Preliminary Environmental Assessment

AVONLIE SOLAR FARM

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ABBREVIATIONS AND ACRONYMS

ABS	Australian Bureau of Statistics
AHIMS	Aboriginal Heritage Information Management System
CCP	Community Consultation Plan
CEMP	Construction Environmental Management Plan
Cwth	Commonwealth
DPE	Department of Planning and Environment (NSW)
EEC	Endangered Ecological Community (listed under NSW BC Act)
EIS	Environmental Impact Statement
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Cwth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
ha	hectares
Heritage Act	*Heritage Act 1977* (NSW)
ISEPP	*State Environmental Planning Policy (Infrastructure) 2007 (NSW)*
km	kilometres
kV	kilovolt
LEP	Local Environment Plan
LGA	Local Government Area
m	metres
MNES	Matters of National Environmental Significance under the EPBC Act (*c.f.*)
MW	megawatts
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
NV Act	*Native Vegetation Act 2003* (NSW)
OEH	(NSW) Office of Environment and Heritage, formerly Department of Environment, Climate Change and Water
RET	Renewable Energy Target
RMS	Roads and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements (issued by DPE)
SEPP	State Environmental Planning Policy (NSW)
SSD	State Significant Development, defined in the ISEPP
TEC	Threatened Ecological Community (listed under Commonwealth EPBC Act)
TSC Act	*Threatened Species Conservation Act 1995* (NSW)

1 INTRODUCTION

1.1 PROPOSAL OVERVIEW

Renewable Energy Systems (RES) Australia Pty Ltd propose to develop a solar farm ('the proposal') at Avonlie, south east of Narrandera, New South Wales (NSW). The solar farm would occupy around 608 hectares of rural land currently used for agriculture. The proposal includes solar arrays on tracking systems, modules, inverters, a battery storage facility, a substation, underground cabling, security fencing, emergency lighting and associated infrastructure.

1.2 THIS REPORT

Scoping is a key stage in the Environmental Impact Assessment (EIA) process. It identifies the main issues and information requirements for the assessment, considering the values of the site, the nature and extent of potential impacts, planning and regulatory requirements and the results of early consultations. This allows the assessment to efficiently focus on the most important issues.

This Preliminary Environmental Assessment:

- Describes the proposal and the site;
- Identifies statutory approval requirements; and
- Identifies key potential environmental issues associated with the proposal.

The Assessment has been prepared to support a request to the Department of Planning and Environment (DPE) for the Secretary's Environmental Assessment Requirements (SEARs). The SEARs would guide the preparation of an Environmental Impact Statement (EIS) for the proposal under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.3 RENEWABLE ENERGY SYSTEMS LTD

RES was established in the UK in the early 1980s and has grown to become the world's largest independent renewable energy company. The company has deployed over 12 GW of utility scale wind, solar and battery energy storage projects around the world, with operations in Europe, the Americas, Turkey and Australia.

RES Australia Pty Ltd has been developing renewable energy projects in Australia since 2004 and is based at Chatswood, Sydney. Recent projects in Australia include the Currawarra and Tarleigh Park Solar Farms near Deniliquin, NSW, the Taralga Wind Farm in NSW, the Ararat and Murra Warra Wind Farms in Victoria, and the Emerald solar project in Queensland.

2 PROPOSAL AREA DESCRIPTION

2.1 LOCATION

The proposal is in the Narrandera Local Government Area (LGA) approximately 20 kilometres south east of Narrandera, as shown in Figure 2-1. Muntz Road runs along the southern boundary of the site and Quilters Road bounds the proposal area to the north. The proposal is located within the Murrumbidgee River Catchment. Local land use is primarily agricultural, including cropping and grazing. Farm dwellings are located to the north east of the proposal area.

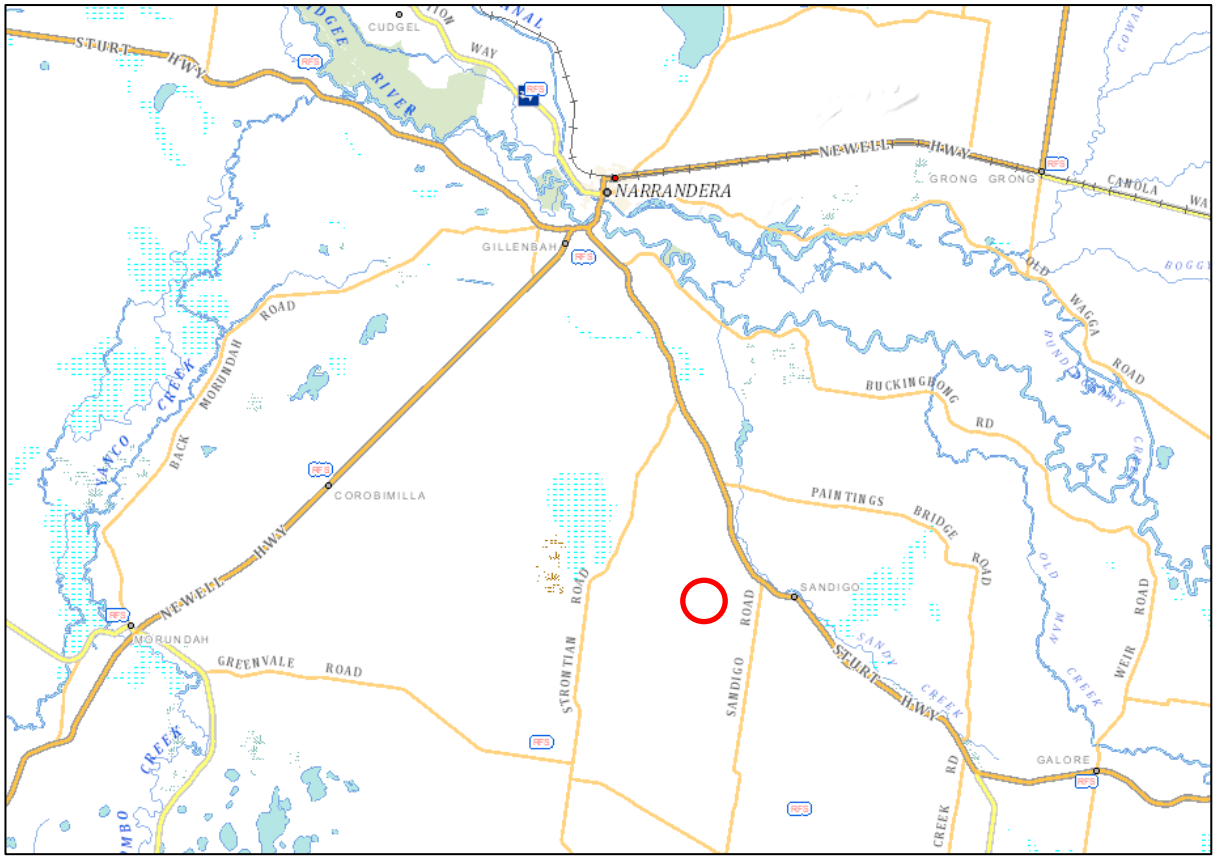

Figure 2-1 Location of the proposal area (Six Maps)

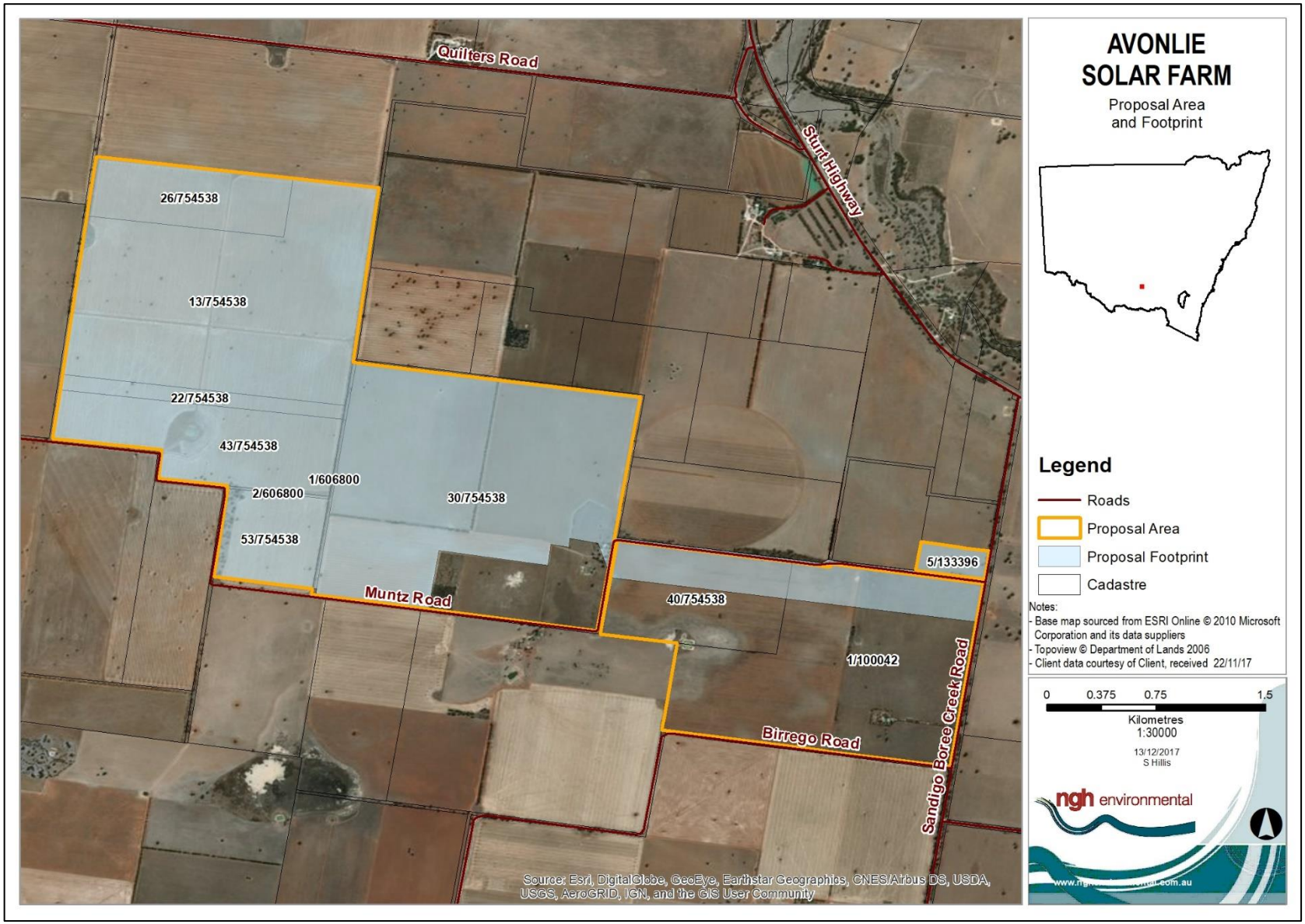

Figure 2-2 Proposal area and footprint

2.3 THE PROPOSAL AREA

The proposal would occupy approximately 608ha of land and includes Lot 5 DP 133396, Lots 1 and 2 DP 606800, Lot 1 DP 100042 and Lots 13, 22, 26, 30, 40, 43, 53 DP 754538 ('the proposal area'). The proposal area is agricultural land comprising several large paddocks which are generally flat, largely cleared and cultivated for pastures and grazing (Figure 2-3).

The proposal area holds several dams (Figure 2-4), an unmanned irrigation channel occurs on the east of Lot 30 DP 754538 (Figure 2-5), and Sandy Creek occurs approximately 1.5 kilometres to the north east. There are no residences within the proposal area, and adjoining land uses include grazing and cropping for agriculture.

The proposal area holds remnant native vegetation in the form of paddock trees. Remnant native woodlands occur along west of the proposal area and along Muntz Road. Planted vegetation is located between paddocks, and along the southern boundary on Muntz Road.

There is an existing TransGrid 132 kV powerline that runs through the eastern side of the property, allowing a connection to the existing grid (Figure 2-6).

