative route selection or technical solutions such as undergrounding. While this Proposal does not include development of transmission lines, the industry and community expectations in this related area are worth noting.

Engagement objectives for this proposal

The CSMP aims to achieve the following objectives to support the Proposal and meet the needs of the surrounding communities.

Objectives	Measures
Initiate conversations with neighbouring residents, sensitive receivers and key stakeholders	- Letters of introduction distributed, offering contact details and an opportunity to meet - Number of residents and stakeholders interested in meeting with project team
Create a basis for consistent, genuine and reliable engagement from scoping through to EIS and project approval	Establish communication and engagement database of stakeholders and interactions
Consistent, transparent information for interactions and subsequent engagement	- Development of initial key messaging - Reliable, regular delivery of communications through lifecycle of the Proposal
Inform the consultation process by gathering feedback and questions from the scoping phase	Compile any questions or suggestions from initial interactions to feed into next stage of engagement
Work together with the neighbouring properties in a collaborative way	- Identification of issues and likely mitigations throughout Proposal phases - Identification of benefit sharing opportunities - Clear, open lines of communication through the Proposal
Develop a sense of local ownership in the Proposal	Number of local advocates
Maintain a positive corporate image for the client and the renewable energy industry	- Management of social and reputational risks - Regular communications featuring clear messaging and opportunities for feedback from wider community
Produce clear information on the potential impacts and benefits for the environment, community, and region	Delivery of high-quality communications across all targeted channels with clear messaging regarding the Proposal
Support an uplift in the regional economy and level of local prosperity	Regional economic assessment
Demonstrate sharing of Proposal benefits	Creation of a successful community led Community Benefit Scheme or Voluntary Planning Agreement
Support and engage local capabilities	Number of local suppliers including Aboriginal owned suppliers

Broader stakeholder setting

Outside of the host landholders, there are a range of interests and stakeholders to be considered for communication and engagement activities. The engagement approach recommended for each stakeholder refers to the IAP2 Engagement Spectrum.

Stakeholder Group	Inclusions/details	Influence (H/M/L)	Impact (H/M/L)	Engagement approach
Near neighbours within 2km	This group may be affected by the visual impact of the Proposal, the noise and heavy vehicle traffic associated with the construction phase (TBC).	High	High	Consult Involve Collaborate
Loomberah and Timbumburi locality	Residents within the Loomberah and Timbumburi locality	High	Medium	Inform Consult Involve
Tamworth Regional Council	- Mayor, Cr Russell Webb - Peter Ross - Acting Director Growth and Prosperity - Gina Vereker – Director Liveable Communities	High	Medium	Consult Involve Collaborate
State MP	Kevin Anderson (Nationals) Minister for Lands and Water Minister for Hospitality and Racing	Medium	Medium	Inform Consult
Federal MP	Barnaby Joyce Deputy Prime Minister and Minister for Infrastructure, Transport and Regional Development	Medium	Medium	Inform Consult
Traditional Owners – Indigenous community	The Tamworth Local Aboriginal Land Council (LALC)	High	High	Consult Involve Collaborate
Rural Fire Service (RFS)	- Loomberah RFS Brigade - Duri RFS - Zone RFS	Medium	Low	Consult Involve
Business groups / industry stakeholders	Tamworth Business Chamber	Medium	Medium	Inform Consult

Stakeholder Group	Inclusions/details	Influence (H/M/L)	Impact (H/M/L)	Engagement approach
				Involve
Community organisations	— Loomberah War Memorial Hall Committee — Timbumburi Public School — Tamworth Clay Target Club — Dungowan Cowboys Rugby League Club — Tamworth Regional Landcare	Medium	Medium	Consult Involve

Engagement overview

It is always important to apply a mix of engagement tools and techniques to allow for a range of inputs and participation opportunities.

For this project, it is recommended that a mix of traditional face-to-face methods and innovative digital tools are used to support the solar, energy storage and the wind component planning.

