

ENVIRONMENTAL IMPACT STATEMENT

WEST WYALONG SOLAR FARM



24 JANUARY 2019
PREPARED FOR LIGHTSOURCE BP



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Proposal Code	P1241
Report Number	FINAL

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TERMINOLOGY

Term / Acronym	Description
ACHAR	Aboriginal Cultural Heritage Assessment Report
AHIP	Aboriginal Heritage Impact Permit
APZ	Asset Protection Zone
AREMI	Australian Renewable Energy Mapping Infrastructure
ASR	Archaeological Survey Report
BAM	Biodiversity Assessment Method
BC Act	<i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offsets Scheme
BSAL	Biophysical Strategic Agricultural Land
CEMP	Construction Environmental Management Plan
CIV	Capital Investment Value
CLM Act	<i>Contaminated Land Management Act 1997</i>
DoP	Department of Planning
DPE	Department of Planning and Environment
DPI	Department of Industry
DGs	Dangerous Goods
EIS	Environmental Impact Statement
EPA	Environmental Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979, is the statutory planning assessment framework.
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
EPL	Environmental protection licence
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically sustainable development
FM Act	<i>Fisheries Management Act 1994</i>
GAVs	General Access Vehicles

Term / Acronym	Description
GW	Gigawatt
GWh	Gigawatt hours
ICNG	Interim Construction Noise Guideline
kVA	Kilovolt-ampere
Kv	Kilovolt
LALC	Local Aboriginal Land Council
LGA	Local Government Area
LRET	Large-Scale Renewable Energy Target
LVIA	Landscape and Visual Impact Assessment
MNES	Matter of National environmental significance
MRET	Mandatory Renewable Energy Target
MW	Megawatt
NA	Noise Assessment
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NSW FFS	NSW Free Flight Society
OEH	Office of Environment and Heritage
PEA	Preliminary Environmental Assessment
PHA	Preliminary Hazard Assessment
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
PV	Photovoltaic
RMS	Roads and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
TIA	Traffic Impact Assessment
WHO	World Health Organisation
WM Act	<i>Water Management Act 2000</i>

STATEMENT OF VALIDITY

Environmental Assessment prepared by





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In respect of	Urbis Pty Ltd
Address	Level 23, Darling Park Tower 2 201 Sussex Street Sydney NSW 2000

Applicant and Land Details

Applicant	Lightsource Development Services Australia (Lightsource BP)
Applicant Address	401 Collins St, Melbourne 3000
Land to be Redeveloped	228-230 Blands Lane, West Wyalong
Lot and DP	17 and 18 in DP 753081
Proposal	West Wyalong 90 MW AC Solar Farm

Declaration

I certify that the contents of the Environmental Impact Statement to the best of my knowledge, has been prepared as follows:

Name	Clare Brown	Ryan Macindoe	Nazia Pokar	Liam Butler
Signature				
Date	24 January 2019	24 January 2019	24 January 2019	24 January 2019

EXECUTIVE SUMMARY

This Environmental Impact Statement (EIS) identifies and assesses the environmental issues associated with the construction and operation of a proposed 90 megawatt (MW) alternating current (AC) photovoltaic (PV) solar farm at West Wyalong (the proposal), central west New South Wales. The 562 hectare (ha) site comprised of a portion of Myers Lane, and Lot 17 and 18 DP753081 is located approximately 15.8 kilometres (km) north-east of West Wyalong.

Urbis Pty Ltd has prepared this EIS on behalf of the applicant Lightsource Development Services Australia (Lightsource BP). This EIS has been prepared in accordance with Part 4 of *Environmental Planning and Assessment Act 1979* (EP&A Act), Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), and the Secretary's Environmental Assessment Requirements (SEARs) provided by NSW Department of Planning and Environment (DPE) dated 8 November 2018.

The proposal is a State significant development (SSD). Under Schedule 1, Part 20 of *State Environmental Planning Policy (State and Regional Development) 2011* (S&R SEPP), solar electricity generating works with a capital investment value of more than \$30 million is declared to be State significant development. The proposal has an estimated capital investment value of \$136,660,000 and is classified as SSD.

PROPOSAL DESCRIPTION

The proposal involves the construction, operation and eventual decommissioning a 90 MW AC solar farm located approximately 15.8kms north-east of the West Wyalong town centre on the south-east side of Blands Lane.

The solar farm infrastructure is located within the boundaries of a single property (Lot 18 in DP753081) currently used for agricultural purposes that is owned by one landholder. Site access will be provided via the northern boundary of adjacent Lot 17 to Blands Lane. The solar farm will connect via overhead or underground lines in Myers Lane to the existing 132kV overhead transmission line (Lake Cowal Mine to Temora to Wagga North).

The Applicant has secured a long-term lease of the site to enable the solar farm to operate for 30 years with an option for a further 10 years.

PROPOSAL NEED

Australia's Federal and State Governments and Agencies have entered into various international agreements, conventions, and protocols in relation to climate change, greenhouse gas emissions, and renewable energy. This includes the United Nations Framework Convention on Climate Change, the Paris Agreement, and the Kyoto Protocol.

The Mandatory Renewable Energy Target (MRET) Scheme was introduced by the Commonwealth Government in 2001 to increase the amount of renewable energy being used in Australia's electricity supply. The initial MRET was for Australia to provide 9,500 gigawatt hours (GWh) of new renewable energy generation by 2010. On January 2011 the target was expanded to provide 45,000GWh of additional renewable energy by 2020. The MRET was split into two components:

- Small-scale Residential Energy Scheme; and
- Large-scale Renewable Energy Target (LRET).

The LRET includes annual targets which require significant investment in new renewable energy generation capacity, with 33,000GWh of renewable electricity generation to be met by 2020. The proposal is consistent with the NSW Governments Renewable Energy Action Plan 2013, which supports and guides renewable energy development in NSW.

The proposal will generate 226GWh which is enough electricity to power 37,596 households. This equates to 180,461 tonnes of carbon dioxide, the equivalent to removing 65,299 cars from the road.

PROPOSAL BENEFIT

The benefits of the proposal are as follow:

- Contributes to shifting energy sources to renewable energy that does not produce greenhouse gas emissions.
- Contributes to meeting Australia's commitments under National and International carbon reduction and renewable energy agreements.
- Contributes to energy security and reliability by providing a diverse energy source mix.
- Supports the development of the solar power and construction industries in Australia.
- Supports the local and regional economy through direct and indirect employment.

CONSULTATION

Urban Unity was engaged to lead on stakeholder engagement, providing information and collecting feedback on the proposal. Community and stakeholder consultation was undertaken in October and November 2018. Consultation activities included:

- Publication and distribution of a Community Information Booklet.
- Conducting a Community Information Session preceded by a newspaper advertisement.
- Consultation with key stakeholders including Bland Shire Council, quarry operators, exploration licence holders, mineral title holders, Registered Aboriginal Organisations, surrounding land owners, Free Flight Society and occupants of adjoining land.
- Media release advising of proposal email address for community enquiries to contact the proposal team.

ENVIRONMENTAL IMPACT

A detailed investigation of potential benefits, risks and impacts was undertaken specific to the construction, operation and decommissioning phases of the proposal. In addition to addressing the proposal-specific SEARs, a risk assessment was carried out to identify key environmental risks of the proposal. The outcomes of the environmental assessment and mitigation measures or proposal benefits are summarised as follows:

Biodiversity

A biodiversity survey has been undertaken on Lot 17, Lot 18 and Myers Lane. The proposed layout of the proposal has been specifically designed to avoid areas of high biodiversity value such as larger woodland patches with higher vegetation integrity. Impacts on vegetation on site include:

The removal of 1.83 hectares of native vegetation comprising:

- 0.80 hectares of 'Belah woodland (PCT 55).
- 1.03 hectares of Weeping Myall open woodland (PCT 26).
- 32 paddock trees.
- 1.83 hectares of woodland habitat for fauna species.
- Eleven habitat trees (containing 16 hollows).

Mitigation measures have been proposed to reduce the potential impacts to the site's biodiversity values. The BAM Calculator was used to determine the offset obligation for the removal of native vegetation (habitat for threatened species) and the removal of paddock trees within the footprint of the proposal.

The purchase and retirement of 68 ecosystem credits is required to meet the offset obligation of the proposal (subject to future development consent conditions). The offset obligation can also be met by purchasing and retiring credits from the biodiversity credit market or by direct payment of \$188,143.67 into the Biodiversity Conservation Fund.

Aboriginal Cultural Archaeology and Heritage

The Aboriginal Heritage survey and assessment undertaken on Lot 17, Lot 18 and Myers Lane found that there were:

- No existing recorded Aboriginal sites (AHIMS) are located within the study area.
- Four new Aboriginal sites were located within the study area.
- No areas of potential archaeological deposit were identified within the study area.
- The study area is of moderate Aboriginal archaeological sensitivity.

Recommendations have been made but are yet to be ratified with the registered Aboriginal parties under the ACHAR process.

Land

The assessment of the site has revealed no major land use conflicts will arise between the proposal and the existing adjacent land uses.

While pressure may be experienced on availability of accommodation and services in local townships during the construction phase, should the proposal and a second solar farm proposal in the region proceed concurrently with the proposed extension of the Cowal Mine, this will be short term. Management plans for the peak construction periods will address issues of temporary conflicts in traffic, noise and demand for local services.

Land and Soil Capability (LSC) Mapping data and *The land and soil capability assessment scheme: second approximate* (OEH) has been analysed and reviewed to determine land and soil capability. The site is classified as LSC Class 3 land which has 'moderate limitations'. LSC Class 3 can accommodate high impact land uses with the implementation of mitigation measures and ongoing management plans.

Visual

The visual impact assessment demonstrates that viewpoints that are representative of high sensitivity areas in the vicinity of the proposal are limited. The visual impact assessment also demonstrates that there are no sections of open views towards the proposal from publicly accessible foreground vantage points.

During community consultation, no concerns were raised by surrounding residents about the visual impacts of the solar farm.

The distance to the proposal components from adjacent residential homesteads and the proportional extent of the view occupied by the proposal elements in conjunction with the presence of existing intervening vegetation across the rural setting, will result in minimal change to the view from adjacent homesteads.

Given the relatively low elevation of the proposal components above ground level, with the exception of the 18-metre-high lightning rod structure, the solar farm will not be a dominant element in the landscape but viewed as a small component (if seen at all) within a wider setting.

Acoustic

The acoustic assessment demonstrated that due to the significant distance from the site to other nearby proposals (approximately 14 km from Wyalong Airport, 17 km from the Lake Cowal Gold Mine and 7km from the proposed Wyalong Solar Farm) there are no expected cumulative noise effects associated with the proposal.

The assessment identified that no exceedances of the management levels are predicted and no adverse impacts are expected due to the separation of the site to the surrounding receivers. Furthermore, it was found that due to the low noise impact levels a noise management plan would not be required for the proposal.

Traffic and Access

The traffic impact assessment concluded that the construction of the proposal would have no significant impacts on the local road network based on the following observations:

- Even during the peak period of construction (Stage 2) the total traffic generation is very moderate, estimated at 140 daily vehicle trips and up to 46 AM and PM site peak hour trips.
- The Stage 2 peak flows would be generated over a period of approximately 3 - 4 months only, while the total construction proposal would be completed in 9 - 12 months.
- The introduction of these construction flows – even during the peak Stage 2 construction period - would not alter the existing levels of service in the key roads or at key intersections providing access to the site.
- The introduction of these construction flows – even during the peak Stage 2 construction period - would not warrant the upgrade of any minor intersections.
- Appropriate management conditions can be introduced to ensure that Blands Lane and Bodells Lane are maintained to an appropriate standard during and after the construction period.

Geotechnical

The geotechnical impact of the development is considered to be manageable through construction practices.

Additional geotechnical investigation may be required after the preliminary design stage to delineate the lateral extent of shallow rock encountered for pile foundation.

Should any minor design changes occur during the construction phase due to localised conditions then further targeted investigations may be required to confirm ground conditions.

Hazards and Risks

Notwithstanding that the site is not identified as bushfire prone land, the assessment of the proposal has identified management practices to be adopted during the various phases of the proposal to address bushfire risk.

A review of the quantities of dangerous goods to be stored within the site during the operational phase and the associated vehicle movements was undertaken and compared to the threshold quantities outlined in State Environmental Planning Policy No. 33 – Hazardous and Offensive Materials (SEPP 33). The results of this analysis indicates the threshold quantities for the dangerous goods to be stored and transported are not exceeded; and, SEPP 33 does not apply to the proposal.

As the solar farm is not classified as potentially hazardous, it is not necessary to prepare a Preliminary Hazard Analysis for the solar farm.

Water

The nature of the proposal will result in a very low impact on the environment and the existing behaviour of surface and ground waters. This is due to the absence of broad-scale reshaping of the landform or excavation, other than in relatively small areas associated with internal road access, site facilities and sub-stations. The same surface area of soils is available for infiltration of rainfall, and grass cover will be progressively established following construction and maintained during operation of the solar farm to distribute runoff from the solar panels and provide erosion protection.

Waste

Based on the nature of the proposal and intended timeframes for the proposal lifecycle, Lightsource BP has provided waste management practices suitable for the management of waste generated during the construction and operation phases of the proposal.

The majority of waste generated during the construction and operation phases will either be reused or recycled however, if these two methods are not suitable then waste will be sent to landfill. A detailed breakdown of the waste management practices undertaken by Lightsource BP implemented and in operation on solar farms worldwide.

Socio-Economic

The socio-economic assessment has found that overall the proposal is likely to have a long term positive impact for NSW by increasing the supply of renewable energy in NSW and reducing greenhouse gas emissions. It will also deliver local employment and economic benefits to Bland Shire LGA.

There will be a period during the construction phase of increased demand for local services, infrastructure and housing, which would be exacerbated by the cumulative impact of other major development in the region if undertaken concurrently.

CONCLUSION

The proposal represents a positive development outcome for the following reasons:

- The proposal will deliver a long-term positive impact by increasing renewable energy supply to the NSW energy grid and reduce harmful carbon emissions.
- The proposal is a low risk investment with a long-term benefit for the broader Australian community.
- The proposal will allow for the introduction of up to 300 workers during peak construction representing a 7.9% increase in population for the West Wyalong and Wyalong area. This will help to generate economic benefits for the local community with short and long-term employment opportunities (direct and indirect employment).
- The visual impacts of the solar farm will be limited. The form of the proposal and the landscape strategy have been designed to ensure minimal impacts on visual amenity resulting from the proposed installation of solar panels and associated infrastructure.
- The loss of agricultural land will be negligible as the proposed use is complementary to the surrounding land uses and the site will be used for grazing purposes during the operation of the solar farm. Furthermore, once operations have ceased the site will be rehabilitated with the removal of infrastructure.
- Environmental impacts within the site will be minor as the flora and fauna will be suitably managed during the construction phases. Management practices to ensure minimal impact have been extensively documented for implementation during the various phases of the proposal.
- Suitable management practices will be implemented to conserve and manage the four aboriginal items discovered during field investigations. The management practices have been referred for RAP consultation and approval. This will ensure the significance and value of discovered items are maintained in accordance with the expectations of the local Aboriginal community.
- Potential impacts in terms of noise, traffic and waste will be limited to the construction period of 9 - 12 months. Suitable management practices have been proposed for this period to ensure the impacts are limited.

The proposal of the West Wyalong Solar Farm represents a positive and sustainable planning outcome for the site.

1. INTRODUCTION

1.1. OVERVIEW

This Environmental Impact Statement (EIS) identifies and assesses the environmental issues associated with the construction and operation of a proposed 90 MW AC PV solar farm at West Wyalong, central west New South Wales. The site is freehold rural land located approximately 15.8 kilometres (km) north-east of West Wyalong.

Urbis Pty Ltd has prepared this EIS on behalf of the applicant Lightsource BP. The EIS has been prepared in accordance with Part 4 of *Environmental Planning and Assessment Act 1979* (EP&A Act), Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), and the Secretary's Environmental Assessment Requirements (SEARs) provided by NSW Department of Planning and Environment (DPE) dated 8 November 2018.

The proposal is a State significant development (SSD). Under Schedule 1, Part 20 of the State Environmental Planning Policy (State and Regional Development) 2011 (S&R SEPP), solar electricity generating works with a capital investment value of more than \$30 million is declared to be a State significant development (SSD). The proposal has an estimated capital investment value of \$136,660,000 and is classified as SSD.

1.2. PROPOSAL

Development consent is sought for the construction, operation and decommissioning of the 90MW AC solar farm comprising the following elements:

Construction:

- Up to approximately 300 construction workers at peak periods.
- Approximately 9-12 months for the construction timing of the proposal.

Operation:

- Approximately 296,000 photovoltaic (PV) modules (solar panel) mounted on single axis tracking framework.
- Fifteen power conversion stations containing electrical switchgear, centralised inverters and medium voltage transformers and 30 containerised lithium ion battery units located adjacent the internal access roads within the solar array area.
- Water tanks with a combined 45,000L capacity located within the north-eastern portion of the site in proximity to the site entrance.
- One Substation in the south-eastern portion of the site.
- One Customer Substation in the south-eastern portion of the site.
- The solar farm will connect via overhead or underground lines in Myers Lane to the existing 132kV overhead transmission line (Lake Cowal Mine to Temora to Wagga North).
- Two maintenance/storage sheds.
- One monitoring house.
- Internal access roads and access points.
- Security fencing around the perimeter of the solar farm.
- CCTV poles up to 2.5 metres high located along the perimeter of the site.
- Landscape screening at the site perimeter.
- Proposal lifecycle of approximately 30 years, with the option of a 10-year lease extension.

Decommissioning:

- Decommissioning timeline of approximately four months.
- Solar panels unscrewed from the mounting frames.
- Removal of horizontal mounting poles and piles from the ground.
- Removal of cabling from the ground within the site.
- Removal of substation, inverters, transformers, battery and switchgear cabinets / housing and transmission lines from the substation to the grid.
- Removal of fencing and CCTV equipment.

1.3. SITE

The site is located at 228-230 Blands Lane, Wyalong. It is legally described as Lot 17 and 18 in DP753081. The solar farm infrastructure is to be located solely on Lot 18 DP753081; while site access is provided on and through Lot 17 DP753081. Myers Lane is a Crown Road and Bland Shire Council have administrative functions over the road.

The site is located within the Bland Shire LGA in the Riverina region of southwestern NSW and is crossed by the Newell and Midwestern Highways and Goldfields Way. The site is disturbed due to its history of clearing and grazing. The site is generally flat and supports one constructed dam, an ephemeral water channel and clustered and sporadic vegetation.

An existing 132kV overhead transmission line (Lake Cowal Mine to Temora to Wagga North) is located approximately 700m to the west of the site, running northeast to southwest. It is proposed to connect the proposal to this transmission line.

The primary land use of the region is agricultural. The land immediately surrounding the site is predominately used for cropping and grazing. Further north (17km) of the site is an operational gold mine (Cowal Gold Mine) and 7km to the south there is a site with an undetermined SSD development application (DA) for a 135MW solar farm located north-east of Wyalong.

1.4. APPLICANT

Lightsource BP is a global market leader in the development, acquisition and long-term management of large-scale solar proposals and smart energy solutions. Since 2010, Lightsource BP has become one of the world's leading solar companies based on installed capacity with 2.0GW of solar proposals under management.

Lightsource BP specialises as a utility-scale developer acting as the developer, operator, and manager of solar proposals with local offices in Melbourne and Sydney.

Lightsource BP currently has two Australian solar proposals. These include:

- A proposed 15MW solar farm at Winton, Victoria. This solar installation will encompass 125 hectares of land and has the potential to generate clean and renewable energy that would power 2,330 local homes, saving 21,582 tonnes of carbon emissions annually, the equivalent of taking 4,621 cars off the road.
- A proposed 50MW solar farm at Katamatite-Nathalia Road, Naring, Victoria for which a decision is expected in early 2019. This solar installation has the potential to generate electricity equivalent to demands of 16,350 households, saving 79,344 tonnes of carbon emissions annually, the equivalent of taking 28,711 cars off the road.

1.5. CAPITAL INVESTMENT VALUE

A Capital Investment Value (CIV) Statement prepared by WT Partnership has been provided as the proposal, with a CIV of \$136,600,000, exceeds the capital investment value threshold of more than \$30 million. The CIV has been provided separately as commercial in confidence.

1.6. PROPOSAL TEAM

This EIS should be read in conjunction with the identified and attached architectural plans and specialist reports:

Table 1 – Proposal Team

Document	Consultant
Survey Plan	Wagga Surveyors
Architectural Drawings	Lightsource BP
Landscape Drawings	Site Image
Biodiversity Assessment Report	SLR Consulting
Water Management Report	
Acoustic Impact Statement	
Bushfire Assessment	
Aboriginal Archaeological Survey Report	Artefact
Aboriginal Cultural Heritage Assessment Report	
Heritage Impact Statement	
Geotechnical Report	SMEC
Traffic Impact Statement	Ason Group
Preliminary Risk Screen Statement	Risk Con Engineering
Socio-Economic Assessment Report	Urbis
Visual Impact Statement	
Consultation Outcomes Report	Urban Unity
Civil Drawings	AT&L

1.7. SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

The NSW Department of Planning and Environment (DPE) issued SEARs on 21 September 2018 in response to a request for SEARs dated August 2018 in relation to a 135MW solar PV energy generation solar farm. Following receipt of the SEARs investigations indicated that the site was capable of accommodating a solar farm with an estimated capacity of 250 MW; and associated infrastructure, including a grid connection and battery storage. A request for modified SEARs was submitted for the larger capacity solar farm. The DPE issued SEARs for the larger solar farm dated 8 November 2018. The technical investigations that have been undertaken in support of the proposal and annexed to this EIS were based on the SEARs dated 8 November 2018.

The SEARs request was made for Lots 17 and 18 which have the capacity to yield up to 250MW however as identified above the proposal will include infrastructure only within Lot 18 and will generate 90 MW AC. The SEARs for the larger solar farm equally apply to the proposal addressed in this EIS.

The SEARs issued on 8 November 2018 are addressed within this EIS and are included in full at **Appendix A. Table 2** below provides a summary of the SEARs and identifies the section of this EIS where the relevant requirement is addressed and/or the Appendix reference for the specialist consultant's report associated with that requirement.

Table 2 – SEARs

SEAR	EIS reference
<p>The EIS for the development must comply with the requirements in Schedule 2 of the <i>Environmental Planning and Assessment Regulation 2000</i>.</p> <ul style="list-style-type: none"> • A stand-alone executive summary; 	
<p>A full description of the development, including:</p> <ul style="list-style-type: none"> • details of construction, operation and decommissioning; • a site plan showing all infrastructure and facilities (including any infrastructure that would be required for the development, but the subject of a separate approval process); • a detailed constraints map identifying the key environmental and other land use constraints that informed the final design of the development. 	Section 3, Section 4
<p>A strategic justification of the development focusing on site selection and the suitability of the proposed site with respect to potential land use conflicts with existing and future surrounding land uses (including other proposed or approved solar farms, rural residential development and subdivision potential);</p>	Section 2
<p>An assessment of the likely impacts of the development on the environment, focusing on the specific issues identified below, including:</p> <ul style="list-style-type: none"> • a description of the existing environment likely to be affected by the development; • an assessment of the likely impacts of all stages of the development (which is commensurate with the level of impact), including any cumulative impacts of the site and existing or proposals (including the proposed Wyalong Solar Farm), taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice; • a description of the measures that would be implemented to avoid, mitigate and/or offset the impacts of the development (including draft management plans for specific issues as identified below); and • a description of the measures that would be implemented to monitor and report on the environmental performance of the development. 	Section 7
<p>A consolidated summary of all the proposed environmental management and monitoring measures, identifying all the commitments in the EIS; and</p>	Section 8
<p>The reasons why the development should be approved having regard to:</p> <ul style="list-style-type: none"> • relevant matters for consideration under the <i>Environmental Planning and Assessment Act 1979</i>, including the objects of the Act and how the principles 	Section 6

SEAR	EIS reference
<p>of ecologically sustainable development have been incorporated in the design, construction and ongoing operations of the development;</p> <ul style="list-style-type: none"> the suitability of the site with respect to potential land use conflicts with the existing and future surrounding land uses; and feasible alternatives to the development (and its key components), including the consequences of not carrying out the development. 	<p>Section 2.4</p> <p>Section 2.2.2, 2.2.3</p>
<p>A detailed consideration of the capability of the proposal to contribute to the security and reliability of the electricity system in the National Electricity Market, having regard to local system conditions and the Department's guidance on the matter.</p>	<p>Section 2.5.3</p>
<p>The EIS must also be accompanied by a report from a suitably qualified person providing:</p> <ul style="list-style-type: none"> a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and components from which the CIV calculation is derived; and certification that the information provided is accurate at the date of preparation. 	<p>Section 1.5</p>
<p>The development application must be accompanied by the consent in writing of the owner/s of the land (as required in clause 49(1)(b) of the Regulation).</p>	<p>Owners consent from the owner of Lot 17 and 18 as well as Bland Shire Council (as administrator of Myers Lane) will be submitted with the DA.</p>
<p>Biodiversity – including:</p> <ul style="list-style-type: none"> an assessment of the biodiversity values and the likely biodiversity impacts of the proposal (including on Inland Grey Box woodland endangered ecological community) in accordance with Section 7.9 of the <i>Biodiversity Conservation Act 2016</i> (NSW), the <i>Biodiversity Assessment Method</i> (BAM) and documented in a <i>Biodiversity Development Assessment Report</i> (BDAR), unless OEH and DPE determine that the proposal is not likely to have any significant impacts on biodiversity values; the BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM; and an assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the <i>Fisheries Management Act 1994</i>, and a description of the measures to minimise and rehabilitate impacts; 	<p>Section 7.3 and Appendix E</p>

SEAR	EIS reference
<p>Heritage – including:</p> <p>An assessment of the likely Aboriginal and historic heritage (cultural and archaeological) impacts of the development, including consultation with the local Aboriginal community in accordance with the <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i>;</p>	<p>Section 7.4</p> <p>Appendix F and Appendix G</p>
<p>Land – including:</p> <ul style="list-style-type: none"> • An assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including: <ul style="list-style-type: none"> – a consideration of agricultural land, flood prone land, Crown lands, mining, mineral or petroleum rights (including Exploration Licence 7750); – a soil survey to determine the soil characteristics and consider the potential for erosion to occur; and – a cumulative impact assessment of nearby developments; • An assessment of the compatibility of the development with existing land uses, during construction, operation and after decommissioning, including: <ul style="list-style-type: none"> – consideration of the zoning provisions applying to the land, including subdivision, and; – completion of a Land Use Conflict Risk Assessment in accordance with the Department of Industry's Land Use Conflict Risk Assessment Guide; and – a description of measure that would be implemented to remediate the land following decommissioning in accordance with <i>State Environmental Planning Policy No 55 - Remediation of Land</i>. 	<p>Section 7.5 and Section 7.6</p>
<p>Visual – including:</p> <p>An assessment of the likely visual impacts of the development (including any glare, reflectivity and night lighting) on surrounding residences, scenic or significant vistas, air traffic and road corridors in the public domain, including a draft landscaping plan for on-site perimeter planting, with evidence it has been developed in consultation with affected landowners;</p>	<p>Section 7.7</p> <p>Appendix J</p>
<p>Noise – including:</p> <p>An assessment of the construction noise impacts of the development in accordance with the <i>Interim Construction Noise Guideline</i> (ICNG), and cumulative noise impacts (considering other developments in the area), and a draft noise management plan if the assessment shows construction noise is likely to exceed applicable criteria;</p>	<p>Section 7.8</p> <p>Appendix K</p>
<p>Transport – including:</p> <ul style="list-style-type: none"> • an assessment of the peak and average traffic generation, including over-dimensional vehicles and construction worker transportation; • an assessment of the likely transport impacts to the site access route (including Newell Highway, Mid-Western Highway, Slee Street, Clear Ridge 	<p>Section 7.9</p> <p>Appendix L</p>

SEAR	EIS reference
<p>Road, Myers Lane and Blands Lane), site access point, rail safety issues, any Crown land, particularly in relation to the capacity and condition of the roads;</p> <ul style="list-style-type: none"> • a cumulative impact assessment of traffic from nearby developments; • a description of any proposed road upgrades developed in consultation with the relevant road and rail authorities (if required); and • a description of the measures that would be implemented to mitigate any transport impacts during construction. 	
<p>Water – including:</p> <ul style="list-style-type: none"> • an assessment of the likely impacts of the development (including flooding) on surface water and groundwater resources (including drainage channels, wetlands, riparian land, farm dams, groundwater dependent ecosystems and acid sulfate soils), related infrastructure, adjacent licensed water users and basic landholder rights, and measures proposed to monitor, reduce and mitigate these impacts; • details of water requirements and supply arrangements for construction and operation; and • a description of the erosion and sediment control measures that would be implemented to mitigate any impacts in accordance with <i>Managing Urban Stormwater: Soils & Construction</i> (LanACoM 2004); 	<p>Section 7.10</p> <p>Appendix M</p>
<p>Hazards and Risks – including:</p> <ul style="list-style-type: none"> • a preliminary risk screening in accordance with State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33 (DoP, 2011), and if the preliminary risk screening indicates the development is “potentially hazardous”, a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazard Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011); and • an assessment of all potential hazards and risks including but not limited to bushfires, spontaneous ignition, electromagnetic fields or the proposed grid connection infrastructure; 	<p>Section 7.13</p> <p>Appendix N and Appendix Q</p>
<p>Socio-Economic – including:</p> <p>An assessment of the likely impacts on the local community and a consideration of the construction workforce accommodation; and</p>	<p>Section 7.13</p> <p>Appendix O</p>
<p>Waste – including:</p> <p>Identify, quantify and classify the likely waste stream to be generated during construction and operation, and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.</p>	<p>Section 7.12</p>

SEAR	EIS reference
<p>Consultation – including:</p> <p>During the preparation of the EIS, you should consult with relevant local, State or Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners, exploration licence holders, quarry operators and mineral title holders (including Evolution Mining (Coral) Pty Limited).</p> <p>In particular, you must undertake detailed consultation with affected landowners surrounding the development and Bland Shire Council.</p> <p>The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.</p> <p>Further consultation after 2 years –</p> <p>If you do not lodge a development application and EIS for the development within 2 years of the issue date of these EARs, you must consult further with the Secretary in relation to the preparation of the EIS.</p>	<p>Section 5</p> <p>Appendix P</p>

