Renew estate.

Springdale Solar Farm

Preliminary Environmental Assessment

September 2017

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1. INTRODUCTION

1.1. Overview

Renew Estate Pty Ltd is proposing to develop a 100 megawatt (MW) solar farm in Sutton NSW, approximately 3.5km northeast of the ACT border. The solar farm will be approximately 350 hectares in size and will be located on land currently used for grazing. The proposal site is zoned Primary Production (RU1) under the Yass Valley Local Environmental Plan 2013 (LEP).

Key elements of the proposed infrastructure include photovoltaic modules mounted on a tracking array structure, containerised power stations containing electrical switchgear and an electrical substation for connection to the National Electricity Market (NEM) (the Project).

The Project is classified as a State Significant Development (SSD) under *State Environmental Planning Policy (State and Regional Development) 2011* and is subject to assessment and determination by the NSW Minister for Planning. SSD projects comprise developments that are deemed to have State significance due to their size, economic value or potential impacts. Applications for SSD must be accompanied by an Environmental Impact Statement (EIS) which is prepared in accordance with Secretary's Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning and Environment (DP&E).

1.2. Purpose of this report

This Preliminary Environmental Assessment (PEA) has been prepared to support Renew Estate's request to DP&E for the SEARs in relation to the Project. The EIS must address the SEARs.

The PEA will assist DP&E's development of the SEARs through providing:

- an overview of the proposal, including justification and alternatives considered;
- an outline of the planning and statutory framework;
- a description of the stakeholder and community consultation undertaken to date;
- characterisation of the existing environment and site constraints;
- a preliminary assessment of key potential environmental issues and risks; and
- identification of further assessments likely required during the EIS.

1.3. The Proponent

Renew Estate is developing medium to large scale renewable energy projects whilst maintaining a position on strong community values. Renew Estate is passionate about meeting the goals of all stakeholders and delivering appropriate and considerate uses of land, technology and investment. Renew Estate's goal is to embed sustainable energy into rural and urban lifestyles whilst enhancing energy security and affordability. Renew Estate develops utility scale solar farms that are flexibly designed to work with the natural and built environments.

Wirsol Energy (subsidiary of WIRCON Group) is Renew Estate's largest shareholder. The WIRCON Group is a globally operating group of companies that specialise in the development, construction and operation of photovoltaic systems (ground & rooftop mounted) and wind farms.

WIRCON can demonstrate significant know-how through its engineering of more than 850 Megawatts (MWp) of installed power that is of the highest quality. WIRCON consistently uses state-of-the-art technology.

Beast Solutions is also a shareholder of Renew Estate. The Beast Solutions team brings high-end consultancy experience to a small personable consultancy practice. The team provides advisory, due diligence and design management support for property and renewable generation developments, low carbon precincts, smart grids and microgrids. Beast Solutions has played a key role in some of the most advanced and recognisable projects in the field.

2. THE PROPOSAL

2.1. Site Description

2.1.1. The Site

The Project, known as Springdale Solar Farm, will be located on land in Sutton, NSW, within the Yass Valley Council area and approximately 3.5km northeast of the ACT border (Figure 1). The Project comprises a solar farm of approximately 350 hectares in size, located on the following lots (Figure 2):

- Lot 111 DP754908
- Lot 10 DP754908
- Lot 190 DP754908
- Lot 189 DP754908
- Lot 54 DP754908
- Lot 97 DP754908
- Lot 182 DP754908
- Lot 15 DP754908
- Lot 209 DP754908
- Lot 161 DP754908
- Lot 202 DP754908
- Lot 1 DP198933

(together, the Site).

The Site also includes a number of paper roads, being unformed Crown roads located adjacent to the boundaries of a number of these lots. Further detail regarding this issue is set out below.

Tallagandra Lane, which runs in a northwest-southeast direction, divides the lots in the southern portion of the Site. This unsealed public local road continues southeast of the Site to connect to Mulligans Flat Road.

The Site is greenfield comprising large paddocks used exclusively for grazing sheep and cattle. With the exception of a seven-hectare patch of woodland in the western portion of the site (lots 189 and 190), the Site is largely cleared, with some scattered trees and rows of trees along fence lines. The topography is gently undulating with a few knolls and ridges. The Site contains a few dams and drainage lines which flow towards the northeast.

Two existing overhead electricity transmission lines traverse the southern portion of the Site in a northwest-southeast direction. The transmission lines are both TransGrid owned and operated assets and are comprised of the Canberra to Capital Wind Farm 330kV circuit and the Canberra to Queanbeyan 132kV circuit. The Project is proposing to connect to the 132kV circuit (feeder 977) via an onsite substation under the transmission line. A buried gas pipeline also runs through the site in a southwest-northeast direction.

The Site is zoned Primary Production (RU1) under the LEP.

2.1.2. The Locality

Yass Valley Council (Council) area occupies around 4,000 km^2 of land in south-eastern NSW with Yass as its main town centre. Yass is approximately 40km northwest of the Site, with Canberra being the Site's nearest major settlement approximately 3.5km to the southwest. In addition to Yass, residents of the Council area live in the townships and villages of Binalong, Bookham, Bowning, Gundaroo, Murrumbateman, Sutton and Wee Jasper. It is estimated that around half of the Council's work force commutes to the ACT, via Barton Highway (YVC, 2014a).

Sutton Village is approximately 8km southeast of the Site. The Village includes a store, primary school, sporting facilities and is supported by a local Community Association (YVC, n.d.a).

The Council area has a population of approximately 16,000 as recorded in the 2016 census, which has been steadily increasing over the past decade (ABS, 2016). The population density is 0.04 persons per hectare, reflecting its largely undeveloped, rural setting (ABS, 2016). The region was originally inhabited by the Ngunnawal people as early as 20,000 years ago (YVC, 2014a). The area's rich colonial history dates back to 1821 which is evident through historical architecture across the Yass Valley (YVC, 2014a).

The region is dominated by cool climate wineries east of the Murrumbidgee River and sheep and wool production in the north and west (YVC, 2014a). In 2010/11 the total value of agricultural output in the Council

area was $63m which increased from $55m in 2005/6. The largest commodity produced was livestock slaughterings, which accounted for 46.7% of the Council area's total agricultural output in value (ABS, 2011).

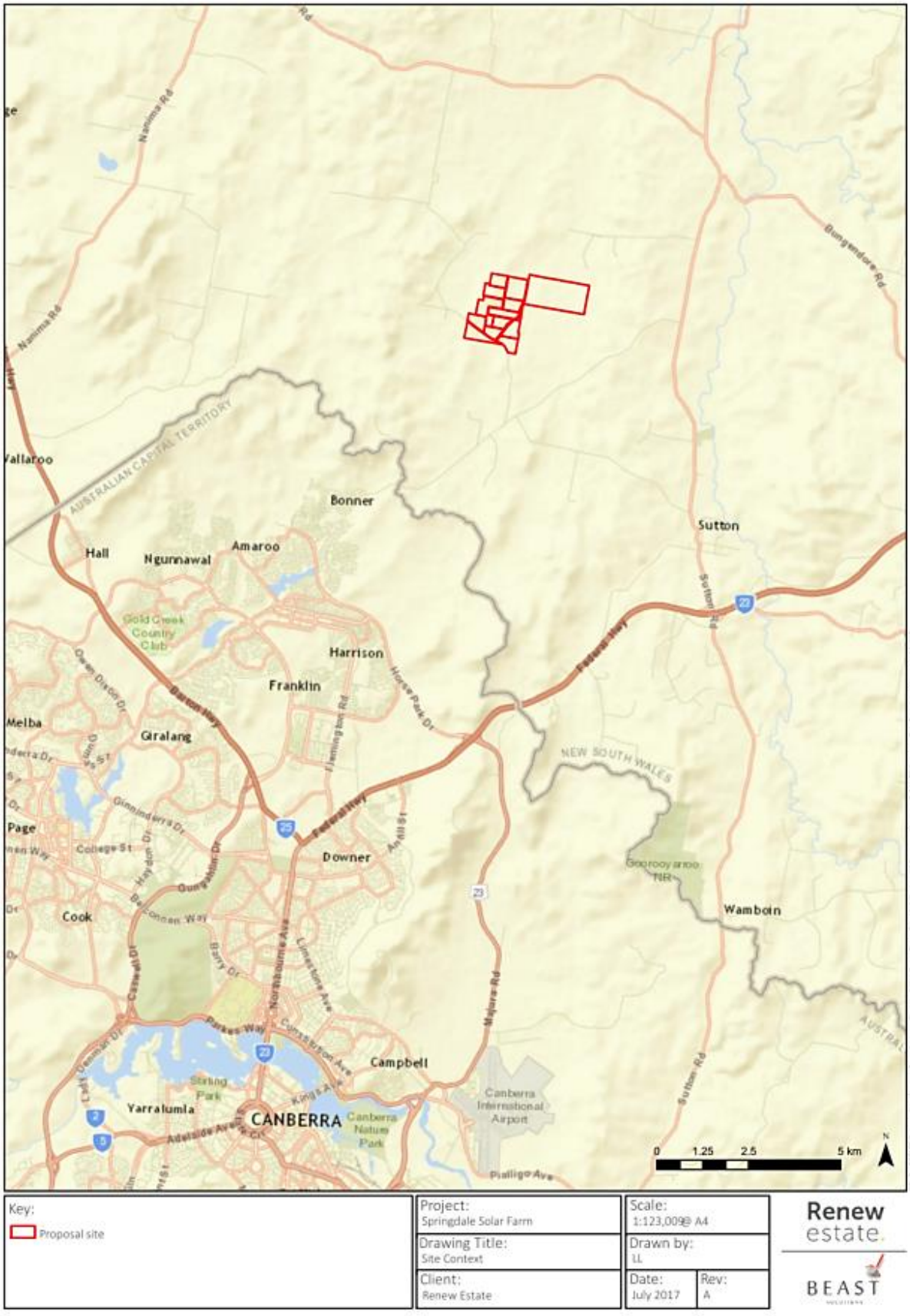


Figure 1 Site Context

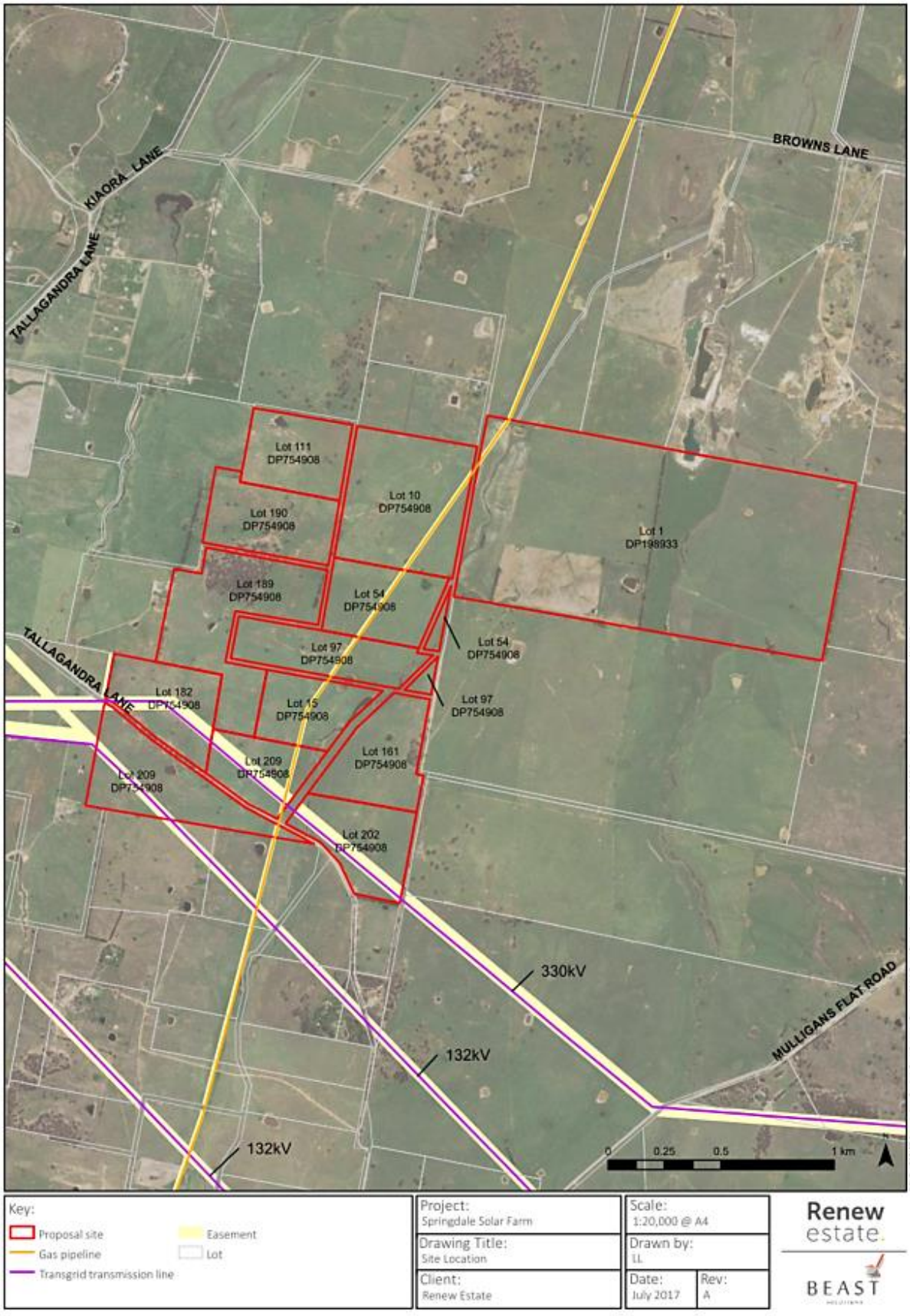


Figure 2 Site Location

2.2. Description of the Project

The Site can facilitate up to 100MWac of solar generation equipment. Detailed design is currently underway, though the primary project components will consist of:

- photovoltaic solar modules (modules);
- single-axis tracking framing system mounted on steel piles;
- approximately 20 containerised power conversion stations, one located approximately every 15 ha, containing the electrical switchgear, inverters and MV transformers;
- electrical switchyard and substation under the existing 132kV TransGrid transmission line;
- control building including office, SCADA systems, operation and maintenance facilities and spare parts;
- internal all-weather access tracks;
- internal fire trail and bushfire asset protection zones;
- security fencing;
- internal underground DC and AC cabling for electrical reticulation; and
- meteorological station.

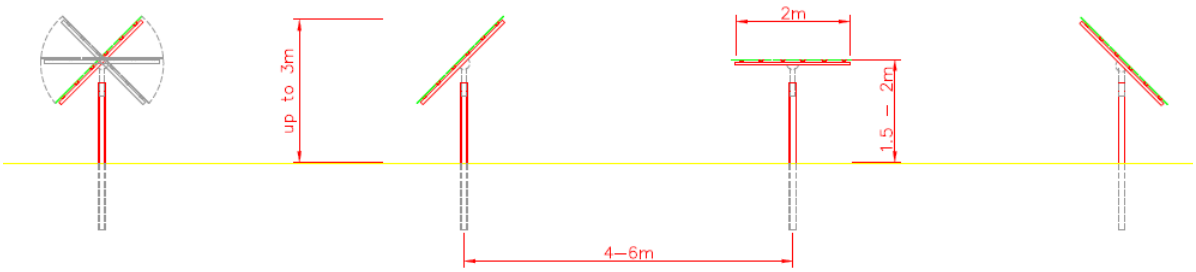
Up to 90 modules will be mounted on each tracker arm in portrait arrangement, with the tracking angle ranging from +60 to -60 degrees to the horizontal each day. The modules will be oriented to face east for first light in the morning, and will track to follow the position of the sun throughout the course of the day. At solar noon, the position of the modules will be zero degrees (parallel to the ground) and they will finish facing west in the late afternoon.

Overnight, and in the event of high winds, the system will automatically stow the trackers into flat position to reduce loading. Local weather conditions including average and gusting winds speed will be monitored by the onsite meteorological station 24 hours a day.

The tracking structures will be mounted on piles, which will be screwed or pile driven depending on final geotechnical analysis. This eliminates the need for concrete and foundations which significantly reduces the impact of construction. In turn, this enables the retention of native grasslands and habitats under the array.

This construction methodology keeps ground disturbance to a minimum and allows the final site design to follow the existing lie of the land. The intention of the Project is to maintain the existing vegetation on site and all future vegetation management, as dictated by the final bushfire management and environmental management plans. The Site will be maintained by grazing sheep as much as possible.

The onsite switchyard and substation will have a footprint of approximately 50m x 70m and will lie adjacent to the existing 132kV TransGrid Easement. Final design will be in collaboration with TransGrid and the Australian Energy Market Operator (AEMO), however, there will likely be some civil and earthworks required to meet the transmission substation design guidelines.



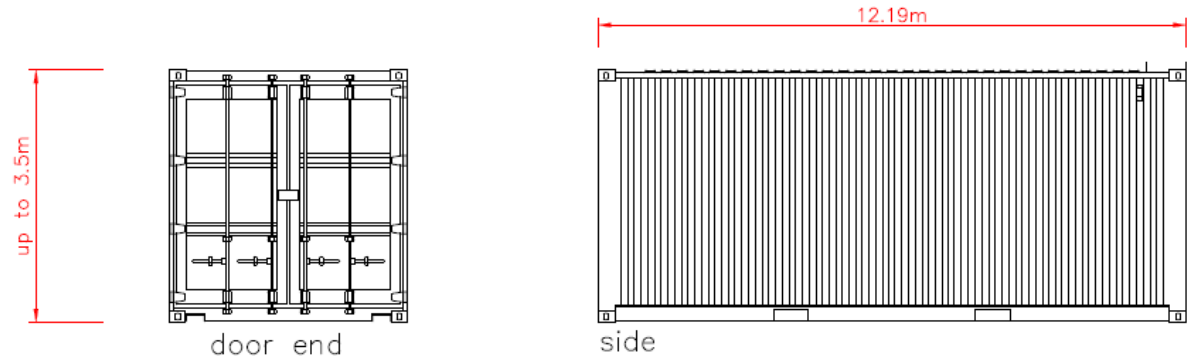


Figure 3 Indicative Tracker and Power Conversion Station Dimensions

Figure 4 Example of Nextracker system at the Moree Solar Farm in Northern NSW

Site access will be via the unsealed Tallagandra Lane accessed from the east via Mulligans Flat Road approximately 3km away. This access may need to be modified in accordance with the requirements of Council and/or Roads and Maritime Services following the preparation and submission of a traffic impact study. The control building and car parking will be located near the access point of Tallagandra Lane. The control building and substation will both have dedicated septic systems and rainwater tanks for water supply.

The construction schedule for the project is approximately 8 months from site establishment to commissioning. Subject to planning and environmental approvals, the timeline for construction would be as follows:

- Possession of Site: March 2018
- Construction Commences: April 2018
- Energisation: November 2018
- Full Production: January 2019

The operational lifetime of the solar farm is 30 years, at which time the site will either be decommissioned or continue to operate subject to further approval and commercial agreements. Decommissioning will return the Site to the predevelopment condition. In the commercial arrangements, a decommissioning bond will be established in an escrow account to ensure adequate resources are available to make good on the rehabilitation.

2.3. Capital Investment

Based on the initial design and the current solar engineering, procurement and construction (EPC) market the estimated gross CAPEX cost of the project will be approximately $150,000,000.

3. PROPOSAL JUSTIFICATION AND ALTERNATIVES

3.1. Strategic Justification

There is a growing global recognition of the mounting imperative to mitigate the environmental impacts associated with fossil fuel-based energy generation. This growing realisation has manifested into international, national and state-wide commitments from government and industry in support of the development of clean renewable energy projects.

In addition to the environmental imperative for reducing energy sector related emissions, the economic benefits of renewable energy projects have also been highlighted. Federal, state and local governments understand the importance of regional investment and job creation offered by renewables energy projects, which will also help to put downward pressure on the soaring energy prices currently impacting household budgets and industry.

3.1.1. NSW Renewable Energy Action Plan

The NSW Government's Renewable Energy Action Plan was released in 2013 (NSW Government, 2013) in support of the Australian Government's Renewable Energy Target (RET) and to guide renewable energy development in NSW to achieve maximum benefits to the State. The Renewable Energy Action Plan comprises 24 actions to achieve the goals of:

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

3.1.2. NSW Climate Change Policy Framework

The NSW Government has developed NSW Climate Change Policy Framework (OEH, 2016) in support of Australia's COP21 commitments and to demonstrate action on climate change. The Framework outlines the Government's long-term objectives to achieve net-zero emissions by 2050 and to make NSW more resilient to a changing climate.

The report highlights the new opportunities in 'advanced energy' sectors which will help the world adapt to climate change. The government will seek and support opportunities to grow these emerging industries in NSW.

3.1.3. Australian Renewable Energy Target

The large-scale RET is an Australian Government policy which commenced in 2001 to ensure that at least 20% of Australia's electricity consumption comes from renewable sources by 2020. Following review, the RET was confirmed in early 2015 as 33,000 gigawatt hours (GWh) by 2020. To meet the RET, significant new renewable energy capacity is needed.

To assist in achieving the 20% target and emphasise the imperative to invest in clean energy technologies, the Government has committed funding of $1.5 billion to the Solar Flagships program. The program has been designed to accelerate the delivery of large scale solar powerstations into the National Electricity Market, demonstrating the Government's commitment to large scale solar projects and cleaner energy generation.

3.1.4. COP21

At the COP21 climate talks in Paris in December 2015, the Australia Government committed an emissions target of a 26-28% reduction by 2030 compared to 2005 levels. The Government announced at the end of 2016 that the Australian climate and energy policies will be reviewed in 2017 to ensure the 2030 targets are met.

3.1.5. Electricity Supply

In Australia, energy security is defined as "the adequate, reliable and competitive supply of energy to support the functioning of the economy and social development" (DRET, 2011). A National Energy Security Assessment (NESA) carried out in 2011 (DRET, 2011) found that while Australia's energy security was deemed 'moderate'. In

addition, significant amounts of new capacity will be needed over the medium to long term to compensate for the retirement of emissions intensive coal plants and to help achieve emissions reduction targets.

Significant increases in energy prices in recent years has highlighted the vulnerability of households and industries to energy supply costs. Renewable energy projects are seen as a key mechanism for putting downward pressure on the energy prices currently impacting our vulnerable households and industries.

3.1.6. Local economic benefits

The Yass Valley Council Economic Development Strategy (YVC, 2014a) outlines its plan to improve the economic wellbeing of the region through attracting employment-generating investment. The objective of the Council's strategy is to manage the transition from an economy based primarily on traditional agricultural practices to one which is diverse, robust and sustainable whilst maintaining a vibrant and skilled workforce. Infrastructure projects and services in particular were identified as having a significant impact on the amount and type of economic activity that can be developed within the region. Due to its location, topography and climate, the Yass Valley could potentially be a significant producer of renewable energy from solar or wind sources.

Large-scale solar farm projects have been shown to provide much-needed investment in regional areas, creating a significant source of employment and ongoing economic benefits to local communities.

3.2. Alternatives to the Proposal

ACT government official modelling (*ACT Population Projections: 2017 – 2020,* ACT Government, 2016*)* shows the total Canberra population is projected to increase by 6% by June 2020. The fastest growth is projected in the northern suburbs of Gungahlin, Crace, Casey, Franklin and Bonner.

TransGrid already supplies over 440MW of peak demand into the Canberra substation, and another 70MW into Queanbeyan, with these numbers projected to increase in TransGrid's Transmission Annual Planning Report 2017 (TAPR).

The Project is located approximately 3.5km north of the ACT, between Canberra and Queanbeyan substations under TransGrid's 132kV feeder 977. The Site is uniquely located to provide the additional electrical demand in Canberra over the coming decades from clean renewable sources.

The Proponent has considered the following alternative options:

- do-nothing approach; and
- alternative site location.

A do-nothing approach would not help achieve the strategic targets and goals Australian, NSW or ACT governments.

The do-nothing approach would result in the additional demand in the ACT and region being met by existing generation, which is predominantly made up of non-renewable sources. The current Australian energy mix is made up of 63% coal generation (DIIS, 2016). Further current upwards pressure on wholesale electricity prices is largely a result of a narrowing of the supply and demand balance in the National electricity market. By doing nothing, the demand in the region will increase without a corresponding increase in supply, resulting in further rises in whole electricity prices which will result in an increase to retail electricity prices.