It is expected that outside of the landholders, engagement activities will sit on the Inform, Consult and Involve side of the IAP2 engagement spectrum.

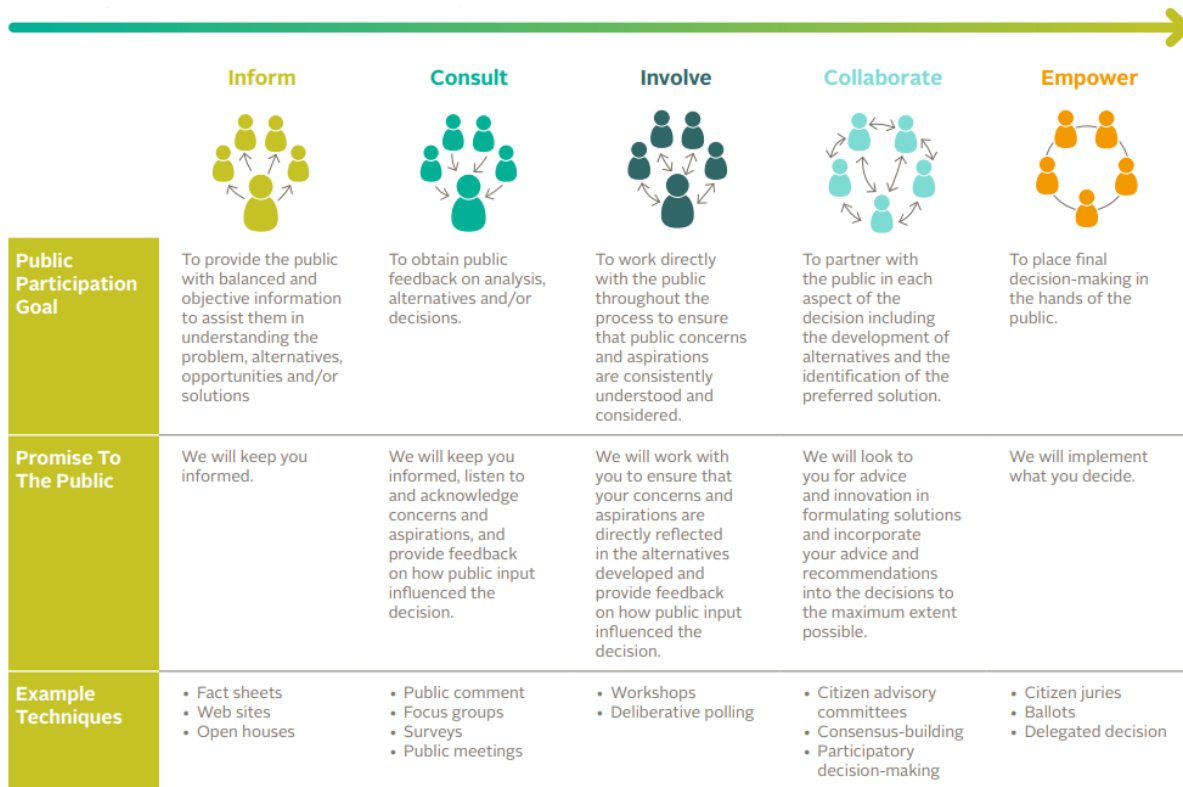


Fig 3: IAP2 Engagement Spectrum

Community Engagement Model

There are differing options available (as shown in the IAP2 Community Engagement Model). For this project, it is appropriate that the predominant approach is Organisation Leads/Act, whereby organisations lead engagement and seek input to shape the policies, projects and services for which they are responsible. This form of engagement is used to both inform the community about the proposed policy, project or propositions and to provide some input to the shape or execution of the policy, project or proposition.



Fig 4: IAP2 Community Engagement Model

Engagement Goals

Specifying the goals of the proposed engagement is critical to establishing the design of engagement and evaluating its success. The example goals for this project reflect the stakeholder analysis of the project and appropriate participation.