Figure 2-3 Typical view of large flat tree lined paddocks

Figure 2-4 Typical dam within the proposal area

Figure 2-5 Irrigation channel

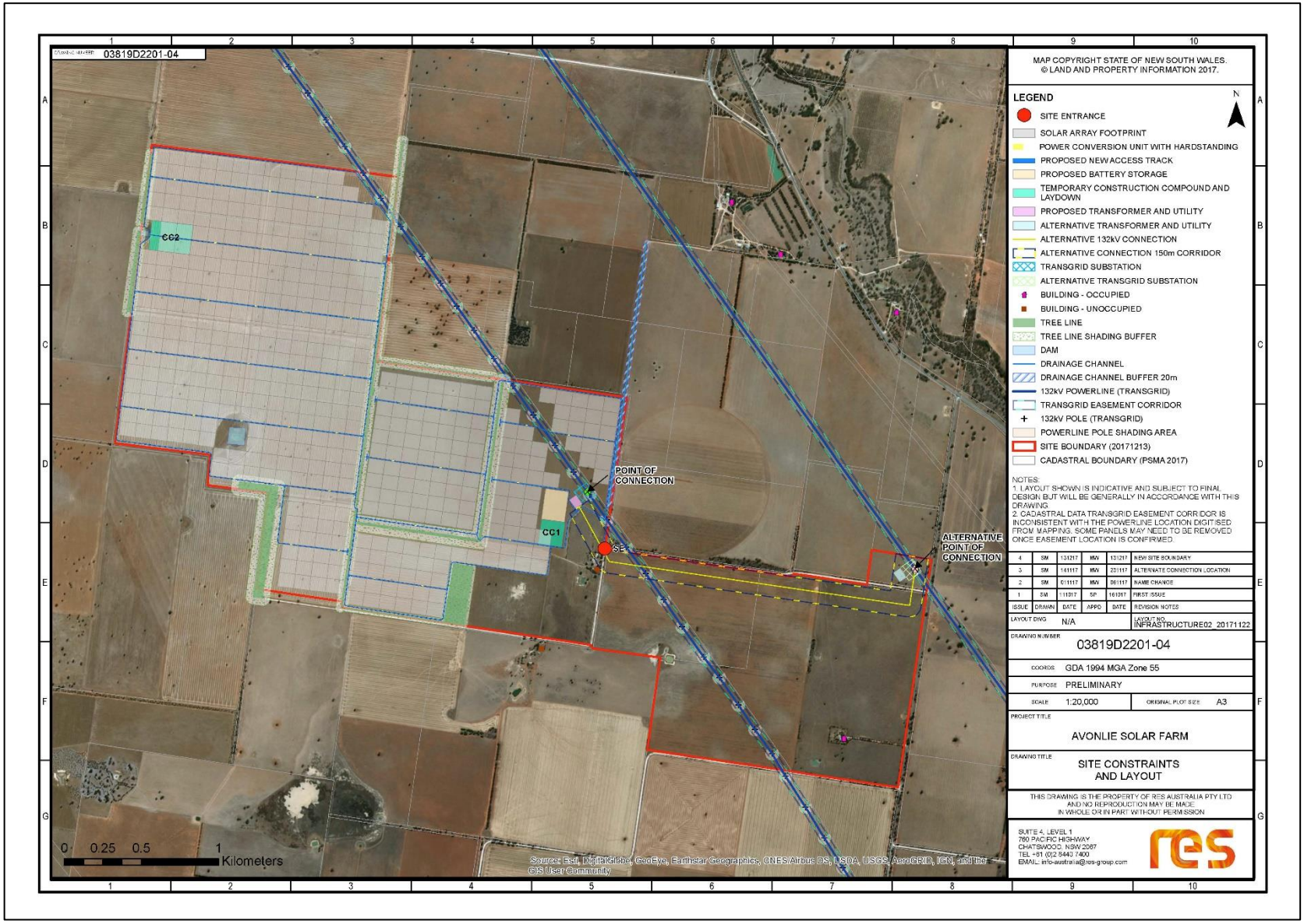

Figure 2-6 Proposal area layout

3 THE PROPOSAL

3.1 SITE SELECTION

The proposal site has been selected for the following reasons:

- Excellent solar exposure;
- Excellent access to local and major roads;
- Excellent access to the grid transmission network; and
- Likely low level of environmental impact – the site has been largely cleared and heavily disturbed by cultivation and cropping.

The use of the proposal site would be based on a lease agreement between RES and the landowners for the life of the project. Subdivision of 1 ha of land is required for the construction of the substation.

3.2 PROPOSED WORKS

3.2.1 Proposed infrastructure

The proposal involves the construction of a ground-mounted photovoltaic solar array which will generate approximately 200MW of renewable energy.

The proposal arrangement is flexible and adaptable and would be designed to avoid impacts where feasible, and minimise/mitigate environmental impacts if avoidance is not possible. The design would consider the results of this PEA, consultation with relevant stakeholders and the Environmental Impact Statement (EIS) to be prepared. The EIS will detail how these studies have been used to produce the final proposal design.

The proposal consists of the following components:

- Solar arrays mounted on either a fixed or single-axis tracking system;
- Power conversion units;
- A substation including an elevated busbar, switchroom, a lightning protection system, current and voltage transformers and a connection into the existing 132kV TransGrid overhead line;
- A battery storage facility;
- Operations and maintenance buildings with associated car parking;
- Access points to the site via Muntz Road;
- Underground cabling;
- Internal access tracks;
- Emergency lighting;
- CCTV system including infrared (non-visible) lighting; and
- Security fencing.

The proposed infrastructure footprint is shown in Figure 2-6. This includes all land likely to be directly impacted by the proposal, including the grid connection options.

Construction, operation and decommissioning

The proposal is expected to operate for 30 years. The construction phase of the proposal is expected to take eighteen months and commence in Autumn 2019. After the initial operating phase, the proposal would either be decommissioned, removing all above ground infrastructure and returning the site to its existing land capability (12 months), or upgraded with new photo voltaic equipment.

3.3 CAPITAL INVESTMENT

The Avonlie Solar Farm proposal would have an estimated capital investment of $250 million. A quantity surveyor's report would be prepared during the EIS process as part of the proposal which would confirm the capital investment cost.

4 JUSTIFICATION AND ALTERNATIVES

4.1 STRATEGIC JUSTIFICATION

4.1.1 Technical feasibility

The proposal would employ proven and mature solar technology. The solar site is highly suited to efficient, high-output generation. Battery storage will also aid in storing and providing energy during high demand periods or when solar energy is unavailable.

The site is flat and predominantly clear, making it an ideal location for a utility scale solar project.

A TransGrid easement passes over the eastern part of the proposal area, and it has been proposed to connect directly to the transmission lines. Two options have been proposed, with the preferred point of connection within the bounds of the proposal footprint (Figure 2-6). The proponent has commenced discussions with TransGrid regarding network connection. The project has been sized for the available network capacity.

It is noteworthy that the electricity grid in New South Wales can present challenges in terms of having the capacity to connect utility scale renewable energy projects. The proposal benefits from having good connection options adjacent to the site with, moreover, sufficient spare capacity in the transmission network to allow power generated at Avonlie to be exported into the wider NSW grid.

4.1.2 Climate change

The proposal would contribute to the New South Wales Renewable Energy Action Plan (NSW Government 2013), which supports the national target of 20% renewable energy by 2020. The proposal will also further the three goals of the Action Plan:

1. Attract renewable energy investment and projects;
2. Build community support for renewable energy; and
3. Attract and grow expertise in renewable energy.

The NSW 2021: A plan to Make NSW Number One (NSW Government 2011) has the following goal:

- *Contribute to the national renewable energy target … by promoting energy security through a more diverse energy mix, reducing coal dependence, increasing energy efficiency and moving to lower emission energy sources*.

The proposal would also contribute to the Commonwealth Government's objective to achieve an additional 33GW of electricity from renewable sources by 2020 under the Renewable Energy Target or RET.

The COP21, also known as the 2015 Paris Climate Conference, achieved a legally binding and universal agreement on climate, with the aim of keeping global warming below 2°C, chiefly by reducing greenhouse gas emissions. The proposal would form part of the Australian effort to help meet this target.

4.1.3 Electricity supply

AEMO (2016) forecasts that grid-supplied electricity consumption will remain flat for the next 20 years, despite projected 30% growth in population. Although not required to meet projected electricity demand, the proposal would benefit the network by shifting electricity production closer to local consumption. The

electricity network was designed to deal with a small number of very large power generating stations. The localisation of power generation helps the grid to cope with supply from diversified renewable energy projects.

4.1.4 Socio-economic benefits

Employment

The proposal will generate around 200 direct jobs during construction and plus indirect supply chain jobs. In addition, it will employ approximately four full time staff and up to six service contractors during the operation and maintenance phase (expected to be approximately 30 years).

The employment benefits extend through the local supply chains to fuel supply, vehicle servicing, uniform suppliers, hotels/motels, B&B's, cafés, pubs, catering and cleaning companies, tradespersons, tool and equipment suppliers and many other businesses. In 2015/16, 11,150 Australians were directly employed in the renewable energy sector with an additional 3,725 jobs expected to be created in the 2017/18 financial year (CEC 2016).

Economic Diversification

The proposal would diversify the use of land in the area. The predominant land use in the area is agriculture. The proposal would add to that and provide both local land holders and business in the broader area with an additional source of income and economic activity.

4.1.5 Land Use

It is important to note that solar farms do not preclude the use of land for agriculture. Some agricultural activity is still possible whilst a solar farm is operating (e.g. grazing). Additionally, the degree of permanent land disturbance in the construction and operation of solar farms is small, and it's highly likely that agricultural activities which were occurring before the solar farm was constructed would be able to be continued once the solar farm is decommissioned and removed.

4.2 ALTERNATIVES TO THE PROPOSAL

4.2.1 Alternative sites

RES has reviewed the solar generation potential of many areas in NSW using a Geographic Information System model. Several renewable energy projects are required in NSW to meet the state and national climate change targets including the United Nations Paris Agreement and NSW Climate Change Policy Framework. Projects are also being explored by RES in other areas of NSW.

The proposed site was selected because it satisfies the criteria for utility scale solar electricity generation in terms of solar yield, transmission grid connection, low environmental and heritage constraints, flat clear land for competitive construction cost and limited close neighbours.

The proposal area is of a scale that allows for flexibility in the design. These would be identified and the factors that determine the final design would be detailed in the EIS.

4.2.2 Alternative technologies

Photovoltaic solar technology was chosen because it is cost-effective, low profile, durable and flexible regarding layout and siting. It is a proven and mature technology which is readily available for broad scale deployment at the site.

Battery technology was selected over mechanical or physical storage methods because it enables modular installation without major infrastructure or specialised landform features. Batteries also generally have lower weight and physical volume and better scalability compared to other technologies.

4.2.3 The 'Do Nothing' Option

Not proceeding with the proposal would forgo the benefits of the proposal, resulting in:

- The loss of a source of renewable energy that would assist the Australian and NSW Governments reach their targets;
- The loss of cleaner energy and reduced greenhouse gas emission;
- The loss of additional electricity generation and supply into the grid; and
- Loss of social and economic benefit through the provision of direct and indirect employment.

The 'do nothing' option may avoid any potential impact; however, the likelihood of significant negative impacts is low. It is considered the benefit of the proposed solar farm outweighs any potential impact whilst contributing to ecologically sustainable development.

5 PLANNING CONTEXT

5.1 NSW LEGISLATION

5.1.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and its associated regulations and instruments set the framework for development assessment in NSW. The proposal would be assessed under Part 4 of the EP&A Act.

5.1.2 State Environmental Planning Policy (State and Regional Development) 2011

Clause 20 of Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011* defines 'State Significant Development' as including:

Development for 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 has a:

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

(b) capital investment value of more than $10 million and is in an environmentally sensitive area of State significance.'

The proposal would have an estimated capital investment cost greater than $30 million. The proposal is therefore classified as 'State Significant Development' under Part 4 of the EP&A Act.

State Significant Developments (SSD) are major projects which require approval from the Minister for Planning and Environment. While the Minister for Planning and Environment is the consent authority for SSD, the Minister may delegate the consent authority function to the Planning Assessment Commission (PAC), the Secretary or to any other public authority.

An Environment Impact Statement (EIS) is prepared in accordance with environmental assessment requirements issued by the Secretary of the Department of Planning and Environment (SEARs). In determining the SEARs, the Secretary must consult with relevant public authorities and would have regard to the need to assess key issues raised by those public authorities. A scoping study is required to be submitted with the request for the SEARs.

5.1.3 State Environmental Planning Policy (Infrastructure) 2007

Clause 34(7) of *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) provides that development for a 'solar energy system' may be carried out by any person with consent on any land (except land in a prescribed residential zone). The proposal is located within a rural zone and is permissible with consent under the ISEPP.