Alternative sites under feeder 977 are limited due to challenges in topography and land uses. Alternative sites under feeder 977 will likely result in extensive earthworks and disturbance of the natural environment, increased disturbance to the community in Sutton or removal of extensive areas of native vegetation.

4. PLANNING CONTEXT

4.1. NSW Legislation

4.1.1. Environment Planning and Assessment Act

The *Environmental Planning and Assessment Act 1979* (EP&A Act), *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) and associated environmental planning instruments (including State Environmental Planning Policies (SEPPs) and LEPs) provide the framework for the assessment of environmental impacts and approval of development in NSW.

The EP&A Act authorises the making of environmental planning instruments including *State Environmental Planning Policy (State and Regional Development) 2011* (S&RD SEPP) including the scope, power and content of plans. The EP&A Act also establishes the process for the assessment and approval of development which requires consent under Part 4.

Relevantly to this Project, section 89C of the EP&A Act provides for a process where development can be declared as State significant development either by a SEPP or Ministerial order published in the Gazette. Section 89D of the EP&A Act provides that the Minister for Planning is the consent authority for State significant development. Part 4.1 of the EP&A Act sets out provisions which apply to the assessment and determination of State significant development.

4.1.2. State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State and Regional Development) 2011 (S&RD SEPP) identifies development that is classified as State Significant Development (SSD) or State Significant Infrastructure (SSI). Clause 20 of Schedule 1 of the S&RD SEPP states that the following is SSD for the purposes of s89D of the EP&A Act:

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

> *(a) has a capital investment value of more than $30 million, or*
>
> *(b) has a capital investment value of more than $10 million and is located in an environmentally sensitive area of State significance.*

As the Springdale solar farm will have an estimated capital investment cost greater than $30 million, the proposal is classified as "State Significant Development" and is subject to assessment and determination under Part 4 of the EP&A Act. The Minister of Planning and Environment or delegate is the consent authority for SSD.

4.1.3. State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State. Clause 34(7) of ISEPP states that development for the purpose of a solar energy system may be carried out by any person with consent on any land (except land in a prescribed residential zone). The Site is zoned RU1 under *Yass Local Environmental Plan 2013*. As RU1 is a "prescribed rural zone" and not a "prescribed residential zone" for the purposes of Division 4, Part 3 of the ISEPP, the Project is permissible with consent pursuant to subclause 34(7).

4.1.4. Other relevant NSW legislation

Crown Lands Act 1989	The *Crown Lands Act 1989* (CL Act) contains provisions which regulate the occupation, use, sale, lease and licence of Crown land, along with its proper management having regard to the principles contained in the CL Act. As noted above, and as indicated in Figure 2, the Site includes a number of paper roads, being unformed Crown roads located adjacent to the boundaries of a number of the lots. Renew Estate understands that these are all currently the subject of enclosure permits and will explore the potential to avoid those paper roads in the final site layout and/or the ability to purchase and close those paper roads, as part of the EIS process. Renew Estate will consult with the Department of Industry, where required, in order to finalise this issue for the purposes of the final EIS.
Roads Act 1993	The *Roads Act 1993* (Roads Act) regulates the carrying out of various activities on public roads, and provides for the declaration of Roads and Maritime Services (RMS) and other public authorities including local Councils as roads authority for different types of roads (classified and unclassified). Under section 138 of the Roads Act, the consent of the appropriate roads authority (Council or RMS) is required before a person can, for example, erect a structure or carry out a work in, on or over a public road, or dig up or disturb the surface of a public road. The potential need for upgrade works on local roads is discussed in Section 6.6 of this report and would be further investigated during the design and preparation of the EIS. If required, approval from the relevant roads authority (likely the Council) would be sought under section 138 of the Roads Act.
Native Vegetation Act 2003	The *Native Vegetation Act 2003* (NV Act) regulates the clearing of native vegetation. Clearing is defined as cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ringbarking, uprooting or burning native vegetation including native grasses and herbage. Pursuant to Section 89J of the EP&A Act, an authorisation referred to in Section 12 of the NV Act to clear native vegetation is not required for SSD. The potential impacts on native vegetation will be detailed in the EIS.
Biodiversity Conservation Act 2016	The Biodiversity Conservation Act 2016 (BC Act) commenced on 25 August 2017, repealing and replacing the *Threatened Species Conservation Act 1996*. The BC Act now contains provisions for the assessment of impacts on biodiversity values of a proposed development, calculating measures to offset those impacts and establishing market-based conservation measures, including biodiversity credits. Pursuant to Section 79B of the EP&A Act, for State Significant Development concurrence by the Chief Executive of the Office of Environment and Heritage is not required for development that is likely to significantly affect a threatened species, population, or ecological community, or its habitat. The potential to impact threatened species, populations and ecological communities listed under the BC Act is discussed in Section 6.3 of this PEA and will be further assessed in the EIS.

National Parks and Wildlife Act 1974	Under the *National Parks and Wildlife Act 1974* (NP&W Act), 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. A permit is required under section 90 of the NP&W Act before harming or desecrating an Aboriginal object, otherwise, such action is an offence under the NP&W Act. Despite this, under Section 89J of the EP&A Act, an Aboriginal Heritage Impact Permit is not required for SSD. The closest nature reserve is more than 6km south of the site. The potential impacts to Aboriginal heritage and native fauna and flora are discussed in Section 6.6 and 6.3 of this PEA respectively.
Heritage Act 1977	The *Heritage Act 1977* (Heritage Act) aims to conserve heritage values. Heritage items are listed on the State Heritage Register which is established under the Heritage Act. Items of local heritage significance are also found in local environmental plans, which contain provisions to ensure the protection of such items. Under Section 89J of the EP&A Act, an approval under Part 4 or an excavation permit under section 139 of the Heritage Act is not required for SSD. The Project is unlikely to impact any items of heritage significance, as discussed in Section 6.6.
Water Management Act 2000	Water use approval, water management work approval and activity approvals are required under Sections 89, 90 and 91 of the *Water Management Act 2000* (WM Act). Pursuant to Section 89J of the EP&A Act, these approvals are not required for SSD.
Contaminated Land Management Act 1997	Section 60 of the *Contaminated Land Management Act 1997* (CLM Act) imposes a duty on landowners to notify OEH, and potentially investigate and remediate land if contamination is above levels set by the Environmental Protection Authority (EPA). The CLM Act also contains provisions relating to the regulation of 'significantly contaminated land' by the EPA. The potential for contamination at the site is discussed in Section 6.6.
Protection of the Environment Operations Act 1997	The *Protection of the Environment Operations Act 1997* (POEO Act) contains provisions relating to pollution offences committed in respect of land, water and air. The POEO Act also contains provisions relating to need to obtain an environment protection licence (EPL) for certain scheduled activities. Solar energy generation does not fall within the definition of electricity generation under Schedule 1 of the POEO and therefore does not require an EPL.

Waste Avoidance and Resource Recovery Act 2001	The *Waste Avoidance and Resource Recovery Act 2001* (WARR Act) introduces a scheme to promote extended producer responsibility for the life-cycle of a product. The WARR Act outlines the resource management hierarchy principles of priority as: • avoidance of unnecessary resource consumption; • resource recovery (including reuse, reprocessing, recycling and energy recovery); and • disposal. Waste is discussed in Section 6.6.

4.2. Local Government

4.2.1. Yass Valley Local Environmental Plan 2013

The LEP sets out the framework for the planning and development of land within the Yass Valley Local Government Area (LGA). The aims of the LEP are as follows:

(a) to establish planning controls that promote sustainable development,
(b) to protect high quality agricultural land and encourage emerging agricultural industries,
(c) to encourage housing diversity,
(d) to promote employment-generating tourism,
(e) to provide for commercial and industrial development,
(f) to encourage the establishment of retail and professional services in urban locations,
(g) to protect and enhance the character of each of the villages in Yass Valley,
(h) to enhance service provision in each of the villages in Yass Valley,
(i) to protect and conserve the cultural heritage and history of Yass Valley,
(j) to protect and enhance the environmental and biodiversity values of Yass Valley,
(k) to minimise land use conflicts.

The Project is located on land zoned RU1 – Primary Production under the LEP. Electrical generation is not listed as permissible with consent in this zone, however, the ISEPP takes precedence over the LEP to the extent of any inconsistency and permits solar developments with development consent in the RU1 zone (refer Section 4.1.3).

4.3. Commonwealth Legislation

4.3.1. Environmental Protection and Biodiversity Conservation Act 1999

The *Environmental Protection Biodiversity and Conservation Act* 1999 (EPBC Act) aims to protect matters of national environmental significance (MNES) which 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; and
- a water resource, in relation to coal seam gas development and large coal mining development.

Approval from the Commonwealth Minister for the Environment is required if an action is likely to have a significant impact on a MNES (a 'controlled action'). Assessments of significance are based on criteria listed in the Significant Impact Guidelines 1.1 issued by the Commonwealth (DoE, 2013).

A search of matters protected by the EPBC Act was undertaken in July 2017 using the EPBC Act Protected Matters Search Tool (PMST) (DEE, 2017). A search radius of 5km was applied. The results of the search are summarised in Table 1 and a copy of the PMST report is provided in Appendix B. Potential impacts to threatened species and ecological communities are further discussed in Section 6.3.

Table 1 Results of the EPBC Act Protected Matters Search

Matters of National Environmental Significance	
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Significance (Ramsar)	4 (note the closest Ramsar site is 600-700km upstream)
Great Barrier Marine Park	None
Commonwealth Marine Area	None
Listed Threatened Ecological Communities	2
Listed Threatened Species	27
Listed Migratory Species	13
Other Matters Protected by the EPBC Act	
Commonwealth land	None
Commonwealth Heritage places	None
Listed Marine Species	19 (note the site is not near a marine environment)
Whale and Other Cetaceans	None
Critical habitats	None
Commonwealth reserves Terrestrial	None
Commonwealth reserves Marine	None

If further investigations identify that the Project is likely to have a significant impact on a MNES, a referral will be submitted to the Commonwealth Department of the Environment and Energy (DEE). DEE will then determine whether the proposal is a 'controlled action' requiring approval from the Commonwealth Environment Minister or their delegate.

4.3.2. Native Title Act 1993

The *Native Title Act 1993* (Native Title Act) provides a legislative framework for the recognition and protection of native title rights. Native title is the recognition that, in certain circumstances, Indigenous people continue to hold rights to their land and waters, which come from their traditional laws and customs.

The Native Title Act sets up processes to determine whether native title exists, how future activity impacting upon native title may be undertaken, and to provide compensation where native title is impaired or extinguished.

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.

The National Native Title Tribunal does not identify any Native Title applications or determinations that affect the site. Further review of Native Title considerations will be undertaken during the EIS.

5. CONSULTATION

5.1. Engagement and Consultation Strategy

Renew Estate has developed its Engagement and Consultation Strategy (ECS) to ensure a broad, exemplar and authentic engagement process with all Government and community stakeholders relevant to the Project, throughout the life of the Project.

Renew Estate has been proactive in commencing early consultation with the local community and a range of local and State government agencies for the purposes of this PEA. The Project ECS will be refined on receipt of the SEARS and consultation will continue and increase throughout the EIS process to ensure all stakeholders have a deep understanding of the nature and scope of the Project. Finalisation of the Project ECS will be informed by a range of resources and experts, including reference to the NSW Government report "Community Attitudes to Renewable Energy in NSW" (Office of Environment and Heritage, November 2015)

For community stakeholders, implementation of the ECS will ensure:

- Broad dissemination of information on both the impact and the benefits of the Project for those stakeholders; and
- Genuine opportunity to provide input throughout the assessment and development phases.

It is noted that agency consultation will also be undertaken in accordance with the specific requirements to be set out in the SEARs.

Following development, the ECS will provide for the ongoing and effective liaison with community stakeholders, landowners and applicable government agencies throughout the life of the Project.

5.2. Government agencies and other key stakeholders

Meeting with Yass Valley Regional Council –13th July

Meetings with TransGrid –7th June and 10th August

Meeting with the Department of Planning and Environment - 3rd August

5.3. Community Engagement

August 2017 - Consultation with neighbours and local community members.