Table 3 – Agency Comments

Agency comments	EIS reference
<p><i>Bland Shire Council</i></p> <p>Waste Generation and Disposal –</p> <p>The development will generate significant waste from solar panel packaging. The volume of waste that could be expected to be generated by the site would have a significant impact on the capacity of the West Wyalong Landfill. Council is concerned with disposal of the solar panels packaging. Accordingly, waste management should be addressed in the EIS.</p> <p>Impact on Local Roads –</p> <p>The preliminary environment assessment indicated that the joining transmission line is on an unformed section of Myers Lane. As both sections of Gordons Lane and Myers Lane that lead to this area are also unformed, Council considers that access to the new transmission line should be via Gordons Lane and the access road in Gordons and Myers Lane is to be constructed and maintained by the applicant.</p> <p>The increase in traffic along Blands Lane will lead to the deterioration of this road, which will need to be repaired by the applicant. The proposal's impact on the local road network will need to be addressed in the EIS.</p>	<p>Section 7.12</p> <p>Section 7.9</p> <p>Appendix L</p>
<p><i>NSW Department of Industry</i></p> <p>Department of Industry – Water</p>	<p>Section 7.10</p> <p>Appendix M</p>

Agency comments	EIS reference
<ul style="list-style-type: none"> • Identification of an adequate water supply for the life of the proposal. Confirmation that water can be sourced from an appropriately authorised and reliable supply. • A detailed and consolidated site water balance. • Assessment of impacts on surface and ground water sources, related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts. • Proposed surface and groundwater monitoring activities and methodologies. • Consideration of relevant legislation, policies and guidelines, including the NSW Aquifer Interference Policy (2012), the NRAR Guidelines for Controlled Activities on Waterfront Land (2012) and the relevant Water Sharing Plans available at: https://www.industry.nsw.gov.au/water <p>Department of Industry – Agriculture</p> <ul style="list-style-type: none"> • Aerial images of the associated property and surrounding areas show that cropping is practiced in the area. The applicant should ensure that a rehabilitation and decommissioning strategy is developed during the EIS that will ensure all previously cropped lands are returned to their pre-development state. This should include the removal of all underground infrastructure. • The Draft SEARs provided by DPE should be amended with the following changes: <ul style="list-style-type: none"> – General requirements – details of construction, operation and decommissioning, including rehabilitation objectives for agricultural land. – Land – a soil survey undertaken in accordance with the Guidelines listed in Attachment 1. 	<p>Appendix I</p> <p>Section 7.5</p>
<p><i>NSW Planning and Environment - Resources & Geoscience</i></p> <p>The applicant should identify any exploration licence holders, quarry operators and mineral title holders in the EIS and consult with the operators or title holders to establish if the proposal is likely to have a significant impact on current or future extraction of minerals, petroleum or extractive materials (including by limiting access to, or impeding assessment of resources). The EIS should also document any way the proposal may be incompatible with existing or approved uses, or current or future extraction or recovery of resources under the land use compatibility requirements of Part 3 (13) of the MSEPP.</p> <p>In fulfilling the SEARs relating to the State's mineral resources and rights to assess and extract those resources, the Division requires the following proposal specific requirements to be addressed in the EIS:</p> <ul style="list-style-type: none"> • The applicant should undertake a dated and referenced search of current mining and exploration titles and applications. Evidence of the search should be provided in the form of a date referenced map. Current mining and 	<p>Section 5.5</p>

Agency comments	EIS reference
<p>exploration titles and applications can be viewed through the Division's Minview map viewer at:</p> <p>http://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/geoscienceinformation/services/online-services/minview</p> <p>The proposal site is coincident with Exploration Licence (EL) 7750 (held by Evolution Mining (Cowl) Pty Limited) which overlaps the south-eastern boundary of the subject site.</p> <ul style="list-style-type: none"> • The applicant must consult with Evolution Mining (Cowl Pty Limited) and provide authentic consultation to the Division. This should include a letter of notification of the proposal to the title holder including a map indicating the solar farm proposal area (including associated electricity transmission infrastructure) in relation to the exploration title boundaries, and a letter of response from the title holder to the applicant. If responses are not received from the titleholder, the applicant is to contact the Division. • Consultation with the Division in relation to the proposed location of any offsite biodiversity offset areas or any supplementary biodiversity measures to ensure there is no consequent reduction in access to prospective land for mineral exploration, or potential for sterilisation of mineral or extractive resources. 	
<p><i>NSW Office of Environment and Heritage</i></p> <p>Office of Environment and Heritage (OEH) recommends the EIS needs to appropriately address the following:</p> <ul style="list-style-type: none"> • Biodiversity and offsetting. • Aboriginal cultural heritage. • Flooding. <p>The EIS should describe the proposal, the existing environment and impacts of the development including the location and extent of all proposed works that may impact on ACH and biodiversity. The scale and intensity of the proposal should dictate the level of investigation. Conclusions are to be supported by adequate data. The assessment must include all ancillary infrastructure associated with the proposal and Rural Fire Service requirements for asset protection.</p> <p>The EIS should address discrepancies between the current ecological community circumstances and vegetation mapping for the site. Also, if it is proposed to remove paddock trees the EIS should detail the value of paddock tree habitat to all threatened species known or likely to occur in the area and an assessment of the impacts of clearing those trees.</p> <p>Proposals not defined as pending or interim planning applications under Part 7 of the <i>Biodiversity Conservation (Savings and Transitional) Regulation 2017</i> the Biodiversity Assessment Methodology (BAM) must be used to assess impacts to biodiversity in accordance with the <i>Biodiversity Conservation Act 2016</i> (BC Act), unless the Planning Agency Head and the Environment Agency Head</p>	<p>Section 7.3</p> <p>Section 7.4</p> <p>Section 7.10</p> <p>Appendix F</p> <p>Appendix G</p> <p>Appendix H</p>

Agency comments	EIS reference
<p>determine that the proposal is not likely to have any significant impact on biodiversity values.</p> <p>An Aboriginal Cultural Heritage Assessment Report (ACHAR) will be required as part of the EIS. The ACHAR must demonstrate consultation in accordance with the 'Aboriginal cultural heritage consultation requirements for applicants 2010' (DECCW). Aboriginal cultural heritage values that exist across the whole area that will be affected by the development must be identified and documented in the ACHAR.</p> <p>All Aboriginal objects identified must be reported to the OEH through registration on AHIMS in accordance with the mandatory notification requirements of section 89A of the <i>National Parks and Wildlife Act 1974</i>.</p>	
<p>NSW Fire and Rescue</p> <p>It is Fire + Rescue NSW (FRNSW) experience that small and large-scale photovoltaic installations present unique electrical hazard risks to our personnel when fulfilling their emergency duties. It is highlighted that the <i>Fire Brigades Act 1989</i> (the Act) imposes specific statutory functions and duties upon the Commissioner of FRNSW. Section 6 of the Act requires the Commissioner to take all practicable measures for preventing and extinguishing fires and protecting and saving life and property within a FRNSW fire district. Section 6 of the Act also requires the Commissioner to protect and save life and property endangered by hazmat incidents and for confining a hazmat incident and for rendering the hazmat site safe.</p> <p>The <i>Work Health and Safety (WHS) Act 2011</i> (and its subordinate Regulation) classify FRNSW as a person (entity) conducting a business or undertaking (PCBU). Clauses 34 and 35 of the WHS Regulation impose specific obligations upon a PCBU to identify hazards and manage risks at workplaces. A site involved in fire or hazmat incident is deemed to be a FRNSW place of work.</p> <p>Due to the electrical hazards associated with large scale PV installations and the potential risk to the health and safety of firefighters, both FRNSW and the NSW Rural Fire Service must be able to implement effective and appropriate risk control measures when managing an emergency incident at the proposed site.</p> <p>In the event of a fire or hazardous material incident, it is important that first responders have ready access to information which enables effective hazard control measures to be quickly implemented. Without limiting the scope of the emergency response plan (ERP) requirements of Clause 43 of the <i>Work Health and Safety Regulation 2000</i> (the Regulation), the following matters are recommended to be addressed:</p> <ul style="list-style-type: none"> • Development of a comprehensive ERP for the site. • the ERP specifically addresses foreseeable on-site and off-site fire events and other emergency incidents (i.e. fires involving solar panel arrays, bushfires in the vicinity) or potential hazmat incidents. 	<p>Appendix Q</p>

Agency comments	EIS reference
<ul style="list-style-type: none"> the ERP details the appropriate risk control measures that would need to be implemented to safely mitigate potential risks to the health and safety of firefighters and other first responders. These measures include the level of personal protective equipment clothing required to be worn, level of respiratory protection required and a safe method of shutting down the PV system. Other risk control measures that may need to be implemented in a fire emergency (due to any unique hazards specific to the site) should also be included in the ERP. Two copies of the ERP be stored in a prominent 'Emergency Information Cabinet' located in a position directly adjacent to the site's main entry point/s. Once constructed and prior to operation, the operator of the solar farm is to contact the relevant local emergency management committee (LEMC). 	
<p><i>NSW Rural Fire Service</i></p> <p>A bushfire hazard assessment prepared by a suitably qualified person should accompany the EIS. This assessment should include site-specific recommendations for the proper design of:</p> <ul style="list-style-type: none"> Asset protection zones (APZs). Measures to prevent a fire occurring within the site from developing into a bush/grass fire risk to the surrounding area. Water supply for firefighting purposes. Land and vegetation management. Fire Management Plan in consultation with the local NSW RFS District Fire Control Centre. Vehicular access and defensible space around the solar array. <p>Protection for the facilities from bush fires can be achieved through a combination of strategies which will:</p> <ul style="list-style-type: none"> Minimise the impact of radiant heat and direct flame contact by separating development from bush fire hazards. Minimise the vulnerability of buildings to ignition and fire spread from flames, radiation and embers. Enable appropriate access and egress for the public and firefighters. Provide adequate water supplies for bush fire suppression operations. Focus on solar farm preparedness, including emergency planning and property maintenance requirements. Facilitate the maintenance of APZs, fire trails, access for firefighting and on-site equipment for fire suppression and prevention of fire spreading from the site. 	<p>Appendix Q</p>

Agency comments	EIS reference
<p><i>NSW Acting Director of South West NSW</i></p> <p>Roads and Maritime Services (RMS) considers that the traffic related issues relevant to the development should be considered and addressed in two distinct stages as follows:</p> <ul style="list-style-type: none"> • Construction & Decommission phase – the transport of materials and equipment/components for the establishment of the solar farm and ancillary infrastructure, the movement and parking of personal vehicles and construction related vehicles during the construction of the solar farm. • Operational phase – the ongoing traffic generation due to the operation, maintenance and servicing of the proposal. <p>RMS realises the need to minimise impacts of any development on the existing road network and maintain the level of safety, efficiency and maintenance along the road network. Given the scale of this proposal, a Traffic Impact Assessment (TIA) should be submitted with the Development Application. The TIA needs to address the impacts of traffic generated by this development upon the nearby road network.</p> <p>A Transport Management Plan should accompany this proposal, detailing the delivery of equipment/components to the site during the construction period.</p> <p>The TIA shall detail the potential impacts associated with the phases of the development, the measures to be implemented to maintain the standard and safety of the road network, and procedures to monitor and ensure compliance. Where road safety concerns are identified at a specific location along the haulage route/s, the TIA may be supported by a targeted Road Safety Audit undertaken by suitably qualified persons.</p> <p>For guidance in the preparation of the TIA the applicant is referred to section 2 of the “Guide to Traffic Generating Developments” prepared by the RTA and the Austroads publications, particularly the Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development and Austroads Guide to Traffic Management Part 3 – Traffic Studies and Analysis. The TIA should contain information such as the expected traffic generation, vehicle numbers and types of vehicles, and travel routes for vehicles accessing the development site.</p> <p>Given the type and scale of the proposal and its proximity to the public road network it is considered appropriate that issues relating to potential for distraction of, and for glint/glare impacts on passing motorists be addressed. Consideration could be given to establishment and/or maintenance of visual buffers, such as a vegetated buffer along the site frontage and any public road.</p>	<p>Section 7.9 &</p> <p>Appendix L</p>
<p><i>Safe Work NSW</i></p> <p>Safework NSW will not be making comment on the Development Application and Environmental Impact Statement for the proposed Wyalong Solar Farm.</p> <p>Safework will look forward to working with the successful contractor during the construction phase.</p>	<p>To be addressed throughout the construction phase of the proposal.</p>

2. OBJECTIVES, ALTERNATIVES & JUSTIFICATION

2.1. PROPOSAL OBJECTIVES

The objectives of the West Wyalong Solar Farm proposal and how they have been met are outlined in **Table 4** below.

Table 4 – Objectives of the West Wyalong Solar Farm proposal

Objectives	How the Proposal achieves objectives
Select and develop a site which is suitable for industrial scale solar electricity generation	<p>The site is located within proximity to an existing transmission line and is located with good access to main road transport routes for construction activities.</p> <p>The site's topography is flat and has appropriate geological conditions to support the solar farm infrastructure. The site is provided with ample solar irradiation making it ideal for capturing solar energy.</p>
Assist in meeting Australia's renewable energy targets and provide a clean and renewable energy source to assist in reducing greenhouse gas emissions	The proposal will create additional electricity supply of 90 MW AC at full capacity, which is enough to power approximately 37,596 homes with renewable energy. This will significantly reduce the quantum of carbon dioxide emissions.
Develop a proposal which is acceptable to the local West Wyalong community	Community consultation has occurred to inform local communities and key stakeholders. Feedback received has been included in this EIS (Appendix P).
Provide employment opportunities and economic and social benefits during construction and operation of the solar farm	Up to 300 construction jobs will be created during peak construction periods. During operation the proposal would employ approximately up to three full time staff.
Construct a proposal with minimal adverse environmental impacts	This EIS demonstrates that each of the likely impacts identified in the assessment of the key issues will either be positive or can be appropriately mitigated. In many cases, the environmental management controls and operational protocols inherent to the construction and operation of the solar farm will manages and/or mitigate the potential impacts.

2.2. ALTERNATIVES CONSIDERED

The development of the West Wyalong Solar Farm has considered the following alternatives:

- The 'do nothing' option.
- Alternative site locations.
- Alternative technologies.
- Alternative scale of the proposal.

2.2.1. The 'do nothing' option

The 'do nothing' option would result in a loss of the identified benefits and would result in the following consequences:

- Lost opportunity to contribute to the strategic goals and targets set by the Australian and NSW Governments on renewable energy.
- Loss of opportunity to provide the equivalent of approximately 37,596 homes electricity demand through a renewable energy supply.
- Loss of opportunity to provide greater energy security and reliability in NSW.
- Loss of social and economic benefits that will be generated by the proposal.

The 'do nothing' option would not result in any adverse social impacts.

2.2.2. Alternative site locations

During the site selection process for the proposal, a number of alternative locations were considered, including alternative locations in the region. A site resulting in minimal environmental impacts and maximum efficiency was considered critical during this selection process.

The site was identified as the preferred location, based on the following:

- Technical suitability of the site for operating a solar PV system.
- Grid connection feasibility.
- Planning constraints.
- Site Availability.

As the site was considered to meet the four key site selection criteria, it was decided to proceed with further detailed assessments and stakeholder consultation to inform the preparation of this EIS.

It is noted that at the time of community consultation activities in October and November 2018, the larger 250MW solar farm (the subject of the November SEARs) was being investigated and environmental surveys were undertaken across both Lots 17 and 18. The results of further technical assessments identified that the 250MW solar farm would require extensive and costly grid network upgrade works. To avoid these works the capacity of the proposal was reduced. Lot 18 was identified as the preferred location on which to install the solar farm and associated infrastructure due to its proximity to the grid connection point and the significant setback it provides from Blands Lane, reducing potential visual impacts from the adjoining public road.

2.2.3. Alternative technologies

Lightsource BP is a solar energy generating station developer and operator with significant experience in assessing the various technologies available and selecting the most appropriate for a given location and proposal. The technology that has been chosen on the basis of its suitability for the site and local conditions, and energy efficiency.

The key alternative technologies considered are as follows:

- **Panel Types:** Three photovoltaic (PV) module (solar panel) technology types were assessed: Thinfil, Monocrystalline and Polycrystalline, Thinfil technology is rarely deployed by Lightsource BP due to its low power rating (more modules and land area required) and involving the use of some heavy metals. Polycrystalline and Monocrystalline PV solar modules are constructed from identical materials and often within the same manufacturing facilities. These panel types use benign photovoltaic active material (silicon) which is either poured into a mould producing polysilicon with a grainy texture or the silicon is pulled slowly from a molten state resulting in pure crystalline monosilane solar cell. The choice of using Polycrystalline vs Monocrystalline solar PV modules is based on market cycle pricing and local availability. In this instance Polysilicon panels have been selected as the most appropriate panel technology for local conditions.
- **Mounting System:** Solar panels convert both incident ambient daylight and direct sunlight into electricity. Depending on the geo-location and local conditions the ratio of ambient light to direct sunlight can vary considerably and impact the optimal mounting design. Three mounting systems were considered for the proposal including Fixed Tilt, Single-Axis Tracking, and Dual-Axis Tracking.

With a Fixed Tilt system, the panels face a single direction at a fixed angle (facing north in the Southern Hemisphere and south in the Northern Hemisphere). This approach is typically utilised where ambient light hours are high and the complimentary direct sunlight period low such as in Northern Europe. In geographies where there are a lot of direct sunlight hours per year a more complex mechanised mounting structure can be implemented enabling the PV modules to follow the path of the sun during the day thus harvesting the maximum amount of light for conversion to electricity. These single or dual axis tracker systems require a higher capital investment at installation and increased maintenance, as such they are only installed where it is clear that there is enough direct irradiation to justify the installation. In this instance there is sufficient direct sunlight received at the site to justify the use of a Single-Axis Tracking system. The system has been designed to provide sufficient ground clearance by the panels to allow for sheep grazing beneath and between the rows of panels.

- **Inverters:** There are two key technologies for inverter, small String Inverters of which multiple are required and distributed around the site, and Central Inverters suitable for handling inputs from thousands of solar panels. On large solar farms, such as the proposal, Lightsource BP typically designs using Central Inverters. Though more expensive, they have longer life times (often double that of String Inverters) and reduced installation time during construction.
- **Batteries:** A containerised lithium battery storage system is identified as the favoured battery storage option as it is reliable and industry tested, is low risk in terms of meeting fatality and injury risk criteria specified in DPE's '*Risk Criteria for Land Use Safety Planning*', and is relatively simple to construct and decommission minimising potential environmental impacts.

For each of the key components that make up the solar farm, there are a range of suppliers and product models on the market. Lightsource BP's in house Technical Team run a technical qualification process for all key solar PV equipment (including modules, inverters, transformers, switchgear, batteries etc.) and associated suppliers. Only following qualification and sign off will a supplier achieve approval for use within Lightsource BP's plant design and build specifications. The approved supplier and product list is then matched to market parameters such as local availability, maintenance support and licensing compliance requirements, resulting in a high level of confidence that Lightsource BP will be well placed to build and operate the solar farm throughout its multi-decade lifetime. Based on current market knowledge and technical requirements the most likely equipment specifications have been incorporated into the Layout design, however as the market moves rapidly, these assumptions will be reassessed as part of detailed design prior to construction.

2.2.4. Layout of the proposal

The scale of the proposal has been influenced by property boundaries, the location of existing on-site dams, fauna and flora communities, consideration of Aboriginal Cultural Heritage values, demand for new renewable electricity generation to meet generation targets, the commercial investment and viability considerations, and transmission grid capacity.

Lightsource BP have undertaken extensive due diligence to determine the optimal scale of the solar farm to ensure minimal constraint and connection to the national electricity market. The scale of the proposal is appropriate considering the site constraints and the capacity within the local grid to accommodate the solar farm.

2.3. SITE SELECTION

In accordance with the NSW *Large-Scale Solar Energy Guideline for State Significant Development* (2018) site selection is critical to ensuring that an efficient, technically and economically viable solar installation can be developed without causing significant adverse environmental impacts.

2.3.1. Selection Criteria

Numerous technical, commercial and environmental factors are taken into consideration when Lightsource BP selects sites for the development of a solar farm. Lightsource BP's site selection criteria include:

Grid Connection Feasibility

- Availability of grid capacity at the nearest substation.
- Proximity of nearest substation.
- Likely ease/difficulty of accessing the substation or point of connection on the existing overhead line from the site.

Technical Suitability for a Solar PV Installation

- Site size, minimum site size dependent upon grid connection type and therefore costs.
- Irradiation (daylight) levels and potential energy yield.
- Orientation and topography (with a flat site or north facing slope preferred).
- Accessibility of the site for construction vehicles.

Planning and Environmental Context

- State and local level planning policies.
- Sensitive landscapes and cultural heritage.
- Hazard risks (i.e. flooding or bush fire).
- Neighbouring land uses.
- Potential visual receptors.

Commercial Considerations

- Land availability: the land owner must be willing to rent or sell their land for a solar development.
- Ability to achieve any easements that may be required over third-party land.
- Economic viability of the site in Lightsource BP's financial model (based on a wide range of parameters including: expected MW capacity, anticipated grid costs, rent/land costs, anticipated installation costs, and irradiation).

2.3.2. Selection of the West Wyalong Site

Site selection for solar farms begins with identifying areas that have appropriate conditions for solar energy development. Lightsource BP works with site finders to identify areas with grid infrastructure and capacity, adequate levels of solar irradiation, moderate ambient temperatures and land availability. In some cases, Lightsource BP acquires sites from a developer that have had some prior site investigations, which was the case with the West Wyalong site.

For solar farms to operate effectively, adequate energy from the sun is required. Thus, at a high level, site selection begins with identifying areas that have sufficient irradiation¹, or solar power, for solar energy generation.

¹ This is measured in terms of average Global Horizontal Irradiance (GHI) and Direct Normal Irradiance (DNI). GHI is the total amount of solar power received from above by a horizontal surface, DNI is a measure of the energy received by a surface in a straight line from the current position of the sun in the sky.

Information on irradiation levels across Australia is available from the Australian Renewable Energy Mapping Infrastructure (AREMI)² website.

Higher irradiance levels equate to greater energy generation, however site selection for solar development is significantly more complex than simply identifying areas of high irradiance. At a basic level, the whole state of NSW has sufficient irradiance levels to support solar farm development. However, the minimum irradiance level required for the development of a viable solar farm in any given location depends on a wide range of financial inputs, including expected revenue (\$ p/watt generated), grid connection costs, land rentals/purchase price and construction costs.

For a solar farm to transmit the electricity generated from the sun's energy there must be sufficient capacity on the electricity grid network. Grid capacity and the cost of grid connection are key factors influencing the viability of any given proposal.

Essential Energy, the owner and operator of the distribution network in areas of NSW where there are higher levels of irradiation, has publicly available information on the capacity of electricity lines. This information is analysed in order to identify areas with sufficient grid capacity to support new solar farm development.

For the West Wyalong proposal, the initial developer had done much of the early stage work, including assessing the grid capacity and contracting with Essential Energy to start the work to get to a connection agreement. The initial developer then carried out further investigations (concerning technical, planning and environmental, and commercial considerations) to confirm the suitability of the site.

The initial developer made contact with multiple landowners along the 132kV route to ascertain whether they would be interested in diversifying their farming operations into solar PV, and what fields they would be willing to be assessed for site suitability. The landowner of the site was approached as part of this site search exercise because they owned land adjacent to the 132kV line that was suitable for a solar installation and they were looking for a way to diversify their farming operation.

The short list of potential sites was then reviewed further, looking at the various criteria set out above, with sites that failed on one or more criteria being discarded. Following selection of the site as the preferred site a preliminary grid application was submitted which confirmed grid capacity availability, followed by an agreement with Essential Energy to commence work on the offer to connect.

Following a review of the information provided by the initial site developer, Lightsource BP undertook further assessments, including:

- Engaging with Clean Technology Partners to start the next stage of grid studies.
- Engaging with SMEC to undertake a site geotechnical analysis.
- Engaging with Urbis to undertake a high-level planning and environmental review of the site and to prepare a SEARs request for submission to the Department.
- Agreement of key commercial documents with the Landowner.

Initial indicative layouts were prepared based on Lot 18 only, however this was later increased to 250MW DC utilising both Lot 17 and 18 to maximise energy generation potential. This 250MW DC design solar farm was presented at the community information event in November 2018. However, the results of further technical assessments identified that a smaller solar farm solar farm would avoid significant grid network upgrade works, therefore the capacity of the proposal was reduced. Lot 18 was identified as the preferred site on which to locate the solar farm infrastructure due to its proximity to the grid connection point and the significant setback it provides from Blands Lane, thus reducing potential visual impacts. Access to the solar farm will be provided across adjacent Lot 17.

² <https://nationalmap.gov.au/renewables/>

2.4. SITE SUITABILITY

It is concluded that the site is suitable for development as a solar installation on the following basis:

- The site is located within close proximity to an existing electricity transmission line and there is available capacity on the grid transmission system.
- The proposal is unlikely to generate major land use conflicts and will allow for a dual land use of the site, that enables grazing purposes to continue.
- The site has suitable road access.
- The Council and local community have demonstrated support for the proposal.
- The land is largely cleared of any vegetation, is flat and has been carefully selected for maximum generation and benefit.
- The site is provided with ample solar irradiation making it ideal for capturing solar energy.

As the site was considered to meet the four key site selection criteria, it was decided to proceed with further detailed assessments and stakeholder consultation to inform the preparation of this EIS.

2.5. PROPOSAL JUSTIFICATION

The need for and benefits of the proposal include:

- Shifting energy sources to renewable energy that does not produce greenhouse gas emissions.
- Increased energy security and reliability by providing a diverse energy source mix.
- Continued support and development of the solar power industry and supply chain in Australia.
- Contribute to Australia's commitments under National and International carbon reduction and renewable energy agreements.
- Creating additional electricity generation and supply into the Australian grid.

2.5.1. Reducing greenhouse gas emissions

Australia's Federal and State governments and agencies have entered into commitments to various international agreements, conventions, and protocols in relation to climate change, greenhouse gas emissions, and renewable energy. This includes the United Nations Framework Convention on Climate Change, the Paris Agreement, and the Kyoto Protocol. Both the NSW and Australian Governments have renewable energy targets and strategies to ensure these commitments can be met. The proposal will have an installed generation capacity of 90 MW AC, producing electricity sufficient to power approximately 37,596 homes annually. This reduces the reliance on fossil fuels as a primary form of energy and subsequently reduces greenhouse gas emissions.

2.5.2. Commonwealth renewable energy targets

Faced with the reality of a climate that is drastically impacted by change, there have been many recent government policies in place in Australia that influence the development of renewable energy. The Mandatory Renewable Energy Target (MRET) Scheme was introduced by the Commonwealth Government in 2001 to increase the amount of renewable energy being used in Australia's electricity supply. The initial MRET was for Australia to provide 9,500 gigawatt hours (GWh) of new renewable energy generation by 2010. This target was revised and from January 2011 the target was expanded to provide 45,000 GWh of additional renewable energy by 2020. The MRET was split into two components:

- Small-scale Residential Energy Scheme.
- Large-scale Renewable Energy Target (LRET).

The proposal seeks to satisfy the LRET which includes annual targets which require significant investment in new renewable energy generation capacity, with 33,000 GWh of renewable electricity generation to be met by 2020.

2.5.3. National electricity supply and reliability

In Australia, approximately 87 per cent of our electricity generation comes from fossil fuel-based generation, making our nation ranked as one of the highest levels of fossil fuel generation (AEC 2016). From a climate change perspective, it is important that we increase our renewable energy generation capacity, this need is further highlighted as many of Australia's coal power stations approach the end of their operating lives.

Energy security, as defined by the Australian Department of Resources, Energy and Tourism is "*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 carried out in 2011 (DRET 2011) found that Australia's energy security was 'moderate'. A moderate energy security rating is when the economic and social needs of Australia are being met. However, it suggests that there could be a number of emerging issues and negative influences or uncertainties that will need to be addressed to maintain this level of energy security. In response, significant amounts of new capacity will be required in the medium to long term to compensate for the retirement of various coal plants and to help achieve emissions reduction targets. Therefore, a range of energy generation methods, such as solar are required to ensure security of energy supply on the national grid network.

Australia's electricity system is in a state of transition (Finkel et. al). This was highlighted in, with the failure of various coal power stations in a single week of February 2017, suggesting that a considered approach to the future of Australia's energy system is needed. The 2017 Independent Review into Future Security of the National Electricity Market (Finkel Report) is a report commissioned by the Federal Government in order to establish a framework for the development of the Australian energy sector.

2.5.4. Energy prices

Significant increases in the cost of energy in recent years have been aligned with a rapid decline in the cost of renewable energy technologies, providing industry with the opportunity to secure cost-competitive or cheaper energy alternatives than was previously available (Clean Energy Council 2016; Finkel et al 2017). Inflated power prices are now considered as a major concern to industry groups, and a growing threat to NSW industry and employment.

Substantial increases in the price for energy have effects on both households and businesses. Renewable energy proposals are considered to be a key driver to reduce energy prices (AEMC 2016). The proposal contributes to the growing number of solar farm proposals in NSW and will aid in applying downward pressure to energy prices.

2.5.5. Reducing air pollution

According to the World Health Organization (WHO), air pollution remains one of the world's greatest threats to human life, with approximately 6.5 million deaths occurring each year due to air pollution. Air pollution also results in major costs to the economy and damage to the environment (IEA 2016). Recent studies have shown an increase in global deaths from fine particulate air pollution, of which coal is a major source, from approximately 3.5 million in 1990 to 4.2 million in 2015 (DEA 2017).

In Australia, it has been estimated that more than 3,000 Australians die prematurely each year from air pollution. A 2013 Commonwealth Senate Committee Inquiry concluded that despite improvements in Australian air quality over the last two decades, air quality is still a significant problem in many parts of Australia. Some communities are much more affected than others, depending on how close they are to pollution sources (EJA 2014).

The proposal would assist in reducing the levels of air pollution in Australian communities. The provision of pollution-free, renewable energy into the National Electricity Market will displace other sources of harmful, pollution intensive emissions, such as coal-fired generation.

2.5.6. Supporting local industry

The proposal is aligned with the Council's vision to encourage industry that is both economically viable and sustainably managed, as outlined in the objectives of their *Combined Delivery Program and Operational Plan 2018-22*. The Council seeks to achieve this through partnerships with industry stakeholders to ensure that commercial and industrial land, coupled with the area's geographic location, be maximised and marketed in a way that boosts economic growth. By way of example, the proposal will provide both construction and ongoing jobs for the local community including; manual labourers, electricians, supervisors, proposal managers and health and safety professionals.

2.5.7. Local and regional development and employment

The proposal would positively contribute to regional development, employment and economic benefits in the local region. Bland Shire LGA is referenced in the Riverina Murray Regional Plan (DP&E 2017), as an economy underpinned by agriculture and mining. However, the area has the capability to leverage opportunities from the shire's location to support diverse industries.

This is significant as population and economic fluctuations occur with the development of mineral and energy resources, some regional communities will need support to diversify and transition economies as the mineral extraction sector diminishes.