5.1.4 State Environmental Planning Policy (Rural Lands) 2008

The aims of the *State Environmental Planning Policy (Rural Lands) 2008* (Rural Lands SEPP) are:

(a) to facilitate the orderly and economic use and development of rural lands for rural and related purposes,

(b) to identify the Rural Planning Principles and the Rural Subdivision Principles to assist in the proper management, development and protection of rural lands for the purpose of promoting the social, economic and environmental welfare of the State,

(c) to implement measures designed to reduce land use conflicts,

(d) to identify State significant agricultural land for ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations,

(e) to amend provisions of other environmental planning instruments relating to concessional lots in rural subdivisions.

The Rural Lands SEPP rural planning principles, listed under clause 7, are:

(a) the promotion and protection of opportunities for current and potential productive and sustainable economic activities in rural areas,

(b) recognition of the importance of rural lands and agriculture and the changing nature of agriculture and of trends, demands and issues in agriculture in the area, region or State,

(c) recognition of the significance of rural land uses to the State and rural communities, including the social and economic benefits of rural land use and development,

(d) in planning for rural lands, to balance the social, economic and environmental interests of the community,

(e) the identification and protection of natural resources, having regard to maintaining biodiversity, the protection of native vegetation, the importance of water resources and avoiding constrained land,

(f) the provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities,

(g) the consideration of impacts on services and infrastructure and appropriate location when providing for rural housing,

(h) ensuring consistency with any applicable regional strategy of the Department of Planning or any applicable local strategy endorsed by the Director-General.

It is considered that the proposal is consistent with the aims and planning principles of the Rural Lands SEPP. Part 4 of the Rural Lands SEPP relates to state significant agricultural land. Given the proposal area is not identified in schedule 2, it is not identified as state significant agricultural land and Part 4 does not apply.

5.1.5 Roads Act 1993

The *Roads Act 1993* (Roads Act) provides for the classification of roads and for the declaration of the Roads and Maritime Services (RMS) and other public authorities as roads authorities for both classified and unclassified roads. It also regulates the carrying out of various activities in, on and over public roads. The need for upgrade works on local roads would be considered as part of the traffic assessment conducted for the proposal. If required, approval from the roads authority (RMS and/or Council) would be sought under section 138 of the Roads Act. Narrandera Shire Council, and RMS if required, would be consulted during the design and preparation of the EIS.

5.1.6 Biodiversity Conservation Act 2016

The NSW government introduced new biodiversity legislation for the consideration and assessment of biodiversity impacts. The *Biodiversity Conservation Act 2016* (BC Act) and *Local Land Services Act 2013* (LLS Act) commenced on the 25th August 2017 and has replaced the *Threatened Species Conservation Act 1995*.

The proposal would require assessment under Section 7.9 of the BC Act. A preliminary assessment of potential impacts has been conducted in section 7 of this report.

5.1.7 National Parks and Wildlife Act 1974

Under the *National Parks and Wildlife Act 1974*, the Director-General of the National Parks and Wildlife Service is responsible for the care, control and management of all national parks, historic sites, nature reserves, Aboriginal areas and state game reserves. The Director-General is also responsible under this legislation for the protection and care of native fauna and flora, and Aboriginal places and objects throughout NSW. Under Section 89J of the EP&A Act, an Aboriginal Heritage Impact Permit under Section 90 of the *National Parks and Wildlife Act 1974* would not be required for a State Significant Development. The potential impacts to Aboriginal heritage and native fauna and flora are discussed in section 7 of this report.

5.1.8 Heritage Act 1977

This Act aims to conserve heritage values. The Act defines 'environmental heritage' as those places, buildings, works, relics, moveable objects and precincts listed in the Local or State Heritage Significance. Heritage items are listed in the environmental heritage schedule of the local Council's Local Environmental Plan or listed on the State Heritage Register, a register of places and items of particular importance to the people of NSW. Under Section 89J of the EP&A Act, an approval under Part 4 or a permit under Section 139 of the *Heritage Act 1977* would not be required for a State Significant Development. The proposal is unlikely to directly or indirectly affect any items of heritage significance (refer to Section 7).

5.1.9 Crown Lands Act 1989

The objects of this Act are to ensure that Crown land is managed for the benefit of the people of New South Wales. Under Part 3 of the Act, the Minister for Lands must be satisfied that the land has been assessed prior to any allocation action, i.e. reservation, dedication, sale, lease, licence or permit. The purpose of a land assessment is to ensure decisions made in relation to Crown land are in accordance with the principles of Crown land management by (amongst other matters) including an assessment of the capabilities of Crown land and the identification of suitable land uses.

Preliminary searches do not indicate Crown land to be present within the proposed solar farm site. This would be further investigated in the EIS and the Department of Industries (Lands) would be consulted during the assessment process.

5.2 LOCAL GOVERNMENT

5.2.1 Narrandera Local Environmental Plan 2013

The proposal is in the Narrandera Local Government Area (LGA) and is subject to the *Narrandera Local Environmental Plan 2013* (LEP).

The proposal area is zoned RU1 - Primary Production under the Narrandera LEP. Electrical generation is not listed among developments that are permitted within the zone. However, the ISEPP takes precedence over an LEP and permits solar energy systems with consent in the RU1 zone.

Land Use Zone Objectives

The LEP states that the consent authority must have regard to the objectives for development in a zone when determining a development application. The objectives of the RU1 zone are to:

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

Subdivision

A lease of land creates a subdivision under *s*.7A *Conveyancing Act 1919* (formerly s.327AA *Local Government Act 1919* now repealed) when the total of the original term of the lease, together with any option of renewal, is more than five years. Development consent is required for such a subdivision.

Furthermore, land subdivision that affects land containing a dwelling will be subject to the provisions of the *State Environmental Planning Policy (Rural Lands) 2008* and the matters that must be considered in determining development applications for rural subdivisions or rural dwellings.

A derelict unoccupied dwelling exists within the south-east corner of the proposal area. Further investigation is required to determine the property owner's intentions on inhabitancy of the dwelling, and will be explored in the EIS.

5.3 COMMONWEALTH LEGISLATION

5.3.1 Environmental Protection and Biodiversity Conservation Act 1999

The EPBC Act provides an assessment and approval process for actions likely to cause a significant impact on Matters of National Environmental Significance (MNES). These include:

- World Heritage properties
- National Heritage places
- Wetlands of international importance (listed under the Ramsar Convention)
- Listed threatened species and ecological communities
- Migratory species protected under international agreements
- Nuclear actions (including uranium mines)
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- A water resource, in relation to coal seam gas development and large coal mining development.

Approval by the Commonwealth Environment Minister is required if an action is likely to have a significant impact on a MNES. Assessments of significance based on criteria listed in Significant Impact Guidelines 1.1 issued by the Commonwealth (Commonwealth of Australia 2013) are used to determine whether the proposed action is likely to have a significant impact (i.e. is likely to be considered a 'controlled action').

A search of the Commonwealth Protected Matters Search Tool (10-kilometre buffer, undertaken on 13 November 2017) indicated four threatened ecological communities, 22 threatened species and 10 migratory species within the search area. Surveys to determine the presence and likelihood of impact to these entities would be undertaken during the preparation of the EIS. The search also indicated 4 wetlands of international importance, all located greater than 300 metres upstream.

A summary of the EPBC Act search report is provided in Table 7-1.

5.3.2 Native Title Act 1993

The *Native Title Act 1993* provides a legislative framework for the recognition and protection of common law native title rights. Native title is the recognition by Australian law that Indigenous people had a system of law and ownership of their lands before European settlement. Where that traditional connection to land and waters has been maintained and where government acts have not removed it, the law recognises this as native title.

People who hold native title have a right to consult or continue to practise their law and customs over traditional lands and waters while respecting other Australian laws. This could include visiting to protect important places, making decisions about the future use of the land or waters, hunting, gathering and collecting bush medicines. Further, when a native title claimant application is registered by the National Native Title Tribunal, the people seeking native title recognition gain a right to consult or negotiate with anyone who wants to undertake a project on the area claimed.

Where native title does exist in relation to the proposal area, the proponent would comply with the provisions of the *Native Title Act 1993*.

6 CONSULTATION

Community and stakeholder consultation will be integral to the proposal. A Community Consultation Plan (CCP) has been prepared to provide a framework to engage with the community and stakeholders about the proposal and ensure opportunities to provide input into the assessment and development process are understood. Stakeholders were identified as those potentially being impacted by the solar farm proposal or having interest in the proposal:

Stakeholder group	Defining characteristics
1. Adjacent and near neighbours	Given that the landscape is generally flat with no elevated views of the proposal site within 3km, adjacent and near neighbours with a potential to be affected are limited to those with a potential view of infrastructure or affected by noise or vibration from haulage route or construction activities. This is considered to be limited to those within 3km of the proposal site or those along potential haulage routes.
2. Adjacent Businesses	The proposal is surrounded by farming business. The nearest non-farming business is the CAD Factory, located approximately 5 km west of the proposal area. The business is accessed via Strontian Road and should not be impacted by construction or operation of the solar farm.
3. Local Businesses	No local businesses are located within 5 km of the site. However, being close to the township of Narrandera several businesses are located within 20 km of the proposal area. These are unlikely to experience any negative impact.
4. Representative bodies	Representatives of groups such as: • Narrandera Visitors Information Centre • Narrandera Shire Council • Narrandera Landcare • Local state and national Members of Parliament • Chamber of Commerce
5. Media	Outlets to ensure a clear message is delivered, like local radio, television, newspapers, project website.
6. Broader community	The project is likely to be of interest to the broader local and regional community.
7. Narrandera Shire	While direct impacts are unlikely, the project would be a large new development for the broader community.
8. Aboriginal Stakeholders	The project is of interest to Registered Aboriginal Parties within the region. See Section 7.2.2 for further details

The CCP has set out consultation requirements with interested parties including adjacent neighbours, near neighbours, local businesses, any special interest groups and representative bodies. The plan also includes strategies for consultation for the local community and the broader community within the region. This includes:

- Face to face meetings with neighbours, local business, interested stakeholders etc.
- Community participation
- Phone calls
- Feedback forms
- An avenue to receive information and provide specific feedback
- Newsletter and/or factsheet drops
- Key milestones communicated through a dedicated website, links to other projects and accreditations.

The CCP aims to ensure that there is effective, ongoing liaison with the community. Measures to reduce adverse impacts and promote positive impacts would be identified in the EIS and appropriate management plans developed for the proposal.

Consultation to date

Consultation to date by RES include meetings with Narrandera Shire Council, Roads and Maritime Services, TransGrid and phone conversations with close neighbours. It is noted that early consultation with close neighbours was unsuccessful, as they were too busy to discuss the proposal until the end of the harvesting period. Further consultation with neighbours has been requested for the end of the harvest period, and is planned for the end January. No significant concerns to date have been raised.

There are no residences within the proposal area, and adjoining land uses include grazing and cropping for agriculture. Six properties have been identified as being involved with the project, with an additional 12 neighbours uninvolved within five kilometres of the site. There are no sensitive receptors within 500 metres of the site, with 14 neighbours within three kilometres (Figure 6-1).