In line with the engagement and consultation strategy outlined in 5.1 above, Renew Estate will continue to proactively engage with the community

6. PRELIMINARY ENVIRONMENTAL ASSESSMENT

6.1. Methodology

This Section provides a preliminary environmental assessment of the Project to identify key environmental issues and risks that will require a more detailed assessment within the EIS. The assessment is based on desktop review and site inspections and covers, construction, operational and decommissioning phases of the Project.

The risk rating is a function of the likelihood of the impact occurring and the consequence of the impact, as determined through the risk rating matrix in Table 2. Risks rated High to Extreme warrant a more detailed investigation than risks rated Low to Medium. Where there is a higher degree of uncertainty, a higher rating has been applied as a precaution.

This preliminary risk assessment identifies pre-mitigation risk, assessing potential impacts without the implementation of any controls. An assessment of residual risk following the implementation of proposed mitigation measures will be undertaken as part of the EIS.

Table 2 Risk rating matrix

		Consequence				
		Negligible	Minor	Moderate	Major	Catastrophic
Likelihood	Remote	Low	Low	Low	Medium	Medium
	Unlikely	Low	Low	Medium	High	High
	Possible	Low	Medium	High	Very High	Very High
	Likely	Medium	High	Very High	Very High	Extreme
	Almost certain	Medium	High	Very High	Extreme	Extreme

6.2. Summary of Preliminary Risk Assessment Results

Table 3 summarises the results of the preliminary risk assessment. Key identified environment risks associated with the proposal are biodiversity, flooding and Aboriginal heritage.

Table 3 Results of the Preliminary Risk Assessment (unmitigated risks)

Environmental risk	Likelihood	Consequence	Risk rating (unmitigated)
Biodiversity	Likely	Major	Very High
Flooding and hydrology	Possible	Moderate	High
Aboriginal Heritage	Possible	Moderate	High
Bushfire	Unlikely	Moderate	Medium
Visual amenity	Possible	Minor	Medium
Noise and vibration	Possible	Minor	Medium
Soils	Possible	Minor	Medium
Contamination	Possible	Minor	Medium
Waste	Likely	Negligible	Medium
Utilities	Possible	Minor	Medium
Socio-economics	Possible	Minor	Medium
Traffic and access	Possible	Minor	Medium
Land use	Likely	Negligible	Medium

Environmental risk	Likelihood	Consequence	Risk rating (unmitigated)
Non-Aboriginal Heritage	Remote	Moderate	Low
Air quality	Possible	Negligible	Low
Electromagnetic Fields	Unlikely	Negligible	Low

6.3. Biodiversity

6.3.1. Existing Environment

Potential ecological constraints within the Site have been identified based on desktop database searches and a preliminary site inspection by a biologist.

Database searches

The following database searches were undertaken:

- A search of matters protected by the EPBC Act was undertaken in July 2017 using the EPBC Act Protected Matters Search Tool (PMST) (DEE, 2017). A search radius of 5km was applied.
- A search of the Atlas of NSW Wildlife (a NSW Bionet database administered by NSW OEH, 2017a) was undertaken in September 2017. The minimum search extent of 10km X 10km was used. The NSW Bionet databases include species and communities listed as threatened Nationally and in NSW.

The PMST identified that the following two threatened ecological communities are likely to occur in the search area:

- Natural Temperate Grasslands of the South Eastern Highlands – Critically Endangered under the EPBC Act and not listed in NSW under the BC Act.
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – Critically Endangered under the EPBC Act and Endangered under the BC Act[1].

The PMST identified 25 threatened species (excluding fish) as potentially occurring in the search area. NSW Bionet returned 7 records of 3 threatened species within the search area. The threatened species identified through the searches are listed in Table 4.

One of the records returned through the Atlas of NSW Wildlife was an observed Golden Sun Moth (GSM) (*Synemon plana)* located within the Site, on the western site boundary, south of Tallegandra Lane. The record was from the year 2000. Another two records of GSM exist within 5km of the site, and another within 10km. The GSM is listed as critically endangered under the EPBC Act and endangered under the BC Act.

[1] Note the criteria for the NSW listing of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland under the BC Act is different from the criteria under the EPBC Act.

Table 4 Threatened flora and fauna species potentially occurring in the search area as indicated in database searches.

Scientific name	Common name	Status		Indicated in Search?	
		Commonwealth	NSW	PMST	NSW Bionet
Birds					
Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Critically Endangered	✓	X
Calidris ferruginea	Curlew Sandpiper	Critically Endangered	Endangered	✓	X
Grantiella picta	Painted Honeyeater	Vulnerable	Vulnerable	✓	X
Lathamus discolor	Swift Parrot	Critically Endangered	Endangered	✓	X
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	Critically Endangered	-	✓	X
Polytelis swainsonii	Superb Parrot	Vulnerable	Vulnerable	✓	X
Rostratula australis	Australian Painted Snipe	Endangered	Endangered	✓	X
Artamus cyanopterus cyanopterus	Dusky Woodswallow	-	Vulnerable	X	✓
Frogs					
Litoria aurea	Green and Golden Bell Frog	Vulnerable	Endangered	✓	X
Litoria booroolongensis	Booroolong Frog	Endangered	Endangered	✓	X
Litoria castanea	Yellow-spotted Tree Frog, Yellow-spotted Bell Frog	Endangered	Critically Endangered	✓	X
Litoria raniformis	Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog	Vulnerable	Endangered	✓	X
Insects					
Synemon plana	Golden Sun Moth	Critically Endangered	Endangered	✓	✓
Mammals					
Dasyurus maculatus maculatus	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll	Endangered (southeastern mainland population)	Vulnerable (species only)	✓	X
Petauroides volans	Greater Glider	Vulnerable	Endangered (populations only: - Eurobodalla LGA - Mount Gibraltar Reserve area - Seven Mile Beach National Park area)	✓	X
Phascolarctos cinereus	Koala	Vulnerable	Vulnerable	✓	✓
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Vulnerable	✓	X

Scientific name	Common name	Status		Indicated in Search?	
		Commonwealth	NSW	PMST	NSW Bionet
			(species and the following populations: - Hawkes Nest and Tea Gardens - Pittwater LGA - between the Tweed River and Brunswick River east of the Pacific Highway)		
Plants					
Eucalyptus aggregata	Black Gum	Vulnerable	Vulnerable (species and population only in the Wingecaribee LGA)	✓	X
Lepidium hyssopifolium	Basalt Pepper-cress, Peppercress, Rubble Peppercress, Pepperweed	Endangered	Endangered	✓	X
Leucochrysum albicans var. tricolor	Hoary Sunray, Grassland Paper-daisy	Endangered	-	✓	X
Pelargonium sp.	Omeo Stork's-bill	Endangered (*Pelargonium sp. Striatellum)*	Endangered	✓	X
Pomaderris pallida	Pale Pomaderris	Vulnerable	Vulnerable	✓	X
Prasophyllum petilum	Tarengo Leek Orchid	Endangered	Endangered	✓	X
Thesium australe	Austral Toadflax, Toadflax	Vulnerable	Vulnerable	✓	X
Reptiles					
Aprasia parapulchella	Pink-tailed Worm-lizard, Pink-tailed Legless Lizard	Vulnerable	Vulnerable	✓	X
Delma impar	Striped Legless Lizard	Vulnerable	Vulnerable	✓	X

The PMST additionally identified 13 migratory species protected under the EPBC Act as potentially occurring within the search area. A copy of the PMST report is provided in Appendix B.

Preliminary Site Inspection

An initial inspection of the Site was undertaken by a biologist on 13 July 2017. A primary focus of the inspection was determining the likelihood of the GSM being present at the site, given the GSM record within the Site is from the year 2000. This section summarises the outcomes of the site inspection report, which is also provided in Appendix C (Rowell, 2017).

Note that while the large block in the northeast portion of the Site (Lot 1 DP198933) was not included within the scope of the Site inspection (as this lot was incorporated into the Site at a later time), it will be included in the scope of the detailed further work to be undertaken as part of the EIS.

Some areas unlikely to contain GSM habitat (such as dense Phalaris on creek flats) were not covered. The main vegetation types encountered were marked on an aerial photograph, and GPS readings were taken for patches of native grasses that had potential to be GSM habitat.

Results

The inspection found that the Site contains mainly improved pasture of Phalaris and Ryegrass (photograph 1 of Appendix C), a few scattered paddock trees and a patch of woodland/forest. Cattle are rotated through the paddocks, and the biomass varied from very low in the paddock east of the woodland patch to high along the eastern edge of the Site.

Native grasses were present in small areas, in isolated patches and also scattered thinly through much of the exotic-dominated pasture.

Grassland containing varying amounts of native grasses was tentatively mapped as good, low to medium, or low quality potential GSM habitat. Good quality potential habitat was dominated by low native grasses, with a high proportion of Wallaby Grasses and a variety of native forbs. Low to medium quality potential habitat was dominated by taller native grasses but contained few or no native forbs, and low quality potential habitat contained native grasses mixed equally with exotic grasses. These areas amounted to about 5 ha. Large parts of the Site (about 92 ha) were dominated by exotic grasses but contained scattered native grasses. These areas are much less likely to support GSM, but this will be confirmed through the further surveys to be undertaken as part of the EIS.

Small areas of moderate to good potential habitat were seen in the vicinity of the 2000 GSM record, north and south of Tallagandra Lane. The vegetation characteristics of these patches are shown in Table 5. There was another small patch of moderate quality potential habitat in the centre of the site, in a heavily grazed paddock. These areas all contained a number of native forbs as well as a moderate to high cover of native grasses.

The minimum area of potential GSM habitat recorded, and its quality, is shown in Table 6.

Some small native-dominated areas may reach the minimum standard for threatened communities (Natural Temperate Grassland/Box Gum Woodland).

Additionally, five Varied Sittellas (Daphoenositta chrysoptera) were seen moving through the trees bordering Tallagandra Lane. This species is listed as vulnerable in NSW under the BC Act.

Table 5 Moderate to high quality potential GSM habitat near Tallagandra Lane.

Habitat parameter	South	North
Native grasses (% cover)	70	70
Native forbs (% cover)	1	5
Bare ground (% cover)	2	20
Exotic grasses (% cover)	22	3
Exotic forbs (% cover)	5	2
Biomass	Moderate	Low

Table 6 Approximate areas of grassland and habitat quality categories

CATEGORY	TOTAL HECTARES
Good quality potential GSM habitat, dominated by short native grasses, native forbs present	0.5
Low to moderate quality potential GSM habitat, native grasses dominant, few or no native forbs	1.0
Low quality potential GSM habitat with mixed native and exotic grasses	4
Exotic pasture with sparsely scattered native grasses, very low quality discontinuous potential GSM habitat	92
Mainly exotic pasture grasses	18
Not inspected, most of area probably not GSM habitat	118
Not inspected, out of scope at time of site visit	133

Discussion

GSM habitat condition

An area of at least 100 hectares (Table 6) identified to have some potential as GSM habitat is to be confirmed by surveys for flying males in spring. Almost all (ca 95%) of the potential habitat is very low quality, containing sparsely scattered native grasses only. These areas will nevertheless require survey as part of the EIS.

The higher quality potential habitat near the previous GSM record is very likely to be occupied. The lower quality or patchy habitat on other parts of the site may or may not be occupied, depending on the management history of the paddocks. The application of fertilisers, some grazing regimes and ploughing can all damage or destroy GSM habitat.

The property owner reported that he has been applying super phosphate every twelve months for the last five years, and every two years in the previous decades. GSM is not usually found in paddocks that have had frequent applications of fertilisers, probably because exotic grasses outcompete native grasses in high nutrient soils. The paddocks have also been sown with Phalaris and Ryegrass, which GSM larvae are not thought to feed on. The application of fertiliser and the practice of rotational rather than continuous grazing results in large fluctuations in biomass which is not preferred by the GSM.

Vegetation quality

Ungrazed Phalaris may be masking the extent of native grass cover in some areas, and it is also possible that in spring more native forbs would be detected in the higher quality native-dominated grassland patches. These could include threatened species such as Hoary Sunray (*Leucochrysum albicans*) and Silky Swainson-pea (*Swainsona sericea*).