A peak period consisting of up to 300 employees on-site during the construction stage will contribute \$23 million GVA to the economy. This will support up to \$7 million in supply chain GVA across NSW.

Three direct ongoing jobs associated with the operational phase results in an additional five indirect supply-chain jobs. Direct operational GVA of up to \$2.1 million, and indirect supply-chain GVA of \$0.5 million per annum supports supply chain businesses.

Construction of the proposal would require substantial capital investment and employment. This investment would sustain significant employment in the construction industry and have supply chain effects for the Bland Shire LGA and NSW economy.

3. SITE & ENVIRONS

3.1. THE SITE

A descriptive overview of the site is provided in **Table 5**.

The site location is provided at **Figure 1** and **Figure 2**.

Photos of the site are provided at **Figure 3**.

Table 5 – Site Description

Component	Description
Address	228-230 Blands Lane, Wyalong
Legal description	<p>Lot 17 and 18 DP753081</p> <p>The solar farm infrastructure is located solely on Lot 18 DP753081; a site access road is provided on Lot 17 DP753081</p> <p>The connection to the existing transmission line will be via Myers Lane DP753081</p>
LGA	Bland Shire Council
Site area	Lot 17 has an area of 280ha (approx.); Lot 18 has an area of 280ha (approx.); Myers Lane connection route has an area of 2.2ha (approx.)
Characteristics	<p>The site is a rectangular parcel of land that comprises several large paddocks.</p> <p>The site has an elevation that steadily falls from 237m near the north-east boundary to 227m in the south-east corner.</p> <p>The site is generally flat and supports one constructed dam, an ephemeral water channel and clustered and sporadic vegetation. It contains a small area of ecological significance in the centre and adjacent to the south-west boundary of the site.</p> <p>There are no residences within the site. The site has a 2km frontage to Blands Lane to the north-west and is adjoined by rural landholding to all other boundaries. The proposal will be accessed via a 8m internal access road connecting to Blands Lane, with various internal access roads throughout the site.</p> <p>The primary land use of the region is agricultural, with the land immediately surrounding the site being predominately used for cropping and grazing. The field to the south west is used by the NSW Free Flight Society to fly model aircraft.</p> <p>An existing 132kV overhead transmission line (Lake Cowal Mine to Temora to Wagga North) is located approximately 700m to the west of the site, running northeast to southwest. It is proposed to connect the proposal to this transmission line.</p>

Land subject to the DA

Myers Lane connection

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3 KM

Figure 2 – Site Location



Figure 3 – Photos of the Site



Looking northeast from the proposal toward the future location of the substation (centre) and existing vegetation along Gordon's lane (right). The distant trees are located along Blands Lane.



Looking east across the site from Blands Lane, next to one of the internal roads provide clearer context.



Looking south-east toward the central entrance to the site.



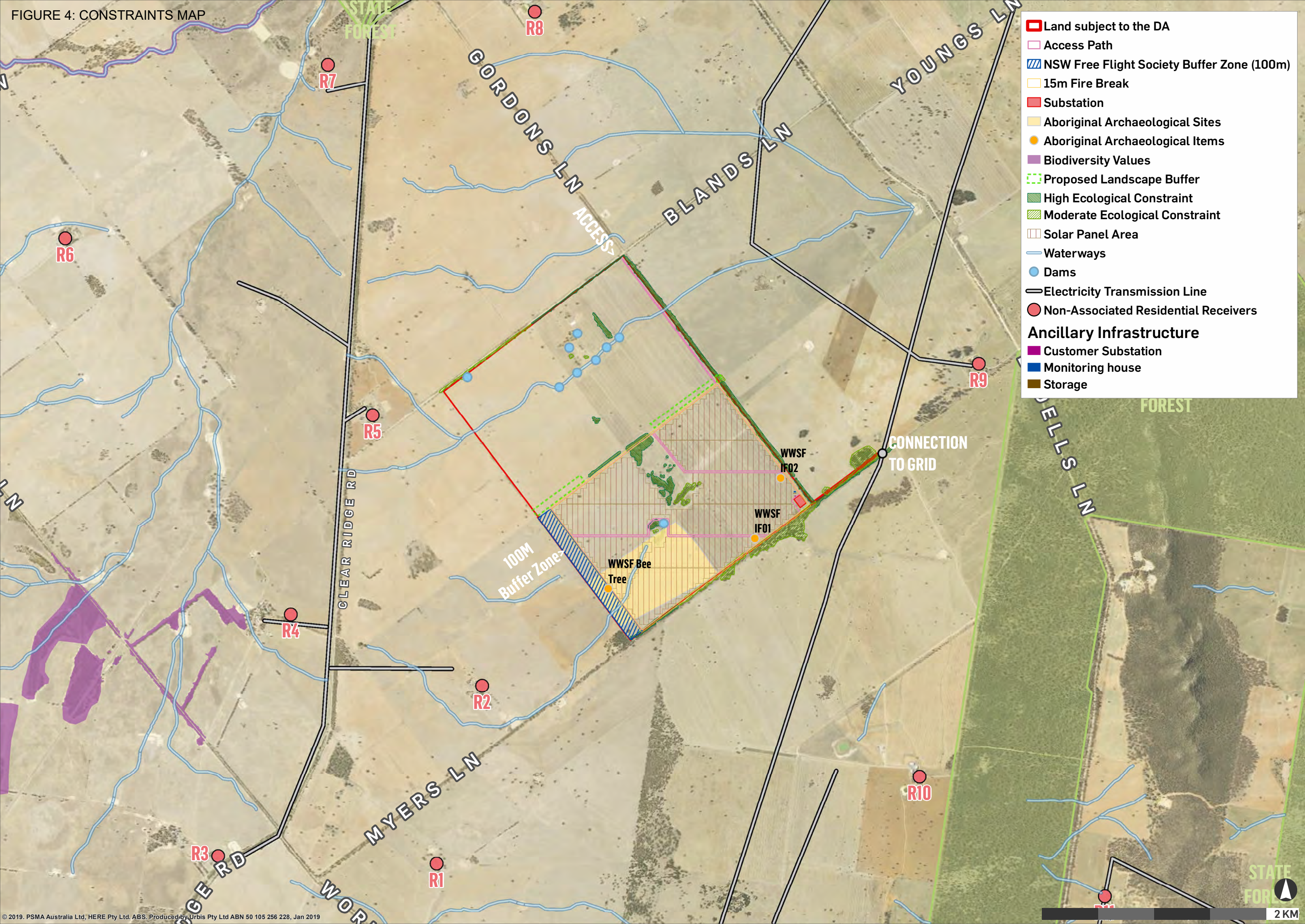
Looking south across the site from the central internal access road.

3.2. SITE CONSTRAINTS

The site is constrained by the following:

- Areas of medium to high ecological significance are located along the north-eastern boundary (Gordons Lane), south-eastern boundary (Myers Lane), south-western boundary (the Bee Tree) and scattered throughout the centre of Lot 18.
- The site has been identified as having moderate Aboriginal archaeological sensitivity, with identified sites located in the southern corner and scattered throughout the site.
- The proposal is subject to various view point locations, particularly along Blands Lane (a public road).
- To the site's immediate south-west is the NSW Free Flight Society site. A buffer zone has been proposed along the common boundary to mitigate any potential land use conflicts between the flight activities with the adjoining site and the future operation of the proposal.

Figure 4 overleaf provides a map of the site constraints.



3.3. SURROUNDING CONTEXT

The site context is described in **Table 6**.

Key contextual features are identified **Figure 5**.

Photos of the surrounding context are provided in **Figure 6**.

Table 6 – Description of surrounding context

Direction	Description
North	To the north of the site is Blands Lane. Past the lane is predominately agriculture landholdings with one residential farm house and ancillary sheds. Clear Ridge Railway station is located approximately 3.3km from the site. Approximately 3.7km to the further to north is the intersection of Clear Ridge Road, Clear Ridge and Sandy Creek.
South	To the south of the site is Myers Lane and predominately agriculture landholdings with particular built or natural elements of significance.
East	To the east of the site is predominately agriculture landholdings with particular built or natural elements of significance. Approximately 2.74km to the east is Bodells Lane and Wyrra a large land parcel of tree planting.
West	<p>To the west of the site agriculture landholdings with particular built or natural elements of significance. Clear Ridge Road is located approximately 1.5km from the site.</p> <p>The adjacent landholding to the southwestern boundary of the site is owned by the NSW Free Flight Society (NSW FFS).</p>

Figure 5 – Site in relation to key contextual features



Figure 6 – Photos of surrounding context



Picture 1 – Looking northeast up Gordons Lane. The roadside is predominately bare, with scattered vegetation either side.



Picture 2 – Looking southwest along Blands Lane. The distance vegetation helps filter views to the surrounding landscape.



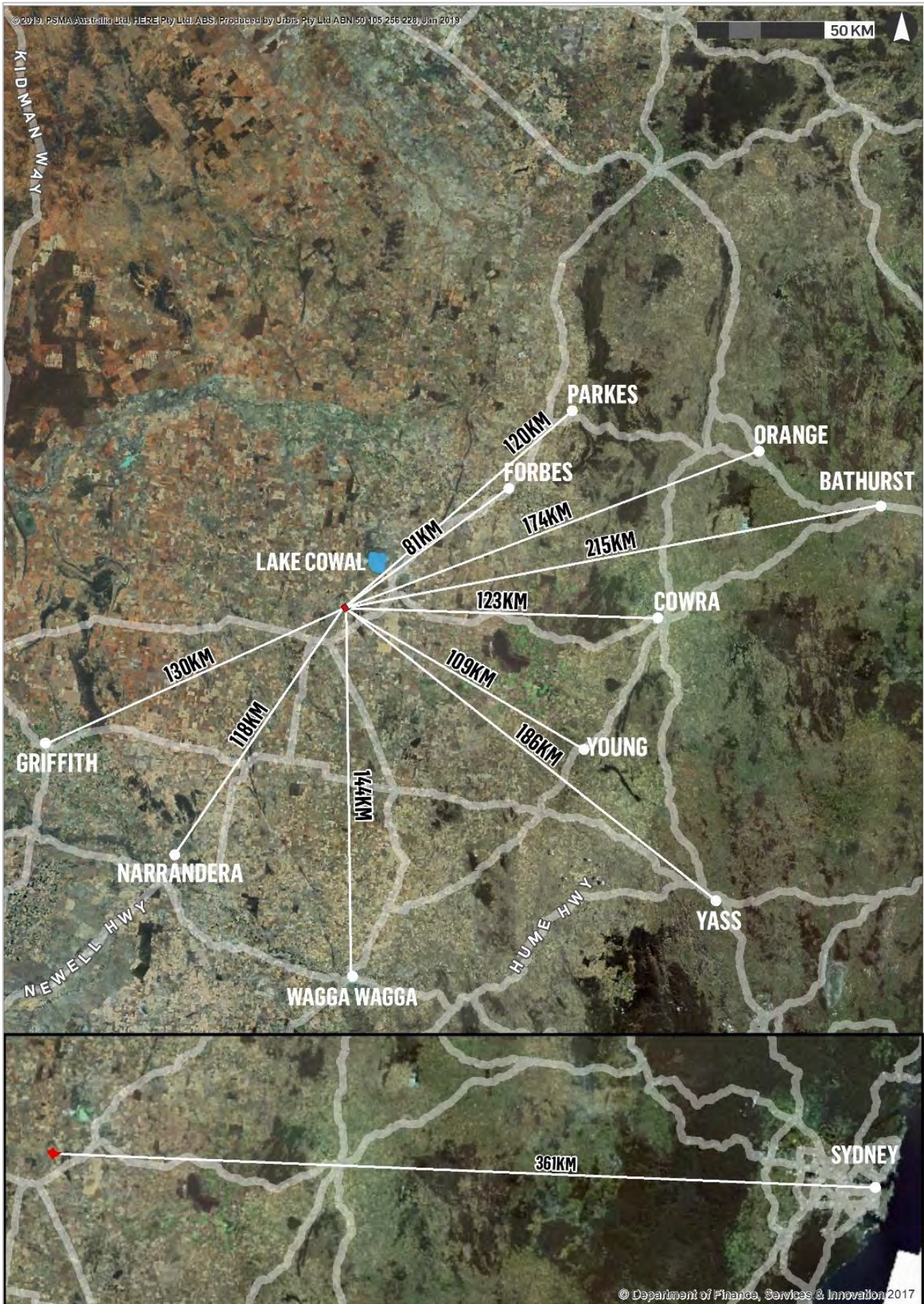
Picture 3 – Typical view of the existing vegetation along Myers Lane looking east.

3.4. REGIONAL CONTEXT

West Wyalong is located 467km west of Sydney and on the crossroads of Newell Highway between Melbourne and Brisbane, and the Mid-Western Highway between Sydney and Adelaide. The town is connected to the regional road network through these direct connections. West Wyalong is within a 160 kilometre radius of other established rural centres such as Wagga Wagga, Griffith, Forbes, Parkes and Cowra.

According to the Australian Bureau of Statistics (ABS) data, the townships of Wyalong and West Wyalong are small communities, with a combined population of approximately 3,800 people. West Wyalong has an ageing population, with 13.4% of the suburb aged 75 years and over, with 6.5% in Wyalong over the age of 75. Wyalong and West Wyalong are characterised by low density housing, consistent with a rural area, with more than 90% of the population living in detached dwellings. Most homes are owned outright or with a mortgage, suggesting a permanent population and established community.

Figure 7 - Regional Map



4. DESCRIPTION OF PROPOSAL

4.1. OVERVIEW

Table 7 provides an overview of the proposal.

Table 7 – Key features of proposed West Wyalong Solar Farm

Component	Description
Proposal	West Wyalong Solar Farm
Capacity	90 MW AC
Solar array	<p>Installation of approximately 296,000 panels.</p> <p>These will be affixed to a mounting structure with tracking capabilities. Each panel will be approximately 1.95 metres (m) x 0.992 (m) with a depth of 50 millimetres (mm). They will be dark blue in colour with an aluminium frame and will be coated with an anti-reflective coating in order to maximise daylight absorption.</p>
Battery Storage	Containerised lithium ion batteries to provide electricity storage capacity of 50MW/h. The storage container has the following dimensions 12.192m (L) x 2.438m (W) x 2.591m (H).
Inverters / Transformers	Installation of Twinskid inverter/transformer combination
Substation	An on-site substation will be located at the south-eastern corner of the site.
Transmission connection	The solar will connect via overhead or underground lines in Myers Lane to the existing 132kV overhead transmission line (Lake Cowal Mine to Temora to Wagga North). Myers Lane is a Crown road.
Site access	The proposal will be accessed through Lot 17 from the north-east via an 8m wide private driveway off Blands Lane.
Internal access tracks	Running the entire perimeter of the site, with other internal access roads coming off.
Landscaping	Perimeter landscape screening and infill planting.
Operations and maintenance buildings	One monitoring house will be located at the south-eastern corner of the site to monitor the proposal and provide facilities for maintenance staff. Two storage sheds will be provided for maintenance equipment and spare parts.
Water Tanks	Two water tanks with a combined holding capacity of 45,000L.
Security fencing & CCTV	<ul style="list-style-type: none"> Fencing: 2-metre-high fencing surrounding the solar farm. CCTV: 2.5-metre-high CCTV Pole located at various locations throughout the site
Construction hours	<ul style="list-style-type: none"> 7am to 6pm - Monday to Friday.

Component	Description <ul style="list-style-type: none"> • 8am to 1pm – Saturdays. • No work on Sunday and public holidays.
Construction duration	<ul style="list-style-type: none"> • Stage 1 - Site Preparation and Early works: 2 months • Stage 2 - Solar Farm and substation, site infrastructure, transport and construction works: 3-4 months • Stage 3 - Solar Farm and substation construction, testing and fine tuning: 3-6 months
Workforce	<ul style="list-style-type: none"> • Early works: 56 construction workers (max) • Main works: 300 construction workers (max)
Operation period	30 years with the option of 10-year extension
Decommissioning	The site would be returned to its pre-works state. Any areas excavated during decommissioning will be backfilled with top soil, harrowed, and either seeded or left ready for crops. Not to exceed 4 months.

4.2. LAYOUT

The proposal's indicative layout plan at **Figure 8** and included in **Appendix D** detail the dispersion of the proposal and its individual elements across the site, while providing relevant buffering to site constraints, such as the Bee Tree and the NSW Free Flight Society. These features include:

- Site access
- Site boundary and fencing
- Single Axis Trackers
- Inverter/Transformer TwinSkid combination
- Batteries
- Customer substation
- Connection via overhead or underground lines in Myers Lane to the existing 132kV overhead transmission line.
- Monitoring house and storage facilities
- Access Road and Gates
- CCTV services
- 2 x 22,500L Water Tanks
- 15m fire break free of infrastructure
- West Wyalong Solar Farm Bee Tree buffer

4.2.1. Development Footprint

The total footprint is outlined in the table below.

Table 8 – Development Footprint

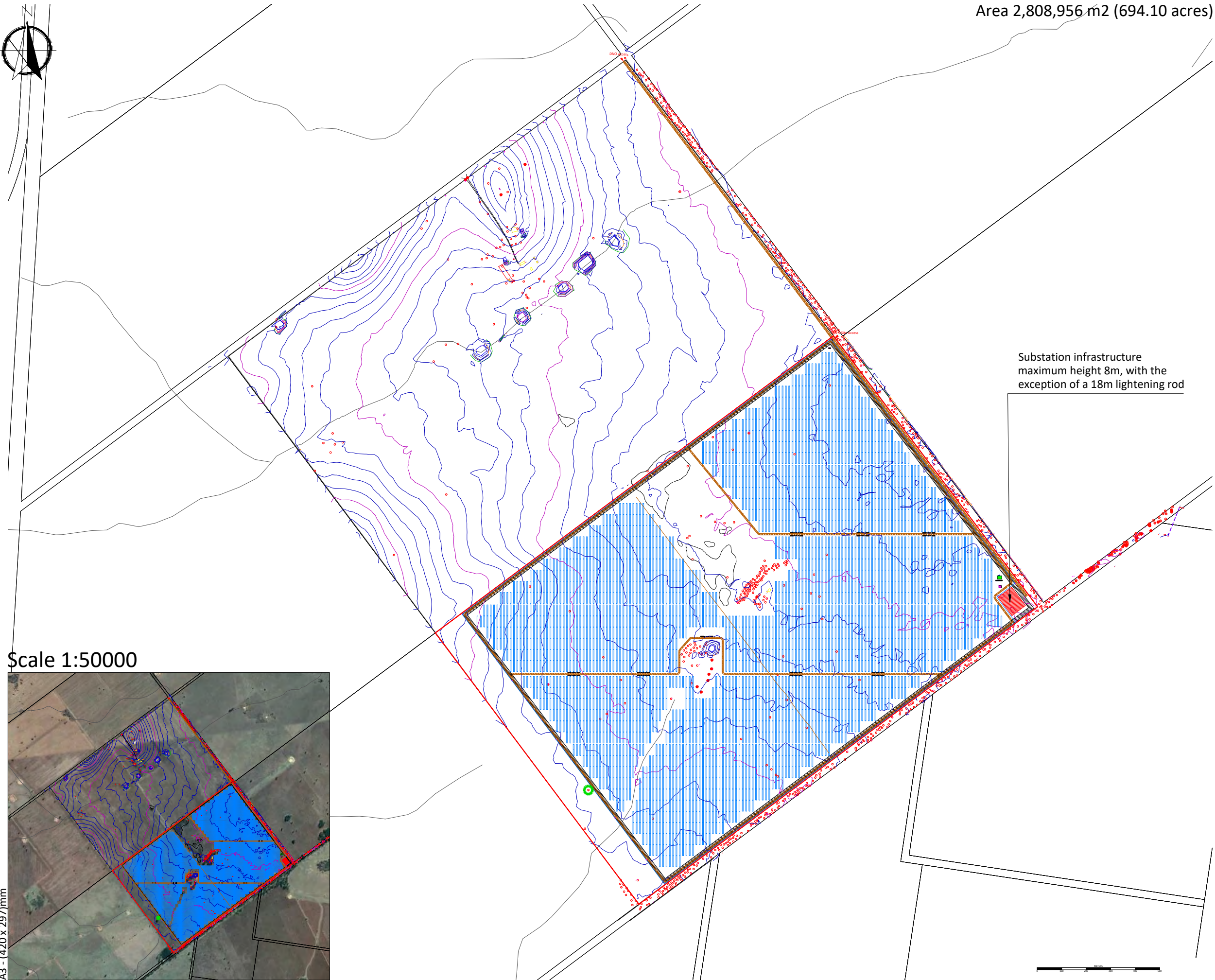
Proposal element	Area
Solar panels	572,582.4sqm (1.95 metres (m) x 0.992 (m) x 296,000)
Fencing	6.16sqm
Roads and access tracks	94,374sqm

Proposal element	Area
Inverter Transformer TwinSkid	602.91sqm
Customer Substation	93.6sqm
Monitoring House	256.5sqm
Batteries Container	861.88sqm
Water Tanks (1 unit with 2 tanks)	32.81sqm
Substation	2,433.68sqm
Total 132kv cable trenches (total cabling related to the project – HV cable (located inside the solar farm and along the Myers Lane connection to the transmission line), the LV cable within the solar array and the communications cables within the solar farm)	9,693.5sqm
Total development footprint	680,937.44sqm (68ha)
Total fire break area (including internal roads)	6,447sqm
The only area of land disturbance within the fire break area is the 6m wide road – which is included within the area for roads and tracks. The fire break is an area grass, actively managed to ensure the grass is kept low to reduce bushfire risk.	
Construction laydown (location to be determined at later stage of development)	5,000sqm

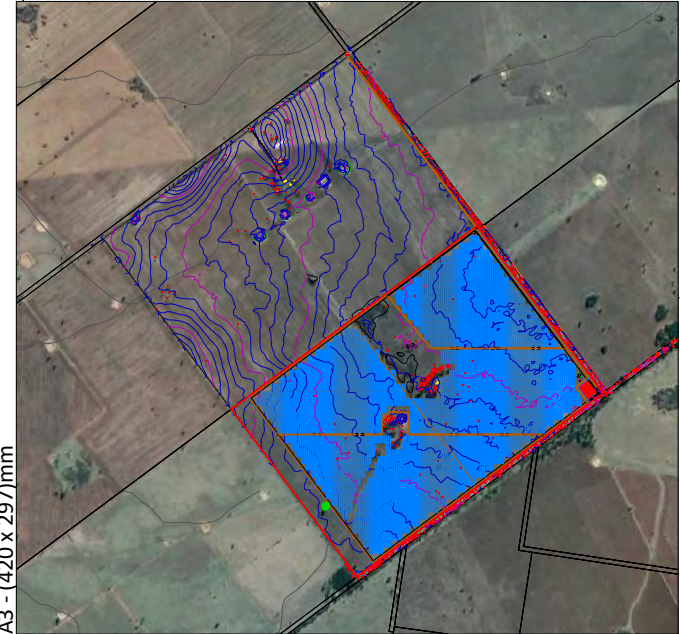
FIGURE 8: PROPOSED LAYOUT

Wyalong_Proposed_Layout_Rev15_v2

Area 2,808,956 m2 (694.10 acres)





Scale 1:50000



	Site Access
	Site Boundary
	Security Fence
	Single Axis Tracker 45 x 2
	Inverter Transformer TwinSkid
	Batteries
	Area for Substation
	Customer Substation
	Monitoring House
	Storage
	Access Road
	Access Gates
	CCTV
	45,000L Water Tank
	15m Fire Break
	WWSF Bee Tree Buffer

Substation infrastructure
maximum height 8m, with the
exception of a 18m lightening rod

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WLG_01		Preliminary	
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4.3. SOLAR FARM COMPONENTS

4.3.1. Photovoltaic Modules

The primary components of the solar farm are the approximately 296,000 photovoltaic (PV) modules (solar panels). Each panel will be approximately 1.95 metres (m) x 0.992m width and a depth of 50 millimetres (mm).

The panel will be dark blue in colour with an aluminium frame and will be coated with an anti-reflective coating in order to maximise daylight absorption. **Figure 9** provides an example of the PV modules.

Figure 9 - PV modules (example)

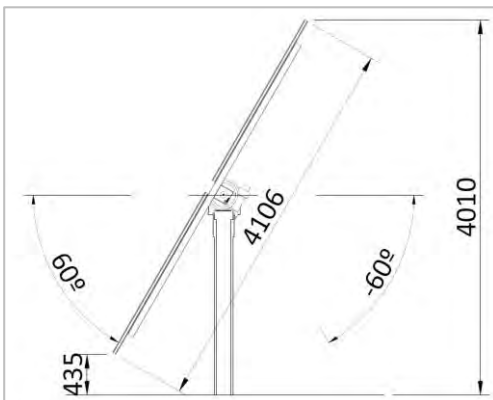


Source: Lightsource BP

4.3.2. Tracking System

The PV modules will be mounted on single-axis tracking systems that will very slowly move to follow the path of the sun from east to west throughout the day. Steel piles will be driven into the ground to a depth of approximately 1.5m and concrete foundations are not required. The tracking structure is approximately 2m high. The greatest height reached by the edge of the panels is 4.10m, which occurs when the tracker is at its maximum angle (60 degrees) at the beginning and end of each daylight period. **Figure 9** above shows the panels in a horizontal position when the sun is at its highest point in the sky. The panels can be programmed to 'rest' in any desired position overnight. **Figure 10** shows the typical panel dimensions of the tracking system and mounted panels.

Figure 10 – Typical Section of Tracker



Source: Lightsource BP

Figure 11 – Example of Mounting Framework



Picture 4 – Example of the installation of framework piles with a piling rig



Picture 5 – Example of the mounting framework



Picture 6 – Example of the rear elevation of fixed tilt panels

Source: *Lightsource BP*

4.3.3. Inverter and Transformer

A total of fifteen power conversion units consisting of two central inverters, one external transformers and an LV box each will be installed on site. The system will be a TwinSkid inverter/transformer combination, an example of an inverter transformer unit is shown in **Figure 12** below.

The inverters will be white in colour in order to minimise temperatures, the LV box can be prefabricated in a colour such as Pale Eucalypt, whilst the transformers and their protective fencing will be grey.

The rows (arrays) of panels connect into the inverters via cables (or 'strings'), which are buried in trenches (approximately one metre deep and 0.3m wide). The inverters convert the direct current (DC) electricity generated by the solar panels into alternating current (AC) to match the grid transmission network. The inverters connect to the transformers where the voltage of the electricity is altered (or "stepped up") to match that of the transmission network.

The power conversion units will run east-west and are to be located off the internal access roads between the rows of panels.

Figure 12 – Example of an inverter transformer unit



Source: Lightsource BP

4.3.4. Batteries

Thirty containerised lithium ion batteries units will be installed adjacent to the inverter and transformer units. These can be used to store power (50 MWh) during periods of peak energy generation during the day for export later or at periods of peak demand.

4.3.5. Substation

One 132kV Substation will include electrical equipment up to eight metres in height with the exception of an 18 metre lightning rod. One customer substation is collocated with the 132kV substation in the south-east corner of the site as per **Figure 13**.

The substation is the onsite point of connection from where electricity flows into the grid network via the connection cable. The substation house the site switchgear which acts as a safety mechanism to protect the solar farm from any fault in the grid network. The switchgear disconnects electrical circuits if there is a fault in the system.

Two sets of switchgear are required, one to shut the grid off from the solar farm (referred to as the Substation) and a second to shut the solar farm off from the grid (referred to as the Customer Substation).

Figure 13 - Location of customer substation and substation

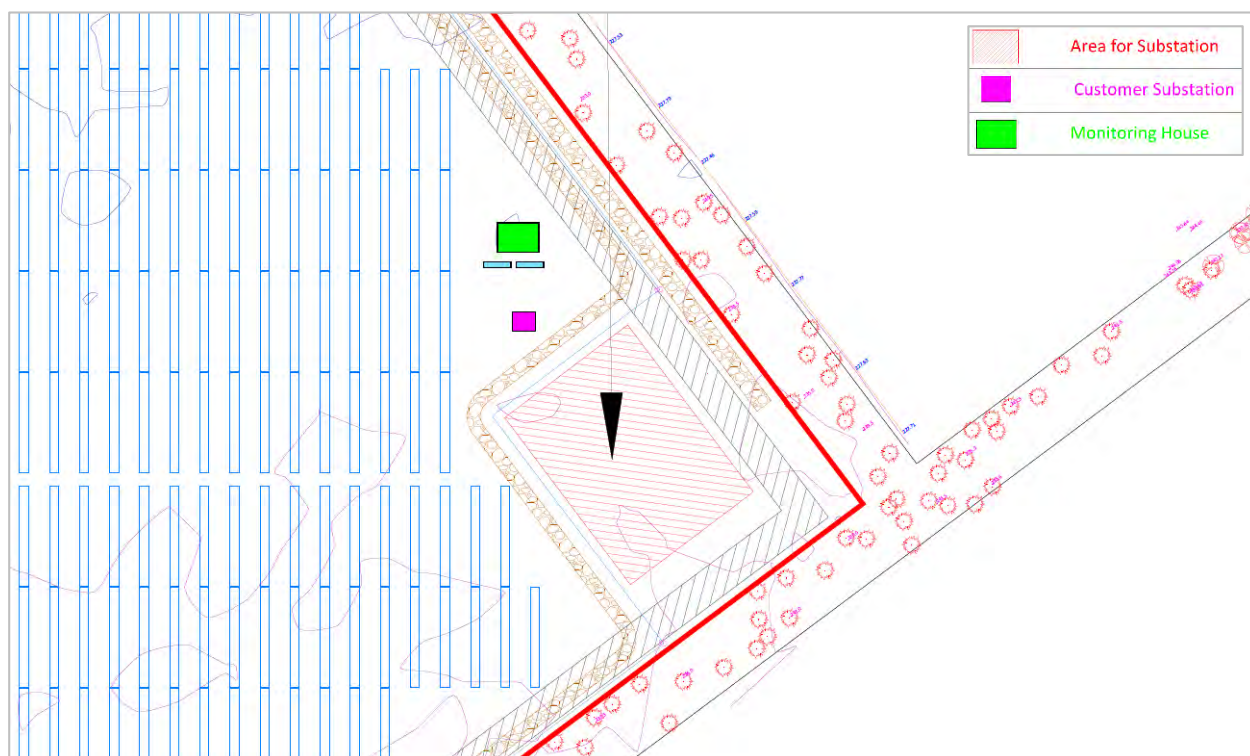


Figure 14 – Proposed Substation



Picture 7 – 132kV Substation



Picture 8 – Customer Substation

Source: Lightsource BP

4.3.6. Transmission Connection

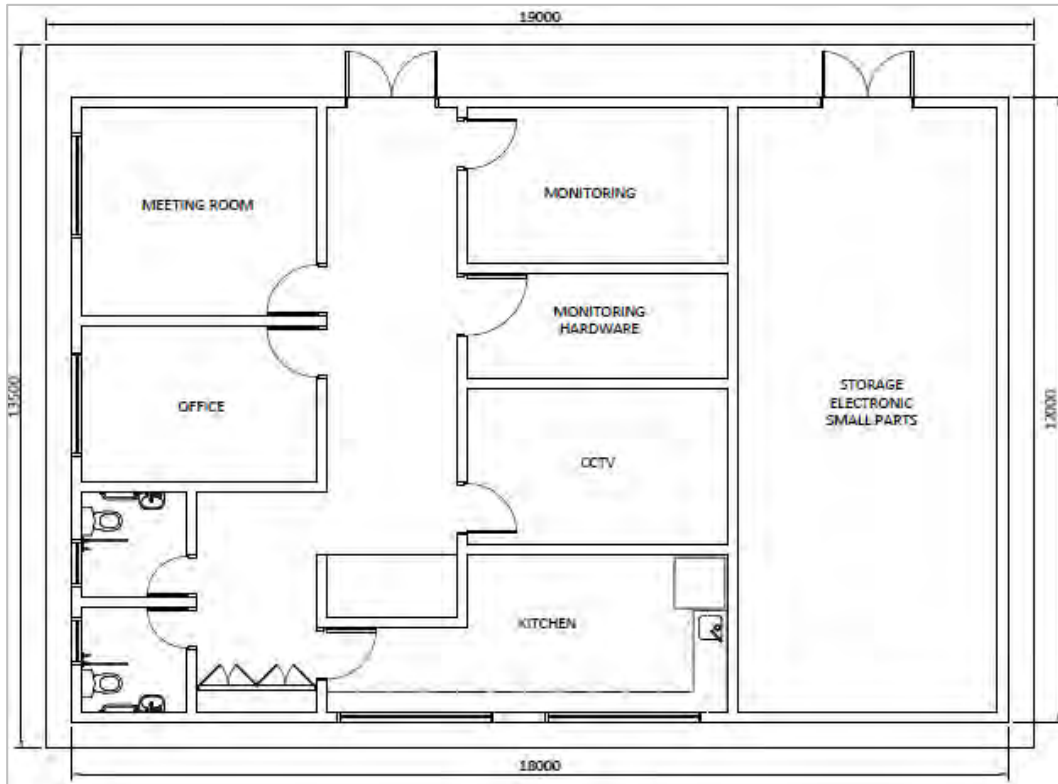
The 132KV Substation will be located on the proposal site (as shown on the Layout Plan **Figure 7**). The proposal will connect from the substation via an overhead or underground 132 kV feeder down Myers Lane to the existing overhead 132kV line 99U (Lake Cowal Mine to Temora to Wagga North) line owned by Essential Energy. The Myers Lane feeder, once constructed, will come under the ownership of Essential Energy.