Common Types	Example Goals	Success Criteria
Share information process	To share information with stakeholders and the public about the project and the opportunity to engage. To ensure that a significant proportion of the stakeholders and community are reached and able to access the information. To create stakeholder and public satisfaction with the information process.	- Reach - % of key stakeholder groups and community target groups reached by information. - Accessibility of information for people with disability. - Diversity of information delivery modes. - Stakeholder and community awareness of engagement.
Comply with law	To meet legal requirements. To engage in a cost-efficient way.	- Legal compliance. - Cost efficient communication, outreach and engagement.
Understand reactions	To understand the views of stakeholders and communities. To understand the implications or consequences of a proposal.	- Reach - % of key stakeholder groups and community target groups who responded. - Representation – adequacy and diversity of representation across the target groups. - Understanding of stakeholder and community perspectives. - Feedback from stakeholders and community target groups.
Problem solve	To create an expanded set of propositions and solutions or options for the resolution of the problem of future development.	- Increase in awareness and understanding of project and proposition. - Understanding of community reactions, issues and concerns and ideas for improvement. - Creation of new problem definition and potential solutions. - Strengthen relationships with stakeholders or across the community.

Fig 5: Example Engagement Goals

Engagement Principles

The following key engagement objectives will take place ensuring all affected stakeholders are properly informed of the project:

- **Proactive:** Engage with relevant stakeholders early in the decision-making process to ensure all information about the project is timely, accessible and easy to understand.
- **Honest:** Ensure that Venn Energy acts honestly and transparently with all key stakeholders during the decision-making process associated with the solar and wind farm renewable project.
- **Inclusive:** Demonstrate Venn Energy's commitment to working closely with all key stakeholders to ensure all queries and concerns are understood.
- **Communicate:** Inform all key stakeholders about the project and communicate on a regular basis.
- **Improve:** Continuously evaluate community engagement and modify when needed, to ensure Venn Energy meets stakeholder expectations.

We subscribe to the International Association for Public Participation (IAP2) Core Values, which state that public participation:

- Is based on the belief that those who are affected by a decision have a right to be involved in the decision-making process
- Includes the promise that the public's contribution will influence the decision
- Promotes sustainable decisions by recognising and communicating the needs and interests of all participants, including decision makers
- Seeks out and facilitates the involvement of those potentially affected by or interested in a decision
- Seeks input from participants in designing how they participate
- Provides participants with the information they need to participate in a meaningful way
- Communicates to participants how their input affected the decision.

Best Practice Engagement

The following is an overview of what industry best practice engagement should look like.

Tool	Site Selection	Feasibility	Planning and Approval	Construction	Commissioning and operations	De-Commissioning
Baseline study	✓	✓	✓	✓	✓	✓
Stakeholder identification & mapping	✓	✓	✓	✓	✓	✓
One-on-one briefings	✓	✓	✓	✓	✓	✓
Newsletters	✓	✓	✓	✓	✓	✓
Project websites			✓	✓	✓	✓
Telephone lines	✓*	✓	✓	✓	✓	✓
Advertisements		✓	✓	✓	✓	✓
Drop-in centre			✓	✓	✓	✓
Open houses			✓	✓	✓	✓
Site visits			✓	✓	✓	✓
Community workshops		✓	✓	✓	✓	✓
Community reference groups		✓	✓	✓	✓	✓
Community partnerships			✓	✓	✓	✓
Complaints management mechanisms				✓	✓	✓

Figure 4: Summary of tools and application during the project lifecycle

* Telephone lines at the site selection stage should be provided for selected stakeholders only, i.e. landowners, local councils and planning authorities.

Fig 6: Engagement tools: Best Practice (source: Clean Energy Council Community Engagement Guidelines)

Engagement Methods Matrix

The following outlines the scope of engagement methods that will be used on this project, outlining the scale, spectrum, context and purpose.