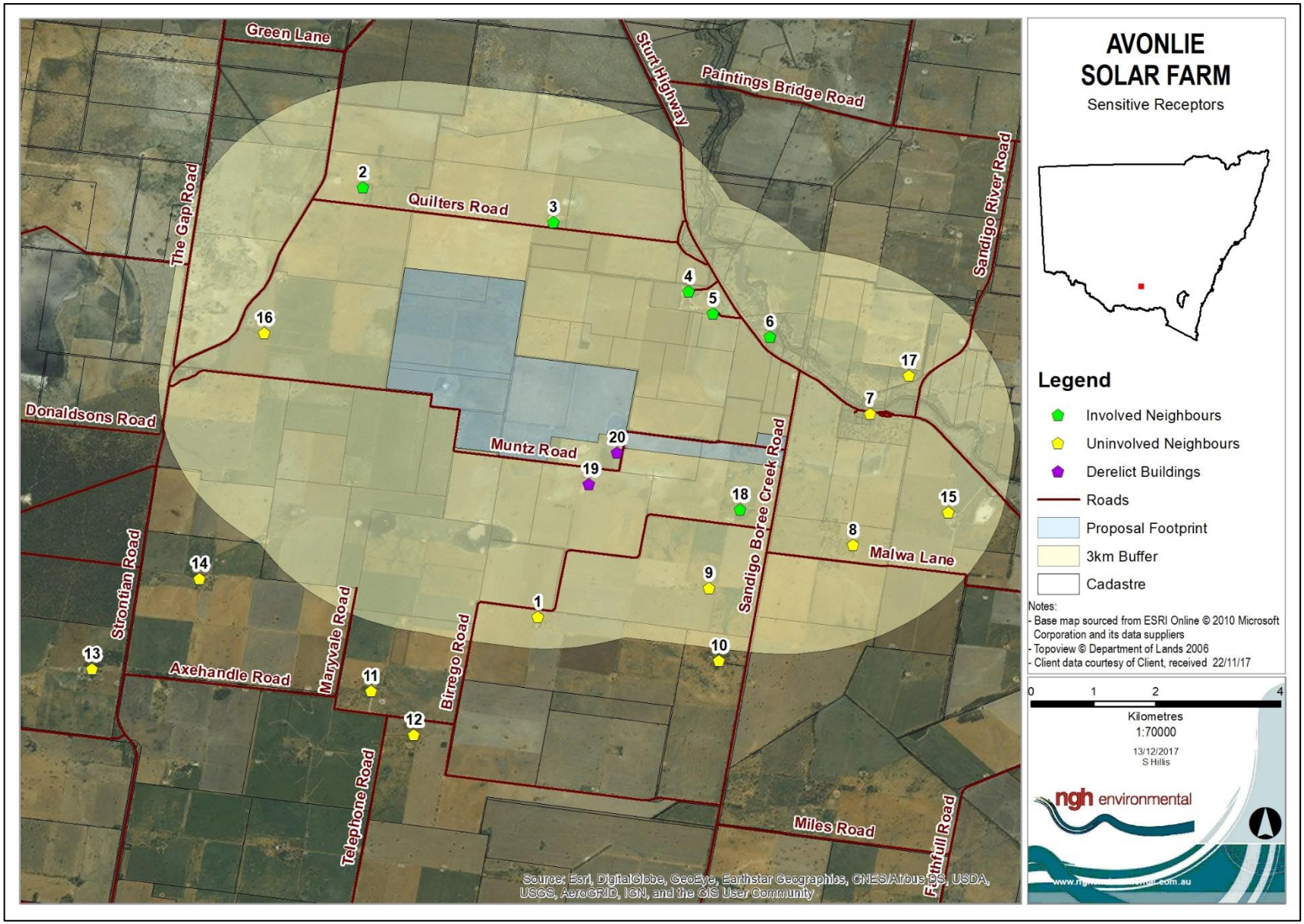

Figure 6-1 Sensitive receptors map

7 PRELIMINARY ENVIRONMENTAL ASSESSMENT

7.1 METHODOLOGY

A preliminary environmental risk analysis has been conducted to assist in the identification of key environmental matters that would require detailed assessment within the EIS. Risks were identified for both the construction and operation phase of the proposal and analysed in relation to their possible consequence and likelihood of occurrence. From this analysis, some environmental matters were deemed to be key issues on the basis that they had the potential, without appropriate mitigation measures, to have a significant impact on the environment.

A summary of the key environmental issues is provided in Section 7.2. The intent of the discussion is to demonstrate an understanding of the issues that require further environmental assessment and likely mitigation measures for these key issues. The potential impacts and management of other (less significant) issues are discussed in Section 7.3**.**

The following environmental risks are considered to be key aspects:

- Biodiversity;
- Aboriginal heritage;
- Land use and resources;
- Noise; and
- Watercourses and hydrology.

7.2 ASSESSMENT OF KEY ENVIRONMENTAL MATTERS

7.2.1 Biodiversity

The potential ecological constraints within the study area have been identified based on the following information sources:

- Threatened species and community listings under the BC Act and EPBC Act;
- Commonwealth EPBC Act Protected Matters Search Tool, using a 10-kilometre search radius;
- Threatened species and communities' records in the Bionet Database (OEH), using a 10-kilometre search radius;
- Areas of outstanding biodiversity value declared under the BC Act;
- Office of Environment and Heritage (OEH) Vegetation Information System (VIS) Mapping; and
- A preliminary site inspection by an ecologist.

Overview

The proposal site has been selected on the basis that it supports limited native vegetation. The land has been extensively farmed, including cropping, over a long period of time. It supports limited flora and fauna features of significance.

The primary constraint is associated with the vegetation along Muntz Road. Whilst this area is not proposed for the installation of solar panels, it may need to be crossed to provide grid connection to the substation

and potential road widening for passing opportunities for construction traffic. Additional constraints are in the form of paddock trees, some of which contain hollows.

At the time of the on-site survey, the alternative point of connection below Muntz Road (as shown on Figure 2-5) was not defined. As such, the area has not been surveyed or mapped within the Ecological Constraints Mapping in Figure 7-1. Further survey of the area is a requirement of the EIS. However, aerial imagery and an on-site visual suggests the area is exotic pasture for cropping.

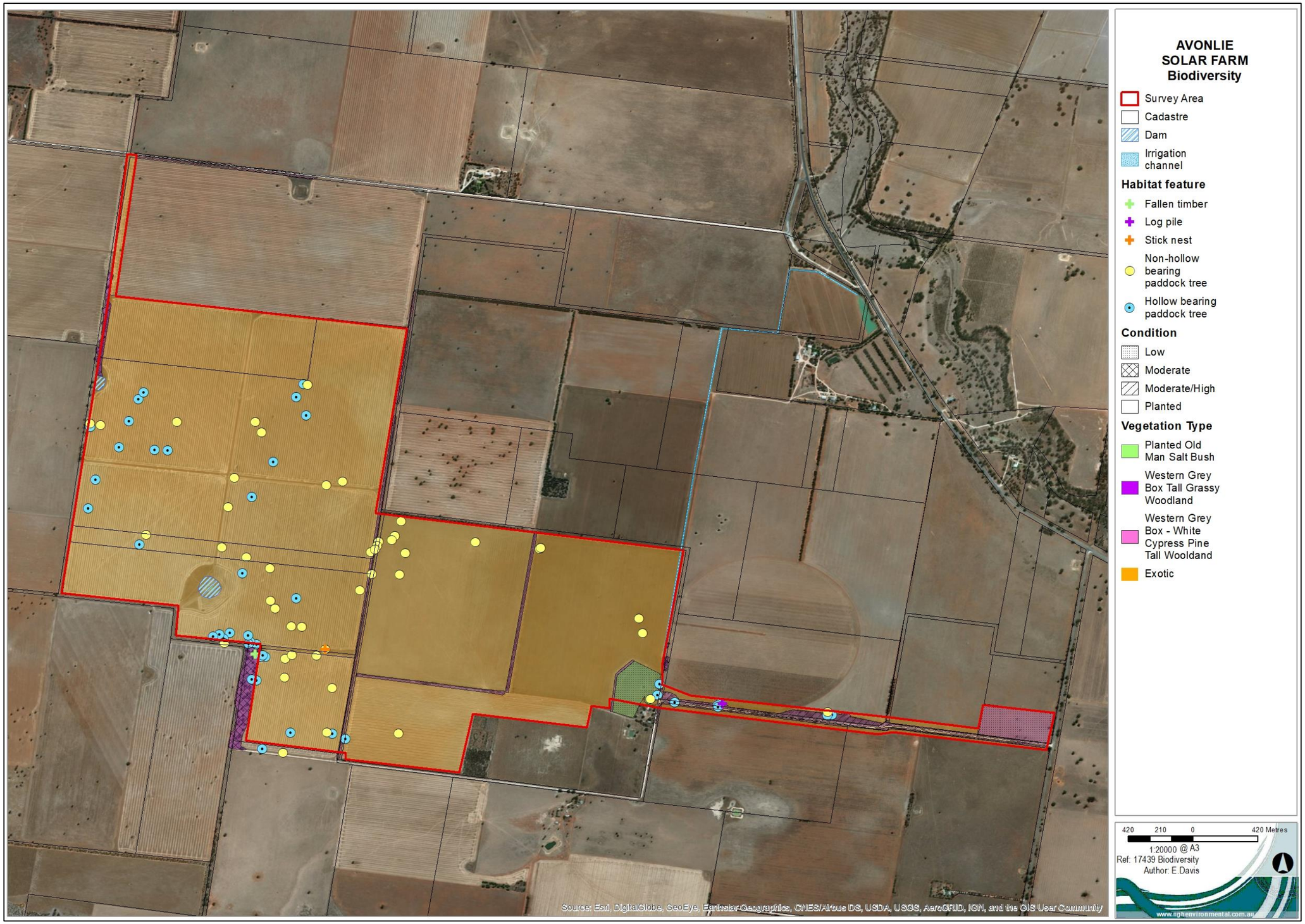

Figure 7-1 Ecological condition of the proposal area

Database searches

The EPBC Act Protected Matters search undertaken on 13 November 2017 indicated four Endangered Ecological Communities, five threatened flora species and fourteen threatened fauna species (excluding fish) that have the potential to occur at the site. A summary of the search results is provided in Table 7-1.

Table 7-1 Summary of EPBC Act Protected Matters Report search results

Protected Matter	Entities within the search area
World Heritage Properties	0
National Heritage	0
Wetlands of International Significance (Ramsar)	4
Threatened Ecological Communities	4
Threatened Species	22
Migratory Species	10
Listed Marine Species	16
Commonwealth land	1
Commonwealth Heritage places	0
Critical habitats	0
Commonwealth reserves (terrestrial)	0
State and territory reserves	0
Regional Forest Agreements	0
Invasive species	27
Nationally Important Wetlands	0
Key Ecological Features (marine)	0

A search of the OEH Threatened Species database (OEH 2017c) on 23 November 2017 for the South-Western Slopes – Lower Slopes IBRA region identified 2 Endangered Ecological Community, 16 threatened flora species and 48 threatened fauna species comprising of 41 bird species and seven mammals. The NSW Environment and Heritage BioNet database (OEH 2017a) indicated three threatened species recorded in or within 10 km of the proposed area:

- Brolga (*Grus rubicunda*);
- Superb Parrot (*Polytelis swainsonii*); and
- Spear Grass (*Austrostipa wakoolica*).

The BioNet mapping suggests that the endangered Spear Grass (*Austrostipa wakoolica*) occurs adjacent to the proposed development area; however, descriptions of the siting place the recording in a quarry. Records are accurate up to 10 km, and there is no quarry within the proposed area. It is unlikely that the recording was taken from within the proposed area. Based on the nearby records, *Austrostipa wakoolica* could occur in areas of remnant native vegetation and targeted surveys in these areas will form part of the EIS process.

No threatened flora or fauna species were observed during the field surveys. A range of commonly occurring fauna species, such as macropods, reptiles and birds could also be present at the proposal site or migrate through at times.

Threatened species that have potential to occur on the proposal site as indicated from the database searches have been included in a table in Appendix A. Preliminary Biodiversity Assessment Methodology (BAM) results detailing presence of habitat, likelihood and potential for impact has been included in a table in Appendix B.

It is noted that the Plains Wanderer (*Pedionomus torquatus*) was identified on site through the BioNet database for the ESCO Pacific Sandigo Solar Farm on the Kywong property. This recording was however more than 10km from the Avonlie solar farm proposal area. The preliminary BAM results did not indicate the potential for the Plains Wanderer, and the proposal area was not identified as primary or secondary habitat on the Murray CMA mapping within the Sandigo PEA. Investigation of the likelihood, consequence and impact of the Plains Wanderer will be further considered in the EIS.

Further investigation into the likelihood and consequence of the impact of the proposal on these species would be considered after a full floristic plot survey under the BAM for the EIS.

Vegetation Mapping

An assessment was undertaken of existing vegetation mapping for the proposal area. The proposal area is not listed as an area of outstanding biodiversity value under the Biodiversity Conservation Act.

OEH VIS mapping for the locality shows the proposal area mapped as non-native vegetation or planted woody vegetation. Small patches of Inland Grey Box Woodland are mapped as occurring in the surrounding locality.

Site inspection

A field survey was undertaken on the 15th November 2017. The results of the field survey are shown in Figure 7-1.

Farmed Land

Most of the proposal area is used for cropping and grazing, and has lost native tree cover and understorey. The paddocks have been deep ripped and cultivated in past management practices. Scattered remnant trees of Grey Box (*Eucalyptus microcarpa*) and White Cypress (*Callitris glaucophylla*) are present within the paddocks with the understorey comprised entirely of exotic species.