Consent is sought for the removal of vegetation and the installation of electricity works within Myers Lane.

4.3.7. Monitoring House and Storage Buildings

A monitoring house will be constructed in the south-eastern corner of the site, next to the Gordons Lane and Myers Lane juncture (refer to Layout Plan). The dimensions of the monitoring house are expected to be approximately 18m long, 12m wide and 6.6m high. All visitors and contractors will be required to report to the monitoring house upon entry to the site. The monitoring house will include a staff office, monitoring room, CCTV room, monitoring hardware and storage electronic small parts area. Staff amenities will include toilets, showers, a meeting room and a kitchen, detailed below in **Figure 15**.

Figure 15 – Monitoring House Floor Plan



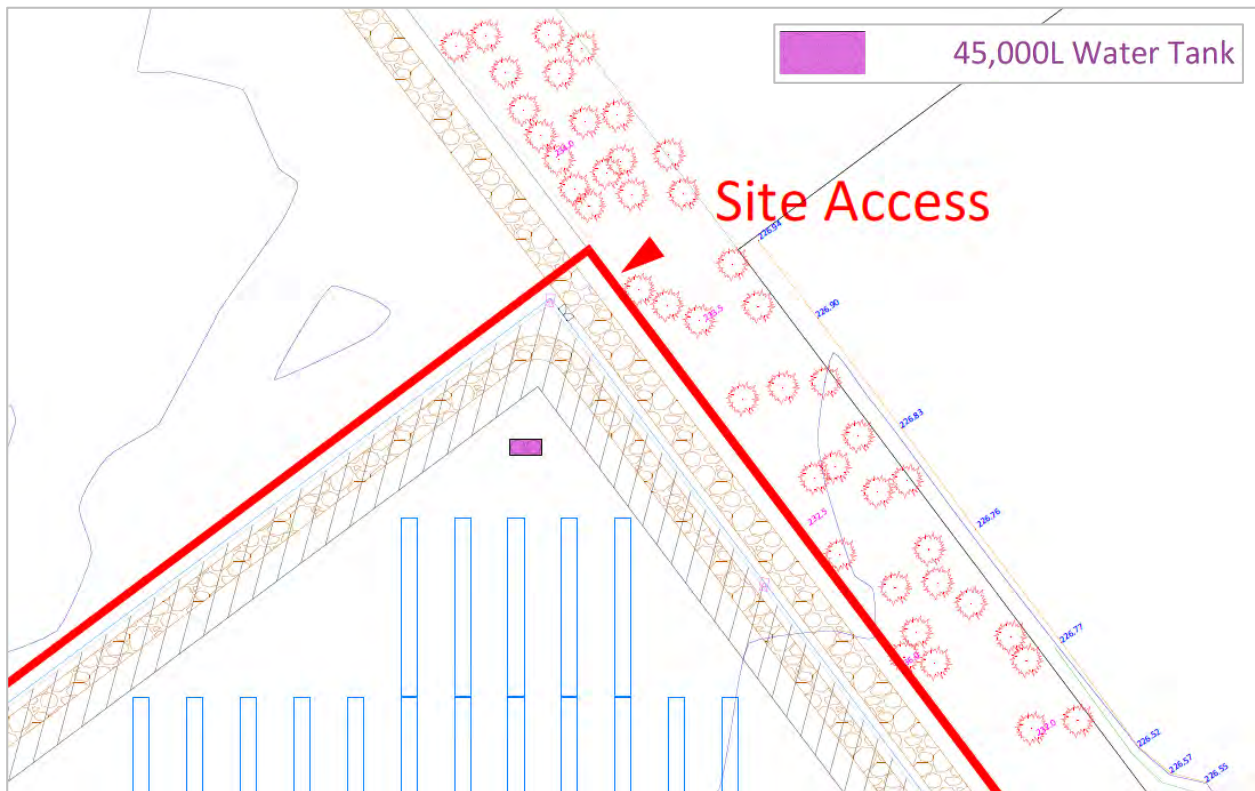
Source: Lightsource BP

Two storage buildings will be located adjacent the monitoring house for the storage of maintenance equipment and spare parts to allow for fast repairs and replacement of any faulty panels.

4.3.8. Water Tanks

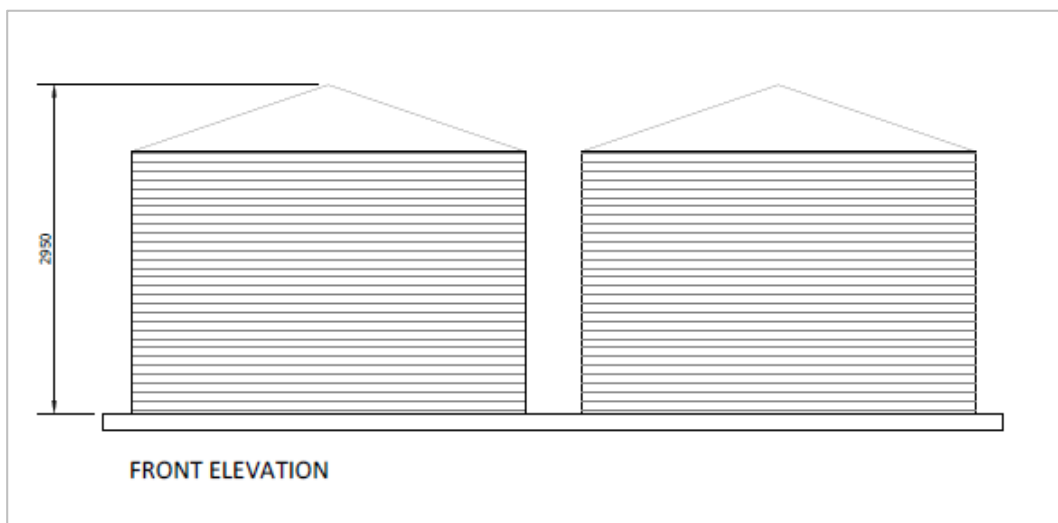
The water tanks would be located as shown on the Layout Plan. The tanks will service the site during the construction and operation phase of the proposal. The collective dimensions of the water tanks are expected to be approximately 8.1m long, 4.05m wide and 2.95m high. The tanks would have a combined carrying capacity of 45,000L.

Figure 16 - Water tank location



Source: Lightsource BP

Figure 17 – Water Tank Elevation and Floor Plan



Source: Lightsource BP

4.3.9. Site Access

The proposal will be accessed via Lot 17 via an 8m internal road connecting to Blands Lane as shown in the Layout plan. The location of the site access point is shown in **Figure 18**. The driveway will run through Lot 17 to Lot 18. Blands Lane is a formed road, connecting to Bodells Lane to the east, and to Clear Ridge Road to west of the site. Both Bodells Lane and Clear Ridge Road in turn connect south to the Newell Highway.

Figure 18 – Site Access Point



Source: Lightsource BP

4.3.10. Internal Roads

Internal vehicular access would be all-weather access roads with an indicative width of 6m.

The internal access roads would be accessed via the entrance to the site on Blands Lane to the north. The access roads would run around the entire perimeter of the site, linking to other internal roads running east to west.

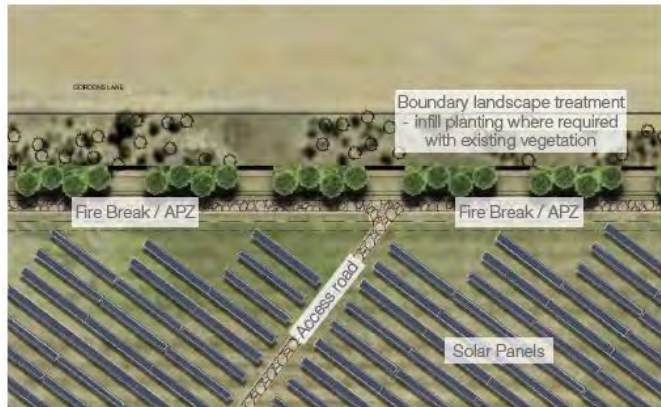
4.3.11. Landscaping

The proposal includes a five-metre perimeter landscape zone, with a further 15m buffer zone setback to the panel arrays. These zones will be separated by the proposed security fencing.

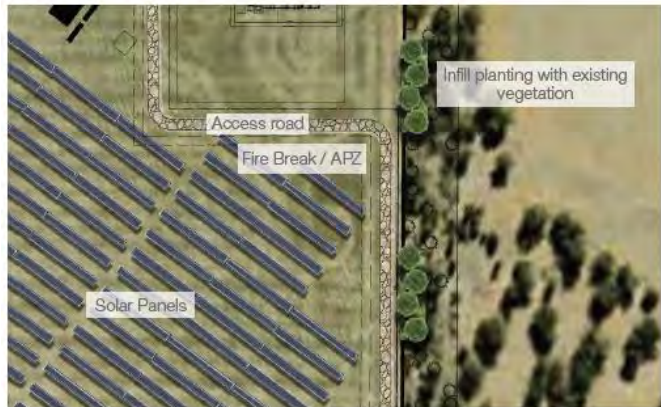
The NSW Free Flight Society's site is adjacent to the south-western boundary, has been identified as an area of potential land use conflict. The inclusion of a 100m buffer zone between the solar farm's security fence and the south west property boundary will mitigate any land use conflicts and ensure the continued use of the neighbouring site for model plane activities.

The majority of the perimeter boundary landscape treatment would utilise existing vegetation and infill planting where required, as demonstrated along Myers and Gordons Lane in **Figure 19**.

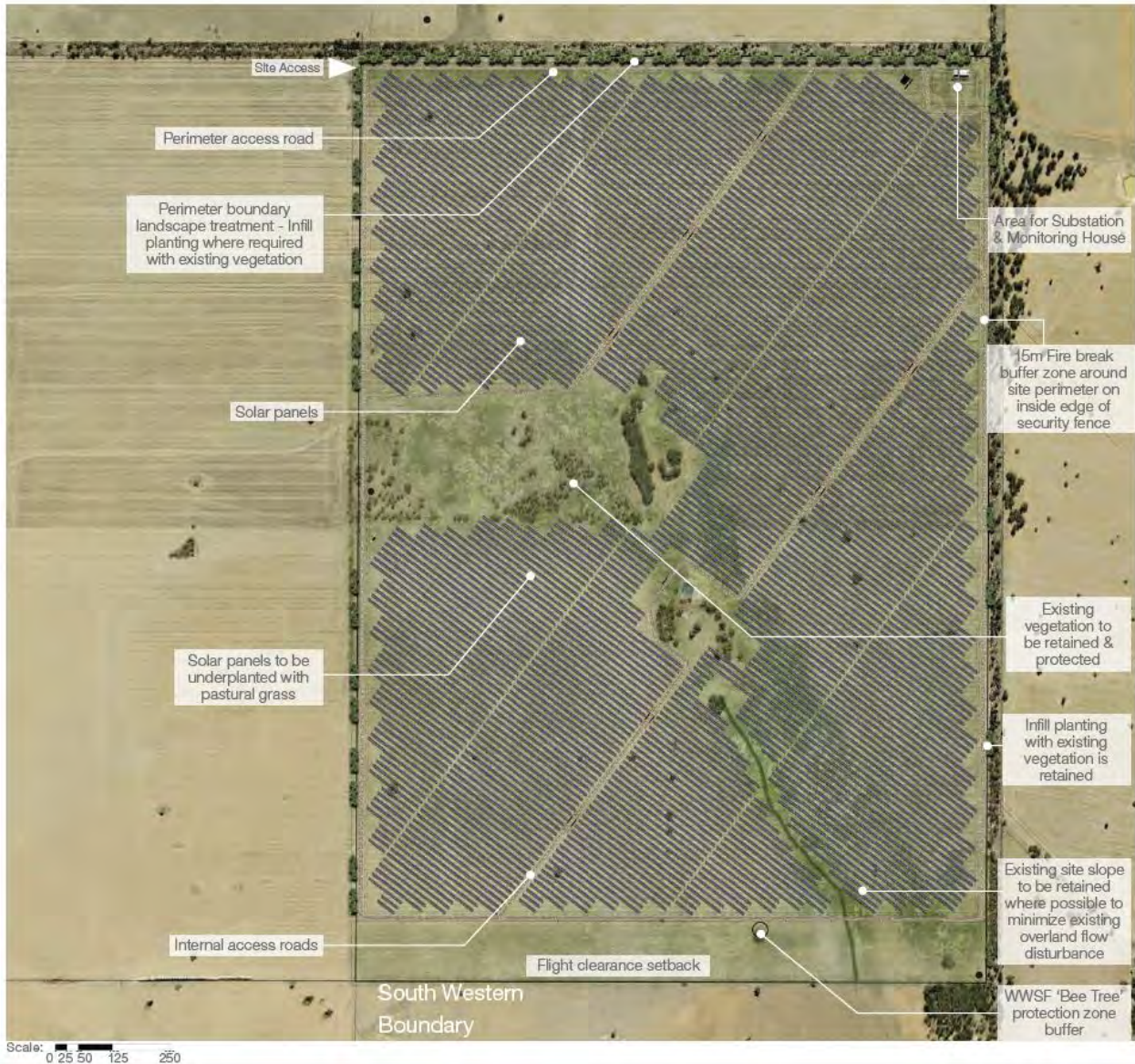
Figure 19 – Proposed Landscaping Strategy



Typical landscape boundary treatment with infill planting where required with existing vegetation
Scale: 0 25 50



Typical landscape infill planting where required with existing vegetation
Scale: 0 25 50



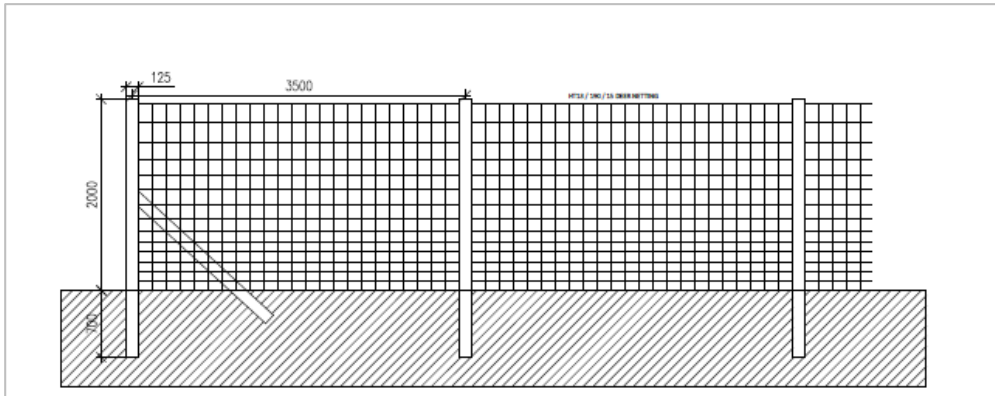
Source: Site Image

4.3.12. Security

Security fencing will be installed around the perimeter of the site, and temporary fencing around the Bee Tree. The indicative height of the fencing as indicated in **Figure 20** would be two metres, subject to final design which would seek to minimise the visual impact of the fencing when viewed from surrounding properties.

Continued security video coverage would be maintained via a series of security cameras installed on the perimeter fencing. CCTV poles up to 2.5 metres high will be located along the perimeter of the site.

Figure 20 – Fencing details



Source: Lightsource

4.4. PROPOSAL LIFECYCLE

An indicative lifecycle of the proposal is outlined in **Table 9** below.

Table 9 – Indicative Lifecycle

Phase	Approximate commencement	Approximate duration
Construction	June 2019	March 2020
Operation	March 2020	Lease is in place for 30 years with an option for a 10-year extension.
Decommissioning	To be determined	Not to exceed 4 months

4.5. CONSTRUCTION

4.5.1. Indicative construction schedule

Construction of the solar farm is expected to be completed over approximately 9 – 12 months. A summary of the different characteristics of each stage of construction is provided in **Table 10**, and detailed further in sections below.

Table 10 – Solar Farm Construction Schedule

Construction Stage	Timeframe	Peak Daily Staff	Peak Daily Vehicles
Stage 1 Site Preparation & Earthworks	2 months	60 per day	10 light vehicles 4 shuttle buses 10 trucks
Stage 2 Solar Farm & Sub-Station Construction	3-4 months	300 per day	10 light vehicles 20 shuttle buses

Construction Stage	Timeframe	Peak Daily Staff	Peak Daily Vehicles
			25 trucks (incl. one over dimensional truck)
Stage 3 Solar Farm & Sub-Station Construction, Testing and Commissioning	3-6 months	300 per day, however this will reduce once peak construction is completed and testing and commissioning is underway	10 light vehicles 20 shuttle buses 10 trucks

4.5.2. Contractor Parking

On-site parking for all construction staff, shuttle buses and trucks will be provided throughout the construction works. The location of parking areas, and the number of spaces, is expected to vary through the different construction stages. All parking requirements will be accommodated on site at all times.

4.5.3. Construction Traffic and Access

Source and quantity of materials

The level of transportation of materials varies significantly between the three stages of construction. These include:

- **Stage 1** - construction period, trucks will transport equipment and materials such as aggregate and concrete to the site on a daily basis. Up to 10 trucks would visit the site each day during Stage 1, generating a total of 20 truck trips per day; these would be a mix of B-Doubles, articulated vehicle and concrete trucks.
- **Stage 2** - construction period, trucks will transport key materials and equipment to the site on a daily basis, including:
 - Solar panels will be transported in shipping containers to the site from Port Botany. Each container (6.1m) can transport approximately 550 solar panels, and the majority of containers will be transported by B-Doubles carrying two containers. Up to 600 B-Doubles will be required to transport the solar panels to the site over the Stage 2 construction period, generating some 1,200 B-Double trips.
 - Additional truck trips would be generated during the Stage 2 construction period, requiring:
 - Approximately 600 B-Doubles (or 1,200 trips) transporting tracking horizontals.
 - Approximately 300 B-Doubles (or 600 trips) transporting upright piles.
 - Approximately 200 B-Doubles/articulated vehicle transport additional equipment and materials.
- **Stage 3** – construction, testing and commissioning period, trucks may still transport equipment and materials to the site on a daily basis, but in much fewer numbers than during Stage 2. Up to 10 trucks would visit the site each day during Stage 2, generating a total of 20 truck trips per day; these would be a mix of B-Doubles and articulated vehicles.

Transport routes

The site would be accessed via a private driveway to Blands Lane. Blands Lane connects to Bodells Lane to the east of the site, and to Clear Ridge Road to west of the Site; both Bodells Lane and Clear Ridge Road in turn connect to the Newell Highway.

The following routes will be used:

- For all light vehicle, shuttle bus and truck trips to and from the east, which are expected to comprise the majority of construction vehicle trips, a designated route via Newell Highway – Bodells Lane – Blands Lane.
- For light vehicle and shuttle bus trips to and from the south, which are expected to comprise a minority of construction vehicle trips, a route via Newell Highway (west) – Clear Ridge Road – Blands Lane.

- For truck trips to and from the south, which are expected to comprise a minority of heavy vehicle trips, a route via Newell Highway (south) – Showground Road – Compton Road - Central Road –Clear Ridge Road – Blands Lane. It is noted that the section of this route comprising Showground Road, Compton Road and Central Road is designated as the West Wyalong Heavy Vehicle Bypass.

The following figures provide the construction truck routes.

Figure 21 - Construction Vehicle Access Routes 1: To/From the East

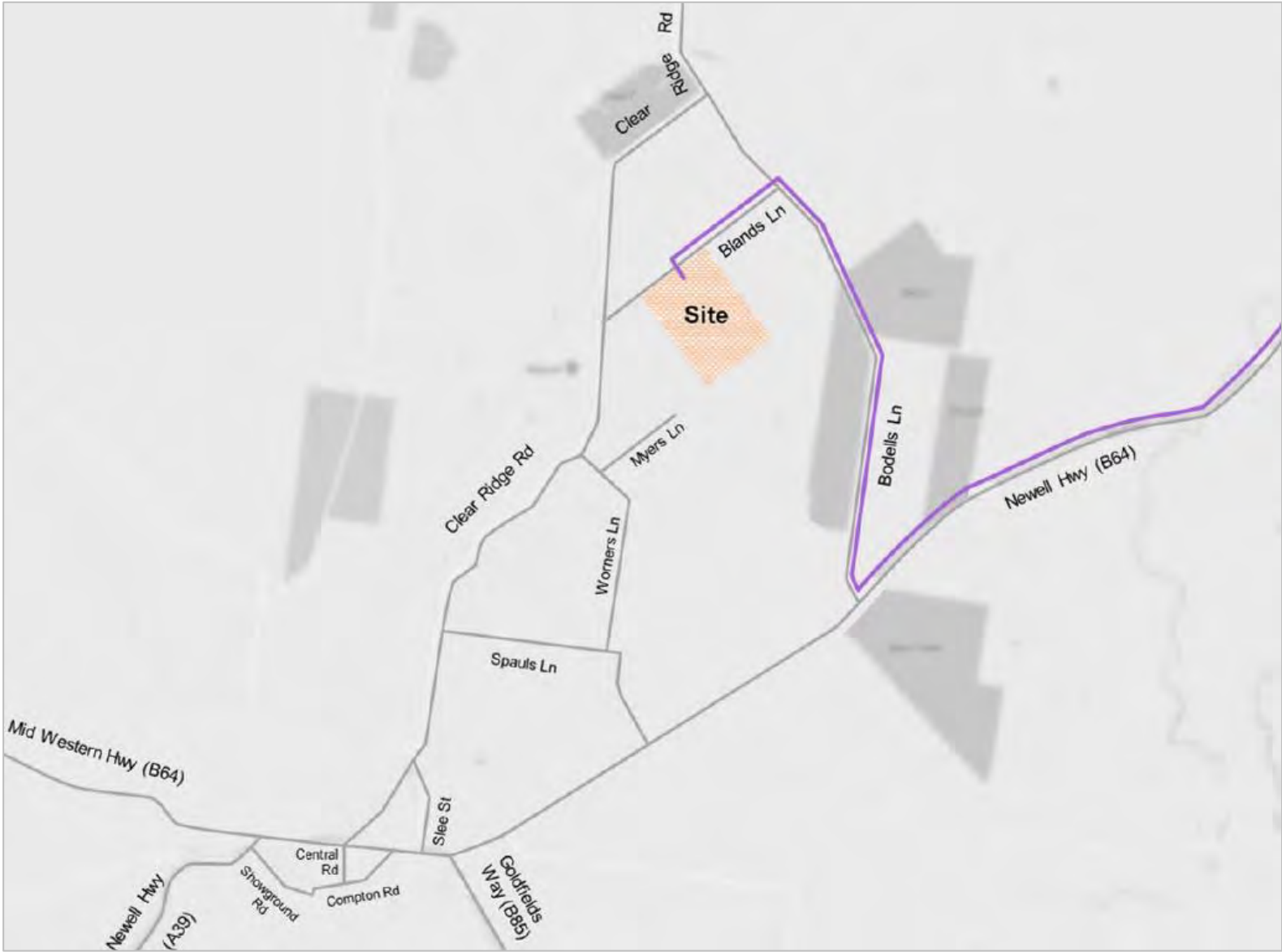


Figure 22 - Construction Vehicle Access Route 2: To/From the South via Bypass

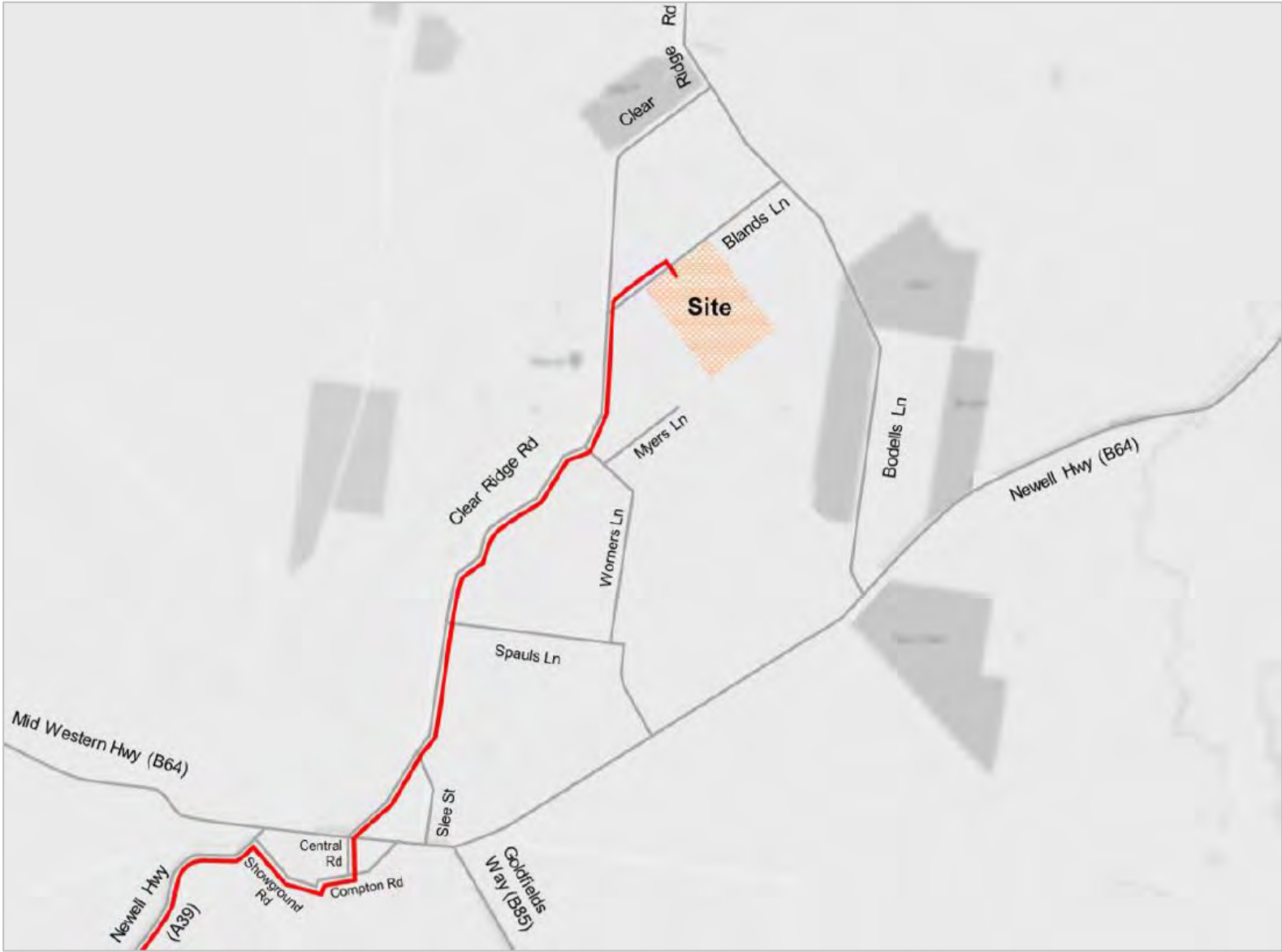


Figure 23 - Construction Vehicle Access Route 3: To/From the South via Newell Highway



Source: Anson Group

Heavy Vehicles

The transportation of the solar panels and other key materials and equipment will be undertaken using B-Doubles and articulated vehicles. These vehicles are expected to be General Access Vehicles (GAVs), i.e. vehicles that are not restricted from using the general road network (other than where a specific restriction is in place).

Construction traffic volumes

The construction of the proposal will generate a significant level of traffic, inclusive of light vehicle trips, (staff) shuttle bus trips, and truck trips over a period estimated at 12 months. Traffic during peak construction (4 months) the site is expected to generate up to 110 vehicle trips per day, including 20 light vehicle trips, 40 shuttle bus trips and 50 truck trips. During this same period, the site is estimated to generate some 30 vehicle trips during a Site peak hour prior to and following construction hours.

4.5.4. Water Use

Non-potable water demand will be very minor as the construction of solar PV farms is not water intensive. Water will be used for dust suppression along site access tracks during dry and/or windy weather conditions.