Method	Description	Scale	Spectrum	Engagement Context	Engagement Purpose
Advertising/Sponsorship	Used to promote project and engagement activities	Public	Inform	Low Interest Low Understanding	Informing Generate support for action
Blogs / Vlogs	An online series of posts about a project which the community can share and comment on	Public	Inform Consult	Hard to reach audiences	Informing Understanding reactions Identify problems Community adaptive capacity
Briefings	Presentations and discussions with community and stakeholder groups. Can vary from informing to gathering feedback.	Individual Small Groups Large Groups	Inform Consult Involve Collaborate	Hard to reach audiences Highly political Need to understand community better	Informing Understanding reactions Relationship development Generate support for action
Community Education Program	A program to educate the community about a project. Can be designed to raise awareness and generate understanding.	Large Groups Public	Inform	Low Understanding	Informing Relationship Development Generate support for action
Community Reference Committee	A structured group of stakeholders that meet regularly and operate under a terms of reference. This is generally activated as the project approaches construction.	Small Group	Inform Consult Involve Collaborate	High Complexity Highly Political	Informing Legal Compliance Understand implications or consequences Improve quality of plans Generate alternatives Identify problems and opportunities Make decisions

Method	Description	Scale	Spectrum	Engagement Context	Engagement Purpose
Hotline (telephone or web)	Widely publicised phone or email contact that provides responses to community questions or concerns.	Public	Inform Consult	Hard to reach audience	Informing Legal compliance Relationship development Identify problems and opportunities
Interviews	One-on-one discussions to understand community or stakeholder needs, perspectives, insights and feedback.	Individual	Inform Consult	High complexity	Informing Understanding reactions Relationship development Identify problems and opportunities
Letters	Sent to affected or interested community members or stakeholders	Individual	Inform Consult	Hard to reach audience	Informing Legal Compliance Relationship Development
Media Stories	Media releases, pitches or briefings for free editorial publishing on projects and engage the public.	Public	Inform	Low Interest	Informing Generate support for action
Newsletters	Designed to inform, seek feedback and to update the community.	Individual Small Group Large Group Public	Inform Consult Involve	Hard to reach audience	Informing
Public Displays	Staffed or unstaffed displays of information which are made available to the public.	Public	Inform Consult	Low interest Hard to reach audience	Informing Understanding reactions Relationship development Behaviour Change
Social Media - Facebook	Most commonly used social media site. Used to reach a broader audience, have online discussions and respond to questions or concerns.	Public	Inform Consult Involve	Low interest Tight timeframes Hard to reach audiences Understand audience	Informing Understanding reactions Relationship development Identify problems and opportunities

Method	Description	Scale	Spectrum	Engagement Context	Engagement Purpose
Website	Can include a dedicated website or specific page on an organisation's website. Can vary from being a static site to highly interactive where the community can comment and upload their own content, participate in consultation. Regardless of the approach, the website must be easily found by stakeholders.	Public	Inform Consult Involve	High complexity Hard to reach audiences	Informing Understanding reactions Generate support for action

Draft Engagement Action Plan

A draft action plan is outlined below. Note that the timing for delivery is contingent on the overall Proposal schedule.

While building social licence is of benefit to this project, this action plan has been developed to ensure that Venn Energy meets the expectations of the NSW Department of Planning and Environment (DPE), and that Venn Energy has adopted the Department's community participation objectives when engaging on State Significant Developments (SSD). This includes the requirement to detail the engagement undertaken during the preparation of the environmental impact statement (EIS) and demonstrate how the engagement was consistent with the SSD guidelines.

This draft action plan ensures that the key elements of engagement by proponents for SSDs are covered. They include:

- Provide clear and concise information about the project and its impacts
- Implement activities that encourage and facilitate participation
- Report back on what was heard, what has or hasn't changed, and why.

It is the Department's expectation that engagement continues throughout the exhibition, assessment, construction and operation of a project.