Planted windbreaks in various locations throughout the site are comprised of a mix of local native vegetation such as Yellow Box (*Eucalyptus melliodora*), Blakely's Red Gum (*Eucalytpus blakelyi*), Grey Box (*Eucalyptus microcarpa*), Mugga Ironbark (*Eucalyptus sideroxylon*), Red Mallee (*Eucalyptus oleosa*) and various shrubs such as Willow Wattle (*Acacia salicina*), Hopbush (*Dodonaea viscosa*) and Old Man Saltbush (*Atriplex nummularia*). The groundcover in these windbreaks is comprised of a mix of native grasses (such as *Rytdiosperma* sp) and exotic annual grasses (*Bromus sp.*). A planted paddock of Old Man Saltbush occurs near the homestead on the east of the proposal area. This paddock has been planted for grazing and does not comprise a vegetation community.

Remnant Vegetation

An area of moderate/high condition Western Grey Box-Cypress Pine Woodland occurs in the east of the proposal area along Muntz Road. Species of trees include Yellow Box, Grey Box and White cypress (*Callitris glaucophylla*) with a native understory predominantly comprised of Wallaby Grass (*Rytidopserma sp.*) and Spear Grass (*Austrostipa scabra and A. aristiglumis*). Native herbs and forbs are present within the woodland and provide good understorey diversity. There is also potential for the threatened flora species, *Austrostipa wakoolica* to occur within this patch of moderate/high condition woodland. On the far east of the Proposal area a small patch of scattered White Cypress Pine over a mainly exotic dominated understory. This area has been defined as Grey Box – Cypress Pine Woodland in Low Condition.

An area of moderate Western Grey Box Woodland occurs on the western boundary of the proposal area. This area is dominated by an overstory of Grey Box. The understory is degraded, having been heavily grazed but still supports some native grasses and forbs.

These areas of remnant vegetation provide habitat and fauna movement corridors. Hollow bearing trees and a good condition over storey could provide habitat for several threatened woodland birds including the Superb Parrot (*Polytelis swainsonii*), and mammals including the Koala (*Phascolarctos cinereus*) and Corbens Long-eared Bat (*Nyctophilus corbeni*).

Plant Community Types and Endangered Ecological Communities

Based on existing vegetation mapping and the initial site inspection, vegetation within the proposal area was assigned to Plant Community Types (PCTs) in accordance with the Vegetation Information System Classification Database. PCTs were determined based on the presence of diagnostic species identified in the site survey. The results are preliminary in nature and will be refined following detailed vegetation survey of the site, and the undertaking of Floristic Plots in accordance with the Biodiversity Assessment Methodology (OEH, 2017).

PCTs identified within the proposal area are:

PCT 76 – Western Grey Box tall grassy woodland on alluvial loam and clay soils of the NSW South Western Slopes and Riverina Bioregion.

PCT 80 - Western Grey Box – White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion.

The isolated paddock trees within the proposal area are likely to be derived from PCT 80 Western Grey Box- White Cypress Pine tall woodland.

Subject to further assessment, the vegetation communities may be consistent with the following threatened ecological communities:

- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (BC Act, Endangered);
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (EPBC Act, Endangered);

Threatened Species

The proposal will be assessed through the Biodiversity Assessment Methodology (OEH 2017). Once full floristic plots have been undertaken in areas of native vegetation to be impacted, the Biodiversity Assessment Methodology Calculator will determine species credit species requiring further consideration.

Potential impacts

The following impacts upon biodiversity have been considered as having potential to occur during the construction and operation of the proposal:

- Clearing, removal and disturbance of vegetation, in particular paddock trees;
- Clearing of limited habitat (including disturbance to potential foraging, sheltering and breeding habitat);
- Loss of connectivity and nesting sites;
- Introduction and spread of invasive species and weeds;
- Increase risk of competition with regenerating native plants;
- Disturbance or displacement of fauna;
- Microclimate impacts due to shading, water availability, temperature etc.; and
- Movement barrier and collision hazard by perimeter fencing.

Further assessment

A full floristic plot survey is required to determine the floristic composition, condition and EEC status of native vegetation at the proposal site. Fauna survey and habitat assessment is also required to determine the potential for the presence of threatened fauna species and habitat features such as tree hollows. These surveys and assessments would be undertaken as part of the EIS, according to the BAM. This will include the calculation of any biodiversity offset required for the project.

7.2.2 Aboriginal heritage

A search of the Aboriginal Heritage Information Management System (AHIMS) on 13 November 2017 identified no Aboriginal places within one kilometre of the proposal area. No Aboriginal places were identified on the proposal area.

Landforms, vegetation and soils over much of the proposal area have been heavily disturbed by paddock levelling, cultivation, track formation and clearing for agriculture. This is likely to reduce the potential for Aboriginal heritage sites of significance in the affected areas. Conversely, unmodified areas with remnant woodlands are likely to have a higher potential for significance. It is noted that field assessment is required to confirm this and that any Aboriginal heritage sites/items/etc. identified would be a moderate to high constraint, requiring impact mitigation.

Aboriginal consultation

The consultation with Aboriginal stakeholders will be undertaken in accordance with clause *80C of the National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2010* following the consultation steps outlined in the (ACHCRP) guide provided by OEH.

A brief summary of the consultation process includes:

1. Registration and initial consultation and registration of Aboriginal community members
2. Review of survey methodology by Registered Aboriginal Parties (RAPs)
3. Completion of field work and reporting
4. Review of report by RAPs
5. Report finalisation.

Advertisement and registration for the Aboriginal Cultural Heritage Assessment process has closed, with three RAPs expressing interest in the proposal. RAPs are currently reviewing survey methodology, with the closing date for comments being 19 January 2018. Fieldwork for the assessment will be undertaken in early February 2018.

Potential impacts

The following impacts upon Aboriginal heritage have been considered as having potential to occur during the construction of the proposal:

- Uncovering an unexpected or unidentified Aboriginal heritage item

Further assessment

An Aboriginal Cultural Heritage Assessment of the development footprint and stakeholder consultation process would be completed as part of the EIS. The significance of any Aboriginal heritage sites that may

be affected by the proposal would be determined in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011).

7.2.3 Watercourses and hydrology

Sandy Creek, approximately 1.2km north east of the proposal area, is a fourth order stream (Class 2 waterway) in accordance with Strahler stream classification system (Strahler, 1952).

There are no prescribed streams within the proposal area.

Manmade irrigation channels traverse the eastern part of the proposal area. Most of these irrigation channels are involved in existing agricultural activities on the property and are periodically ploughed. The irrigation channels are shallow, and grass lined. The proposal area also holds two farm dams. These dams have no fringing vegetation and provide poor habit for native fauna. Dams within the proposal area are currently used for watering stock.

Construction of the proposal may increase the transport of exposed sediment. As vehicles may be travelling on unsealed roads, dust and erosion is likely if no mitigation measures are in place

In accordance with LEP mapping, the proposal area is not subject to flooding or groundwater vulnerability.

Water demand for the proposal will be relatively small, as construction of the solar farm is not water intensive. If surface or groundwater extraction is required to meet the demand for water, and assessment of impacts to water will be included in the EIS.

There is a very low potential that groundwater would be encountered during excavations an earthwork for the construction and pole placements for the transmission lines. This is likely to be highly localised and no interception of ground water is likely to cause any impact on this resource.

Potential impacts

The irrigation channel and the farm dams are proposed not to be impacted. Impacts upon watercourses and hydrology that are considered as having potential to occur during the construction of the proposal include:

- Accidental release of hydrocarbons by inappropriate storage, use and disposal of chemicals;
- Domestic waste, effluent and putrescibles causing contamination;
- Erosion of soil and sedimentation through storm-water runoff; and
- Dewatering sediment laden water from excavations.

Further assessment

The EIS would assess the impacts to waterways during construction and operation and include appropriate mitigation measures as required.

7.2.4 Noise

There are no sensitive receivers located within the immediate vicinity of the proposal area, with the nearest sensitive receiver approximately 1 km to the north-west (receiver 3 on Figure 6-1).

Noise impacts would, for the most part, only occur during construction (generated by construction vehicles and machinery). RES would adopt best practice mitigation measures during construction, such as standard working hours and regular vehicle and machinery maintenance to reduce the risk of adverse noise impacts.

During the operation of the solar farm, noise would potentially be produced by the solar tracking system (an optional feature which would operate for around half an hour per day), the substation and switchgear and any maintenance work undertaken at the site. Noise impacts during the operation of the solar farm are expected to be very low.

Further assessment

A construction noise assessment will be undertaken as part of the EIA to assess potential noise impacts. The assessment will be undertaken in accordance with the Interim Construction Noise Guideline (DECC 2009).

7.2.5 Land use and resources

The rural land in the study area is used primarily for agriculture including cropping and grazing. Aerial mapping suggests irrigation in the area, including irrigation channels and centre pivots used for agricultural activities.

The proposal area comprises several large paddocks which have been deep ripped and largely cleared for growing cereal crops including wheat and oats. Land and agricultural activities like the proposal area are widespread in the region. There is no evidence of horticulture or other intense farming activities within the proposal area.

The *Mining, Petroleum, Production and Extractive Industries (The Mining SEPP) State Environmental Planning Policy 2007* does not extent as far as the proposed Avonlie Solar Farm. It is unknown if the land is classed and Biophysical Strategic Agricultural Land (BSAL), it is however unlikely given the environmental context of the land; BSAL has been described as land with high quality soil and water resources capable of sustaining high levels of productivity. The land is classified as Class 3 under the Land and Soil Capability Assessment Scheme (OEH 2012), and is described as sloping land capable of sustaining cultivation on a rotational basis. The land is readily used for a range of crops including cereals, oilseed and pulses. This class of land is not considered Prime Agricultural Land (Emery (undated)), and is not considered to be high quality soil with water resources capable of high level production.

There are no mineral titles or applications relevant to the proposal area indicated in the Minview database (DPE 2017).

For the construction period (18 months), there will be a complete reduction in agricultural activities within the proposed land. During the operational phase, not all agricultural activities will be precluded and it is highly likely that limited production, such as grazing, could continue. As such, it can be expected that the nature of the agricultural activities will change from cropping to grazing within the proposal area. This would be further explored during the EIA. Following decommissioning, it is expected that the land will be readily returned to its prior primary production uses, as solar farms typically do not have significant permanent impacts to soils and landform.

Overall, the adverse impacts related to alienation of resources are expected to be low and restricted only to the period of operation.

Further assessment

The impact on agricultural production in the locality and region would be assessed in detail in the EIS.

7.3 OTHER ENVIRONMENTAL MATTERS

There are a range of potential environmental matters associated with the proposal which are not considered to be key matters. These are considered secondary matters for investigation, given the characteristics of the proposal and the availability of appropriate safeguards for mitigation. These matters are outlined in Table 7-2. The impacts and any required mitigation relating to these matters would be addressed at an appropriate level of detail in the EIS.

Table 7-2 Other environmental matters

Existing environment	Potential impacts	Management and mitigation
Soils		
The proposal area lies on an alluvial plain with alluvium, clay and sand lithology (espade 2017). Local relief is generally very low. Drainage is imperfect, and erosion hazard is generally moderate.	Construction activities would include minor excavations and vegetation removal which have the potential to cause soil erosion and sedimentation and dust issues.	The design would provide all weather access to the proposal area during construction and operation to avoid erosion/sedimentation impacts and tracking of soil after rain events. The EIS would provide thorough consideration of soil impacts and proposed mitigation measures during construction and operation.
Visual amenity		
The proposal has potential to result in visual impacts to neighbouring houses and road users adjacent to the proposal area. The proposal area is in the locality of Avonlie within a rural area with large lot agricultural production. The generally flat terrain and intermittent tree cover along roadsides limits long range views in the locality.	The proposal has the potential to have low to moderate visual impacts. Existing vegetation, the generally large distances between the proposal area and non-involved residences, plus the potential for screening, limits the risk of substantial impacts.	An assessment of the level of visual impact would be undertaken as part of the EIS process. The EIS would also consider the potential for proposal to affect local landscape character. Additional consultation with specific affected residences would be undertaken to identify the nature and significance of impacts and the need for mitigation measures. The level terrain improves the potential effectiveness of vegetation planting around the proposal area. It is noted that solar panels are designed to absorb as much sunlight as possible. They therefore reflect a very low percentage of the light and are not considered likely to result in

Existing environment	Potential impacts	Management and mitigation
		glare or reflections that would affect traffic or nearby receivers.
Historic heritage		
A search of the NSW Heritage Register on 14 November 2017 for the Narrandera LGA identified 7 items under the NSW Heritage Act, 42 items listed under the Narrandera LEP and by state agencies and no Aboriginal places. The closest listed heritage item is the "Avonlie Hall" listed on the Narrandera LEP, located approximately one kilometre north east of the proposal area.	There is a low risk of impact to heritage items.	The heritage status of the proposal area would be assessed during fieldwork undertaken as part of the archaeological assessment. Appropriate management measures would be implemented if required.
Access and traffic		
Access to the site from the Sturt Highway (nearest major transport route) is via sealed local roads, such as Avonlie Boree Creek Road, Muntz Road, Quilters Road and Strontian Road. These roads are all two-lane, single carriageway sealed roads with speed limits varying from 40 to 80km/h. The Sturt Highway/Quilters Road and Sturt Highway/Sandigo Road intersections are both basic T-intersections. The level of service associated with both intersections would be subject to further assessment as part of the EIS.	Construction traffic may impact traffic along local roads. Maintenance access tracks during operation would also be required across the proposal area and along the easement of the proposed transmission line.	Construction traffic impacts would be considered in the EIS and take into consideration existing traffic volumes and any requirements from RMS. Consultation would be undertaken before construction with RMS, the local council and road users regarding the works that may affect roads or traffic. The design would also consider any requirements from RMS and other relevant stakeholders on access arrangements to the proposal area, including transmissions line, if any modifications to the current access to the site is required. A Traffic Management Plan would be developed as part of the CEMP.