Options for non-potable water supply being considered include:

- Drawing water from existing farm dams
- Trucking water in
- Harvesting of site surface water (within harvestable rights)

Non-potable water use during construction would be mainly for dust suppression on unsealed roads and watering to re-establish vegetation on disturbed areas.

Based on a staged construction of 50ha per month, with up to 10% disturbance by area, and a dust suppression/watering application depth of 5mm per day, then the daily demand for construction water may be up to 250m³/day during dry weather, but would be significantly less during wet weather. Total water use during construction is expected to be in the order of 75ML per year, which may be sourced from the existing site dams (within the limitations of harvestable rights) plus water transported to site by tanker.

4.5.5. Accommodation locations for construction personnel

The proposal will introduce approximately 300 workers on site during Stage 2 and Stage 3 of the construction process. Construction Workforce

The anticipated construction workforce will be inclusive of:

- Early works: 56 construction workers (max).
- Main works: 300 construction workers (max).

It is expected that the majority of the workforce will be sourced from the local area. Non-local workforce or contractors are likely to come from other areas of NSW and are likely to seek accommodation in West Wyalong as first priority, or other regional centres in the area such as Forbes, Cowra, Young, Parkes and Temora. It is expected the majority of the construction staff movements will be made to/from site using shuttle buses from West Wyalong and other townships in the district.

No temporary construction workforce or on-site services are proposed, and workers will utilise local infrastructure and services. Impact of the construction workforce is addressed in the social economic report (**Appendix O**).

4.5.6. Construction Hours

Construction works will be undertaken during standard construction work hours, which are likely to be as follows:

- 7am to 6pm - Monday to Friday.
- 8am to 1pm – Saturdays.
- No work on Sunday and public holidays.

4.6. OPERATION

4.6.1. Personnel

During the operational phase the solar farm will require up to three employees.

4.6.2. Operational Vehicles, Parking & Access

The operational stage will generate two light vehicles and one heavy vehicle quarterly for servicing and maintenance.

The proposal will be accessed from the north-east corner of Lot 17 via an 8m wide internal road off Blands Lane.

All staff parking will be provided on-site in designated parking areas, which will be constructed with reference to the appropriate Australian Standards during the detailed design stage.

4.6.3. Water Use

The proposal includes water tanks with a combined capacity of 45,000L. The tank levels would be topped up as required from non-potable water supply sources. During operation water will be utilised for the following purposes:

- Potable water for site offices
- Cleaning of PV arrays
- Dust suppression on site access roads
- Topping up a fire fighting water tank

Operational water demands for solar farms are not significant. Total water demand for the site is likely to be less than 25ML per annum, or significantly less than the Harvestable Right of the site (estimated at 43ML). However, the demand would vary significantly with weather conditions, and during

4.6.4. Agricultural Use

The solar panels when attached to the tracking structures will sit approximately 2m high and 4.10m at their peak, which occurs when the tracker is at maximum angle (60 degrees). The height of the panels from the ground will be sufficient to allow for sheep to graze between and underneath the panels throughout the operation of the proposal. Generally, between four and eight sheep can graze per hectare, similar to stocking rates on conventional grassland. The site is not currently subject to grazing, however as part of the commissioning process the site will be planted with suitable grasslands to facilitate grazing of sheep during the operational phase of the proposal.

The solar panels can also provide valuable shelter for the sheep during harsh weather conditions.

4.7. DECOMMISSIONING AND REHABILITATION

The proposal will operate for 30 years. Following this period, the site would either be extended for an optional 10 years or be decommissioned.

Decommissioning would see the site returned to its pre-works state, as agricultural land. During decommissioning all infrastructure introduced to the site for the solar farm will be removed, requiring the following work:

- The solar panels will be unscrewed from the mounting frames and packaged either to send to a solar recycling depot, or if they are still operational they may be sold as second hand.
- The mounting frames horizontal poles will be removed and the piles will be pulled from the ground, the dismantled framework will be bundled and taken for recycling. Because of the slim line 'H' shape of the piles, they will not leave holes like fence posts and therefore only minimal soil back filling is likely to be required.
- The cable trenches will be reopened, with the top soil set aside, and the cables and ducts will be removed. As the cables are removed, the trenches will be backfilled with the soil that has been set aside.

The cables will be bundled and taken for recycling or sale to a scrap metal yard, and the ducts will be disposed of at an approved landfill.

- The inverters, transformers, battery and switchgear cabinets / housing will all be removed from the site using a crane and HGVs for transportation. They can then be broken down off-site, and any reusable parts salvaged for second hand or scrap metal sale, with the remainder disposed of at an approved landfill. The concrete bases for the cabinets / housing will be broken up and removed, this will either be on-sold to aggregate suppliers or disposed of at an approved landfill. The area where concrete has been removed will then be backfilled with good quality soil.
- The fencing and CCTV equipment will be removed from the site and sold for reuse. Any holes left by the fence posts and poles will be backfilled with soil.
- The aggregate used in the internal access roads will be excavated and removed from site (either for reuse or to an approved landfill) and topsoil will be used to backfill.

Any areas excavated during decommissioning (i.e. cabinet foundations, cable trenches etc), will be backfilled with top soil, harrowed, and either seeded with a grass mix or left ready for crops.

There will be no elements of the solar installation left on the site either above or below ground, all infrastructure will be removed for recycling, reuse, or disposal at an approved landfill.

The full decommissioning of the West Wyalong Solar Farm will not exceed four months. The decommissioning phasing will involve:

- 1st month post operation: Disconnection of the solar farm from the electricity grid and electrical isolation of all equipment and plant. Decommissioning and removal of frames and PV panels.
- 2nd month post operation: Continued removal of frames and PV panels. Removal of substation, transformers, inverters and other associated buildings and equipment.
- 3rd month post operation: Continued decommissioning of equipment and removal of building foundations and buried cables. Removal of fencing.
- 4th month post operation: Site restoration and levelling including landscaping/seeding of the site where necessary in accordance with good agricultural practice (prepared and seeded or left as bare soil, as preferred by the landowner).

5. CONSULTATION

The SEARs require that the proponent consults with relevant local, State and Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners, exploration licence holders, quarry operators and mineral title holders. This includes undertaking detailed consultation with affected landowners surrounding the proposed site.

This section describes the consultation that was carried out with the relevant stakeholders. It identifies issues raised during this consultation and explains how these issues have been addressed in the EIS.

Different methods of stakeholder engagement were used in order to gain feedback on the proposal, including:

- **Community information booklet** – this document provided proposal information presented in printed format (double sided A3). The booklet presented an informative brochure providing an overview of the proposal, high level concept design and proposal timeframes. It also included:
 - The strategic context of renewable energy within Australia.
 - A description of the West Wyalong solar installation, including specific proposal statistics.
 - Why this site is suitable for a solar installation.
 - Local community benefits.

This was distributed to approximately 1,350 businesses and households in Wyalong and West Wyalong 2 weeks prior to the major community event and also included an invitation to the event. The purpose of this mailout was to notify local community of the proposal and provide an invitation to and details of the community information session. It also included the proposal team's contact details.

The community information booklet was delivered to homes in Wyalong and West Wyalong on 24 October 2018.

- **Local newspaper advert** – 1 week prior to the community information session, the event was addressed in the West Wyalong Advocate.

The newspaper advert inviting community to the information session was printed on 31 October 2018.

- **Community Information Session** – This event was held as a drop-in session held at the West Wyalong Services and Citizens Club, West Wyalong. The event was held between 4pm – 7pm in order to cater to a wide demographic of the population.

The community was invited to attend the event in order to gain further information on the proposal, and to meet members of the proposal team. Various collateral was prepared for the event, including:

- A1 informative boards.
 - Frequently Asked Questions (FAQ) sheet.
 - Community response form.
 - The community information session was held on 7 November 2018.
- **One-on-one meetings and/or discussions with key stakeholders** – key stakeholders and groups were introduced to the proposal through provision of the community information booklet and following this, were contacted to follow up on any clarifications they required. These stakeholders included:
 - Bland Council.
 - Surrounding land owners.
 - Quarry operators.
 - Exploration licence holders.
 - Mineral title holders.

- Registers Aboriginal Organisations.
- Interest groups utilising adjacent land.

Meetings and discussions provided key stakeholders an opportunity to ask questions about the proposal or provide comments relating to the proposal. It also provided the proposal team with an ability to respond directly to any questions raised.

The one-on-one meetings were held on 7 November 2018. A proposal briefing was given to Council on 18 October 2018.

- **Local newspaper media releases** – a media release was provided to local media sources one day after the community information session. A second media release may be released in the future if considered appropriate at the time. Currently, only one media release has been circulated.
- A media release was provided to media on 10 November 2018.

5.1. LOCAL COMMUNITY

On 7 November 2018, between 4pm – 7pm a community information session was held. The consensus from attendees was one of genuine interest in the proposal. Issues raised during this session and clarifications sought are included in **Table 11** below.

Table 11 – Summary of issues - local community

Theme	Feedback	Response
Definition of specific site location	Due to another solar installation in North Wyalong, the community has become confused with the relationship between this installation and the proposal. As a result, the proposal team understands the need to clarify the proposal's location.	The A1 boards used at the community information session included a site location that clearly detailed the location of the proposal.
Personal access to the power generated – clarification sought for whether the power generated would benefit consumer's power bills	The benefit of the power to be generated was clearly stipulated to increase capacity on a large scale, not individual level.	No action required.
Impact of traffic during construction	<p>The intent of traffic management plan to be prepared in the next phase of the proposal was used as a means to detail the traffic impacts.</p> <p>Both temporary and permanent measures required during the construction and future operation of the proposal are being investigated.</p> <p>It is anticipated that no major long-term impacts will occur, due to the non-permanent on-site staff</p>	No action required at the moment – the traffic management plan will be made public through the standard DA notification process.

Theme	Feedback	Response
	throughout the construction and operation stages.	
Extent of glare from the panels	The solar panels are made of a non-reflective coating to increase efficiency.	No action required.
Delivery of more than one major solar installation in the region	It was clearly stipulated that the proposals were in no way interrelated. Therefore, each proposal will be subject to their own standard planning process and assessment by DPE.	No action required.
Easements – infrastructure delivery over adjacent property was as means to reduce the impact on vegetation in Myers Lane	Discussions between Lightsource BP and the adjacent landowner over the potential to divert an easement across the eastern part of their land, have not been reached. Therefore, the proposal will connect to the transmission line via a connection along Myers Lane.	Connection to the grid will be delivered along Myers Lane.
Visual impact	No concerns who raised by surrounding land owners about the potential visual impact of the solar farm.	No action required.

5.2. BLAND SHIRE COUNCIL

On 18 October 2018, the proposal team along with representatives from Lightsource BP, Urbis and Urban Unity attended a meeting and site visit with representatives of the Council. The meeting aimed to provide an opportunity to present the proposal to representatives of the Council and clarify any issues that Council may wish to discuss.

The meeting enabled discussions around the timing and delivery of the proposal. No specific concerns were raised during both the presentation and discussions.

The Council presentation is contained in Attachment H of **Appendix P**.

5.3. REGISTERED ABORIGINAL PARTIES

The Registered Aboriginal Organisations have been engaged by consulting team, Artefact.

Table 12 – Summary of issues - Registered Aboriginal Parties

Theme	Feedback	Response
WWSF Bee Tree	<ul style="list-style-type: none"> Should be fenced at the dripline. Noted tree is located between the boundary fence and the 2m 	<ul style="list-style-type: none"> Notation on Landscape strategy plan. No response required.

Theme	Feedback	Response
	<p>fence surrounding the solar panels.</p> <ul style="list-style-type: none"> • Agreement on need for permanent (life of the solar farm) fencing of a NO GO zone around tree. • Signage: debate about whether the sign should state this is an area of cultural heritage. Concerns that identifying the area as a cultural site would lead to vandalism. On the other hand, that not identifying the area could lead to accidental destruction. Young LALC agrees to go with whatever West Wyalong LALC would prefer. • Tree health to be checked on in conjunction with the maintenance of the proposal planting along Blands Lane. 	<ul style="list-style-type: none"> • Fencing to be provided and noted on the landscape strategy plan. • Decision to be made by the West Wyalong LALC. • Proposed condition of consent subject to approval.
Artefacts	<ul style="list-style-type: none"> • Surface collect of WWSF IF01 and WWSF IF02 and the artefacts within WWSF AS01 that will be impacted, leave the 4 between the boundary fence and the 2m fence. • Artefacts to be analysed by Artefact's artefact specialist. Discussion as to whether the artefacts be reburied or placed with the WW LALC as a teaching collection (Young LALC state happy with West Wyalong LALC to have final say and to let West Wyalong LALC use these for a teaching collection). • Surface collection to be conducted by two Artefact staff and representatives of West Wyalong and Young LALCs. Collection and analysis to be conducted in the same trip. 	<ul style="list-style-type: none"> • Proposed recommendation by Artefact. • Decision to be made by the West Wyalong LALC. • Recommendation by Artefact.

Theme	Feedback	Response
Other	Young LALC note their (absent) elders would insist that a representative of Young LALC be present during any ground disturbance such as for cable installation. Such opportunities to inspect exposed soil condition and potential soil inclusions are not common and are of great value to them in gaining better knowledge of potential soil and archaeological conditions in the region.	<ul style="list-style-type: none"> Noted and this request can be coordinated by Artefact with the elders prior to the ground disturbance.

5.4. NSW FREE FLIGHT SOCIETY

The NSW Free Flight Society (NSW FFS) has ownership of land directly west of the site and as such were identified as a key stakeholder in the proposal. The proposal team met with a representative of the society on 7 November 2018.

Further, as a direct result of this meeting and subsequent consultation between the applicant and the NSW FFS regarding the issues raised in **Table 13** below, the NSW FFS has agreed to submit a letter of no objection to the proposal construction and location.

Table 13 – Summary of key issues - NSW Free Flight Society

Theme	Feedback	Response
Site access	<p>The proposal can only be accessed by trained professionals who understand the function and operation of solar arrays.</p> <p>If public access is needed to the proposal, operational staff will be available.</p> <p>During major events at the NSW FFS, a suitably qualified staff member will be present at the proposal site.</p>	<p>The solar arrays and site fencing have been setback 100m from the south-western boundary to allow NSW FFS members to retrieve any craft that overshoot their property boundary.</p> <p>Ongoing engagement with NSW FFS will be undertaken prior to construction commencing and will continue through the operational phase, with Lightsource BP operations contact details made accessible to members to facilitate the retrieval of any craft that cross the 100m buffer and land within the fenced solar farm.</p>
Potential heat island effect	<p>PV panels are not designed to radiate heat, with the energy coming into the site, from the sun, remaining the same, there will be no increase in energy input. Panels operate best when cool.</p> <p>Increases in temperature may occur during the day up to 10m around the panels when compared</p>	<p>The solar arrays and site fencing have been setback 100m from the south-western boundary. The solar arrays will not result in any increased temperatures adjacent to the south-western boundary.</p> <p>The setback has addressed the concerns raised by the NSW FFS</p>

Theme	Feedback	Response
	to surrounding farmland. Anything beyond 10m generally experiences no increase in temperature	
Liability for damage	Lightsource BP is aware of liability for damage issues. In the event that any damage is caused by craft entering the site by accident, then Lightsource BP has determined that no such liability will be imposed to NSW FFS.	No action required

5.5. QUARRY OPERATORS, EXPLORATION LICENCE HOLDERS & MINERAL TITLE HOLDERS

5.5.1. Engagement with Quarry Operators

On 1 November 2018, Lightsource BP emailed a community information booklet to the relevant quarry operators. Millers Metals, Cleary P + AL and iMinco (Cowl Gold Operation West Wyalong). A follow up call was conducted on 5 November 2018, with no response received from two of the parties and a referral to another contact by Millers Metals was received, this conversation was recorded.

Lightsource BP conducted a follow up call to Millers Metals on 29 November 2018, with no response; with a further call placed during the week ending 3 December 2018.

Lightsource BP followed up call to Cleary P + AL and iMinco on 3 December 2018, with no interests in the proposal expressed by iMinco. Cleary P + AL similarly expressed no interest in the proposal, but were willing to discuss future work opportunities that may arise through the delivery of the proposal.

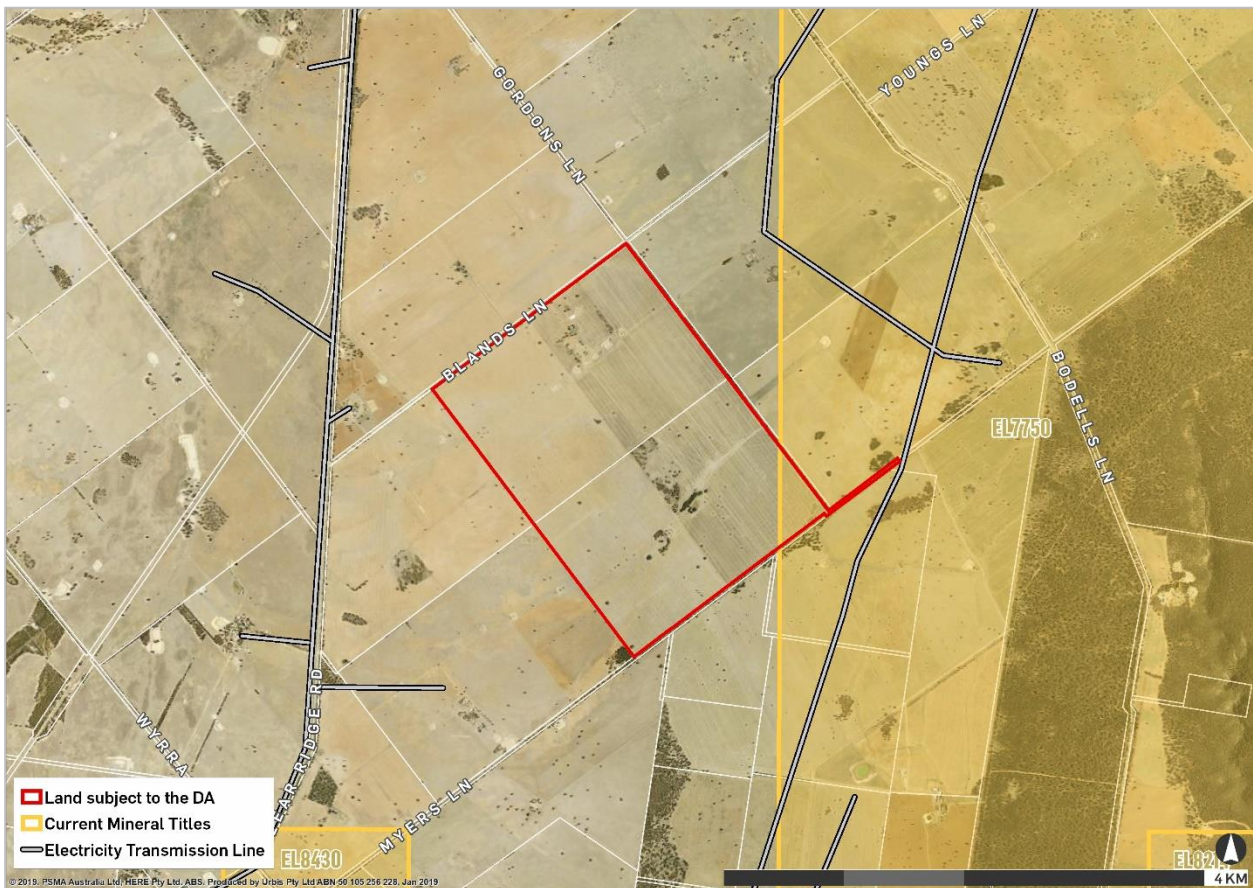
5.5.2. Engagement with Mining Exploration Licence Holders

Following issue of the SEARs, one relevant exploration licence holder was identified as overlapping the south-eastern boundary of the site, being Evolution Mining (Cowl) Pty Limited Exploration Licence (EL) 7750. In accordance with the SEARs, the applicant undertook a search of current mining and exploration titles and applications. The location of EL 7750 relative to the site is shown at **Figure 24**.

On 1 November 2018, a community information booklet was emailed to Evolution Mining (Cowl), St Barbara Limited, Argent Minerals, Sandfire Resources NL and Goldfields Australasia. The latter responded with no clarifications sought or queries in relation to the proposal.

On 5 November 2018, a follow up call was made to Evolution Mining and St Barbara Limited, with no response received. Further follow up correspondence was made with no response.

Figure 24 – Exploration Licence (EL7750) overlapping the south-eastern corner of the proposal site.



Source: Urbis GIS

5.6. ESSENTIAL ENERGY

Essential Energy has been engaged with the proposal since 2016 and has provided the required information to determine the feasibility of connecting the proposal to the grid. Several face to face meetings have occurred in 2018 to advance the final stages of the process.

6. PLANNING ASSESSMENT

6.1. COMMONWEALTH LEGISLATION

6.1.1. Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Department of the Environment and Energy (DEE). Under the EPBC Act, if the Minister determines that an action is a 'controlled action' which would have or is likely to have a significant impact on a matter of National environmental significance (MNES) or Commonwealth land, then the action may not be undertaken without prior approval of the Minister.

The following are identified as MNES:

- World Heritage Properties.
- National heritage places.
- RAMSAR wetlands of international significance.
- Threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining).

When a person proposes to take an action that they believe may be a 'controlled action' under the EPBC Act, they must refer the proposal to the DEE and seek a decision about whether the proposed action is a 'controlled action'.

A search of the Commonwealth Protected Matters Search Tool (10km radius) indicates that there are no World Heritage Properties or National Heritage Places within or near the site. The search results listed four wetlands of International Importance that are either known to occur or have potential to occur in the area, however these are not relevant to the site or the proposal as they are located approximately 600-800km upstream. Three listed threatened ecological communities, 23 listed threatened species and 11 listed migratory species were identified within 10km of the site.

Two EPBC listed TECs were identified within the Project Site:

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia; and
- Weeping Myall Woodlands.

A total of 1.03 hectares of Weeping Myall Woodland will be removed for the proposed development. Given that this vegetation type appears to be poorly represented in the locality, an EPBC referral is recommended.

One EPBC listed threatened bird species was detected within the site, the Painted Honeyeater. All woodland areas are considered to constitute habitat for this species. Approximately 1.83 hectares of habitat will be removed by the proposed development.

SLR Consulting are currently (at the date of this report) preparing the EPBC referral, based on the EPBC Significant Impact Guidelines, to be made to the Department of Environment and Energy.

6.1.2. Native Title Act 1993

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

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

A search of the Register of Native Title Claims was conducted in July 2018. The results identified that there are no native title claims, recorded on or near the site.

6.1.3. Renewable Energy (Electricity) Act 2000

The *Renewable Energy (Electricity) Act 2000* aims to:

- Encourage the generation of electricity from renewable sources.
- Ensure renewable energy sources align with the principals of Ecologically Sustainable Development.
- Reduce GHG emissions produced by the electricity sector.
- Solar energy is listed as an eligible renewable energy source under section 17 of this Act.

The proposal aligns with the aims of the *Renewable Energy (Electricity) Act 2000*, because it will generate significant quantities of renewable energy, whilst emitting negligible GHG emissions. The principles of Ecologically Sustainable Development have been addressed Section 6.2 of this EIS.

6.2. NSW LEGISLATION

6.2.1. Environmental Planning and Assessment Act 1979

The EP&A Act and its associated regulations and environmental planning instruments set out the framework for development assessment in NSW. Development assessment provisions are contained in Part 4 of the EP&A Act. Section 4.36 provides that a development would be SSD if it is declared to be SSD by a State Environmental Planning Policy (SEPP).

Objects of the EP&A Act are identified and the proposal assessed against them in **Table 14** below.

Table 14 – Objects of the Act

Object	Consideration
<i>The proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment</i>	<p>The proposal has been located and designed accordingly that it would avoid protected natural environment areas. The subject site is zoned RU1 Primary Production under the <i>Bland Local Environmental Plan 2011</i>. Solar farms are compatible use within this land use zone as they are permissible as electricity generating works. The site is located on land that is relatively flat, largely cleared of any vegetation and achieves significant hours of sunlight daily and is suitable for solar farms.</p> <p>The proposed construction and ongoing use will minimise the use of natural and artificial resources. Its proposed use will allow the provision of a source of renewable energy feeding into the Australian Energy Grid. Thus, it will contribute to a better and more sustainable natural environment, reduce Australia's greenhouse gas emissions and more broadly contribute to the adverse impact of global climate change.</p> <p>The proposal will benefit the social and economic welfare of the community and broader Australian population during construction and ongoing operation through the provision of jobs during construction and ongoing use of benefit to the Australian Economy and GDP.</p>

Object	Consideration
<i>The promotion and co-ordination of the orderly and economic use and development of land</i>	The proposal represents the effective, orderly and economic use of the land, noting that the proposed will be on the site for 30 and potentially up to 40 years.
<i>The protection, provision and co-ordination of communication and utility services</i>	<p>The proposal is a form of development providing renewable energy which is an essential utility service to the benefit of the Australia population and economy.</p> <p>The proposal ensures the protection of existing transmission lines which run north-south from Lake Cowal Mine to Temora to Wagga North near the eastern portion of the development site.</p>
<i>The provision of land for public purposes</i>	The objective is not applicable to the proposal.
<i>The provision and co-ordination of community services and facilities</i>	The objective is not applicable to the proposal.
<i>The protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats</i>	<p>During the preparation of this EIS a detailed assessment of the proposal against the relevant criteria of the Biodiversity Conservation Act 2016 (NSW) and a suite of technical studies were undertaken to identify, remove or mitigate any potential adverse impacts against flora and fauna within or adjacent to the site during construction, operation and decommissioning phases.</p> <p>As demonstrated in section 7 and the attached assessments the proposal will have minimal impacts upon flora and fauna.</p>
<i>Ecologically sustainable development</i>	<p>The EP&A Act adopts the definition for Ecological Sustainable Development (ESD) found in the <i>Protection of the Environment Administration Act 1991</i>. Section 6(2) states that ESD requires the effective integration of economic and environmental considerations in decision making processes and that ESD can be achieved through the implementation of:</p> <ul style="list-style-type: none"> (a) the precautionary principle; (b) inter-generational equity; (c) conservation of biological diversity and ecological integrity; and (d) improved valuation, pricing and incentive mechanisms. <p>The precautionary and intergenerational equity principles have been applied to the proposal via a thorough and rigorous assessment of potential environmental impacts of the proposal.</p>
<i>The provision and maintenance of affordable housing</i>	<p>No residential uses are proposed as part of the proposal.</p> <p>The objective is not applicable to the proposal.</p>
<i>To promote the sharing of the responsibility for</i>	The proposal allows the sharing of the responsibility between the different levels of government in the State of NSW.

Object	Consideration
<i>environmental planning between the different levels of government in the State, and</i>	
<i>To provide increased opportunity for public involvement and participation in environmental planning and assessment</i>	During the preparation of this EIS consultation was undertaken with the key community and agency stakeholders and discussed and documented in section 5 and Appendix P of this EIS.

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

Under Schedule 1, Part 20 of *State Environmental Planning Policy (State and Regional Development) 2011* (S&R SEPP), electricity generating works with a capital investment value of more than \$30 million is declared to be SSD. The proposal has an estimated capital investment value is \$136,660,00 it is classified as SSD under Part 4 of the EP&A Act.

6.2.3. State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP) aims to facilitate the effective delivery of infrastructure across NSW by identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure.

In particular, matters of consideration with respect to the proposal are:

- Division 4 – Clause 34(1) – Solar energy systems.
- Division 5, Subdivision 2 – Clause 45 – Determination of development applications.

Table 15 provides an assessment of the proposal against relevant provision of SEPP Infrastructure.

Table 15 – SEPP Infrastructure Assessment

Object	Consideration
Clause 34(1) <i>Development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special zone.</i>	<p>A prescribed rural zone is defined in clause 33 of the Infrastructure SEPP as follows:</p> <p><i>‘prescribed rural zone means any of the following land use zones or a land use zone that is equivalent to any of those zones:</i></p> <p><i>Zone RU1 Primary Production,</i></p> <p><i>Zone RU2 Rural Landscape,</i></p> <p><i>Zone RU3 Forestry,</i></p> <p><i>Zone RU4 Primary Production Small Lots.’</i></p> <p>Electricity generating works is defined in clause 33 of the Infrastructure SEPP as follows:</p> <p><i>‘electricity generating works means a building or place used for the purpose of making or generating electricity’.</i></p>

Object	Consideration
	<p>The proposal is classified as electricity generating works and is located on land zoned RU1 – Primary Production under the <i>Bland Local Environmental Plan 2011</i> (BLEP 2011).</p> <p>The proposal is permitted with consent under clause 34(1) of the Infrastructure SEPP.</p>

6.2.4. State Environmental Planning and Policy No 33 – Hazardous and Offensive Development

State Environmental Planning Policy No. 33 – Hazardous and Offensive Developments (SEPP 33) seeks to control potentially hazardous and offensive developments and to ensure appropriate safety features are installed at a solar farm to ensure the risks to surrounding land uses is minimised.

The policy includes a guideline that assists government and industry alike in determining whether SEPP 33 applies to a specific development. The guideline, “Applying SEPP 33 - Hazardous and Offensive Developments” provides a list of threshold levels, for the storage of Dangerous Goods (DGs), above which the regulator considers the DG storage to be potentially hazardous. In the event the threshold levels are exceeded, SEPP 33 applies and a Preliminary Hazard Analysis (PHA) is required, followed by a series of hazard analysis studies stipulated by the DPE in the conditions of consent.

A review of the quantities of DGs against the threshold levels listed in SEPP 33, determined that the SEPP criteria is not exceeded. Further, as the products stored at the site are not subject to SEPP 33, the transportation of these products is permissible.

As the solar farm is not classified as potentially hazardous, it is not necessary to provide a PHA for the proposal as SEPP 33 does not apply.

6.2.5. State Environmental Planning and Policy No 44 – Koala Habitat Protection

State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44) encourages the conservation and management of natural vegetation that provides habitat for Koalas. Koalas are listed under the *Biodiversity and Conservation Act 2016* as a vulnerable species. SEPP 44 is currently being amended by DPE. Key changes to the amended SEPP relate to the following:

- Definitions of koala habitat;
- List of Koala feed tree species;
- Lists of Councils to which the SEPP applies; and
- Changes to the development assessment process.

SEPP 44 applies to each LGA listed in Schedule 1. Bland Shire LGA is not listed in Schedule 1, therefore SEPP 44 does not apply to the Proposal. Further, through the BDAR study, no Koala feed trees were identified within the site SEPP 44 is not relevant.

6.2.6. State Environmental Planning Policy No 55 – Remediation of Land

The *State Environmental Planning Policy No 55 – Remediation of Land* (SEPP 55) aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.