Some very small native-dominated areas may reach the minimum standard for threatened communities (Natural Temperate Grassland/Box Gum Woodland), but this will be investigated for the EIS .

Other threatened species

Springdale is within the known range of the Striped Legless Lizard (*Delma impar*), listed as vulnerable in NSW and nationally. The nearest records appear to be in Gungahlin in the ACT, but it is not known if targeted surveys have been undertaken in the Springdale/Sutton area.

The 7 ha woodland/forest patch was not visited, but is likely to contain habitat for the Varied Sittellas seen at Tallagandra Lane, and a number of other threatened woodland bird species such as Dusky Woodswallow, Hooded Robin, Scarlet Robin, Flame Robin, Brown Treecreeper, Speckled Warbler, Superb Parrot and Diamond Firetail.

Birds seen on the site included Galah, Sulphur-crested Cockatoo, Laughing Kookaburra, Varied Sittella, Superb Fairy-wren, Richard's Pipit, White-plumed Honeyeater, Australian Raven, Australian Magpie and the introduced Common Starling.

Potential Impacts

Potential impacts to biodiversity from the proposal include impacts from clearing of vegetation for the installation of solar panels, access tracks and other ancillary infrastructure, and shading of grassland. The clearing and shading of vegetation could result in the destruction of threatened flora or threatened fauna habitat, or a threatened ecological community.

In regards to GSM, impacts could be reduced by avoiding damage to areas of occupied habitat, and managing any undeveloped areas to improve the habitat and retain connectivity. The current management of the grasslands, with pasture improvement and rotational grazing, does not favour the retention of GSM habitat in good condition. If spring/summer surveys show the area of occupied GSM habitat to be small relative to the size of the project site, it may be possible to develop the solar farm while avoiding damage to most or all of the habitat. With an appropriate vegetation management plan for undeveloped areas within the solar farm, it may also be possible to improve and increase GSM habitat and connectivity, resulting in no net habitat loss. Appropriate management could include weed control, ceasing pasture improvement, maintaining biomass within the low to moderate range throughout the year by grazing or slashing, revegetation of disturbed areas with Wallaby Grasses and linking of habitat patches.

6.3.2. Further Assessment

A detailed assessment of potential impacts to biodiversity will be undertaken as part of the EIS. This will include further investigation of the presence of threatened species and communities within the Site, the potential for significant impacts and methods for the avoidance of impacts through, for example, avoidance through design, management practices and biodiversity offsets. The assessment for the EIS will be informed and undertaken in accordance with the Project SEARs.

6.4. Flooding and hydrology

6.4.1. Existing Environment

The Site contains a number of drainage/creek lines and number of dams as illustrated in Figure 5. The drainage lines generally flow in a southwest to northeast direction across the Site, and drain towards Yass River approximately 10km downstream.

As shown on Figure 5, Spring Flat Creek runs west of the Site and Back Creek runs through the north-eastern portion of the Site. Another unnamed creek runs through the Site from south of Tallagandra Lane through the southeast portion of the Site towards the centre-north the site. The landowner has reported observations of this creek flooding from time to time.

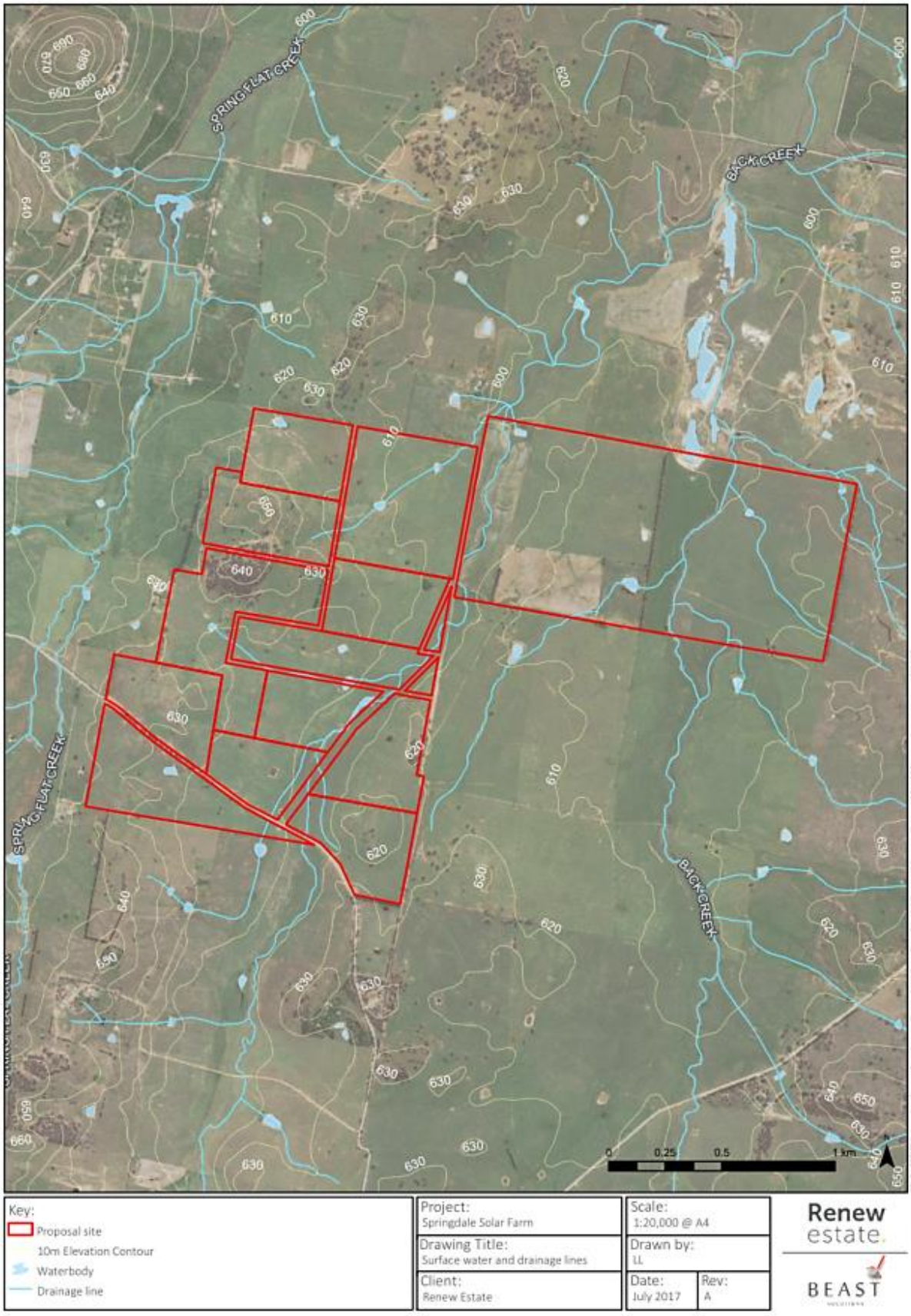


Figure 5 Surface water and drainage lines

6.4.2. Further Assessment

An assessment of flood constraints will be undertaken as part of the EIS. It is expected that the final design will avoid any identified flood zones. Potential impacts to dams and other water resources on the site will also be assessed and, where appropriate, mitigation measures identified.

6.5. Aboriginal heritage

6.5.1. Existing Environment

The Yass district had a number of Aboriginal campsites prior to 1821, which reflects a complex Aboriginal history within the area (YVC, n.d.b). The inhabitants of the area were known as the Ngunnawal tribe.

In August 2017, a Basic Search of the online NSW Aboriginal Heritage Information System (AHIMS, 2017b) database was undertaken for each lot subject of the Project. The search identified that no Aboriginal items are recorded within 1km of each lot. The absence of previously recorded items may be due to a lack of previous surveys undertaken in the area.

6.5.2. Further Assessment

Potential impacts to Aboriginal heritage include damage to Aboriginal heritage items during construction or indirect impacts to Aboriginal heritage sites due to changes to the landscape.

Further assessment of Aboriginal heritage will be undertaken as part of the EIS.

6.6. Other Environmental Issues

Table 7 on the following pages describes other environmental issues relevant to the Project that are not considered key issues due to the nature of the Project and existing environment, and availability of effective mitigation measures. These issues will be further considered as part of the EIS.

Table 7 Other Environmental Issues

Existing Environment	Potential Impacts	Management and Mitigation and Further Assessment
Visual Amenity		
Due to the undulating topography of the Site and surrounds, as well as the rural, undeveloped nature of the Project setting, the number of visual receptors is low. There are four residences within 1km of the Site, and 13 residences within 2km (Figure 6). The only road which has views to the Site is Tallagandra Lane, which runs in a northwest-southeast direction, through the southern portion of the Site. This public local road continues for 2km southeast of the Site to connect to Mulligans Flat Road which is out of view of the Site.	The Project has the potential to result in visual impacts to residences and road users with a view of the Site. The solar farm will be in the viewshed of a relatively small number of residences. Vehicle movements on Tallagandra Lane are infrequent, resulting in minimal anticipated visual impacts to road users. Further, the visual sensitivity of the road users is likely to be low due to the temporary, transient nature of the view.	A visual and landscape character impact assessment, including view shed analysis, would be undertaken for the EIS to further investigate potential impacts and mitigation options such as vegetation screening.
Air Quality		
The existing local air quality is expected to be influenced by its proximity to the city of Canberra. Existing sources of air pollution are expected to include vehicle emissions, emissions from commercial and industrial activities within Canberra, and agricultural practices.	During construction, potential impacts to local air quality include dust generation from excavation, earthworks and vehicle movement. Impacts to air quality during operation would be negligible, limited to potential minor dust generation from maintenance vehicles.	A CEMP would be prepared for the construction phase of the Project which incorporates measures to minimise dust generation.

Existing Environment	Potential Impacts	Management and Mitigation and Further Assessment
Noise and Vibration		
Existing noise levels are likely to be very low at the Site, consistent with typical rural environments. The predominant existing noise source would be the occasional vehicle movements on Tallagandra Lane. There are 13 sensitive receivers (all residences) within 2km of the proposal site, 4 of which are within 1km (Figure 6). The closest sensitive receiver is approximately 100m from the Site. The next closest residences are approximately 150m, 800m and 900m from the Site.	Noise generated by construction activities, such as the use of construction vehicles and plant onsite, and construction traffic, has the potential to impact nearby receivers. During operation minimal noise would be generated by the inverters and substation transformer, though is not expected to be audible to neighbouring properties. The trackers are very quiet. Ongoing maintenance requirements will be negligible and would likely involve light utility vehicles and hand tools. Traffic associated with the operation of the Project will likely be negligible, limited to around two to three light vehicles travelling to the Site each day. The Project does not involve vibration-intensive activities during construction or operation.	A construction noise assessment in accordance with the Interim Construction Noise Guideline (DECC, 2009) will be undertaken as part of the EIS. This assessment will determine the likely noise impacts to surrounding receivers and identify any required mitigation measures. The CEMP prepared for the Project would include a component for noise management which includes controls such as standard working hours, an out of hours protocol, and noise minimisation measures.

Existing Environment	Potential Impacts	Management and Mitigation and Further Assessment
Soils		
The majority of the Site is located within the Williamdale soil unit of the Soil Landscapes of Canberra 1:100,000 Sheet (Jenkins, 2010). The Williamsdale soil group is characterised by undulating rises, fans and valley flats on Silurian Volcanics of Canberra Lowlands. Soils are typically moderately deep, moderately well drained Yellow Chromosols (Yellow Podzolic Soils) on red and brown Kandosols (Red and Yellow Earths) on upper rises and fan elements. Documented qualities and limitations include hardsetting, erodible, dispersible (localised), acidic topsoils, seasonal waterlogging and causing localised flooding hazards.	Impacts to the soil environment are most likely during construction. Minor excavations for footings or trenching for underground cables could result in soil erosion and sedimentation if not managed appropriately. Soil compaction could result from development of maintenance and access roads, and pile driving solar panel support poles. Construction activities may also generate dust.	Further assessment of potential soil impacts will be undertaken for the EIS to identify appropriate mitigation during the construction and operation. At a minimum, a CEMP would be prepared for the construction phase which incorporates erosion and sediment controls and measures to minimise dust.
Non-Aboriginal Heritage		
A review of the NSW State Heritage Register and LEP has identified that there are no sites of non-indigenous heritage recorded within the Site. The closest recorded non-indigenous heritage site to the Site is “Bywong-homestead, outbuildings and landscape” (I089) approximately 2.6km east of the site. The next closest site is approximately 4.5km to the northeast.	The Project is considered unlikely to impact the heritage values of the non-indigenous heritage sites in the area due to the significant distances from the closest sites.	The EIS will detail the non-aboriginal heritage sites identified in the local area. A phase 1 desktop assessment may be necessary.