Existing environment	Potential impacts	Management and mitigation
Contamination		
There are no contaminated sites for the Narrandera LGA within 7.5 kilometres of the proposal area on the EPA contaminated land register (EPA 2017). Contamination associated with agricultural activities (e.g. pesticides, petrochemicals) or asbestos construction or insulation materials may still be present on the site.	There is potential that contaminants may be uncovered during excavation activities at the proposal area, or the accidental spill or release of chemicals due to incorrect storage and use.	Risk associated with contamination at the proposal area are considered low and therefore no detailed investigation is likely to be required within the EIS. The mitigation measures would require a CEMP be prepared to manage any contamination identified or created during construction.
Air quality		
The air quality in the study area is expected to be good and typical of rural settings in NSW with low population density and few industrial pollution sources. Existing sources of air pollution are expected to include vehicle emissions, dust from agricultural practices and smoke from seasonal stubble burning. During colder months, solid fuel heating may result in a localised reduction in air quality, particularly if temperature inversions operate overnight.	The construction of the proposal is not anticipated to have a significant impact on air quality, and would mostly be related to dust during dry periods and vegetation removal. Impacts to air quality during operation would be negligible due to the expected standard of vehicles and maintenance, and lack of sensitive receptors.	The mitigation measures would require a CEMP be prepared to manage air quality impacts during the construction phase. There is an opportunity to improve local air quality by maintaining ground cover vegetation under the panels.
Hazard and risk – electric and magnetic fields (EMF)		
Existing powerlines produce EMF at the site. The addition of a substation at the proposal site would produce supplementary electromagnetic emissions.	The substation and network connection would be located within the proposal area, and will connect to existing overhead transmission lines. The EMF that would be generated by the proposed powerlines and substation is expected to be below the guideline for public exposure and would not be expected to have an adverse impact on human health.	The EMF levels of the proposed powerlines and substation would be assessed as part of the EIS.

Existing environment	Potential impacts	Management and mitigation
Hazard and risk - bushfire		
The proposal area has been predominantly cleared for agriculture, and is not identified as fire prone under the LEP or Rural Fire Services mapping (RFS 2017).	The proposal is unlikely to be affected by bushfire, or pose a significant bushfire risk.	Bushfire impacts and risk would be assessed in the EIS.
Social and economic impacts		
The proposal area is located within the Narrandera LGA. In 2016 Narrandera LGA had a population of 5,853. The main industry of employment in 2016 was grain-sheep or grain-beef cattle farming.	The proposal would generate economic benefits during construction and operation. Other socio-economic impacts would include traffic and access, noise, air quality and visual impacts. Solar farms also pay higher local council rates than farm land, providing an additional economic benefit.	The EIS would assess potential social and economic impacts of the proposal.
Workforce accommodation would be required for potentially 200 staff members during peak construction periods. A large majority of these may already reside locally. For visiting workers, accommodation can be sought from Narrandera or other towns within a 100km radius, including Ardlethan, Griffith, Wagga Wagga, Grong Grong and Darlington Point	The proposal would generate economic benefits during construction, bringing business to hotel and motels for long-term accommodation. Accommodation demand may however displace tourism for the region. This however is relatively short-term.	The EIS would assess potential social and economic impacts of the proposal.
Utilities		
Electricity network TransGrid manages and operates the high voltage electricity transmission network in NSW, and have restrictions on development within powerline easements. TransGrid guidelines state that activities and encroachments are prohibited within a transmission line easement, including 'the installation of fixed plant or equipment', and 'the placing of obstructions within 20 metres of any part of a transmission line structure or supporting guy wire'. Roads or tracks within 10 metres of the centre-line of a transmission line 132kV are prohibited although roads that cross the transmission line as a thoroughfare may be permitted.	The proposed works would involve works adjacent to these utilities. The solar farm would need to connect to the TransGrid electricity network.	The EIS would assess the proposal against the setback and approval requirements of TransGrid. The solar farm would be designed to comply with required setback, approval and consultation requirements of TransGrid.

Existing environment	Potential impacts	Management and mitigation
Waste management		
The proposal would generate several waste streams and utilise a variety of materials during the construction phase.	During construction, excavated material and green waste would be generated as waste. Packaging from panels and other components would require disposal. Limited operational waste would be associated with the proposal.	A Waste Management Plan would be incorporated into the CEMP, applying the principles to avoid, re-use and recycle to minimise wastes. Cleared trees would be recycled as fauna habitat where possible.
Cumulative Impacts		
The Sandigo Solar Project by ESCO Pacific comprises of two solar farms at Kywong and Glen Moira, Sandigo. The proposal will generate up to a combined total of 300MW of renewable energy. The proposed Avonlie Solar Farm would contribute to overall infrastructure construction in the region, with all three solar farms located within 10km of one other (Figure 7-2).	During construction and operation, key cumulative impacts may include additional stress on the grid, community complaints such as visual amenity impacts, stress on local business for supply and demand (in particular staff accommodation), noise impacts, air quality, waste management, traffic etc.	Early consultation with the community regarding cumulative impacts should be conducted. Further assessment/investigation of cumulative impacts will be required, and the EIS would assess potential impact and risk

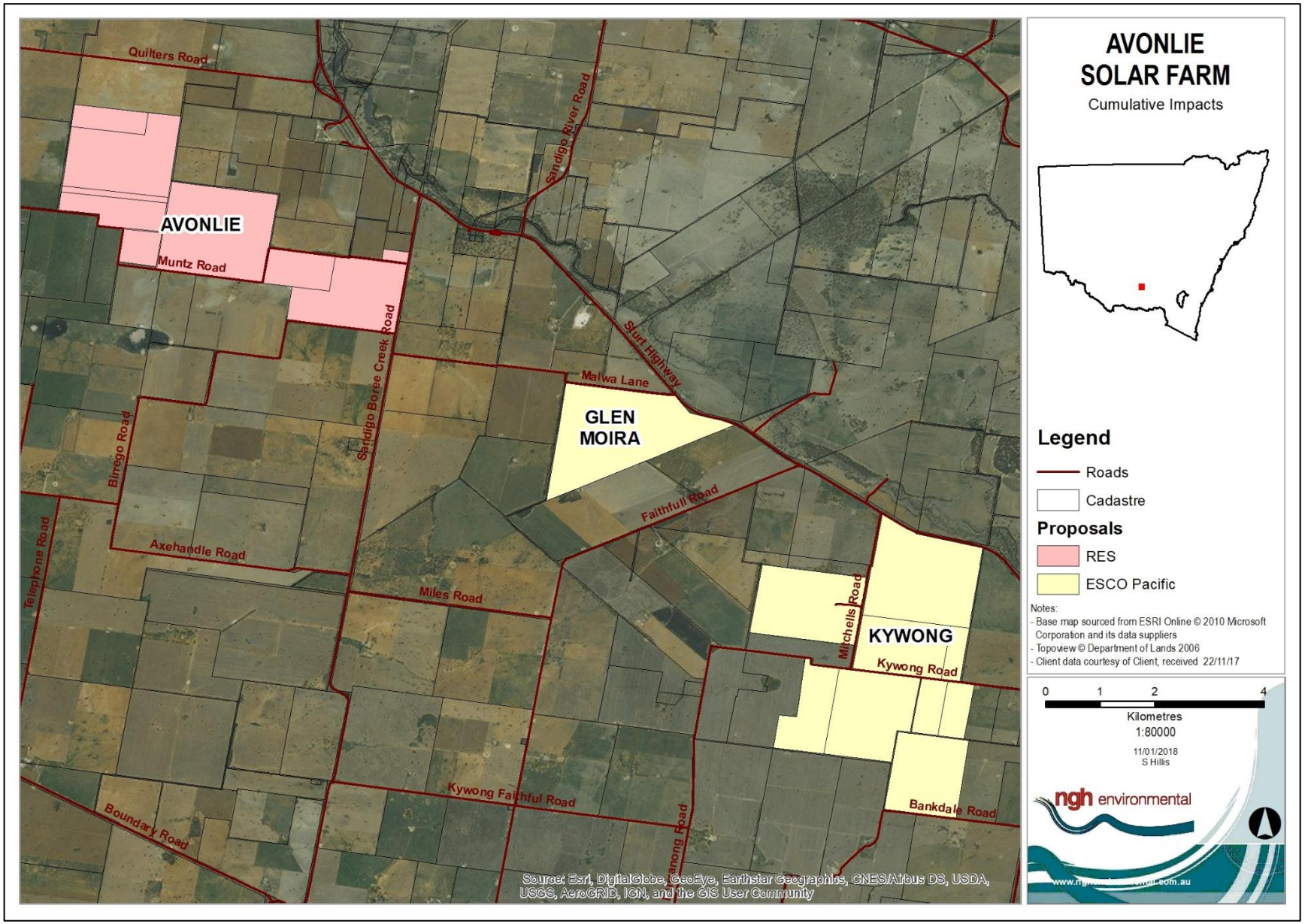

Figure 7-2 Cumulative Impacts

8 CONCLUSION

This Preliminary Environmental Assessment has outlined the proposal and established the environmental and planning context of the proposal. The proposal would be assessed under Part 4 of the EP&A Act and classed as State Significant Development under *State Environmental Planning Policy (State and Regional Development) 2011.*

The report has been prepared to assist the development of Secretary's Environmental Assessment Requirements (SEARs) for the proposal, which will guide the preparation of the Environmental Impact Statement (EIS).

The report identifies the following key environmental aspects associated with the proposal, based on preliminary investigations:

- Biodiversity
- Aboriginal heritage
- Noise (construction)
- Land use and resources
- Watercourses and hydrology.

These matters will be assessed in detail in the EIS. It is likely that other matters such as soil and water values, traffic impacts and natural hazards can be readily addressed by appropriate standard mitigation and management measures. The relevance and importance of matters would be reviewed throughout the EIS process.