A soil survey was conducted as part of the Geotechnical studies (**Appendix I**), finding the site to primarily consist of topsoil over stiff to very stiff alluvial clays. For this reason, it is anticipated that soil materials encountered on the site can generally be excavated with conventional earth moving equipment.

Soil testing will be undertaken during the construction stage of the proposal. An Erosion and Sediment Control Plan (ESCP) will be prepared as part of the Construction Environmental Management Plan (CEMP)

to ensure that the correct procedures are adhered to. Geotechnical and contamination issues are addressed in further detail in Section 7.6 and **Appendix I**.

6.2.7. Other Legislation

Other NSW legislation that is relevant to the assessment of the proposal is summarised in **Table 16**.

Table 16 – NSW Legislation table

Legislation	Applicability
State Environmental Planning Policy (Rural Lands) 2008	<p>Clause 13 of the <i>Statement Environmental Planning Policy (Rural Lands) 2008</i> (Rural Lands SEPP) identifies land as being State Significant Agricultural Land if it is listed in Schedule 2. Schedule 2 does not currently identify any land.</p> <p>The proposal location is not identified as Biophysical Strategic Agricultural Land (BSAL). Therefore, the Rural Lands SEPP does not apply.</p>
Crown Lands Management Act 2016	<p>Myers Lane will be used to connect the solar farm to the existing transmission line. Myers Lane is a Crown Road. A licence under <i>Crown Lands Management Act 2016</i> will be required for these works.</p>
Roads Act 1993	<p>Approval RMS and/or Bland Shire would be required under section 138 of the <i>Roads Act 1993</i> (Roads Act) as the relevant Roads Authority will be required to erect a structure or carry out work in, on or over a public road.</p> <p>Bland Shire and RMS would both be consulted regarding the use of roads during construction and for construction and operational site access as required.</p>
Native Vegetation Act 2003	<p>This Act regulates the clearing of native vegetation and applies to the state of NSW. An assessment will be required as it is proposed to clear native vegetation as part of this proposal.</p> <p>The BDAR studies determined that approximately 1.83 ha of native vegetation will require removal for the proposal. This vegetation comprises 0.8 ha of 'Belah woodland' and 1.03 ha of Weeping Myall open woodland. This vegetation is located within the Myers Lane road reserve in the south-east corner of the proposal site. The removal of this vegetation is required to establish a connection with the powerline located to the north.</p> <p>Recommendations and mitigation measures have been used to inform the proposed layout of the proposal to reduce potential impacts to biodiversity values.</p>
National Parks and Wildlife Act 1974	<p>The <i>National Parks and Wildlife Act 1974</i> (NPW Act) outlines the approval requirements for work in the vicinity of Aboriginal heritage and provides for the protection of flora and fauna. While it is not necessary to obtain an Aboriginal Heritage Impact Permit (AHIP) for SSD, the potential to impact Aboriginal sites has been investigated.</p> <p>The ASR report identified four newly identified Aboriginal sites within the proposal area and identified part of the site to be of moderate Aboriginal archaeological sensitivity. The proposed layout is designed in consideration of these sites, with a buffer zone provided for the Bee Tree, which is a cultural modified tree of significance. The ASR has provided recommendations to mitigate the impact of the</p>

Legislation	Applicability
	<p>proposal on these areas. These recommendations will be ratified through consultation with the registered Aboriginal parties (RAP).</p> <p>The BDAR identified a range of recommendations to help reduce the impact of the proposal upon existing flora and fauna species, these are discussed in Section 7.3.4 of the EIS.</p>
Heritage Act 1977	<p>Development or activities cannot be carried out which may affect an item listed on the State Heritage Register without approval under section 60 of the <i>Heritage Act 1977</i> (Heritage Act). An approval under Part 4 or an excavation permit under section 139 of the Heritage Act is not required for SSD.</p> <p>No items of European heritage are located at the proposal site or surrounding area.</p>
Contaminated Land Management Act 1997	<p>Section 60 of the <i>Contaminated Land Management Act 1997</i> (CLM Act) imposes a duty on landowners to notify the Office of Environment and Heritage (OEH), and potentially investigate and remediate land if contamination is above levels set by the Environmental Protection Authority (EPA).</p> <p>Soil testing is to be undertaken at the construction stage of the development. Implementation of the CEMP will ensure that the correct procedures are met. Geotechnical and contamination issues are addressed in further detail in Section 7.6 and Appendix I.</p>
Water Management Act 2000	<p>Water use approval, water management work approval and activity approvals are required under sections 89, 90 and 91 of the <i>Water Management Act 2000</i> (WM Act). These approvals are not required for SSD.</p> <p>The Water Management Report (Appendix M) determined that the proposal will have a low impact on the environment and existing condition of surface and ground waters. This is the result of the absence of broad-scale reshaping of the landform or excavation, apart from the relatively small areas to be associated with the internal roads, site facilities / infrastructure and substation.</p>
Protection of the Environment Operations Act 1997	<p>The <i>Protection of the Environment Operations Act 1997</i> (POEO Act) is the key piece of legislation for environmental protection in NSW. The POEO Act also clearly outlines pollution offences relating to land, water, air and noise pollution and includes a duty to report pollution incidents.</p> <p>Solar energy generation does not fall within the definition of electricity generation under Schedule 1 of the POEO Act and therefore does not require an environmental protection licence (EPL).</p>
Waste Avoidance and Resource Recovery Act 2001	<p>The <i>Waste Avoidance and Resource Recovery Act 2001</i> (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:</p> <ul style="list-style-type: none"> • Avoidance of unnecessary resource consumption; • Resource recovery (including reuse, reprocessing, recycling and energy recovery); and • Disposal.

Legislation	Applicability
<i>Mining Act 1992</i>	<p>Resource and waste management is assessed at Section 7.12.</p> <p>The main objective of the <i>Mining Act 1992</i> is to encourage and facilitate the discovery and development of mineral resources in NSW, having regard to the need to encourage ecologically sustainable development (ESD).</p> <p>The land within the Proposal site is subject to the following authorities under the <i>Mining Act 1992</i>:</p> <p>EL7750 – Evolution Mining (Cowal) Pty Limited</p> <p>No activities authorised by the exploration licence have been carried out on land within the Proposal site.</p> <p>Lightsource BP and Urban Unity have consulted with the authority holder and the details and outcomes of the consultation are provided in Section 5 and Appendix P.</p>
<i>Biosecurity Act 2015</i>	<p>The <i>NSW Biosecurity Act 2015</i> is a statutory framework to protect the NSW economy, environment and community from the negative impact of pests, diseases and weeds. The primary object of the Act is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers. In NSW, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.</p>
<i>Biodiversity and Conservation Act 2016</i>	<p>The <i>Biodiversity Conservation Act 2016</i> (BC Act) is a regulatory framework for assessing and offsetting the biodiversity impacts of proposals and activities. The Act contains provisions relating to flora and fauna protection, threatened species and ecological communities listing and assessment, a single BAM, and a Biodiversity Offsets Scheme (BOS) for the calculation and retirement of biodiversity credits and biodiversity assessment and planning approvals. The BC Act has been considered in the preparation of this EIS and in the provision of a Biodiversity Development Assessment Report (BDAR) and BOS.</p>
<i>Fisheries Management Act 1994</i>	<p>The Department of Primary Industries (DPI) administers the Fisheries Management Act 1994 (FM Act). The broad objective of the FM Act is to conserve, develop and share the fishery resources of the State for the benefit of present and future generations.</p> <p>Part 7 of the Act deals with the protection of aquatic habitats and Part 7A deals with threatened species conservation. When assessing and either approving or refusing proposals for developments or other activities affecting fish habitats, DPI take into account their Policy and Guidelines for Fish Habitat Conservation and Management (DPI 2013b).</p> <p>A BDAR has been prepared as part of this EIS to identify the potential impacts of the proposal on biodiversity. The outcomes of the BDAR are provided in Appendix E.</p>

6.3. BLAND LOCAL ENVIRONMENTAL PLAN 2011

The proposal is defined as solar energy system and is permissible with consent under clause 34(1) and (7) of the (SEPP Infrastructure). Consent may be granted under Part 4 of the EP&A Act.

State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP) declares the proposal to be SSD as it is a development for the purpose of electricity generating works with a capital cost of greater than \$30 million (clause 20, Schedule 1).

While the provisions of the Infrastructure SEPP prevail over the provisions of *Bland Local Environmental Plan 2011* (Bland LEP 2011), the following demonstrates consistency of the proposal with the principles of the zone objectives.

Table 17 – Bland LEP 2011

Objective	Proposal
RU1 Primary Production	
<i>To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.</i>	For the life of the proposal, the subject area would harness a renewable natural resource. Further, being highly reversible and involving limited ground disturbance, the proposed works would not remove the potential to use the land for primary production at the end of the life of the proposal.
<i>To encourage diversity in primary industry enterprises and systems appropriate for the area.</i>	The solar farm will offer a diversity in primary industry enterprises and systems suitable for the area and topography of the site.
<i>To minimise the fragmentation and alienation of resource lands.</i>	The proposal will not fragment resource lands. The site is not currently used for productive agricultural purposes. The proposal includes the planting of pasture grasses suitable for the grazing of sheep.
<i>To minimise conflict between land uses within this zone and land uses within adjoining zones</i>	The proposal will minimise conflict between land uses within this zone and land uses within adjoining zones through considered design.
<i>To ensure that development on land within this zone does not unreasonably increase the demand for public services or public facilities.</i>	The proposed solar farm development will result in an increase in demand for public services and facilities. However, this increase is considered reasonable because it will only be temporary during the construction phase of the development.

6.4. LARGE-SCALE SOLAR ENERGY GUIDELINE

The NSW Government released a new guideline for large-scale solar energy proposals on 11 December 2018, to complement the Secretary's environmental assessment requirements. This guideline provides the community, industry, applicants and regulators with information on the planning framework for the assessment and approval of State significant large-scale solar energy proposals.

The framework encourages early, genuine consultation with local communities about new large-scale solar proposals, and it encourages the developers of large-scale solar proposals to choose their site carefully so that conflicts with established land uses can be addressed properly.

The guidelines set out:

- Who to consult when preparing a large-scale proposal, including government agencies, potentially affected land owners and community groups.
- Key site constraints to carefully consider when selecting a site for a large-scale solar proposal including visibility, biodiversity, important agricultural land, residences, natural hazards, mining and petroleum exploration lease and Crown lands.
- Key assessment issues in an Environmental Impact Statement such as government climate and energy policies, potential conflicts with other land uses such as agriculture and residences, traffic and transport risk screening for battery storage installations.

An assessment of the proposal against the requirements of the guideline are detailed in below.

Table 18 – Large Scale Solar Energy Guideline

Requirement	Addressed in EIS
Other approvals needed	
<p>Commonwealth approval – Under the <i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Commonwealth) (EPBC Act), an approval from the Commonwealth Government may be required if a development is likely to have significant impact on matters of national environmental significance or other protected matters. This includes (but is not limited to) listed threatened species and ecological communities.</p> <p>Applicants are encouraged to discuss their proposal with the Department early in the assessment process to understand if approval under the EPBC Act is likely to be required.</p> <p>An applicant must refer their proposal to the Commonwealth Department of Environment and Energy if it is likely to have a significant impact on matters of national environmental significance.</p>	<p>The EPBC Act identifies NES as including the following:</p> <ul style="list-style-type: none"> • World heritage properties. • National heritage places. • Wetlands of international importance (Ramsar Wetlands). • Threatened species and ecological communities. • Migratory species. • Commonwealth marine areas. • The Great Barrier Reef Marine Park. • Nuclear actions (including uranium mining). • A water resource, in relation to coal seam gas development and large coal mining development. <p>The investigations undertaken in response to the SEARs and annexed to this EIS do not identify any items of NES. A referral under the EPBC Act is required as per Section 3.6 of the BDAR.</p>
<p>Subdivision of land – Some sites may require the subdivision of land to support the proposal. For</p>	<p>The proposal involves the installation of transformers and a customer and site substation. It will be</p>

Requirement	Addressed in EIS
<p>example, subdivisions may be required for substation within a proposal site, or for land that will be leased for longer than five years.</p> <p>Local councils are generally the relevant consent authorities for subdivisions and applicants should discuss subdivision options with the relevant council and Department.</p>	<p>necessary to create a separate lot on which the customer substation will be located. A separate DA will be lodged with Bland Shire Council to create the lot when the substation is constructed.</p>
<p>Planning approval for network connections</p> <p>State Significant development: applies if the applicant includes the network connection works in the development application for the State Significant solar energy proposal.</p>	<p><i>State Environmental Planning Policy</i> (State and Regional Development) 2011 (SRD SEPP) declares the proposal to be SSD as it is development for the purpose of electricity generating works with a capital cost of greater than \$30 million (clause 20, Schedule 1).</p> <p>Section 4.12 of the EP&A Act requires a development application for SSD to be accompanied by an EIS prepared in accordance with the EP&A Regulation. This EIS has been prepared in accordance with Part 4 of EP&A Act and Schedule 2 of the EP&A Regulation.</p>
Stakeholder engagement	
<p>Government – consultation with relevant agencies at the local, State and Commonwealth levels, including:</p> <ul style="list-style-type: none"> • Local Council. • NSW Government Agencies. • Commonwealth Government. 	Section 5 and Appendix P
<p>Community – consultation with affected landowners, special interest groups and other stakeholders, including:</p> <ul style="list-style-type: none"> • Local land owners. • Special interest groups. • Aboriginal community members. • Other potentially affected stakeholders. 	<p>Section 5 and Appendix P</p> <p>Section 5 and Appendix P</p>
Mineral title holders	Section 5 and Appendix P
Network service providers	Section 5
Site Selection	
Key site constraints, including:	The site selection process for the proposal has been thorough and rigorous, to ensure that the site for the

Requirement	Addressed in EIS
<ul style="list-style-type: none"> • Visibility and topography. • Biodiversity. • Agriculture. • Natural hazards. • Resources. • Crown Lands. 	<p>future solar farm was technically and economically viable with limited environmental impacts. A detailed assessment of the site selection process is provided in Section 2.3 of this EIS.</p> <p>An assessment of the relevant key site constraints has been undertaken throughout this EIS and accompanying technical reports, ultimately informing the design process. A detailed sites constraints map has been provided at Figure 4. The proposal's indicative layout plan details the impact of site constraints upon the proposed design and layout.</p>
<p>Process of site selection – Applicants that are considering sites with environmental planning constraints are encouraged to discuss these issues with the Department and other relevant stakeholders during the scoping stage.</p>	<p>During development of the proposal, the applicant has engaged with relevant stakeholders to discuss potential environmental planning constraints. The issues raised have been suitably addressed throughout this EIS and have informed the final design and layout of the proposal, to achieve an outcome that is appropriate for all parties (refer Section 5).</p>
<p>Assessment issues</p>	
<p>Key assessment issues – Applicants should be aware of the following issues that commonly warrant more detailed assessment for a State significant solar energy development:</p> <p>Key assessment issues, include:</p>	
<p>Strategic context – whether proposal is consistent with local or state planning strategies, and government policies such as climate change and energy policies, including the capability of the proposal to contribute to energy security and reliability.</p>	<p>The proposal is consistent with the relevant local or State planning strategies (refer Section 2.5).</p> <p>The proposal is also consistent with government policies regarding climate change and energy policies, with a capability to contribute to the energy security and reliability (refer Section 2.5).</p>
<p>Land use conflicts – assessment of the compatibility of the solar proposal with the existing land uses (particularly agricultural and residential land uses) on the site and adjacent land, during construction, operation and after decommissioning. This requires reference to the zoning provisions applying to the land, and consideration of post-development remediation.</p>	<p>As demonstrated throughout this EIS and accompanying technical reports, the proposal will be permissible within the zone and compatible with the surrounding agricultural lands. The proposal has been designed to enable the use of the site for agricultural purposes through sheep grazing.</p> <p>A detailed description of the construction, operation and decommissioning phases has been presented in Sections 4.3 - 4.7 of this EIS.</p> <p>During the decommissioning phase, post-development remediation will involve the removal of solar infrastructure and site restoration, including</p>

Requirement	Addressed in EIS
<p>Traffic and Transport – consideration of whether the local and classified road network can accommodate the traffic generated by the construction of the solar proposal.</p>	<p>backfilling, harrowing and seeding of the site where necessary for future agricultural practice.</p> <p>The proposal has considered and assessed the impacts of the proposal on the local and classified road network. It was determined that the local and regional road network is able to accommodate the traffic generated during construction, operation and decommissioning phases</p> <p>The local and classified road network can accommodate a moderate increase of traffic and transport involved throughout the proposal's construction, operation and decommissioning phases. Refer to Section 7.9 and Appendix L.</p>
<p>Batteries – if the proposal includes battery energy storage, the applicant should undertake preliminary risk screening in accordance with SEPP 33. If the preliminary risk screening indicates the development is “potentially hazardous”, a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazard Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011).</p>	<p>RiskCon Engineering were engaged by Lightsource BP to conduct the preliminary risk screening of the site. The studies found that dangerous goods stored at the site did not exceed the SEPP 33 threshold. As a result, the site is not classified as potentially hazardous, therefore it is not necessary to prepare a PHA as SEPP 33 does not apply.</p>
<p>Other issues that may be relevant:</p> <ul style="list-style-type: none"> • Biodiversity. • Heritage. • Visual Impacts. • Water. • Hazards and risks. • Waste. • Socio-Economic. • Noise. • Cumulative impacts. 	<p>Addressed in Section 7.</p>

7. IMPACT ASSESSMENT

7.1. INTRODUCTION

This Section of the EIS provides a comprehensive assessment of the proposed solar farm against the SEARs dated 8 November 2018. As discussed in section 1.7 is the SEARs issued specifies the proposal for a 250MW capacity for the solar farm at West Wyalong. The technical reports undertaken to support the DA and annexed to this EIS were prepared under the terms of the SEARs however the proposal has been amended to relate to a solar farm that has a capacity of 90 MW AC.

The specialist technical reports annexed to this EIS address the key issues identified in the SEARs. The following sections, provide an environmental assessment of the proposal.

7.2. ASSESSMENT METHODOLOGY

The assessment of the impacts has been informed by the extensive and comprehensive inputs from various consultants in the proposal team covering a wide range of technical aspects. This process has included the following steps:

- Review of the preliminary scheme for the proposal against the relevant SEARs, legislation, policies, and guidelines to assess compliance.
- Iterative design development with recommendations from proposal team to ensure the final scheme for the Proposal can meet the requirements set out by the SEARs.
- Consultation with various agencies and authorities to ensure the Proposal can address their concerns and requirements.
- Merit assessment of the Proposal for each specific aspect of the proposal within its physical, social, economic or strategic context (as relevant), and against the applicable SEARs, legislation, policies and guidelines.
- An assessment of the cumulative impacts of the proposal.
- Preparation of a Risk Assessment Matrix to identify environmental impacts and consider any mitigation measures that can be implemented to manage those impacts is proposed.
- Conclusion of environmental impact for each aspect based on implementation of the mitigation measures.
- Finally, this EIS provides conclusions as to whether the proposal, as a whole, has limited environmental impacts beyond those already assessed.

7.3. BIODIVERSITY

A specialist Biodiversity Assessment Report (BDAR) has been prepared by SLR Consulting (**Appendix E**) to investigate and assess the potential impacts of the West Wyalong Solar Farm and includes the following:

- an assessment of the biodiversity values and the likely biodiversity impacts of the proposal) in accordance with section 7.9 of the Biodiversity Conservation Act 2016 and the Biodiversity Assessment Method (BAM).
- an avoid, minimise and offset framework including an assessment all direct, indirect and prescribed impacts in accordance with the BAM. Avoidance measures are presented in Section 5.1 of the BDAR. Mitigation measures (minimise impacts) are presented in Sections 5.2, 5.3 and 5.4 of the BDAR and offsetting principals are presented in Section 4.8 of the BDAR. The total offset obligation and the proposed offset method for meeting the prescribed obligations are presented in Section 4.8.2 of the report.
- an assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the Fisheries Management Act 1994, and a description of the measures to minimise and rehabilitate impacts.

7.3.1. Methodology

The following methodology was used to prepare the BDAR:

A desktop review and assessment of the proposal against the following legislation and policies:

- *NSW Environmental Planning and Assessment Act 1979*
- *NSW Biodiversity Conservation Act 2016*
- *NSW Biodiversity Values Map*
- *NSW Biosecurity Act 2015*
- *National Parks and Wildlife Act 1974*
- *NSW Water Management Act*
- *Environment Protection and Biodiversity Conservation Act 1999*
- *State Environmental Planning Policy No. 44- Koala Habitat Protection*
- *Bland Local Environmental Plan 2011*

A field assessment was undertaken on both Lot 17 and Lot 18 which included a tree survey, vegetation mapping, threatened flora surveys, threatened species (fauna) surveys, identification of habitat suitability for threatened species (fauna), threatened bird surveys, threatened amphibian and reptile surveys, nocturnal spotlighting and fauna call playback, remote camera trapping, and microbat surveys. The BDAR includes an assessment of the proposal:

- against the *framework for biodiversity assessment* (FBA), the NSW biodiversity offsets policy developed for Major Proposals (OEH 2014) and the requirements of the SEARs in relation to biodiversity.
- in relation to matters of national environmental significance under the *Environment Protection Biodiversity Conservation Act 2016* (EPBC Act).
- to determine likely impacts on listed threatened species, populations or ecological communities, scheduled under the *Fisheries Management Act 1994*.

As part of the investigations the following information sources have been used:

- Existing threatened species listings under EPBC Act.
- Existing records of threatened species sightings in the study area, as recorded in the *Bionet Atlas of NSW Wildlife*.
- Department of Environmental *Protected Matters Search Tool* (nationally threatened species listed under the EPBC Act).

7.3.2. Existing environment

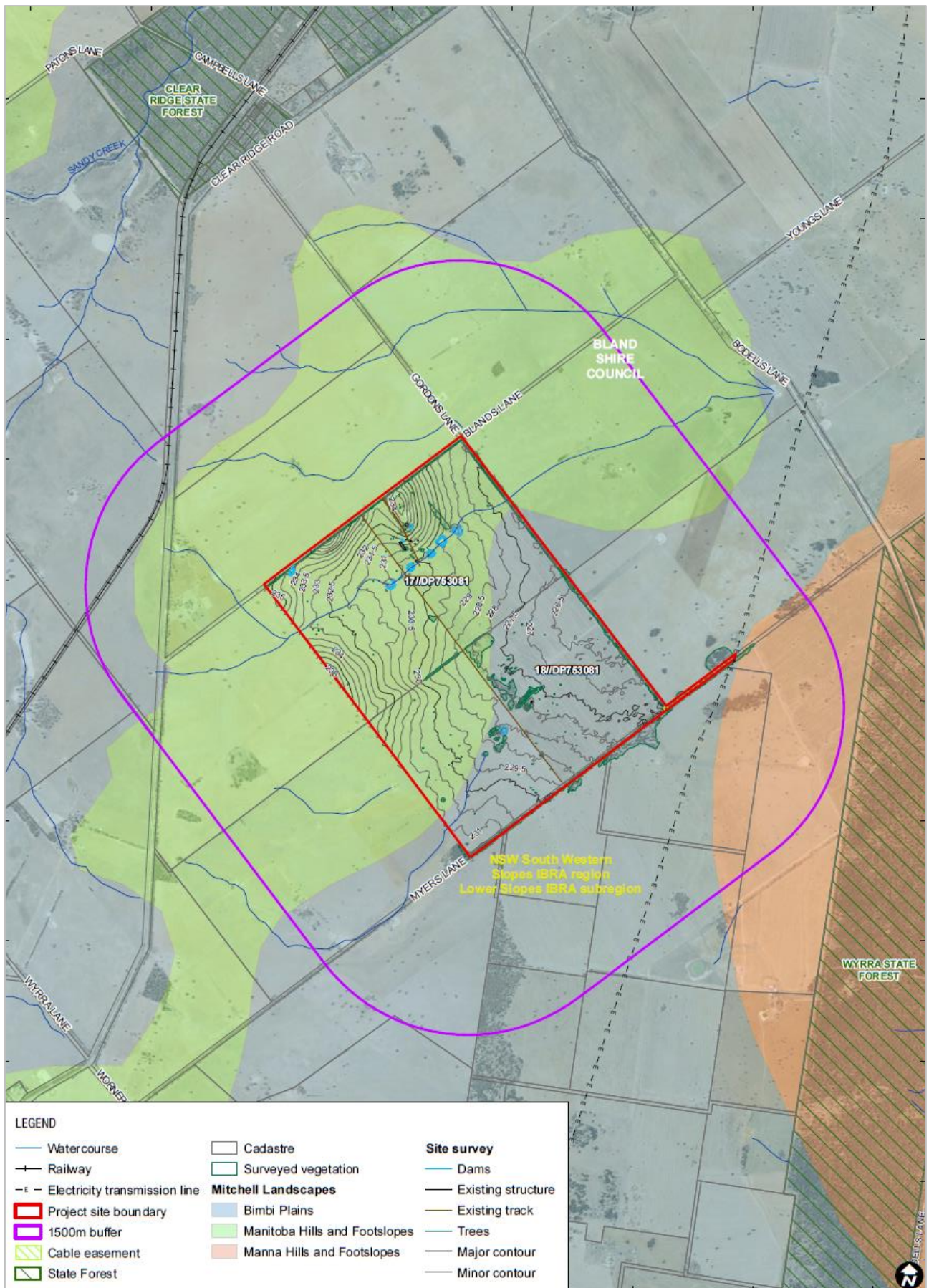
The site is situated on a rural parcel of land located approximately 17km north-east of West Wyalong. The site is located wholly within the Lower Slopes sub-region of the NSW South Western Slopes Bioregion. Based on the *descriptions for NSW (Mitchell) Landscapes*, version 2 (2002) extracted below and mapping provided in **Figure 25**, the site is primarily influenced by the Manitoba Hills and Footslopes landscape. The solar farm is proposed on the southern lot of the site. The north-western portion of the southern lot is mainly shaped by this particular landscape.

Man Manitoba Hills and Footslopes NSS Lower Slopes Granites
Manitoba Hills and Footslopes landscape includes parts of two land systems: *Manitoba* and *Warrawie*.

Low ridges with outcrops and tors of granite with narrow, incised drainage contributing to major creeks. General elevation 200 to 310m, local relief to 30m. Calcareous and neutral red earths with hills of shallow loamy and sandy lithosols with abundant surface grit grading into red earths down slope. Moderate to open Dwyer's mallee gum (*Eucalyptus dwyeri*), tumble-down gum (*Eucalyptus dealbata*), white cypress pine (*Callitris glaucophylla*), red box (*Eucalyptus polyanthemos*), kurrajongs (*Brachychiton populneus*), bumble box (*Eucalyptus populnea*), scattered western golden wattle (*Acacia decora*), variable spear grass (*Stipa* spp.), and wire grass (*Aristida* spp). River red gum (*Eucalyptus camaldulensis*) and bumble box along major creeks. Also mallee (*Eucalyptus* spp.), sugarwood (*Myaporum platycarpum*), grey box (*Eucalyptus microcarpa*), yarran (*Acacia homalophylla*), Dean's wattle (*Acacia deanei*), grasses and forbs.

Source: *Descriptions for NSW (Mitchell) Landscapes*

Figure 25 - Surrounding landscape



Source: SLR

Waterways

Two mapped waterways occur within the subject site. These mapping indicates that these are 1st and 2nd Order Streams according to the Strahler System (Stahler, 1952). An inspection of these areas determined that due to agricultural development, with the exception of the five constructed dams (which were dry at the time of inspection, no natural drainage channels, aquatic habitat or associated riparian vegetation occurs in these areas.

Native vegetation

As shown in **Figure 25**, the southern lot contains vegetation primarily along the northern property boundary, centrally within the site and south along Myers Lane. The site is largely cleared of native vegetation due to historic and ongoing agricultural practices but contains a scattering of vegetation across the site as shown below.

The Mid Lachlan Extant Vegetation (OEH, 1999) shows that no native vegetation is mapped within the Proposal Site as shown in **Figure 27** however there are two areas of native vegetation located to the south and east of the Proposal Site. These two areas comprise the following types of woodland:

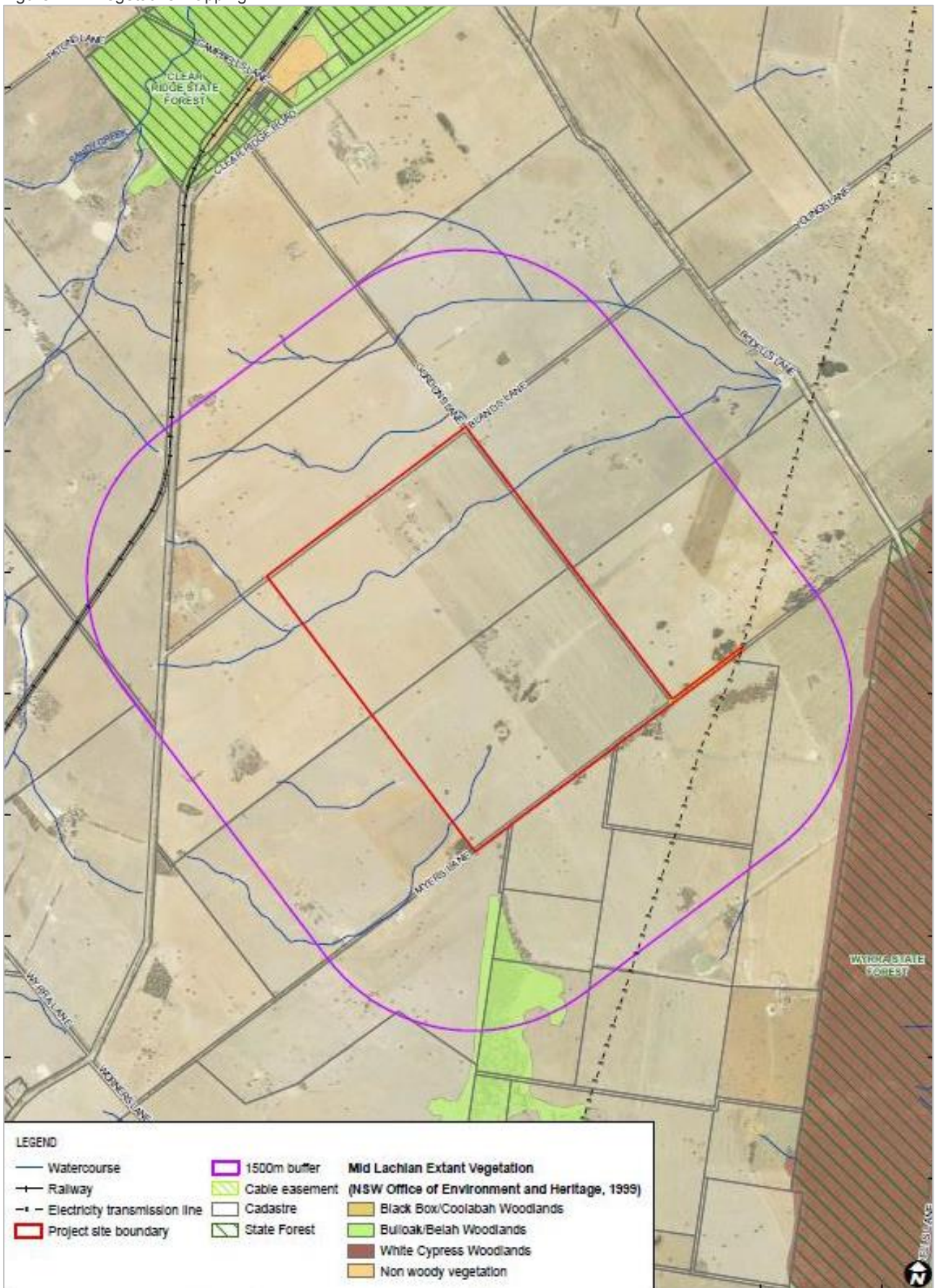
- Bulloak/ Belah Woodland; and
- White Cypress Pine Woodlands.