Existing Environment	Potential Impacts	Management and Mitigation and Further Assessment
Contamination		
A search of the NSW EPA Contaminated Land Public Record (EPA, 2017b) returned two results, though none related to the Site or nearby properties. Four sites were found on the list of NSW Contaminated Sites Notified to the EPA (EPA, 2017b), however none related to the Site or nearby properties.	Due to the Projects land use history, potential sources of contamination within the Site are those associated with agricultural activities (e.g. pesticides, sheep dips etc). Ground disturbance would be minimal and is mostly limited to pile driving or screw piling tracker mounting structures into the ground, therefore the likelihood of encountering contamination is low.	The risks associated with contamination are considered low. The CEMP prepared for the Project would include an unexpected finds protocol for the event that any contamination is discovered during construction works. No further contamination investigations are considered necessary.
Bushfire		
The Site is not in an area identified as bushfire prone within the Yass Valley Council LGA Bush Fire Prone Land Map (YVC, 2014b) and the NSW Rural Fire Service bush fire prone land online map (RFS, 2017).	There is a lower risk of the Project being affected by bushfire as the site is not within bushfire prone lane. The Project does not pose a significant bushfire risk.	A bushfire risk assessment would be undertaken as part of the EIS to assess bushfire risks to the project and bushfire risks posed by the project. The assessment would identify the requirement for asset protection zones and other fire mitigation measures.

Existing Environment	Potential Impacts	Management and Mitigation and Further Assessment
Traffic and Access		
Access to the site is via unsealed Tallagandra Lane which runs in a northwest-southeast direction dividing Lot 209 DP754908 from the rest of the site parcels to the north. Tallagandra Lane is a public local road managed by Yass Valley Council. Tallegandra Lane continues south of the site for approximately 2km before connecting with Mulligans Flat Road (also a local council road). Mulligans Flat Road joins up with Sutton Road, which is a Classified Regional road. Classified roads include State and Regional roads. Regional roads are managed by local councils, though receive funding support from RMS, while State Roads are entirely managed by RMS. Usually, RMS will take an active role in the approvals process in respect of classified roads.	Solar panel deliveries would likely come from Sydney. The likely route the delivery trucks would take is shown in Figure 7. The delivery trucks would likely be Medium Rigid (MR) and would not be larger than typical trucks using the existing local roads in the area. At the peak of construction there could be up to 150-200 construction workers travelling to site each day. Traffic generated during operation would be negligible, limited to approximately two to three operations staff travelling to site per day.	The EIS would assess the adequacy of the external and internal access roads to cater for the construction and operation of the proposal and whether any road upgrades are required. An assessment of potential impacts to traffic during construction will also be included. Council and RMS may require road upgrades or other road works to be undertaken to facilitate the traffic movements generated by the Project. Such consultation will be undertaken as part of the EIS process. Note that this item is separate from the assessment of impact on the paper roads currently the subject of enclosure permits. The issue regarding the paper roads will be resolved separately (as set out at 4.1.4 above).
Waste		
The key waste stream generated by the Project is expected to be solid waste during construction.	Solid waste types likely generated by construction of the Project include packaging materials, building materials, scrap metal, excess soil, plastic and masonry products and vegetation from clearing. The modules packaging including pallets and cardboard makes up most of this waste stream during construction. There would be limited waste generated during the operation phase.	Waste management will be further considered in the EIS. Waste generated during construction would be removed from the Site and either recycled or disposed at an appropriate waste disposal facility. The CEMP prepared for the project would include a Waste Management Plan. The Plan would apply the waste management hierarchy seeking to avoid, re-use and recycle to minimise waste.

Existing Environment	Potential Impacts	Management and Mitigation and Further Assessment
Utilities		
Two existing TransGrid overhead electricity transmission lines traverse the southern portion of the site in a northwest-south-east direction. The more northern of the two lines is the 330kV Canberra to Capital Wind Farm circuit. This line is located within a 60m wide easement. The more southern feeder is the 132kV Canberra to Queanbeyan circuit that the project will be connecting to. This line is located within a 40m wide easement. A buried gas pipeline and associated easement also runs through the Site in a southwest-northeast direction.	The Project is working closely with TransGrid on the connection arrangement and interaction with their assets. The Project will comply with all easements and setbacks as required by TransGrid and the National Electricity Rules (NER). The connection arrangement is currently being determined in collaboration with TransGrid, however it is likely the connection will be through a switchyard and substation located adjacent to the existing 132kV easement. The ownership boundary of the connection assets will be at the substation 33kV terminations and TransGrid will own and operate the connection assets in accordance with their role as a network service provider. The design of the Project will avoid the gas pipeline easement.	The EIS will assess the Project against easement and setback requirements of TransGrid and the NER, as well as the gas pipeline easement.
Land Use		
The Site is presently used for agricultural purposes, specifically grazing, which is consistent with the predominant land use of the surrounding area. The Site and surrounding properties are zoned Primary Production (RU1) under the LEP.	Due to the large amount of productive land in the Yass Valley region, a small loss of agricultural land will occur because of the Project. Overall, the Project is unlikely to have any significant impact on the agricultural productivity of the region. Further, at the end of the operational life of the Project, the solar farm will be decommissioned, making the Site available for agriculture once again.	The EIS will include further assessment of the Projects potential impact to agricultural productivity in the region.

Existing Environment	Potential Impacts	Management and Mitigation and Further Assessment
Socio-economics		
Yass Valley Council area has a population of approximately 16,000 and population density is 0.04 persons per hectare, reflecting its largely undeveloped, rural setting (ABS, 2016). In 2011, the majority (19.1%) of Yass Valley Council residents worked in the Public Administration and Safety industry, followed by 10.3% working in construction. 8.7% of residents worked in agriculture (ABS, 2016).	Whilst the Project would reduce the availability of agricultural land, it will generate economic benefits during construction and operation such as local employment opportunities. Other socio-economic impacts include impacts to amenity resulting from construction noise, dust, construction traffic, and visual impacts.	Social and economic impacts would be assessed as part of the EIS.
Electromagnetic fields (EMF)		
There are currently two large transmission lines traversing the Site which produce electromagnetic fields (EMF). TransGrid is guided by the World Health Organisation (WHO) and the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and complies with all requirements and advice from these agencies.	The field strength of EMF is directly proportional to the magnitude of the voltage and current travelling through a circuit. The Project will not increase the voltage of electrical assets in the region as the highest voltage on site currently is 330kV and the Project voltage would be limited to 132kV. Similarly, the existing assets are arterial transmission lines supplying electrical demand measured in gigawatts. The proposed 100MW facility is a magnitude smaller than the existing assets and will not have any material impact on local EMF levels.	Further assessment of EMF is not considered necessary at the EIS stage.