9 REFERENCES

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APPENDIX A POTENTIAL THREATENED SPECIES

Common Name	Scientific Name	Status
Flora		
Tylophora linearis	*Tylophora linearis*	**TSC-V, EPBC-E**
Austral Pillwort	*Pilularia novae-hollandiae*	**TSC-E**
A spear-grass	*Austrostipa metatoris*	**TSC-V, EPBC-V**
A spear-grass	*Austrostipa wakoolica*	**TSC-E, EPBC-E**
Claypan Daisy	*Brachyscome muelleroides*	**TSC-V, EPBC-V**
Floating Swamp Wallaby-grass	*Amphibromus fluitans*	**TSC-V, EPBC-V**
Lanky Buttons	*Leptorhynchos orientalis*	**TSC-E**
Mossgiel Daisy	*Brachyscome papillosa*	**TSC-V, EPBC-V**
Silky Swainson-pea	*Swainsona sericea*	**TSC-V**
Slender Darling Pea	*Swainsona murrayana*	**TSC-V, EPBC-V**
Small Purple-pea	*Swainsona recta*	**TSC-E, EPBC-E**
Small Scurf-pea	*Cullen parvum*	**TSC-E**
Spike-Rush	*Eleocharis obicis*	**TSC-V, EPBC-V**
Spiny Peppercress	*Lepidium aschersonii*	**TSC-V, EPBC-V**
Winged Peppercress	*Lepidium monoplocoides*	**TSC-E, EPBC-E**
Woolly Ragwort	*Senecio garlandii*	**TSC-V, EPBC-V**
Crimson Spider Orchid	*Caladenia concolor*	**TSC-E, EPBC-V**
Oaklands Diuris	*Diuris sp. (Oaklands, D.L. Jones 5380)*	**TSC-E**
Pine Donkey Orchid	*Diuris tricolor*	**TSC-V**
Sand-hill Spider Orchid	*Caladenia arenaria*	**TSC-E, EPBC-E**
Small Snake Orchid	*Diuris pedunculate*	**TSC-E, EPBC-E**
Philotheca angustifolia subsp. Angustifolia	*Philotheca angustifolia subsp. Angustifolia*	**TSC-Locally extinct**
Ausfeld's Wattle	*Acacia ausfeldii*	**TSC-V**
Fleshy Minuria	*Kippistia suaedifolia*	**TSC-E**
Holly-leaf Grevillea	*Grevillea ilicifolia subsp. Ilicifolia*	**TSC-CE**
Endangered Ecological Community		
Fuzzy Box Woodland on alluvial Soils of the South-western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions		**TSC-EEC**
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions		**TSC-EEC** **EPBC-E**
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions		**TSC-EEC** **EPBC-E**
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions		**TSC-EEC**

Common Name	Scientific Name	Status
White Box Yellow Box Blakely's Red Gum Woodland		**TSC-EEC** **EPBC-CEEC**
Amphibians		
Sloane's Froglet	*Crinia sloanei*	**TSC-V**
Southern Bell Frog	*Litoria raniformis*	**TSC-E, EPBC-V**
Bats		
Corben's Long-eared Bat	*Nyctophilus corbeni*	**TSC-V, EPBC-V**
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	**TSC-V**
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	**TSC-V**
Greater Broad-nosed Bat	*Scoteanax rueppellii*	**TSC-V**
Grey-headed Flying-fox	*Pteropus poliocephalus*	**TSC-V, EPBC-V**
Inland Forest Bat	*Vespadelus baverstocki*	**TSC-V**
Large-eared Pied Bat	*Chalinolobus dwyeri*	**TSC-V, EPBC-V**
Little Pied Bat	*Chalinolobus picatus*	**TSC-V**
Southern Myotis	*Myotis Macropus*	**TSC-V**
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	**TSC-V**
Birds		
Australasian Bittern	*Botaurus poiciloptilus*	**TSC-E, EPBC-E**
Australian Painted Snipe	*Rostratula australis*	**TSC- E, EPBC-V, Marine, Migratory**
Barking Owl	*Ninox connivens*	**TSC-V**
Black Falcon	*Falco subniger*	**TSC-V**
Black-breasted Buzzard	*Hamirostra melanosternon*	***TSC-V***
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*	**TSC-V**
Black-tailed Godwit	*Limosa limosa*	**TSC-V, EPBC-Marine, Migratory**
Blue-billed Duck	*Oxyura australis*	**TSC-V**
Brolga	*Grus rubicunda*	***TSC-V***
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	**TSC-V**
Bush Stone-curlew	*Burhinus grallarius*	**TSC-E**
Chestnut Quail-thrush	*Cinclosoma castanotum*	**TSC-V**
Curlew Sandpiper	*Calidris ferruginea*	**EPBC-Marine, Migratory**
Diamond Firetail	*Stagonopleura guttate*	**TSC-V**
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	**TSC-V**

Common Name	Scientific Name	Status
Flame Robin	*Petroica phoenicea*	**TSC-V**
Freckled Duck	*Stictonetta naevosa*	**TSC-V**
Gang-gang Cockatoo	*Callocephalon fimbriatum*	**TSC-V**
Gilbert's Whistler	*Pachycephala inornata*	**TSC-V**
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	**TSC-V**
Grey Falcon	*Falco hypoleucos*	**TSC-E**
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	**TSC-V**
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullate*	**TSC-V**
Little Eagle	*Hieraaetus morphnoides*	**TSC-V**
Little Lorikeet	*Glossopsitta pusilla*	**TSC- V**
Magpie Goose	*Anseranas semipalmata*	**TSC-V**
Major Mitchell's Cockatoo	*Lophochroa leadbeateri*	**TSC-V**
Malleefowl	*Leipoa ocellate*	**TSC-E, EPBC-V**
Masked Owl	*Tyto novaehollandiae*	**TSC-V**
Painted Honeyeater	*Grantiella picta*	**TSC-V**
Pied Honeyeater	*Certhionyx variegatus*	**TSC-V**
Plains-wanderer	*Pedionomus torquatus*	**TSC-E, EPBC-V**
Purple-crowned Lorikeet	*Glossopsitta porphyrocephala*	**TSC-V**
Regent Honeyeater	*Anthochaera Phrygia*	**TSC-CE, EPBC-E, Migratory**
White-bellied Sea-Eagle	*Haliaetus leucogaster*	**Migratory**
Scarlet Robin	*Petroica boodang*	**TSC-V**
Shy Heathwren	*Hylacola cautus*	***TSC-V***
Southern Scrub-robin	*Drymodes brunneopygia*	**TSC-V**
Speckled Warbler	*Chthonicola sagittate*	**TSC-V**
Spotted Harrier	*Circus assimilis*	**TSC-V**
Square-tailed Kite	*Lophoictinia isura*	**TSC-V**
Superb Parrot	*Polytelis swainsonii*	**TSC-V, EPBC-V**
Swift Parrot	*Lathamus discolour*	**TSC-E, EPBC-E**
Turquoise Parrot	*Neophema pulchella*	**TSC-V**
Varied Sittella	*Daphoenositta chrysoptera*	**TSC-V**
White-browed Treecreeper	*Climacteris affinis*	**TSC-E**
White-fronted Chat	*Epthianura albifrons*	**TSC-V**
Marsupials		
Eastern Pygmy-possum	*Cercartetus nanus*	**TSC-V**
Koala	*Phascolarctos cinereus*	**TSC-V**

Common Name	Scientific Name	Status
Spotted-tailed Quoll	*Dasyurus maculatus*	**TSC-V, EPBC-E**
Squirrel Glider	*Petaurus norfolcensis*	**TSC-V**
Stripe-faced Dunnart	*Sminthopsis macroura*	**TSC-V**
Reptiles		
Pink-tailed Legless Lizard	*Aprasia parapulchella*	**TSC-V, EPBC-V**

APPENDIX B HABITAT TABLE

The tables in this appendix present the habitat evaluation for threatened species, ecological communities and endangered populations listed in the from the preliminary Biometric Assessment Methodology (BAM).

The likelihood of occurrence is based on presence of habitat, proximity of nearest records and mobility of the species (where relevant). The assessment of potential impact is based on the nature of the proposal, the ecology of the species and its likelihood of occurrence. The following classifications are used:

Presence of habitat:

Present: Potential or known habitat is present within the study area

Absent: No potential or known habitat is present within the study area

Likelihood of occurrence

Unlikely: Species known or predicted within the locality but unlikely to occur in the study area

Possible: Species could occur in the study area

Present: Species was recorded during the field investigations

Possible to be impacted

No: The proposal would not impact this species or its habitats. No further assessment would be necessary at this stage of the project.

Yes: The proposal could impact this species or its habitats. Further investigation into the likelihood and consequence of the impact of the proposal on these species would be considered under the BAM for the EIS.

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Flora				
A spear-grass *Austrostipa wakoolica* **TSC-E, EPBC-E**	A densely-tufted, perennial spear-grass, growing to 1 m tall. Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW, with localities including Manna State Forest, Matong, Lake Tooim, Merran Creek, Tulla, Cunninyeuk and Mairjimmy State Forest. Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise. Associated species include *Callitris glaucophylla, Eucalyptus microcarpa, E. populnea, Austrostipa eremophila, A. drummondii, Austrodanthonia eriantha* and *Einadia nutans*. Flowers from October to December, mainly in response to rain. Seed dispersal is mainly by wind, rain and flood events; the awn and sharp point of the floret appear to be an adaptation for burying the seed into the soil; grass seed is traditionally believed to be viable for three to five years, so a long-lived seed bank is considered unlikely for this species. Recorded as common in the Mairjimmy State Forest population.	**Present**	**Likely –** Species has been previously recorded within 10km of the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**
Mossgiel Daisy *Brachyscome papillosa* **TSC-V, EPBC-V**	The Mossgiel Daisy is a multi-stemmed, perennial herb that grows to 40 centimetres tall. Occurs chiefly from Mossgiel to Urana, in south-western NSW, with sites in the Jerilderie area, the Hay Plain, Willandra Lakes district and north to Ivanhoe. A north-western outlier is at Byrnedale Station, north of Menindee. The only known site on South Western Slopes is Ganmain Reserve. The distribution of this species overlaps with the following EPBC Act-listed threatened ecological communities: Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions, and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Recorded primarily in clay soils on Bladder Saltbush (*Atriplex vesicaria*) and *Maireana aphylla* plains, but also in grassland and in Grey Box (*Eucalyptus microcarpa*) - Cypress Pine (*Callitris* spp.) woodland. Flowers from June to December. Recorded as locally occasional to common in populations.	**Present –** Preferred habitat includes Grey Box – Cypress Pine Woodland present in the proposal area.	**Possible -** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**

[1] Information sourced from species profiles on NSW OEH's threatened species database or the Australian Government's Species Profiles and Threats database (SPRAT) unless otherwise stated.