Figure 26 – Agricultural uses on the subject site



Source: SLR Consulting

Figure 27 – Vegetative mapping



Source: SLR Consulting

Plant Community Types

Using the Bionet Vegetation Information System (OEH 2018b) it was found that there are five Plant Community Types (PCTs) are present within the site (refer to **Figure 28**), these include:

- Blue Mallee - Bull Mallee - Green Mallee very tall mallee shrubland of the West Wyalong region, NSW South Western Slopes Bioregion (PCT 177)
- Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions (PCT 55);
- Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (PCT 76);
- Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion (PCT 185); and
- Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion (PCT 26).

Vegetation Communities

Vegetation communities were delineated and mapped based on species composition, structure and condition assessments following the methods described in Section 2.3.1 of the BDAR. A revised vegetation map was prepared based on the assessment and illustrated in **Figure 28**. The condition assessment determined that seven vegetation zones occur within the Proposal Site as follows:

- **PCT 177/ Zone 1:** Moderate/ Good Condition Blue Mallee - Bull Mallee - Green Mallee very tall mallee shrubland of the West Wyalong region, NSW South Western Slopes Bioregion;
- **PCT 177/ Zone 2:** Low Condition Blue Mallee - Bull Mallee - Green Mallee very tall mallee shrubland of the West Wyalong region, NSW South Western Slopes Bioregion;
- **PCT 55/ Zone 1:** Moderate/ Good Condition Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions;
- **PCT 55/ Zone 2:** Low Condition Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions;
- **PCT 76/ Zone 1:** Low Condition Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions;
- **PCT 185/ Zone 1:** Low Condition Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion; and
- **PCT 26/ Zone 1:** Low Condition Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion.

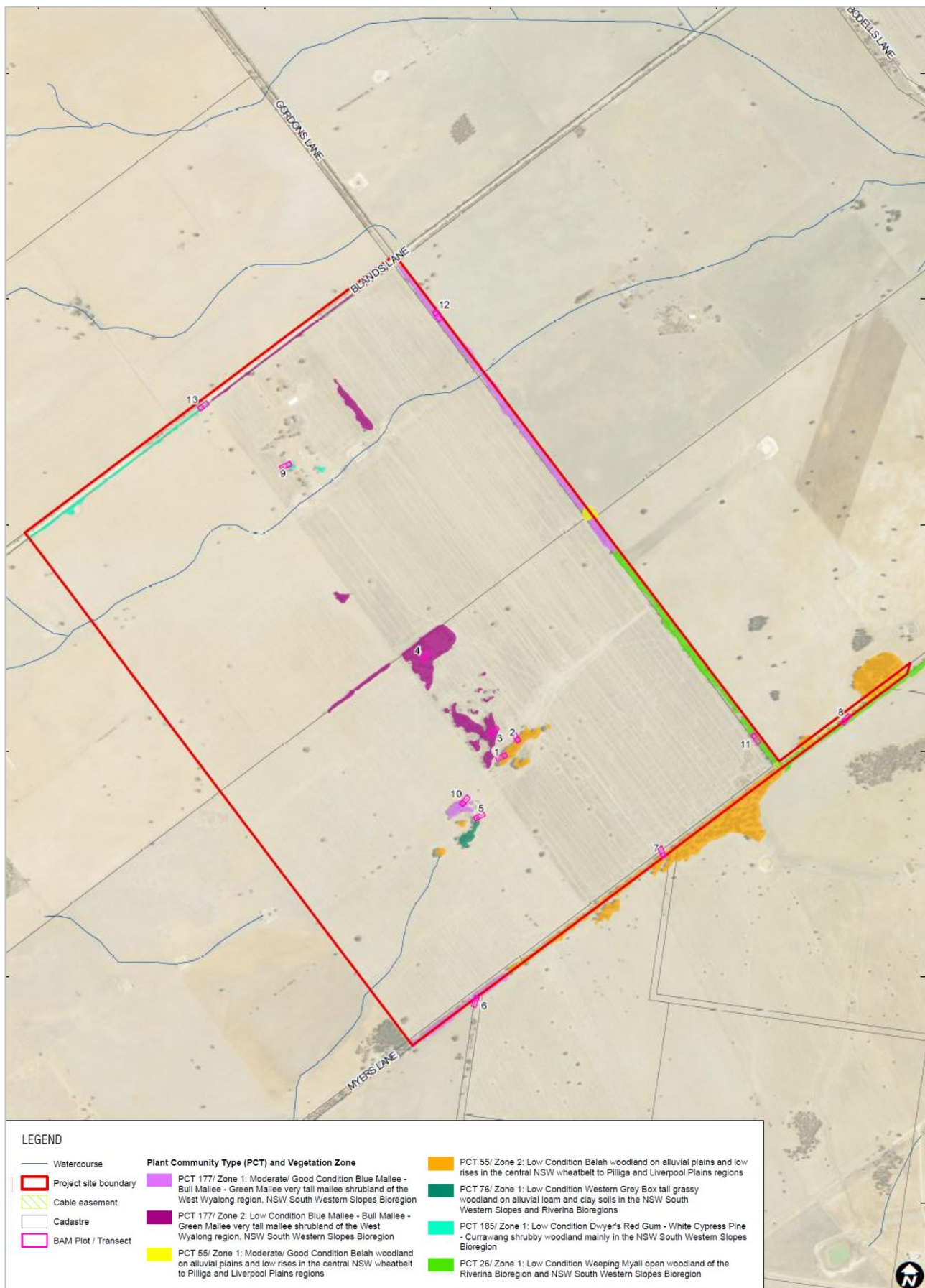
Habitat Trees

A total of 163 habitat trees were identified within the Proposal Site as shown in **Figure 29**. It is estimated that these trees contain approximately 241 hollows. The majority of these hollows were small and medium hollows as detailed below:

- 112 small hollows (<5 cm);
- 115 medium hollows (5-15 cm); and
- 14 large hollows (>20 cm).

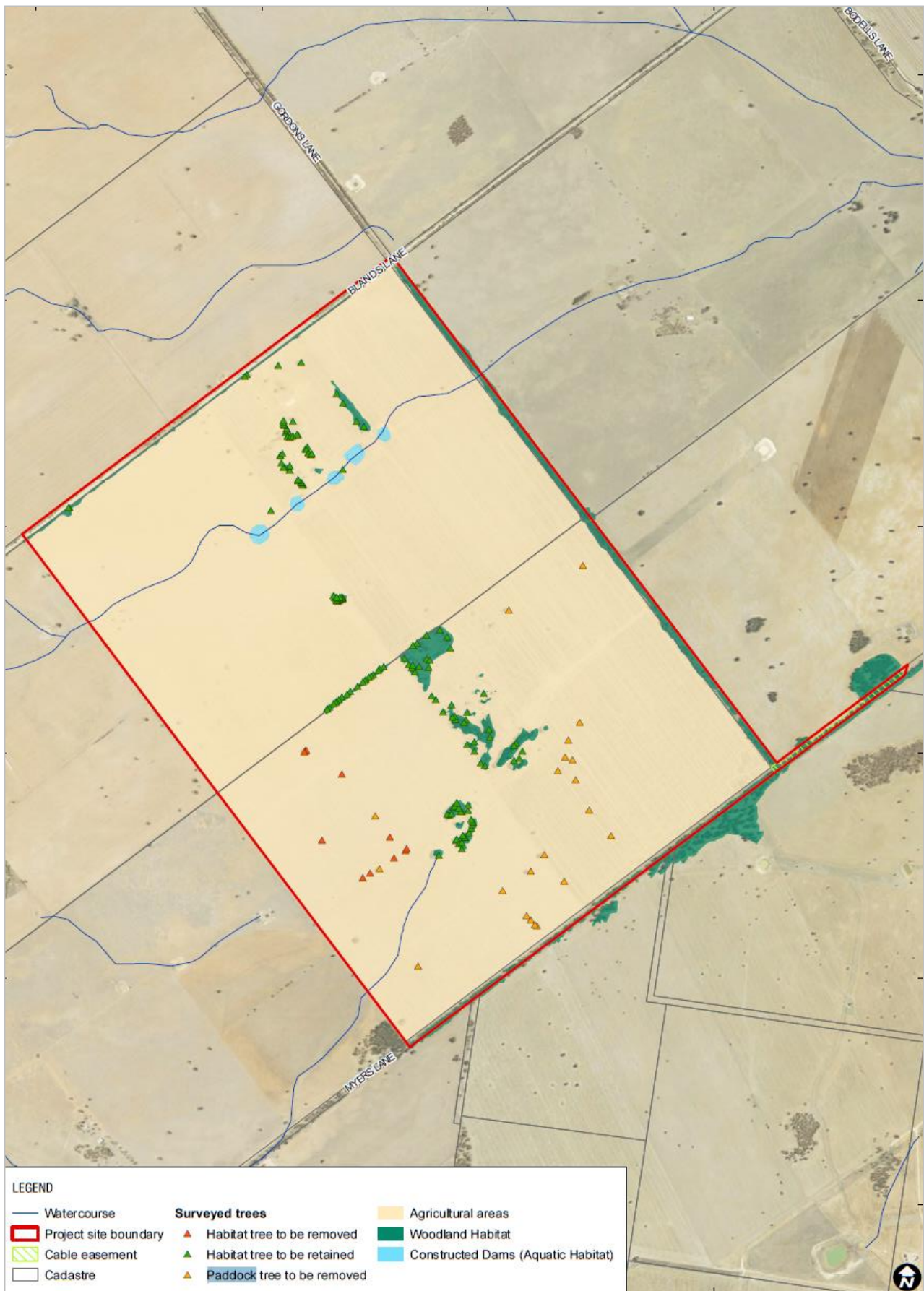
Whereas, a total of 205 paddock trees were identified within the Proposal Site and are identified in **Figure 29**.

Figure 28 – Plant Community and Vegetation Zones



Source: SLR Consulting

Figure 29 – Habitat and Paddock trees location and removal.



Source: SLR Consulting

7.3.3. Potential impacts

The BDAR identifies the following impacts of the proposal to be:

- The removal of 1.83 hectares of native vegetation and woodland habitat for fauna species. This vegetation removal required to establish a connection with the powerline to the north with the removal of the following woodland species:
 - 0.80 hectares of '*Belah woodland*' (PCT 55); and
 - 1.03 hectares of '*Weeping Myall open woodland*' (PCT 26)
- A total of 163 habitat trees were identified within the site. The removal of 11 habitat trees (containing 64 hollows) which constitute habit for arboreal fauna species including threatened species such as the Inland Forest Bat (*Vespadelus baverstocki*).
- A total of 205 paddock trees were identified within the Proposal Site. The proposal will require the removal of 32 Paddock trees comprising the following species:
 - 12 *Casuarina cristata* (Belah);
 - Three *Eucalyptus microcarpa* (Grey Box); and
 - 17 *Eucalyptus behriana* (Bull Mallee).

Native Vegetation Zones Impact Summary

The BDAR identifies the following impacts relating to the native vegetation zones in **Figure 30**. As noted the areas to be retained is 44.14 ha and the areas to be modified to allow for the easement along Myers Lane. The impacts to the native vegetation zones have been mapped in **Figure 32** identifying the area of modification to be restricted to the vegetation areas located south of the subject site along Myers Lane.

Figure 30 – Summary of impact on Native Vegetation Zones

Native Vegetation Zones	Area to be retained (ha)	Area to be modified (ha)
PCT 177/ Zone 1: Moderate/ Good Condition Blue Mallee - Bull Mallee - Green Mallee very tall mallee shrubland of the West Wyalong region, NSW South Western Slopes Bioregion	7.66	0.00
PCT 177/ Zone 2: Low Condition Blue Mallee - Bull Mallee - Green Mallee very tall mallee shrubland of the West Wyalong region, NSW South Western Slopes Bioregion	7.59	0.00
PCT 55/ Zone 1: Moderate/ Good Condition Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions	7.07	0.80
PCT 55/ Zone 2: Low Condition Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions	7.50	0.00
PCT 76/ Zone 1: Low Condition Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	0.46	0.00
PCT 185/ Zone 1: Low Condition Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	1.23	0.00
PCT 26/ Zone 1: Low Condition Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	5.77	1.03
Total	44.14	1.83

Source: SLR Consulting

Threatened Ecological Species Impact Summary

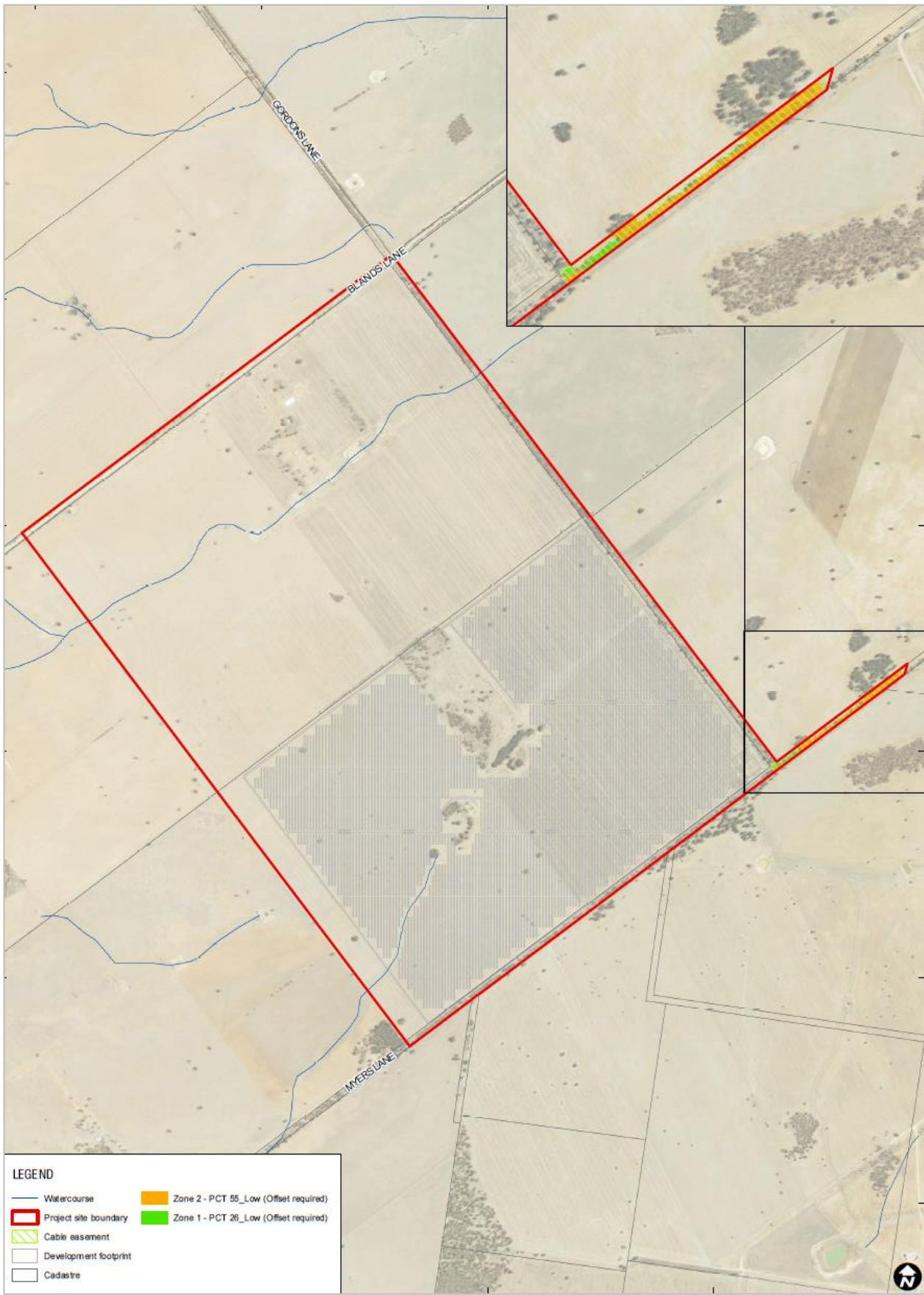
The BDAR identifies the following impacts relating to the threatened ecological species in **Figure 31**. The impacts have been mapped in **Figure 32** identifying the area of modification to be restricted to the vegetation located south of the subject site along Myers Lane.

Figure 31 – Summary of threatened ecological species

Threatened Ecological Community	Area to be retained (ha)	Area to be modified (ha)
Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion	15.25	0.00
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	0.46	0.00
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	5.77	1.03
Total	21.48	1.03

Source: SLR Consulting

Figure 32 – Mapped Impacts on Native Vegetation Zones



Source: SLR Consulting

Threatened Flora

No threatened flora was detected within the proposal site, and therefore the BDAR determined that there are no direct impacts to such species are anticipated. Indirect impacts on threatened flora are discussed in Section 4.7 of the BDAR.

Threatened Fauna

Threatened Species Surveys for fauna were undertaken over five days from 24 to 28 September 2018 to assess and map the presence of candidate species credit species in accordance with Section 6 of the BAM (OEHL, 2017b). All fauna species detected were identified to species level as provided in **Appendix B**.

In identifying threatened species survey requirements, the following key guidelines were considered:

- Threatened Biodiversity Survey and Assessment: *Guidelines for Developments and Activities, for threatened species (excluding frogs) listed under the BC Act (DEC, 2004)*;
- Amphibians - Threatened species survey and assessment guidelines: *field survey methods for fauna – Amphibians (DECCW, 2009)*;
- Threatened bats - *Survey Guidelines for Australia's Threatened Bats, Commonwealth of Australia (DEWHA, 2010a)*;
- Threatened birds - *Survey Guidelines for Australia's Threatened Birds, Commonwealth of Australia (DEWHA, 2010b)*;
- Threatened reptiles - *Survey Guidelines for Australia's Threatened Reptiles, Commonwealth of Australia (DEWHA, 2011b)*;
- Survey guidelines for Australia's threatened frogs: *Guidelines for detecting frogs listed as threatened under the EPBC Act (DEWHA, 2010c)*; and
- Threatened mammals - *Survey Guidelines for Australia's Threatened Mammals, Commonwealth of Australia (DEWHA, 2011a)*.

In accordance with Section 6.4 of the BAM (OEHL, 2017b), the locations of important habitat features, such as breeding or roosting habitat for threatened fauna species were captured with a handheld GPS unit and photographed where appropriate. Searches for potential habitat for threatened fauna species included but were not limited to:

- Foraging trees for threatened birds;
- Habitat trees;
- Potential roosts for threatened microchiropteran bats;
- Vegetated ponds, riparian vegetation and drainage lines for threatened frogs and waterbirds; and
- Woody debris and logs.

Bird Species

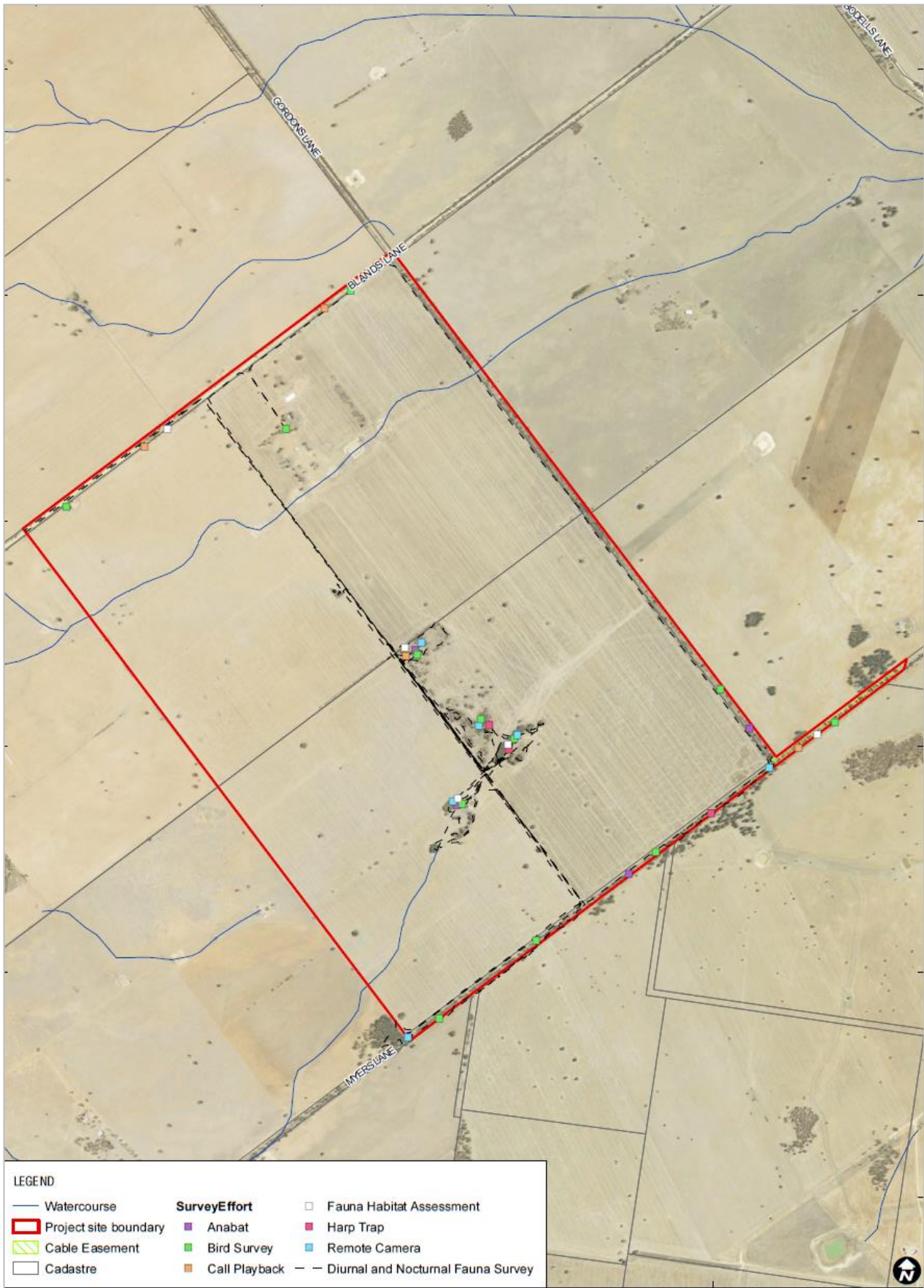
Two threatened bird species were detected within the Proposal Site which included the Grey-crowned Babbler (*Pomatostomus temporalis temporalis*) and the Painted Honeyeater (*Grantiella picta*). All woodland areas identified were considered to constitute habitat for these species in addition to the predicted threatened species described as follows:

- Barking Owl (*Ninox connivens*);
- Black-breasted Buzzard (*Hamirostra melanosternon*);
- Black-chinned Honeyeater (eastern subspecies) (*Melithreptus gularis gularis*);
- Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*);

- Brolga (*Grus rubicunda*);
- Diamond Firetail (*Stagonopleura guttata*);
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*);
- Flame Robin (*Petroica phoenicea*)
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*);
- Grey Falcon (*Falco hypoleucos*);
- Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*);
- Grey-headed Flying Fox (*Pteropus poliocephalus*);
- Hooded Robin (*Melanodryas cucullata cucullata*);
- Koala (*Phascolarctos cinereus*)
- Little Eagle (*Hieraaetus morphnoides*)
- Little Pied Bat (*Chalinolobus pictus*);
- Major Mitchell's Cockatoo (*Lophochroa leadbeateri*)
- Masked Owl (*Tyto novaehollandiae*)
- Painted Honeyeater (*Grantiella picta*)
- Scarlet Robin (*Petroica boodang*);
- Speckled Warbler (*Chthonicola sagittata*);
- Spotted Harrier (*Circus assimilis*);
- Superb Parrot (*Polytelis swainsonii*);
- Swift Parrot (*Lathamus discolor*)
- Varied Sittella (*Daphoenositta chrysoptera*);
- White-bellied Sea-Eagle (*Haliaeetus leucogaster*); and
- Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*)

The threatened microbat species known as Inland Forest Bat (*Vespadelus baverstocki*) was also detected during surveys as shown in **Figure 33 – Fauna and Habitat Assessment**. This species is identified by the BAM as an ecosystem credit species. The Inland Forest Bat utilises hollow-bearing trees (habitat trees) as part of its habitat. Therefore, the removal of 11 habitat trees constitutes a loss of habitat for this species. It is noted that all woodland areas constitute foraging habitat for this particular species. Given the majority of the habitat will be retained by the proposal as indicated in **Figure 30** of the EIS, the impact to this species is considered to be reduced.

Figure 33 – Fauna and Habitat Assessment.



Source: SLR Consulting

Mitigation measures are presented in Section 5 of the BDAR to further reduce potential impacts to threatened fauna species. These mitigation measures are provided in **Section 7.3.4 Safeguards and mitigation measures** of this EIS.

7.3.3.1. EPBC Act Protected Matters

A search of the Protected Matters Search Tool identified a total of three threatened ecological communities, 22 threatened species and 11 migratory species (and/or their habitats) listed under the EPBC Act that are predicted to occur within a 10 kilometre radius of the Proposal Site. The results are provided under **Appendix E** of the BDAR.

Threatened ecological communities

Two EPBC listed TECs were identified within the Proposal Site:

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia; and
- Weeping Myall Woodlands.

A total of 1.03 hectares of Weeping Myall Woodland will be removed for the proposal. Given that this particular vegetation type was noted to be poorly represented in the locality, an EPBC referral has been recommended.

SLR Consulting are currently (at the date of this report) preparing the EPBC referral, based on the EPBC Significant Impact Guidelines, to be made to the Department of Environment and Energy.

Threatened species

Approximately 1.83 hectares of habitat will be removed by the proposal. One EPBC listed threatened bird species, the *Painted Honeyeater* (*Grantiella picta*) was detected within the Proposal Site. It has been considered that all woodland areas will constitute habitat for this species and given the extent of native vegetation summary provided in **Figure 30** the impact to the Painted Honeyeater is manageable.

7.3.3.2. Serious and Irreversible Impacts

The BDAR provides an impact assessment of the proposal in accordance with the *Guidance to assist a decision-maker to determine a serious and irreversible impact* (OEHL, 2017c).

Based on principles 1 and 2 as set out in Clause 6.7 of the *Biodiversity Conservation Regulation 2016*, which are as follows:

- *Principle 1 – species or ecological community currently in a rapid state of decline; and*
- *Principle 2 – species or ecological communities with very small population size.*

The vegetation within the site known as Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion is identified as a serious and irreversible impact (SAIL) Entity.

Using the assessment criteria for threatened communities set out in subsection 10.2.2.1 of the BAM was used to assess the potential for serious and irreversible impacts on Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion. The summary of the results is provided in Figure 34 with the conclusion of the assessment revealing:

‘Given the highly modified nature of the vegetation within the Proposal and the small area proposed to be cleared (i.e. 1.03 hectares), it is unlikely that the direct removal of this vegetation would constitute a serious and irreversible impact as defined by the BC Regulation’.

As a result, based on the assessment the removal of the 1.03 hectares of Weeping Myall open woodland will not create serious and irreversible impact under the BC regulation.