Target Audience	Activity	SSD Guideline Relevance
PLANNING / COMPONENT DEVELOPMENT		
N/A	Draft core materials for the project, including: — Website content — Proposal Overview Fact Sheet — FAQ — Key maps — Project logo — Project website and ensure the website is live and optimised for search engines — Develop social media channels — Coordinate professional photos of the site area and community - for social media and website — Develop visual material – fact sheets, brochures, pull up banners etc	<i>"The Department encourages proponents to use innovative approaches to engagement to enable participation from a broad spectrum of community members. This can include the use of multiple channels such as traditional print, in person and digital. Digital forms of engagement through the major projects website and other platforms such as social media, private websites and online meetings will continue to be increasingly important."</i> <i>"...make it easy for the community to access information and provide feedback."</i>

Target Audience	Activity	SSD Guideline Relevance
	— Build existing email database and continue to send EDM to database with updates and project newsletters — Develop a Social Media Plan and Calendar — Develop a Public Relations strategy, media kit and holding statements.	<i>“Clearly outline how and when the community can be involved in the process.”</i>
N/A	Finalise project website, activate email and phone contacts, and activate the stakeholder record management system. Ensure all key members of the project team are trained and understand the process of recording stakeholder engagements.	
N/A	Establish an interactive mapping tool to allow for capturing of site/area-based issues, queries, and opportunities.	
N/A	Build and activate online survey tool aimed at capturing queries, concerns and opportunities related to the Proposal that can be used to inform content development and social impact analysis.	
ACTIVATION		
Public Loomberah and Timbumburi Community	Venn Energy support	<i>“...be able to demonstrate how the demography of the area affected has been considered in how and what engagement activities have been undertaken.”</i> <i>“Take up any early engagement opportunities for the community to understand the project.”</i>
Public Loomberah and Timbumburi Community	Launch the Project website, including the agreed communications/feedback tools (Proposal overview, survey, interactive map). Launch Social Media channels	<i>“Making information publicly available.”</i> <i>“...make it easy for the community to access information and provide feedback.”</i>
Nearby residents of project	Meet with nearby neighbours, starting with the closest receivers Where contact details (addresses and phone numbers) are not available, use door knocking and letterbox drops to complete the initial engagements and build a stakeholder list using these interactions.	<i>“Identify the key stakeholders for further engagement (i.e. individuals, special interest groups, councils and government agencies with an interest in or likely to be affected by the project).”</i>

Target Audience	Activity	SSD Guideline Relevance
	Summarise the discussions and update the strategy/stakeholder register.	
Community Groups Politicians Business Groups First Nations Groups Emergency Services	Send information on the project to the elected representatives and other strategic stakeholders, such as the Chamber of Commerce and targeted community groups. Follow up with briefings where required/requested.	<i>"Identify the key stakeholders for further engagement (i.e. individuals, special interest groups, councils and government agencies with an interest in or likely to be affected by the project)."</i>
Community Groups Politicians Business Groups First Nations Groups Emergency Services	Hold initial meetings/briefings with agreed stakeholders: — Tamworth Regional Council — State and Federal MPs — Loomberah Memorial Hall Committee — Timbumburi Public School — Tamworth Local Aboriginal Land Council — Loomberah and Duri Rural Fire Service. — Tamworth Clay Target Club	<i>"Engage with the community, council and government agencies, so that the engagement is proportionate to the scale and nature of the project and the likely level of community interest in the project."</i> <i>"Involve the community, councils and government agencies early in the development of the proposal, to enable their views to be considered in project planning and design."</i>
Public Loomberah & Timbumburi Community	Distribute targeted letters/emails introducing the project and inviting people to attend an initial information and focus group session	<i>"The community is able to take up engagement opportunities to understand the project."</i>
Public Loomberah and Timbumburi Community	Implement project Community Newsletter	<i>"Provide clear and concise information about the project and its impacts."</i>
Public Loomberah and Timbumburi Community	Share project content photos and videos associated with milestones and to celebrate the people of the project through LinkedIn and Project Website.	<i>"The Department also encourages proponents to maximise engagement through current and emerging platforms. Innovative engagement methods may include video, infographics, animations, digital visualisations, online forums and virtual consultation events or spaces."</i>