OEH threatened species database: http://www.threatenedspecies.environment.nsw.gov.au/index.aspx
SPRAT: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Silky Swainson-pea *Swainsona sericea* **TSC-V**	A prostrate or erect perennial, growing to 10 cm tall. Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. Found in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland on the Monaro. Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes. Sometimes found in association with cypress-pines *Callitris* spp. Habitat on plains is unknown. Regenerates from seed after fire. Flowers spring to summer.	**Present –** Species can be found in Box Gum Woodland on the South West Slopes.	**Possible -** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**
Slender Darling Pea *Swainsona murrayana* **TSC-V, EPBC-V**	An ascending to erect perennial forb growing to 25 cm high. Occurs from South Australia through south-west Victoria and central NSW to south-east Queensland. Found throughout NSW, it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree. Found in grassland, herbland, and open Black-box woodland, often in depressions. Has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated. Plants produce winter-spring growth, flower in spring to early summer and then die back after flowering. They re-shoot readily and often carpet the landscape after good cool-season rains. The species may require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated.It is often associated with low chenopod shrubs (*Maireana* spp.), wallaby-grass (*Austrodanthonia* spp), and spear grass (*Austrostipa* spp.).	**Present –** Species grows in a variety of vegetation types including grassy woodland that have been grazed or cultivated.	**Possible -** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**
Oaklands Diuris *Diuris sp. (Oaklands, D.L. Jones 5380)* **TSC-E**	Currently known only from the Oaklands-Urana region of southern NSW. Grows in White Cypress Pine (*Callitris glaucophylla*) Woodland, either among dense grasses in flat areas with associated eucalypts, or amongst sparse grasses and forbs on low sandhills. Grows mostly on sandy loam soils. There are thought to be 6-7 populations of *Diuris* sp. Occurs in a largely agricultural area with some plants occurring on a roadside, and no population is protected in a formal conservation reserve. Flowers in November (but does not flower every year).	**Present –** Species grows in White Cypress Pine Woodland.	**Possible -** Preferred habitat for this species is present in the proposal area..	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Pine Donkey Orchid *Diuris tricolor* **TSC-V**	The Pine Donkey Orchid (formerly known as *Diuris sheaffiana*) is a terrestrial species that has a flower stalk 20-40 cm high. It is sporadically distributed on the western slopes of NSW, extending from south of Narrandera all the way to the far north of NSW. Localities include the Condobolin-Nymagee road, Wattamondara towards Cowra, Cooyal, Adelong, Red Hill north of Narrandera, Coolamon, near Darlington Point, Eugowra, Girilambone, Dubbo, Muswellbrook, and several sites west of Wagga Wagga. Disturbance regimes are not known, although the species is usually recorded from disturbed habitats. Associated species include *Callitris glaucophylla, Eucalyptus populnea, Eucalyptus intertexta*, Ironbark and *Acacia* shrubland. The understorey is often grassy with herbaceous plants such as *Bulbine* species. Flowers from September to November or generally spring. The species is a tuberous, deciduous terrestrial orchid and the flowers have a pleasant, light sweet scent. It is found in sandy soils, either on flats or small rises. Also recorded from a red earth soil in a Bimble Box community in western NSW. Usually recorded as common and locally frequent in populations, however only one or two plants have also been observed at sites. The species has been noted as growing in large colonies.	**Present –** Sporadically distributed south of Narrandera, and is associated with White Cypress Pine.	**Possible -** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**
Sand-hill Spider Orchid *Caladenia arenaria* **TSC-E, EPBC-E**	Sand-hill Spider Orchid is from a group of orchids characterised by five long, spreading petals and sepals around a broad down-curled labellum ('lip'). Found mostly on the south west plains and western south west slopes. The original description is of a plant from Nangus, west of Gundagai (1865) and there is a report of the species from Adelong near Tumut. A record near Cootamundra needs verifying. In 1996 the species was found on private property near Urana, and survey in 1998, 1999 and 2000 has revealed three other populations on State Forest in the Riverina (Lonesome Pine SF, Buckingbong SF, Yattanjerry SF). The Sand-hill Spider Orchid is currently only known to occur in the Riverina between Urana and Narranderra. Occurs in woodland with sandy soil, especially that's dominated by White Cypress Pine (*Callitris glaucophylla*). Many of the associated species in the understorey are different at each of the populations, or are species that are widespread and occur in a range of habitats. It is apparent that *C. arenaria* has fairly broad habitat tolerances, occurring in *Callitris glaucophylla* - *Eucalyptus melliodora* (Yellow Box) woodlands, *Callitris glaucophylla – Allocasuarina luehmannii* woodlands and woodlands dominated by a mixture of *Callitris glaucophylla, E. dwyeri* (Dwyer's Redgum) and *Acacia doratoxylon* (Currawang). Soils vary from skeletal soils over sandstone to clay loams. Flowering occurs from late August until early October.	**Present –** Known to occur on the South Western Slopes and in White Cypress/Yellow Box Woodland.	**Possible -** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Amphibians				
Sloane's Froglet *Crinia sloanei* **TSC-V**	A small ground-dwelling frog. Sloane's Froglet has been recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in New South Wales. It has not been recorded recently in the northern part of its range and has only been recorded infrequently in the southern part of its range in NSW. At a number of sites where records are verified by museum specimens, the species has not been subsequently detected during more recent frog surveys in the vicinity (e.g. Holbrook, Nyngan, Wagga Wagga and Tocumwal). The low number of sites, low number of recorded individuals per site, and the low proportion of records of this species in regional surveys all indicate that a moderately low number of mature individuals exist. This indicates that this is not just a rare or uncommonly encountered species, but that there has been a reduction in population size and range. It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats. Typically breeds in ephemeral wetlands, or periodically inundated areas of permanent wetlands, in grasslands, woodlands, and disturbed environments. Shelters in any vegetation, ground debris, or cracks in the soil that would provide suitable refuge. Best detected in winter after 60mm of rain.	**Present –** Associated with temporarily inundated areas and disturbed environments.	**Unlikely –** Dams on the proposal site provide marginal habitat at best for this species given the lack of fringing vegetation.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**
Birds				
Bush Stone-curlew *Burhinus grallarius* **TSC-E**	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range. Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch. Two eggs are laid in spring and early summer.	**Likely –** Inhabits open forests with sparse grassy ground cover	**Possible –** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Curlew Sandpiper *Calidris ferruginea* **EPBC-Marine, Migratory**	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Curlew Sandpipers generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh. This species does not breed in Australia. This species forages mainly on invertebrates, including worms, molluscs, crustaceans, and insects, as well as seeds.	**Absent –** This species prefers coastal habitats.	**Unlikely –** The preferred habitat for this species does not occur in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**
Glossy Black-Cockatoo - Riverina Population *Calyptorhynchus lathami – endangered population* **TSC-V**	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. Dependent on large hollow-bearing eucalypts for nest sites. One or two eggs are laid between March and August. Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (*Allocasuarina littoralis*), Forest She-oak (*A. torulosa*) or Drooping She-oak (*A. verticillata*) occur. In the Riverina area, inhabits open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill.	**Present –** Inhabits open woodlands	**Possible –** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**
Little Eagle *Hieraaetus morphnoides* ***TSC-V***	The Little Eagle is a medium-sized bird of prey that is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	**Present –** Inhabits open eucalypt forests.	**Possible –** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Major Mitchell's Cockatoo *Lophochroa leadbeateri* **TSC-V**	Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that. Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres.	**Present –** Inhabits wide range o0f treed and treeless habitats.	**Possible –** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**
Masked Owl *Tyto novaehollandiae* **TSC-V**	Extends from the coast where it is most abundant to the western plains. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. Habitat for this species is also widespread throughout the dry eucalypt forests of the tablelands, western slopes and the undulating wet-dry forests of the coast. Optimal habitat includes an open understorey and a mosaic of sparse (grassy) and dense (shrubby) ground cover on gentle terrain. Roosts in hollows in live or occasionally dead eucalypts; dense foliage in gullies; and caves. Nest in old hollow eucalypts, live or dead, in a variety of topographic positions, with hollows greater than 40 cm wide and greater than 100 cm deep. Hollow entrances are at least 3 m above ground, in trees of at least 90 cm diameter at breast height. A specialist predator of terrestrial mammals, particularly native rodents. Home range has been estimated as 400-1000 ha according to habitat productivity.	**Present –** Occupies a wide range of habitats with a large home range.	**Possible –** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Superb Parrot *Polytelis swainsonii* **TSC-V, EPBC-V**	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. It is estimated that there are less than 5000 breeding pairs left in the wild. Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Because the Superb Parrots often use different habitats for different activities, the timing of their occurrence in each habitat may vary with the time of year. Between mid-January and early April, Superb Parrots do not use the River Red Gum breeding habitats on the Edward and Murrumbidgee Rivers, and their whereabouts at this time is unknown. Between April and August, they inhabit forests and woodlands dominated by River Red Gum, box-gum, White Cypress Pine (*Callitris glaucophylla*) and Boree. Nest in small colonies, often with more than one nest in a single tree. Breed between September and January. May forage up to 10 km from nesting sites, primarily in grassy box woodland. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain. When foraging on the ground, Superb Parrots often eat the seeds of plants such as the native Ringed Wallaby-grass (*Danthonia caespitosa*), barley-grasses (*Critesion*), as well as cereal crops including wheat, oats and canola (*Brassica napus*); and spilt grain. They also eat the seed-pods of many understorey species of wattles such as Gold-dust Wattle (*Acacia acinacea*), Silver Wattle (*A. dealbata*) and Deane's Wattle (*A. deanei*) and cultivated Cootamundra Wattle (*A. baileyana*). When foraging in the forest canopy, Superb Parrots eat the flowers and fruits of eucalypts, especially in spring and summer, the berries of mistletoe, such as Box Mistletoe (*Amyema miquelii*) and Grey Mistletoe (*A. quandang*), and, in winter, lerps from the foliage of eucalypts.	**Present –** Known to occur on the South West Slopes.	**Possible –** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Swift Parrot *Lathamus discolour* **TSC-E, EPBC-E**	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*. Return to home foraging sites on a cyclic basis depending on food availability.	**Present –** Occurs on the South West Slopes, feed tress present in proposal area.	**Possible –** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**
White-bellied Sea-Eagle *Haliaetus leucogaster* **Migratory**	White-bellied Sea-Eagles are a common sight in coastal and near coastal areas of Australia. Birds form permanent pairs that inhabit territories throughout the year. Their loud "goose-like" honking call is a familiar sound, particularly during the breeding season. Birds are normally seen, perched high in a tree, or soaring over waterways and adjacent land. In addition to Australia, the species is found in New Guinea, Indonesia, China, south-east Asia and India. The White-bellied Sea-Eagle feeds mainly off aquatic animals, such as fish, turtles and sea snakes, but it takes birds and mammals as well. It is a skilled hunter, and will attack prey up to the size of a swan. Sea-Eagles also feed on carrion (dead prey) such as sheep and fish along the waterline. They harass smaller birds, forcing them to drop any food that they are carrying. Sea-Eagles feed alone, in pairs or in family groups. White-bellied Sea-Eagles build a large stick nest, which is used for many seasons in succession. The nest can be located in a tree up to 30m above the ground, but may be also be placed on the ground or on rocks, where there are no suitable trees. At the start of the breeding season (May to October), the nest is lined with fresh green leaves and twigs. The female carries out most of the incubation of the two white eggs, but the male performs this duty from time to time.	**Present –** Occupies a wide range of habitats with a large home range.	**Possible –** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
White-browed Treecreeper *Climacteris affinis* **TSC-E**	In NSW, occupies a broad area of western NSW, west from a line from Balranald to Lake Cargelligo then Lightning Ridge. The species appears absent in the far north west of the state with no records occurring west of a line from Broughams Gate, 100km northwest of Broken Hill to Hungerford. A small population, now recognised as isolated, occurs in Carrathool local government area south of the Lachlan River and Griffith local government areas. Occurs in a range of semi-arid and arid tall shrublands and woodlands across the southern half of Australia. In NSW, the species occupies a variety of habitats including Mulga, Brigalow, Gidgee, Belah, Buloke and White Cypress. The species may also occur in habitats adjacent to those detailed above, including Coolibah, River Red Gum and Black Box. Occur singularly, in pairs and occasionally in small family groups numbering five or fewer. Forage arboreally in shrubs and on tree trunks and branches. It will also feed on the ground through litter and fallen branches and across bare ground. The species has an insectivorous diet, which is dominated by ants. Other insects and spiders are also taken and the diet may include vegetation such as chenopod fruit.	**Present –** Occupies a variety of habitats in this region.	**Possible –** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**
Marsupials				
Eastern Pygmy-possum *Cercartetus nanus* **TSC-V**	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable. Also feeds on insects throughout the year; this feed source may be more important in habitats where flowers are less abundant such as wet forests. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (*Pseudocheirus peregrinus*) dreys or thickets of vegetation, (eg. grass-tree skirts); nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks. Appear to be mainly solitary, each individual using several nests, with males having non-exclusive home-ranges of about 0.68 hectares and females about 0.35 hectares. Young can be born whenever food sources are available, however most births occur between late spring and early autumn. Agile climbers, but can be caught on the ground in traps, pitfalls or postholes; generally nocturnal. Frequently spends time in torpor especially in winter, with body curled, ears folded and internal temperature close to the surroundings.	**Present –** Found in broad range of habitat including woodland.	**Possible –** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Koala *Phascolarctos cinereus* **TSC-V**	Occurs in eastern Australia, from north-eastern Queensland to south-eastern South Australia and to the west of the Great Dividing Range. In NSW it mainly occurs on the central and north coasts with some populations in the western region. It was historically abundant on the south coast of NSW, but now occurs in sparse and possibly disjunct populations. The koala inhabits a range of eucalypt forest and woodland communities, including coastal forests, the woodlands of the tablelands and western slopes, and the riparian communities of the western plains. Examples of important shelter trees are cypress pine and brush box. The quality of forest and woodland communities as habitat for koalas is influenced by a range of factors, such as; species and size of trees present; structural diversity of the vegetation; soil nutrients; climate and rainfall; size and disturbance history of the habitat patch.Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Breeding season for the koala peaks between September and February.	**Present –** Inhabits a wide range of eucalypt woodlands.	**Possible –** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**
Squirrel Glider *Petaurus norfolcensis* **TSC-V**	The Squirrel Glider is sparsely distributed along the east coast and immediate inland districts from western Victoria to north Queensland. The species is found inland as far as the Grampians in Victoria and the Pilliga and the Coonabarabran areas of NSW. Inhabits dry sclerophyll forest and woodland and is generally absent from rainforest and closed forest. In NSW, potential habitat includes Box-Ironbark forests and woodlands in the west, the River Red Gum forests of the Murray Valley and the eucalypt forests of the northeast. Requires abundant hollow-bearing trees and a mix of eucalypts, acacias and banksias. Nightly movements are estimated at between 300 and 500m. Home-ranges have been estimated at between 0.65 and 8.55ha. Smooth-barked eucalypts are preferred as these eucalypts form hollows more readily than rough-barked and support a greater diversity of invertebrates. Squirrel Glider's forage in the upper and lower forest canopies and in the shrub understorey.	**Present –** Occupies a wide range of woodlands.	**Possible –** Preferred habitat for this species is present in the proposal area.	**The possibility of impact on this species as a result of the proposal would be further investigated during the preparation of the EIS.**