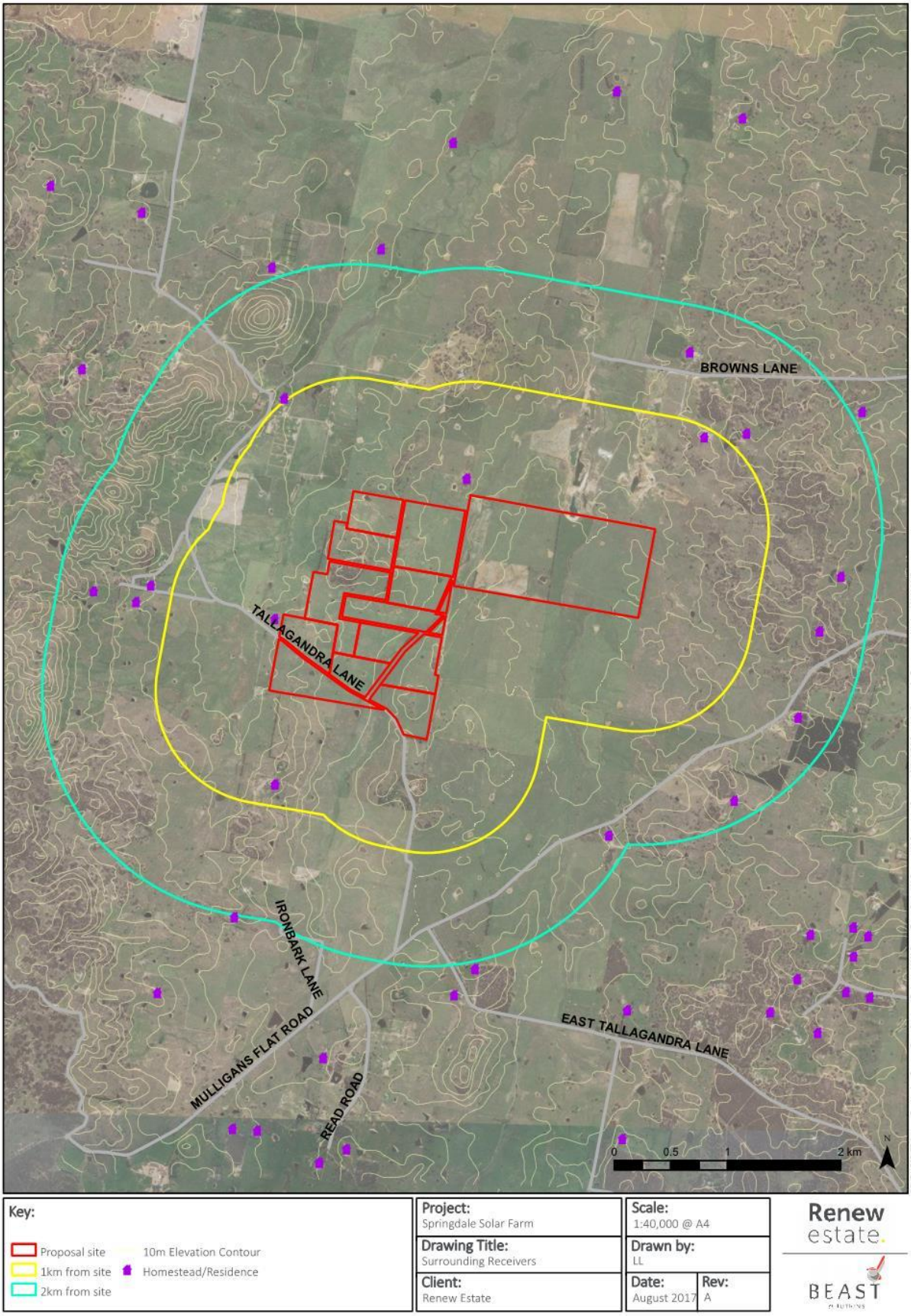


Figure 6 Surrounding Receivers

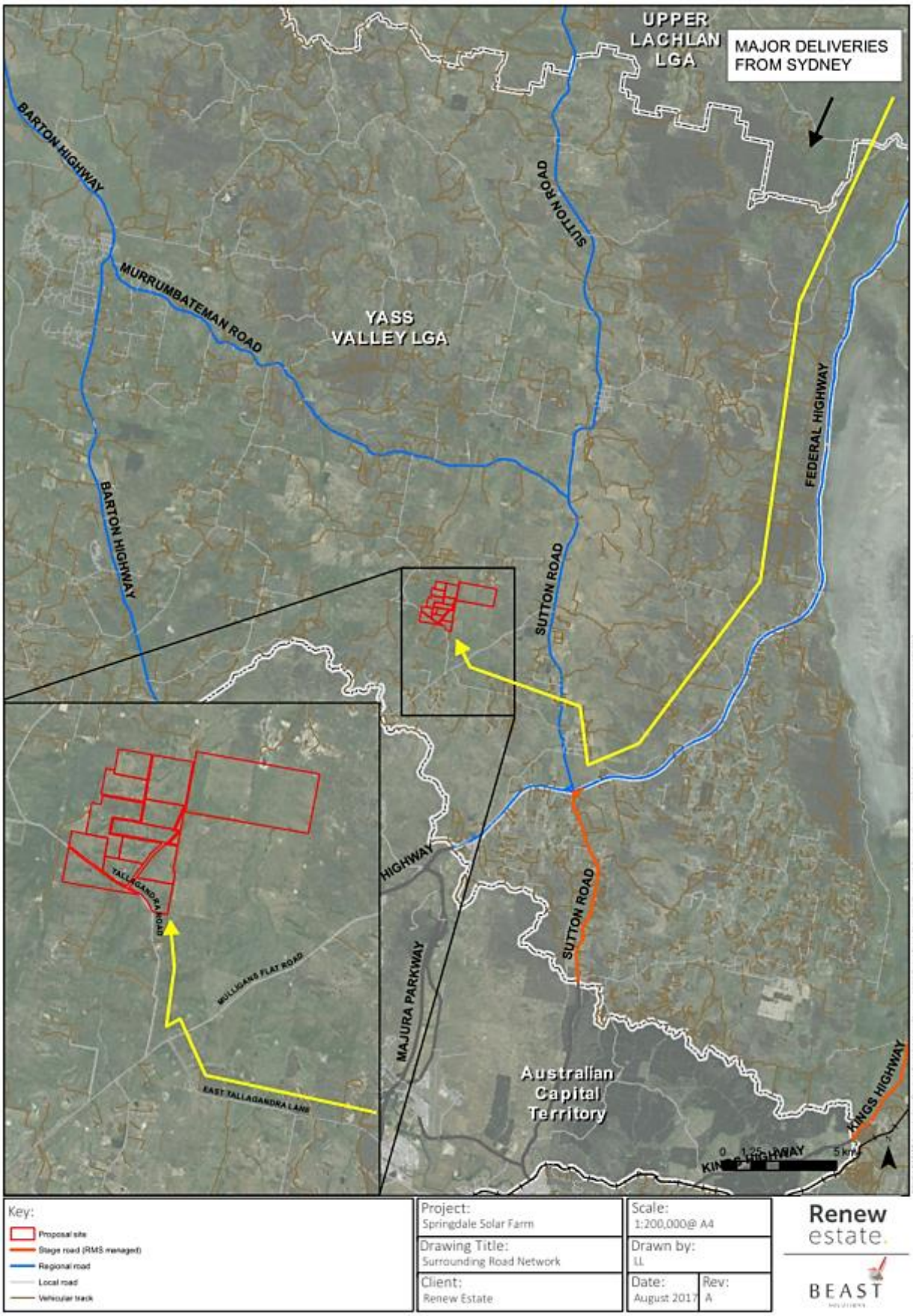


Figure 7 Surrounding road network

7. CONCLUSION

This report has established the environmental and planning context of the proposed 100 MW solar farm in Sutton, NSW and identified possible environmental impacts which require further assessment.

Classified as SSD under the S&RD SEPP, the Project is subject to assessment and determination by the NSW Minister for Planning under Part 4 of the EP&A Act.

Environmental issues considered in this preliminary assessment include:

- Biodiversity
- Flooding and Hydrology
- Visual Amenity
- Air Quality
- Noise and Vibration
- Soils
- Aboriginal Heritage
- Non-Aboriginal Heritage
- Contamination
- Bushfire
- Traffic and Access
- Waste
- Utilities
- Land Use
- Socio-economics
- Electromagnetic Fields

The PEA identifies that the key environmental issues associated with the Project are likely to be biodiversity, flood risk and Aboriginal heritage. These issues, along with other environmental risks identified in this report, will be detailed in the EIS prepared for the Project. The EIS will assess the potential impacts, identify appropriate mitigation measures and assess the residual risks with the implementation of the identified controls. The EIS will be developed in accordance with the project SEARs issued by DP&E.

If further assessment of biodiversity impacts identified that the Project is likely to have a significant impact on any MNES, the Project may also need approval by the Commonwealth Minister for the Environment, or their delegate.

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APPENDIX A

SITE PHOTOGRAPHS

Photo taken on site, 19th April 2017

Photo taken on site, 19th April 2017

Photo taken on site, 13th July 2017

Photo taken on site, 13th July 2017

TransGrid 132kV Feeder 977. Photo taken 19th April 2017

TransGrid 132kV Feeder 977. Photo taken 19th April 2017

APPENDIX B

EPBC ACT PROTECTED MATTERS SEARCH TOOL REPORT

Australian Government
Department of the Environment and Energy

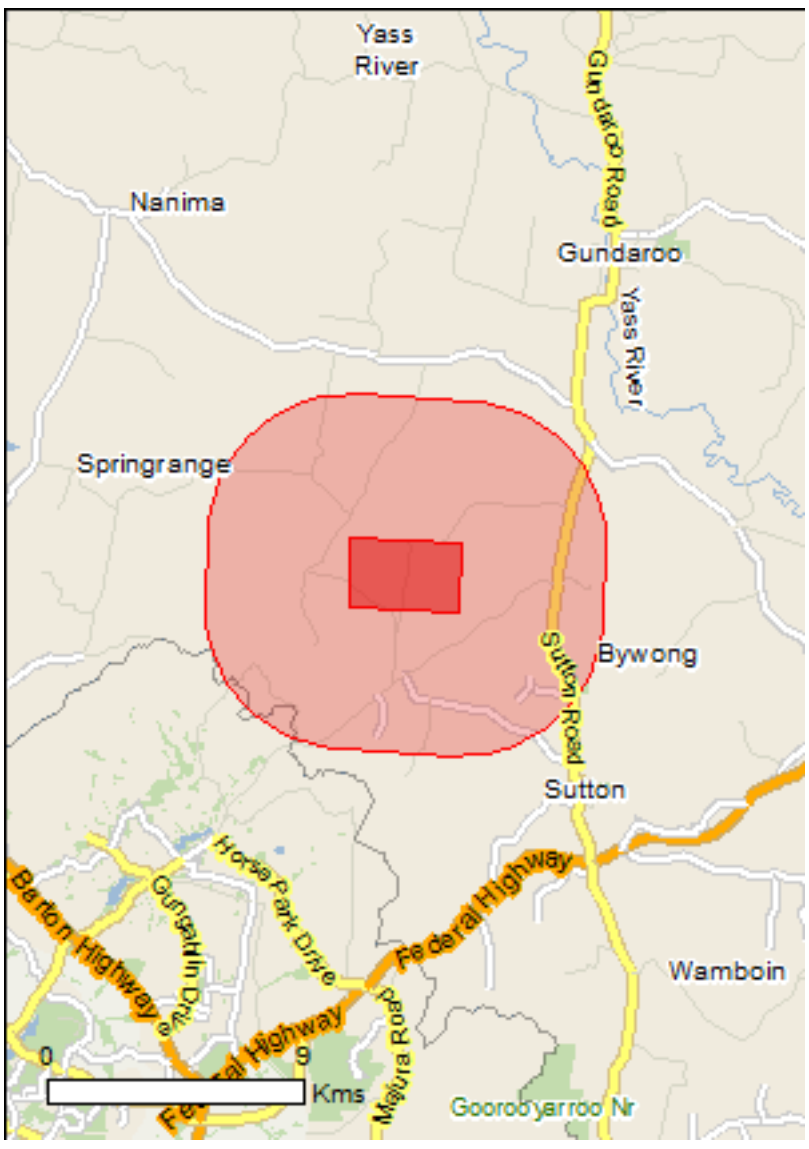
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 15/08/17 08:31:52



Coordinates

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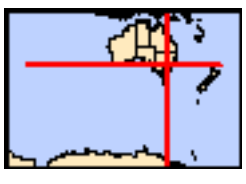

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	27
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	19
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	1
Invasive Species:	35
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Banrock station wetland complex	800 - 900km upstream
Hattah-kulkyne lakes	600 - 700km upstream
Riverland	700 - 800km upstream
The coorong, and lakes alexandrina and albert wetland	800 - 900km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Frogs		
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat may occur within area
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat may occur within area
Litoria castanea Yellow-spotted Tree Frog, Yellow-spotted Bell Frog [1848]	Endangered	Species or species habitat may occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat may occur within area
Insects		
Synemon plana Golden Sun Moth [25234]	Critically Endangered	Species or species habitat known to occur within area
Mammals		
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Eucalyptus aggregata Black Gum [20890]	Vulnerable	Species or species habitat likely to occur within area
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat may occur within area
Leucochrysum albicans var. tricolor Hoary Sunray, Grassland Paper-daisy [56204]	Endangered	Species or species habitat likely to occur within area
Pelargonium sp. Striatellum (G.W.Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat may occur within area
Pomaderris pallida Pale Pomaderris [13684]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat known to occur within area
Reptiles		

Name	Status	Type of Presence
Aprasia parapulchella		
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area
Delma impar		
Striped Legless Lizard [1649]	Vulnerable	Species or species habitat known to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Mulligans Flat	ACT

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
Southern RFA	New South Wales

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within

Name	Status	Type of Presence
		area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-35.116405 149.181215,-35.116405 149.181024,-35.116405 149.181215,-35.098774 149.181787,-35.100334 149.217073,-35.117965 149.216309,-35.116405 149.181215

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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APPENDIX C

INITIAL ECOLOGICAL SITE INSPECTION REPORT

Initial ecological inspection of Springdale Solar site

Tallagandra Lane near Sutton, NSW

Alison Rowell
Biologist and Environmental Consultant
PO Box 777 DICKSON ACT
arowell@webone.com.au

for Renew Estate

August 2017

Springdale Solar site, Tallagandra Lane

1. The project

A 350 hectare property near Sutton (referred to as Springdale) is being assessed for development as a solar farm. There is a NSW Wildlife Atlas record of the Golden Sun Moth *Synemon plana* from the year 2000 on the western edge of the area selected for assessment, two other records within 5 km, and more within 10 km. This species is listed as critically endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and as endangered in NSW under the *Threatened Species Conservation Act 1995*.

The initial inspection was to determine the likelihood of the Golden Sun Moth (GSM) being present at the site. GSM lives in low open native grasslands, usually dominated by Wallaby and Spear Grasses. The short-lived adults fly, mate and lay eggs during a few weeks in spring, and the larvae feed on the roots of native grasses for 1 to 3 years before pupating.

Winter is not a good time to identify GSM habitat, and assessing the vegetation was made more difficult by cattle grazing and the current very dry conditions. The assessment was therefore based on the presence and frequency of native grasses, mostly identified by vegetative characters.

2. Method

The site was visited on 13 July 2017. The first area inspected was near the western boundary of the site, just south of Tallagandra Lane, in the area indicated as containing GSM in 2000. The composition and structure of the grassland in this area was described and photographed, and the rest of this paddock was walked over.

As much as possible of the rest of the site was then traversed by vehicle and on foot. Regular stops were made to check native grass identifications using a hand lens.

Some areas unlikely to contain GSM habitat (such as dense Phalaris on creek flats) were not covered. The main vegetation types encountered were marked on an aerial photograph, and GPS readings were taken for patches of native grasses that had potential to be GSM habitat.

The time available and the condition of the vegetation did not allow transect measurement to quantify GSM habitat condition.

3. Results

The site contains mainly improved pasture of Phalaris and Ryegrass (photograph 1), a few scattered paddock trees and a patch of woodland/forest. Cattle are rotated through the paddocks, and the biomass varied from very low in the paddock east of the woodland patch to high along the eastern edge of the site.

Native grasses were present in small areas, in isolated patches and also scattered thinly through much of the exotic-dominated pasture. Native grasses were more common adjacent to Tallagandra Lane, and on knolls and ridges and some other areas where the ground cover was sparse. Lower-lying areas, drainage lines and disturbed areas around dams were dominated by exotic pasture grasses and contained few native grasses. Native grass species recorded were Rough and Tall Speargrass (*Austrostipa scabra, A. bigeniculata*), at least two Wallaby Grasses (*Rytidosperma* spp.), Redleg Grass (*Bothriochloa macra*) and Hairy Panic Grass (*Panicum effusum*). Few non-grass native species forbs were seen on most of the site, and the cover of broad-leaved weeds was also low. This may be due to broad-scale use of herbicides to control weeds such as thistles.