Target Audience	Activity	SSD Guideline Relevance
Loomberah and Timbumburi Community	Organise and hold the community focus groups at venue such as the Loomberah Memorial Hall. This session will provide an overview of the Proposal, while focusing on the community's view on issues and opportunities that can be investigated. Ensure these sessions can be held online if required.	"The community is able to: — Take up any early engagement opportunities to understand the project — Provide feedback to the proponent about aspects of the project which they support, do not support, or wish to be adjusted — Provide clear reasons for any concerns to enable the proponent to consider possible alternative approaches to address the issues — Alert the proponent to any matters they feel have not been considered."
All	Take calls, answer questions, and arrange any required follow up meetings that can help proactively address issues.	"Report back on what was heard, what has or hasn't changed, and why."
All	Summarise interactions, feedback, and strategies/mitigations to manage issues.	"Provide feedback about how community and stakeholder views were used to shape the project or considered in making decisions." "Be able to demonstrate how the demography of the area affected has been considered in how and what engagement activities have been undertaken."

Community benefit sharing

The Lambruk Solar Project will provide a number of benefits for the community:

- Employment opportunities for up to 350 employees and contractors during the construction phase, and up to 15 full-time equivalent positions for the ongoing maintenance of the site.
- Procurement of goods and services from local businesses – such as accommodation, meals, machinery contractors, construction trades, surveyors, cleaning services, security services, training service providers, building supplies, and waste contractors.
- A Neighbour and Community benefit sharing program to help support the local community, with contributions of a minimum of \$500/MWac (of installed solar capacity) per year, over the expected 30-year operational life of the project.
- Reducing the cost of electricity for consumers in comparison to traditional fossil fuel-based energy sources.
- Training and educational opportunity for local trades, apprentices, and local schools.
- Significant reduction of greenhouse gas emissions by 600,000 tonnes of CO₂ annually.

Brand Identity

It is important that stakeholders and community can easily identify the project through brand recognition. The creation of a unique brand identifier (that is overarching for both the solar and wind developments) is a positive approach that provides a foundation to tell the project's story. Projects are often large and complicated, and unique branding can make them more tangible, easier to understand and recognise throughout the project's lifecycle.

Once a relationship has been brokered with a community consistent branding is important to sustain it. This should be noted as Venn Energy undertakes internal change of branding. By implementing a project brand, it offsets the need to broadly explain or restate the machinations within a corporate entity and provide reassurance to stakeholders.

The preferred approach of this strategic management plan is to implement a brand identity that is Venn Energy-owned but represents specifically Venn Energy's Lambruk Solar Project.

Media

While this plan outlines Venn Energy's process of community and stakeholder engagement in relation to the Lambruk Solar Project, it is also important to identify key communication channels that can facilitate this engagement. It will remain the responsibility of Venn Energy to facilitate and manage the relationship with local media and manage content through Venn Energy-owned digital assets to ensure that it is timely, accurate and accessible to stakeholders.

Local Media

The following media are recommended to inform stakeholders about the project, as the project progresses to the next stages:

- Local newspaper (The Northern Daily Leader)
- Local radio (88.9FM, 2TM, 92.9FM, ABC New England North West)
- Local television news (NBN Television, 7New New England)
- Social media (LinkedIn).

Digital / owned media

The following digital media will be Venn Energy owned, and provide a great opportunity to tailor community messages and good news about the project, including:

- Website
- LinkedIn.

Future media liaison

To supplement media requests, the following is recommended to assist with media liaison:

- Dedicated project spokesperson – Geoff Stoker-Lavelle (Project Director).

Summary

This engagement strategy has been developed initially with the aim to outline Venn Energy's approach to engaging with targeted stakeholders through the planning and decision-making processes. We believe this approach will help to increase community awareness and trust in Venn Energy and the project.

This engagement strategy will be expanded in parallel to include a community stakeholder engagement strategy and tactics. The proposed engagement tactics have been developed based on time and resources available at this stage of the project. Further engagement strategy and tactics will need to be developed as the project progresses.