Grassland containing varying amounts of native grasses was tentatively mapped as good, low to medium, or low quality potential GSM habitat. Good quality potential habitat was dominated by low native grasses, with a high proportion of Wallaby Grasses and a variety of native forbs. Low to medium quality potential habitat was dominated by taller native grasses but contained few or no native forbs, and low quality potential habitat contained native grasses mixed equally with exotic grasses. These areas amounted to about 5 ha. Large parts of the site (about 92 ha) were dominated by exotic grasses but contained scattered native grasses. These areas are much less likely to support GSM, but survey would be needed to confirm this.

Small areas of moderate to good potential habitat were seen in the vicinity of the 2000 GSM record, north and south of Tallagandra Lane (photographs 2 and 3). The vegetation characteristics of these patches are shown in Table 1. There was another small patch of moderate quality potential habitat in the centre of the site, in a heavily grazed paddock (photograph 4). These areas all contained a number of native forbs as well as a moderate to high cover of native grasses. Forbs included *Lomandra, Euchiton, Solenogyne, Juncus, Rumex, Triptilodiscus* and some unidentified seedling plants.

The minimum area of potential GSM habitat recorded, and its quality, is shown in Table 2. These areas are approximate, as less than a full day was spent on the site and conditions were not optimal for assessing grassland type or habitat quality.

Some small native-dominated areas may reach the minimum standard for threatened communities (Natural Temperate Grassland/Box Gum Woodland). The woodland patch was not surveyed, but scattered trees in the northern paddock were forest rather than woodland species. A map and photographs showing the main observations are attached.

Five Varied Sittellas (*Daphoenositta chrysoptera)* were seen moving through the trees bordering Tallagandra Lane. This species is listed as vulnerable in NSW under the *Threatened Species Conservation Act 1995*.

Table 1. Moderate to high quality potential GSM habitat near Tallagandra Lane.

Habitat parameter	**South**	**North**
Native grasses (% cover)	70	70
Native forbs (% cover)	1	5
Bare ground (% cover)	2	20
Exotic grasses (% cover)	22	3
Exotic forbs (% cover)	5	2
Biomass	Moderate	Low

Table 2. Approximate areas of grassland and habitat quality categories

CATEGORY	**TOTAL HECTARES**
Good quality potential GSM habitat, dominated by short native grasses, native forbs present	0.5
Low to moderate quality potential GSM habitat, native grasses dominant, few or no native forbs	1.0
Low quality potential GSM habitat with mixed native and exotic grasses	4
Exotic pasture with sparsely scattered native grasses, very low quality discontinuous potential GSM habitat	92
Mainly exotic pasture grasses	18
Not inspected, most of area probably not GSM habitat	118
Not inspected, out of scope at time of site visit	133

4. Discussion

4.1 GSM habitat condition

An area of at least 100 hectares (Table 2) identified to have some potential as GSM habitat would need to be confirmed by surveys for flying males in spring. Almost all (ca 95%) of the potential habitat is very low quality, containing sparsely scattered native grasses only. These areas nevertheless require survey as it is likely that some small patches of native grasses were not detected, especially in the more heavily grazed paddocks in the centre of the site. Native grasses were mostly found in discontinuous patches on knolls and ridges, where soil and moisture conditions make it harder for the pasture grasses to flourish, and not all such areas were inspected.

The higher quality potential habitat near the previous GSM record is very likely to be occupied. The lower quality or patchy habitat on other parts of the site may or may not be occupied, depending on the management history of the paddocks. The application of fertilisers, some grazing regimes and ploughing can all damage or destroy GSM habitat. The female moths can barely flutter and males are reluctant to fly more than 100 metres outside habitat, so GSM can die out in small patches that are cut off from larger areas of habitat.

The property owner reported that he has been applying super phosphate every twelve months for the last five years, with the most recent application five months ago. In the preceding decades, super phosphate was applied every two years. GSM is not usually found in paddocks that have had frequent applications of fertilisers, probably because exotic grasses outcompete native grasses in high nutrient soils. The paddocks have also been sown with Phalaris and Ryegrass, which GSM larvae are not thought to feed on. The application of fertiliser and the practice of rotational rather than continuous grazing results in large fluctuations in biomass. GSM prefer constant and relatively low biomass, as tall dense grasses interfere with emergence of adults and mating, outcompete the shorter native grasses on which the larvae feed, and contribute to lower soil temperatures which may affect larval development.

4.2 Vegetation quality

Ungrazed Phalaris may be masking the extent of native grass cover in some areas, and it is also possible that in spring more native forbs would be detected in the higher quality native-dominated grassland patches. These could include threatened species such as Hoary Sunray (*Leucochrysum albicans)* and Silky Swainson-pea (*Swainsona sericea)*.

Some very small native-dominated areas may reach the minimum standard for threatened communities (Natural Temperate Grassland/Box Gum Woodland), but this would need investigation in spring/summer.

4.2 Other species

Springdale is within the known range of the Striped Legless Lizard (*Delma impar*), listed as vulnerable in NSW and nationally. This species is found mainly in Natural Temperate Grassland but is sometimes present in modified grasslands with a significant component of exotic grasses. The nearest records appear to be in Gungahlin in the ACT, but it is not known if targeted surveys have been undertaken in the Springdale/Sutton area. This should be discussed with the NSW Office of Environment and Heritage.

The woodland/forest patch was not visited, but is likely to contain habitat for the Varied Sittellas seen at Tallagandra Lane, and a number of other threatened woodland bird species such as Dusky Woodswallow, Hooded Robin, Scarlet Robin, Flame Robin, Brown Treecreeper, Speckled Warbler, Superb Parrot and Diamond Firetail.

Birds seen on the site included Galah, Sulphur-crested Cockatoo, Laughing Kookaburra, Varied Sittella, Superb Fairy-wren, Richard's Pipit, White-plumed Honeyeater, Australian Raven, Australian Magpie and the introduced Common Starling.

5. Recommendations

The Commonwealth significant impact guidelines for GSM state that for large or contiguous habitat areas (>10 ha), the impact threshold is habitat loss, degradation or fragmentation greater than 0.5 ha. For small or fragmented habitat areas (<10 ha), any habitat loss, degradation or fragmentation is significant. Fragmentation of a population through the introduction of barriers to dispersal is also a significant impact.

To assess impact, it is therefore necessary to measure the amount of occupied habitat, and its connectivity. This requires surveys for flying male GSM over at least four days of suitable weather during the local GSM flying season, at approximately weekly intervals. Once presence is established, surveys then focus on determining the relative distribution of the species on the site, followed by searches for egg-laying females and pupal cases to identify areas of mating, egg-laying and larval development.

Impacts to GSM habitat from installation of solar panels would include habitat destruction for panel arrays and access tracks, and shading of grassland. Shading is deleterious to GSM habitat, as it is likely to affect soil temperature and moisture and hence vegetation composition and larval development. Impacts could be reduced by avoiding damage to areas of occupied habitat, and managing any undeveloped areas to improve the habitat and retain connectivity.

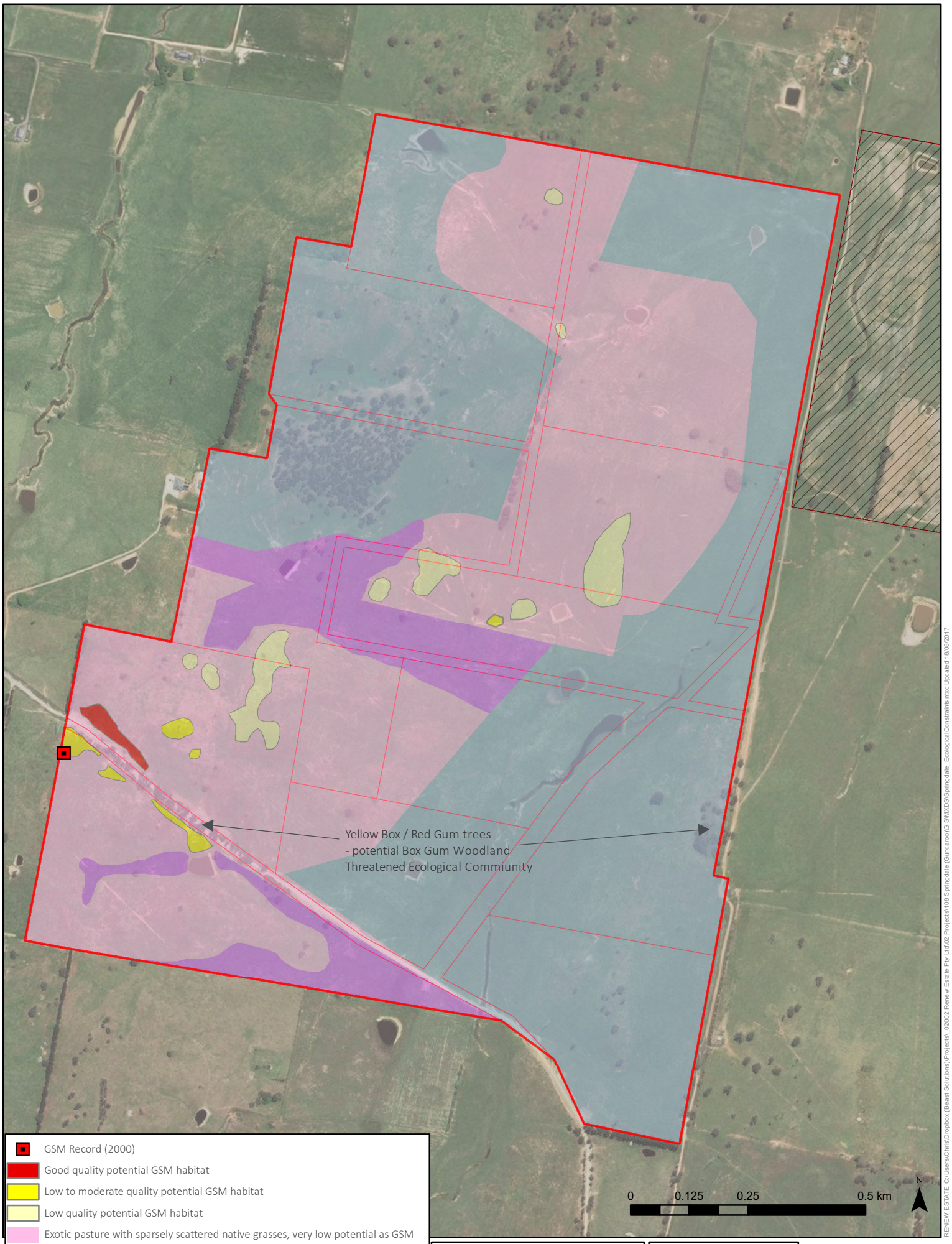
The current management of the grasslands, with pasture improvement and rotational grazing, does not favour the retention of GSM habitat in good condition. If spring/summer surveys show the area of occupied GSM habitat to be small relative to the size of the project site, it may be possible to develop the solar farm while avoiding damage to most or all of the habitat. With an appropriate vegetation management plan for undeveloped areas within the solar farm, it may also be possible to improve and increase GSM habitat and connectivity, resulting in no net habitat loss. Appropriate management could include weed control, ceasing pasture improvement, maintaining biomass within the low to moderate range throughout the year by grazing or slashing, revegetation of disturbed areas with Wallaby Grasses and linking of habitat patches.

Photograph 1. Exotic pasture in low-lying south-eastern part of site.

Photograph 2. Native-dominated moderately dense Wallaby/Speargrass community at site of 2000 GSM record, south of Tallagandra Lane in south-west corner of site.

Photograph 3. Short open native grassland dominated by Wallaby Grasses, north of Tallagandra Lane near western boundary.

Photograph 4. Short open mixed grassland in central part of site, Wallaby Grasses present



GSM Record (2000)

Good quality potential GSM habitat

Low to moderate quality potential GSM habitat

Low quality potential GSM habitat

Exotic pasture with sparsely scattered native grasses, very low potential as GSM habitat

Mainly exotic pasture grasses

Not inspected, most is probably not GSM habitat

Not inspected, out of scope at time of site visit (Lot 1 DP198933)

Lots subject of the proposal site

(Map based on data provided by Biologist - Alison Rowell Aug 2017)

Project: Springdale Solar Farm	Scale: 1:10,000 @ A4
Drawing Title: Initial Ecological Site Inspection Observations	Drawn by: LL
Client: Renew Estate	Date: August 2017 / Rev: A

Renew estate.

BEAST SOLUTIONS

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