Figure 34 – Serious and Irreversible Impacts Assessment for Weeping Myall open woodland

Serious and Irreversible Impacts Assessment for Weeping Myall open woodland	
a) <i>The action and measures taken to avoid the direct and indirect impact on the potential entity for an SAI</i>	Avoidance measures have been implemented which result in 5.77 ha of the community being retained within the Project Site. This was achieved by modifying the layout of the proposed solar panels to avoid areas where the most intact remnants of the community occur. These areas also have the greatest vegetation integrity (as calculated using the BAM).
b) <i>The area (ha) and condition of the TEC to be impacted directly and indirectly by the proposed development. The condition of the TEC is to be represented by the vegetation integrity score for each vegetation zone</i>	Approximately 1.03 ha of the community with a vegetation integrity score of 48.4 will be removed by the proposal (See Table 18). No other patches of the CEEC will be indirectly affected.
c) <i>A description of the extent to which the impact exceeds the threshold for the potential entity that is specified in the Guidance to assist a decision-maker to determine a serious and irreversible impact</i>	No thresholds have been defined for the community in the in the current draft of <i>Guidance to assist a decision-maker to determine a serious and irreversible impact</i> (OEH, 2017c).
d) <i>The extent and overall condition of the potential TEC within an area of 1000ha, and then 10,000ha, surrounding the proposed development footprint</i>	The regional vegetation mapping (OEH, 1999) does not identify this vegetation type within an area of 1000ha, or 10,000ha surrounding the proposed development footprint. This is likely to be due to inaccurate mapping (note that the community has similarities with Belah Woodland, which is mapped extensively in the locality). The overall condition of the community outside the Project Site has not been examined as part of this assessment.
e) <i>An estimate of the extant area and overall condition of the potential TEC remaining in the IBRA subregion before and after the impact of the proposed development has been taken into consideration</i>	The Bionet Vegetation Information System (OEH 2018b) estimates that the pre-European extent of the community within the NSW South Western Slopes Bioregion was 1600,000 ha. The current extent is estimated to be 160,000 ha. The proposed development would result in the removal of 1.03 ha of this vegetation type. This constitutes a removal of 0.00064% of the community within the bioregion.
f) <i>An estimate of the area of the potential TEC that is in the reserve system within the IBRA region and the IBRA subregion</i>	

Serious and Irreversible Impacts Assessment for Weeping Myall open woodland	
The Bionet Vegetation Information System (OEH 2018b) does not provide specific figures for reserve system or the IBRA subregion; however, the community is estimated to be 90% cleared in the landscape.	
<i>g) The development, clearing or biodiversity certification proposal's impact on:</i>	
<i>i. abiotic factors critical to the long-term survival of the potential TEC; for example, how much the impact will lead to a reduction of groundwater levels or the substantial alteration of surface water patterns</i>	Due to the minor scale of vegetation clearing proposed (i.e. 1.03 ha), impacts to abiotic factors are likely to be negligible. The Project Site is relatively flat and contains no wetlands or obvious drainage channels. Additionally, the proposal will not result in an alteration of topography or hydrology.
<i>ii. Characteristic and functionally important species through impacts such as, but not limited to, inappropriate fire/flooding regimes, removal of understorey species or harvesting of plants</i>	Due to the minor scale of vegetation clearing proposed (i.e. 1.03 ha), impacts to characteristic and functionally important species such as <i>Acacia pendula</i> (Weeping Myall) are likely to be negligible.
<i>iii. The quality and integrity of an occurrence of the potential TEC through threats and indirect impacts including, but not limited to, assisting invasive flora and fauna species to become established or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species in the potential TEC</i>	The proposed development will remove approximately 1.03 ha of the community from the Project Site. Approximately 5.77 ha of the community will be retained within the Project Site (84.86%). Given that the vegetation to be retained is already highly fragmented, it is unlikely that edge effects would be greater than currently experienced. The proposed development is therefore unlikely to assist invasive species. Mitigation measures are presented for weed, erosion control, dust control and chemical spill control are recommended.
<i>h) Direct or indirect fragmentation and isolation of an important area of the potential TEC</i>	
Given that the vegetation community within the Project Site is already isolated and fragmented in the landscape, the removal of 1.03 ha of the community is unlikely to cause significant further habitat fragmentation.	
<i>i) The measures proposed to contribute to the recovery of the potential TEC in the IBRA subregion.</i>	
<p>Avoidance measures and mitigation measures to reduce potential impacts to the community that will be retained within the Project Site include the following:</p> <ul style="list-style-type: none"> • Erosion control; • Dust control • Chemical spill control • Vegetation clearing protocols; and • Weed management. <p>Plant species that are commensurate with the community have been selected for planting within the Landscape Management Plan. These include species such as <i>Acacia pendula</i> (Weeping Myall) and <i>Acacia oswaldii</i> (Umbrella Wattle).</p> <p>Recommendations for vegetation integrity monitoring are also presented to ensure that grazing impacts do not have adverse effects on the community during the operational phase.</p>	
<p>Conclusion</p> <p>Given the highly modified nature of the vegetation within the Project and the small area proposed to be cleared (i.e. 1.03 hectares), it is unlikely that the direct removal of this vegetation would constitute a serious and irreversible impact as defined by the BC Regulation.</p>	

Source: SLR Consulting

Indirect Impacts from the proposal

Vegetation and Habitat

Potential indirect impacts to native vegetation and habitat may occur during the construction and operational phase of the proposal. Such impacts may include the following:

- Increased traffic and visitation within the Proposal Site may facilitate the spread of weeds that could further degrade native vegetation;
- Pollution such as chemical spills from construction machinery may have adverse effects on native vegetation, fauna;
- Introduction of weeds and feral animals that could degrade and modify the habitat to be retained within the Proposal Site;
- Ground disturbance by machinery during the construction phase may create dust and facilitate the movement of water-borne sediment. Sedimentation could adversely affect the surrounding vegetation.

Mitigation measures to address the *Vegetation and Habitat* impacts provided above, in **Section 7.3.4 Safeguards and mitigation measures**.

Fauna Species

Potential indirect impacts on locally occurring fauna and their habitats (including threatened biota) may occur during the construction and operational phase of the proposal. Such impacts may include the following:

- The construction of solar panels and security perimeter fencing within the Proposal Site may obstruct the movement of fauna species through the landscape and may trap fauna within the Proposal Site;
- Security fences may obstruct the movement of larger terrestrial species such as kangaroos, wallabies, emus and other fauna species (Peachey, Linke, & Jones, 2007). If such species cannot freely leave the Proposal Site, they may exhaust their food resources and water supply. Ultimately this could cause animal deaths.
- Accidentally fencing in populations of large herbivores and creating a captive population of species such as kangaroos could result in degradation of retained native vegetation (Leigh, Wood, Holgate, Slee, & Stanger, 1989).
- Light spill from artificial lighting within the Proposal Site may adversely affect the natural behaviour of nocturnal fauna species such as arboreal mammals, large forest owls and foraging microbats;
- Increased traffic within the Proposal Site may facilitate the encroachment of plant weeds that could further degrade the retained areas of native woodland; and
- Increased visitation of the Proposal Site may disturb resident fauna and disrupt their natural behaviour.

Mitigation measures to address the *Fauna Species* impacts provided above, in **Section 7.3.4 Safeguards and mitigation measures**.

7.3.4. Safeguards and mitigation measures

As discussed in **Section 7.3.3** of this EIS, whilst the development will result in some impact to the existing fauna and threatened ecological communities on the site, due to the proposal. Mitigation measures have been developed to address and minimise potential risks as provided in **Table 19**.

Table 19 – Potential impacts and mitigation measures

Potential impact	Mitigation measures	Stage
Removal of trees – as per calculations based on BAM for Myers Lane (Case No. 00013377)	In the BDAR two options are presented to address: Option 1: The offset calculations determined that the purchase and retirement of 68 ecosystem credits would be required to meet the offset obligation, as	Pre-Construction

Potential impact	Mitigation measures	Stage
and paddock trees (Case No 00013425) clearing.	presented in Table 25 (vegetation removal) and Table 26 (paddock tree removal) of the BDAR. Option 2: Offset obligations can also be met by purchase and retirement of the credits listed in direct payment of \$188,143.67 into the Biodiversity Conservation Fund.	
Damage to ecological community centrally located on the site from grazing of animals	A livestock fence will be provided around the perimeter of the central EEC to prevent any damage of this area by animals grazing on the site.	Construction
Construction Impacts - Erosion control	Installation of erosion and sediment control measures prior to any works; Regular inspection of erosion and sediment control measures, particularly following rainfall events, to ensure their ongoing functionality; and The immediate removal offsite of excavated materials. Measures that should be adopted during stockpiling of materials should include: <ul style="list-style-type: none">• Avoid stockpiling of materials adjacent to native vegetation, but instead use areas that are already cleared/ disturbed.• Undertake maintenance of silt fences and other mitigation measures to isolate runoff.	Construction
Construction Impacts – Dust Control	<ul style="list-style-type: none">• Setting maximum speed limits for all traffic within the study area to limit dust generation.• Use of a water tanker or similar to spray unpaved access tracks during the construction phase, where required.• Application of dust suppressants or covers on soil stockpiles.	Construction
Construction Impacts – Chemical Spill Control	<ul style="list-style-type: none">• All chemicals must be kept in clearly marked bunded areas.• Regularly inspect vehicles and mechanical plant for leakage of fuel or oil.• No re-fuelling of vehicles, washing of vehicles or maintenance of vehicles and plant to be undertaken within 20 m of natural drainage lines.	Construction
Pre-clearance surveys	<ul style="list-style-type: none">• Pre-clearing surveys are to be undertaken by a Proposal Ecologist prior to commencement of	Construction

Potential impact	Mitigation measures	Stage
	<p>any vegetation clearing activities within the Proposal Site. The Proposal Ecologist will conduct pre-clearing surveys to identify:</p> <ul style="list-style-type: none"> – Fauna species likely to be encountered during construction and potential impacts to fauna during vegetation clearing; – Potential fauna habitat in the Proposal Site; and – Preferred locations to relocate fauna species and habitat features that can be retained following construction. <ul style="list-style-type: none"> • Pre-clearing surveys will take place 1-2 weeks prior to the commencement of vegetation clearing. The Proposal Ecologist will mark all potential fauna habitat (e.g. habitat trees, nest trees, burrows, etc.) in the development footprint with high visibility tape (e.g. trees, large woody debris and nests). 	
Vegetation Clearing Protocols	<ul style="list-style-type: none"> • A Proposal Ecologist is to be present on site during all vegetation clearing operations. • Areas of vegetation outside the development footprint are to be clearly demarcated with high visibility tape to prevent accidental clearing during the construction phase. • Vegetation should be cleared in a way that will allow fauna species living in or near the clearing site enough time to move out of the area without additional human intervention. • No clearing should occur during the early evening or at night, as this is when fauna species are most likely to be on the move and are more vulnerable to injury. • Habitat links must be maintained during clearing to allow fauna species to move safely from the site to adjacent areas. • Clearing should begin in the area that is furthest from vegetation to be retained. • The direction of clearing should also ensure that fauna species are directed away from threats such as roads, developed areas or disturbed areas (e.g. residential areas or cleared spaces > 100m). 	Construction

Potential impact	Mitigation measures	Stage
	<ul style="list-style-type: none"> Sequential clearing should not create an 'island' of habitat that is isolated from adjoining habitat by roads or cleared and disturbed areas. 	
Habitat Tree Removal Protocols	<ul style="list-style-type: none"> All habitat trees to be cleared are to be surveyed and marked with high visibility tape prior to clearing. Clearing should be undertaken in the spring period to facilitate survival of displaced animals. Habitat trees are to be mechanically shaken or agitated prior to felling to encourage any remaining animals to either leave the tree or show themselves and subsequently be removed by the Proposal Ecologist prior to felling. Felling will involve gently pushing the tree and lowering or felling using a forestry harvester to avoid sudden falling as this is likely to injure wildlife. Following felling, habitat trees will be systematically checked from the ground by the Proposal Ecologist for any remaining fauna. Felled habitat trees will be left overnight (i.e. in an adjacent habitat area if required) to allow any undetected fauna further opportunity to escape. If any hollow-bearing tree is found or suspected to contain any threatened species, the tree should be left in place for a minimum of two days and, if possible, be reinspected no more than two hours prior to felling. 	Construction
Management of Displaced Fauna	<ul style="list-style-type: none"> All handling of fauna species should be conducted by the Proposal Ecologist. In the event that arboreal animals do not move or they cannot be captured because the tree hollow to be removed is too large, too high or its recovery would breach OH&S requirements then the tree will be felled (i.e. in the direction of other tree debris if possible) and animals recovered and relocated to suitable adjacent habitat. Animals are to be removed and relocated to the adjacent bushland/nest boxes within the Western Offset Area prior to felling or the tree shall be sectioned and dismantled under the 	Construction

Potential impact	Mitigation measures	Stage
	<p>supervision of the Proposal Ecologist before relocating the animals.</p> <ul style="list-style-type: none"> Nocturnal fauna species, such as microbats, are to be 'soft released' using bat boxes placed in adjacent habitat. Nocturnal fauna species, such as gliders and possums, are to be secured in suitable enclosures and kept in a quiet, dark and cool environment until they can be released into suitable habitat after dark. If any injured fauna species are found during the construction period, construction must stop immediately so that the injured animal can be taken to a vet or wildlife carer. 	
Weed Management	<ul style="list-style-type: none"> Induction materials containing detailed information pertaining to the identification of high threat weeds should be prepared by a suitably trained ecologist or bush regenerator. These materials should be provided to contractors who will carry out construction works within the Proposal Site. All vehicles, equipment, footwear and clothing should be clean and free of weed propagules prior to entering the Proposal Site. Any weeds that are removed during the construction phase should be disposed of via an appropriate waste solar farm. 	Construction
Fauna Monitoring	<p>To reduce the potential for impacts to mobile fauna species such as the Inland Forest Bat (<i>Vespadelus baverstocki</i>) it is recommended that the security perimeter fence is inspected annually as part of a fauna monitoring proposal. The entirety of the security perimeter fence should be inspected by a suitably trained fauna ecologist each year to look for signs of adverse impacts such as animal injury or mortality.</p> <p>Monitoring should be conducted for one to three-years period following proposal construction. A brief report should be prepared for the applicant following each survey.</p>	Construction
Fencing Retained Vegetation	To reduce the potential for adverse grazing impacts to threatened ecological communities (TECs) to be	Construction

Potential impact	Mitigation measures	Stage
	retained within the Proposal Site, it is recommended that livestock should be excluded from these areas. Suitable fences should be erected to prevent livestock from grazing areas containing TECs.	
Nest-box Installation	<p>To reduce the potential for impacts to arboreal fauna species including the Inland Forest Bat (<i>Vespadelus baverstocki</i>), it is recommended that the removal of habitat trees is offset by the installation of nest-boxes in the road corridors adjacent to the Proposal Site.</p> <p>Nest-boxes suitable for a range of fauna species should be installed at a 1:1 ratio if possible (available area). It is important that the density of nest-boxes is no greater than the natural density of hollows in better quality habitats. The success of the nest-box should be monitored for one to three years following completion of the construction phase. Any damaged nest-boxes should be replaced during this time. A brief report should be prepared for the proponent following each survey.</p>	Construction

7.4. ABORIGINAL CULTURAL ARCHAEOLOGY AND HERITAGE

An Aboriginal Archaeological Survey Report (ASR) (**Appendix F**) was prepared by Artefact. The ASR will be used to inform the Aboriginal Cultural Heritage Assessment Report (ACHAR) (**Appendix G**) prepared by Artefact which will be submitted subsequently as part of the application.

Artefact undertook a survey of Lot 17, Lot 18, and Myers Lane.

The ASR provides the site investigation, assessment, potential impacts and mitigation methods for the provision of the West Wyalong Solar Farm whilst observing the Aboriginal and historic significance of the subject site.

The site is located within the traditional boundaries of the Wiradjuri language group (Tindale 1974). The Wiradjuri language group is described by Tindale (1974) as the largest tribal grouping in Australia. The territory extends from the Blue Mountains in the east, north to Nyngan and south to Albury.

7.4.1. Methodology

The following guidelines and policies were used to inform the ASR and ACHAR:

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

The ASR and ACHAR was prepared using the following methodology:

- Desktop research was undertaken on the Aboriginal Heritage Information Management System (AHIMS), previous archaeological assessments
- Assessment of the proposal under the relevant Commonwealth and State legislation including the:
 - *Environment Protection and Diversity Conservation Act 1999*
 - *Australian Heritage Council Act 2003*
 - *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
 - *National Parks and Wildlife Act 1974*
 - *Native Title Act 1994*
 - *Aboriginal Lands Right Act 1983*
 - *Environmental Planning and Assessment Act 1979*
- An archaeological survey was conducted over three days as detailed in Section 5.0 of the ASR, with all survey units traversed on foot, all ground exposures examined for Aboriginal objects and a photographic record was kept during the survey.
- A review of previous archaeological assessments which have been associated with significant infrastructure and mining works.

Further, consultation with the registered Aboriginal parties (RAP) has been undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents*. The outcomes of the RAP will be reported in the ACHAR which will be submitted shortly after submission of the Application.

7.4.2. Existing environment

An extensive search of the AHIMS database was undertaken by Anna Darby on the 17 September 2018 (AHIMS search ID 370985). An area of approximately 25 square kilometres was included in the search. A total of 115 Aboriginal sites were identified in the extensive AHIMS search area.

Of the 115 sites searched as shown in **Figure 4.1** of the ASR report (below), TL8 (AHIMS ID 43-4-0036) was the closest recorded Aboriginal site to the study area, approximately 5 km northeast of the study area. This

site was recorded in 1997 as an artefact located 50 m from the bank of Sandy Creek. No further detail was available from the site card for AHIMS ID 43-4-0036.

Figure 35 - AHIMS sites



Source: Artefact

A field survey of the study area was undertaken by Artefact over three days, with the observations of Section 5.0 Archaeological Survey of the ASR summarised as follows:

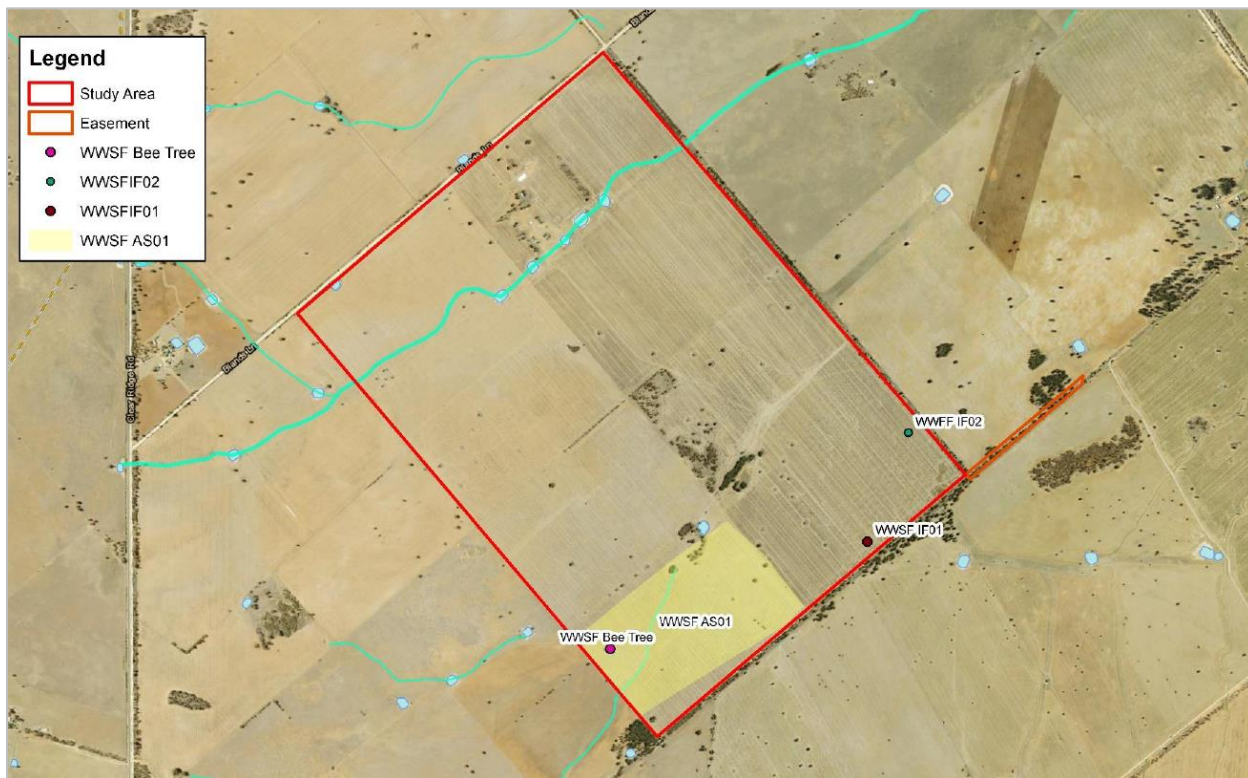
Table 20 – Archaeological Survey Observations

Area	Observed disturbance	Finding comments
Proposed Myers Lane connection	The landscape within the Myers Lane is heavily disturbed due to vegetation clearance, ploughing and cropping.	No Aboriginal objects or areas of potential archaeological deposit were identified within Myers Lane.
Survey Unit 1 (SU1)	Disturbance within the survey unit included ploughing for the wheat crop and earth works associated with the residential building.	Two isolated stone artefacts were identified in SU1.
Survey Unit 2 (SU2)	Disturbance within SU2 two included earth works for dam construction and ploughing.	One artefact scatter and one culturally modified tree were identified in SU2.
Survey Unit (SU3)	Disturbance within the survey unit included earthworks associated with the homestead complex, damming of the drainage line, and ploughing and sowing the wheat crop.	No Aboriginal objects or areas of potential archaeological deposit were identified within SU3.

7.4.3. Potential impacts

An Aboriginal heritage assessment of the site revealed a total of four new Aboriginal sites within the study area as shown **Figure 6.19** of the ASR and below. The review revealed that no previously recorded Aboriginal sites are located within the study area. These comprise one artefact scatter, two isolated artefacts and one culturally modified tree.

Figure 36 - New sites identified



Source: Artefact

An assessment of the four identified sites was undertaken by Artefact. The assessment considered the cultural heritage significance of the items (refer to table below) in order to inform the basis of its management. This assessment was undertaken in accordance with the guidelines of the Burra Charter and NSW Heritage Branch.

The assessment revealed the following summary of archaeological significance (**Table 21**) of the four identified sites as tabulated in **Table 8.1** Summary of archaeological significance of the ASR and ACHAR.

Table 21 – Assessment of significance

Site name/ AHIMS ID	Research potential	Representative value	Rarity	Educational Potential	Overall Archaeological Significance
WWSF IF01 (AHIMS ID 43-4-0056)	Low	Low	Low	Low	Low
WWSF IF02 (AHIMS ID 43-4-0071)	Low	Low	Low	Low	Low
WWSF AS01	Moderate	Moderate	Moderate - High	Moderate	Moderate

Site name/ AHIMS ID	Research potential	Representative value	Rarity	Educational Potential	Overall Archaeological Significance
(AHIMS ID 43-4-0057)					
WWSF Bee Tree (AHIMS ID 43-4-0058)	High	High	High	High	High

The assessment revealed that the WWSF Bee Tree (AHIMS ID pending) was identified as containing high archaeological significance, followed by the WWSF AS01 which was identified as containing 14 artefacts concentrated around the south western ephemeral drainage line.

The other two items were considered to be of low significance as WWSF IF01 the area art which the artefact was found contained a high level of disturbance and as the site contained one artefact it was considered to be of low archaeological significance. Whilst WWSF IF01 consisted of a single silcrete flake within the wheat crop in the eastern portion of the SU1. According to Artefact *'silcrete is abundant in the surrounding areas and therefore the material within the site is not considered rare and has limited research potential'*.

Table 22 provides the impact assessment of the (4) identified sites.

Table 22 – Impact assessment from ACHAR

Site name (AHIMS ID)	Type of harm	Degree of harm	Consequence of harm
WWSF IF01 (AHIMS ID 43-4-0056)	Direct	Total	Total loss of value
WWSF IF02 (AHIMS ID 43-4-0071)	Direct	Total	Total loss of value
WWSF AS01 (AHIMS ID 43-4-0057)	Direct	Partial	Partial loss of value
WWSF Bee Tree (AHIMS ID 43-4-0058)	Indirect	Partial	Partial loss of value

7.4.4. Safeguards and mitigation measures

Under Section 10 of the ASR two main management and mitigation measures were proposed for the (4) new Aboriginal sites discovered as part of the field survey undertaken, which included:

- Avoidance.
- Salvage.

Table 23 provides the mitigation measures for the management of the four identified Aboriginal sites. The mitigation measures also reflect the consultation requirements of the LALC as provided in Appendix 2 of the ACHAR.

Table 23 – Aboriginal Cultural Heritage Mitigation Measures

Site	Degree of harm	Mitigation measure
WWSF IF01 (AHIMS ID 43-4-0056) WWSF IF02 (AHIMS ID 43-4-0071)	Total	<p>Surface collection of all known stone artefacts that will be impacted by the proposal prior to construction Cultural heritage awareness training to highlight Aboriginal significance of area and process for unexpected finds.</p> <p>Detailed analysis and recording of all collected stone artefacts and collation of data in a salvage report Retention of artefacts by West Wyalong LALC under a Care Agreement.</p>
WWSF AS01 (AHIMS ID 43-4-0057)	Partial	<p>Surface collection of all known stone artefacts that will be impacted by the proposal prior to construction.</p> <p>NO GO zones for the lifetime of the solar farm for known stone artefacts that will not be impacted by the proposal NO GO zones to be identified on all construction plans and plans to be kept on site at all times for reference.</p> <p>Cultural heritage awareness training to highlight Aboriginal significance of area, identification of NO GO zones and processes for unexpected finds. Detailed analysis and recording of all collected stone artefacts and collation of data in a salvage report.</p> <p>Retention of artefacts by West Wyalong LALC under a Care Agreement.</p>
WWSF Bee Tree (AHIMS ID 43-4-0058)	Minimal	<p>NO GO zone for the lifetime of the proposed solar farm to be constructed around the tree in consultation with an arborist.</p> <p>Reassessment of the protection zone surrounding the tree at the conclusion of the operation of the proposed solar farm.</p> <p>Tree health to be maintained during construction and operation of the proposed solar farm.</p> <p>Cultural heritage awareness training to highlight the Aboriginal significance of area, identification of NO GO zones and processes for unexpected finds.</p>

The recommended mitigation measures will be confirmed with the Registered Aboriginal Parties for the study area.

Other recommended measures which were recommended in Section 10 – Management and Mitigation Measures of the ACHAR apart from Site Conservation included:

- Surface collection.
- Discovery of human remains.
- Changes to proposed works.
- Management of Aboriginal objects.
- Ongoing consultation with Aboriginal stakeholder groups.

Pending endorsement by the RAPs it is intended that the salvaged items WWS IF01, WWSF IF02 and WWSF AS01 will be retained by the West Wyalong LALC under a Care Agreement. The WWS Bee Tree will have a NO GO zone for the lifetime of the proposed solar farm which will be constructed around the tree in consultation with an arborist. These mitigation measures have been listed as recommendations in Section 11 of the ACHAR.

7.5. LAND

The proposal is a State Significant Development (SSD). This assessment has been undertaken to fulfil the requirements of the Secretary's Environmental Assessment Requirements (SEARs), issued on 8 November 2018. This assessment specifically addresses the need to consider:

- Potential impacts of the development on existing land uses on the site and adjacent land including:
 - An assessment of compatibility of the development with existing land uses during construction, operation and decommissioning of the solar farm.

7.5.1. Methodology

The following guidelines and policies were used to determine the land use impacts on the subject and surrounding land uses resulting from the proposed solar farm development.

- *Bland Local Environmental Plan 2011.*
- *Department of Industry Land Use Conflict Risk Assessment (LUCRA).*
- *The land and soil capability assessment scheme: second approximate (OEH)*
- Social Economic Impact Assessment prepared by Urbis.
- Landscape Strategy prepared by Site Image.
- Water Assessment prepared by SLR Consulting.
- Geotechnical Impact prepared by SMEC.

7.5.2. Existing environment

The proposal site is comprised of two lots including Lots 17 and 18 of DP 753081 and is commonly known as 228-230 Blands Lane, Wyalong. The proposal includes Lot 17 for access purposes however Lot 18 is proposed to be used for the solar farm containing 296,000 photovoltaic panels. The solar farm will connect via overhead or underground lines in Myers Lane to the existing 132kV overhead transmission line (Lake Cowal Mine to Temora to Wagga North).

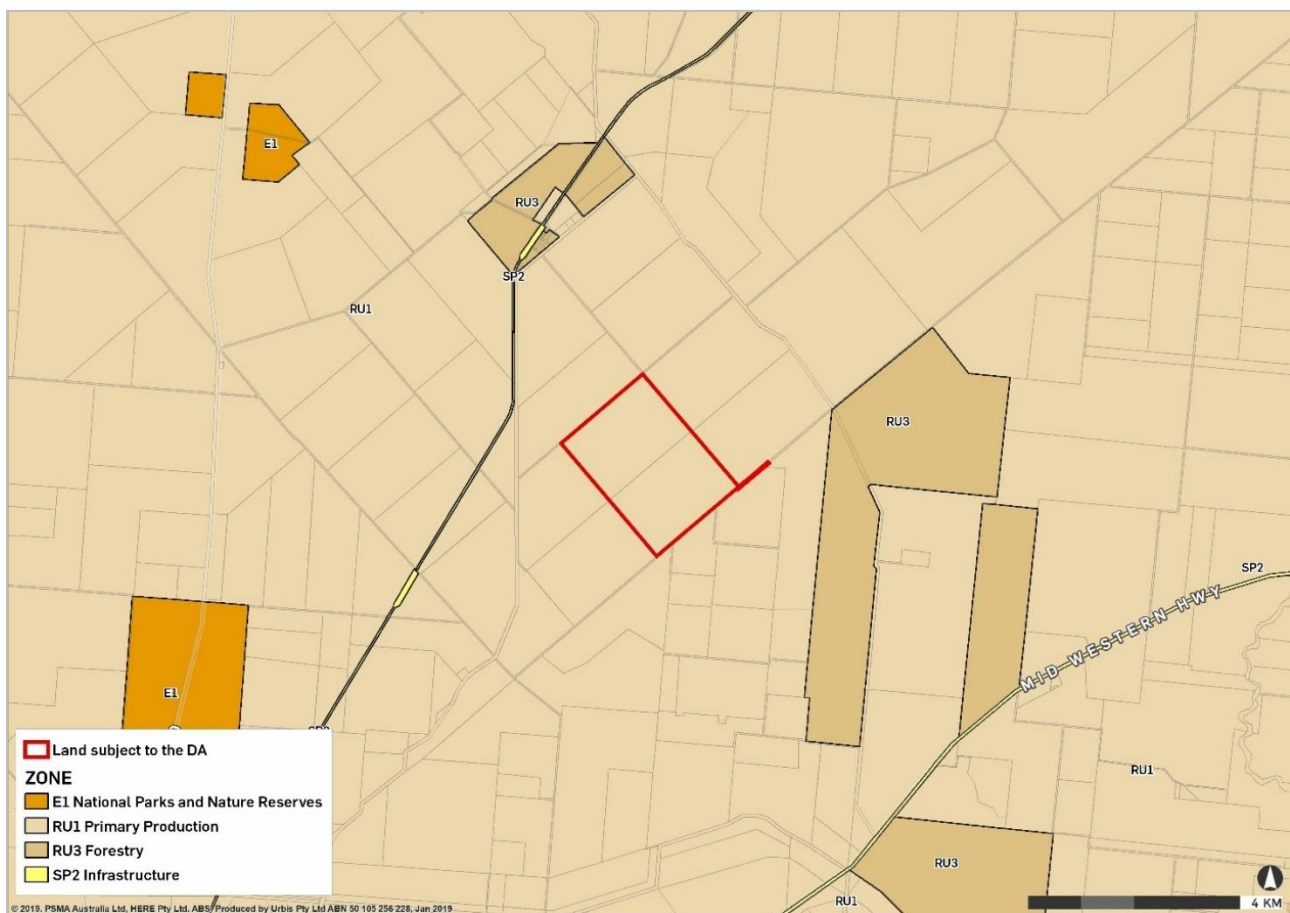
Zoning

The subject site and surrounding uses are zoned RU1 – Primary Production under the *Bland Local Environmental Plan 2011* as shown in **Figure 37**. The proposed use of the subject site for the purposes of a solar farm meets the intended objectives of the RU1 Primary Production zone as identified in **Table 24**.

Table 24 – Zoning objectives

Zone	Zone objectives
RU1 Primary Production	<ul style="list-style-type: none"> • To encourage sustainable primary industry production by maintaining and enhancing the natural resource base. • To encourage sustainable primary industry production by maintaining and enhancing the natural resource base. • To encourage diversity in primary industry enterprises and systems appropriate for the area. • To minimise the fragmentation and alienation of resource lands. • To minimise conflict between land uses within this zone and land uses within adjoining zones.

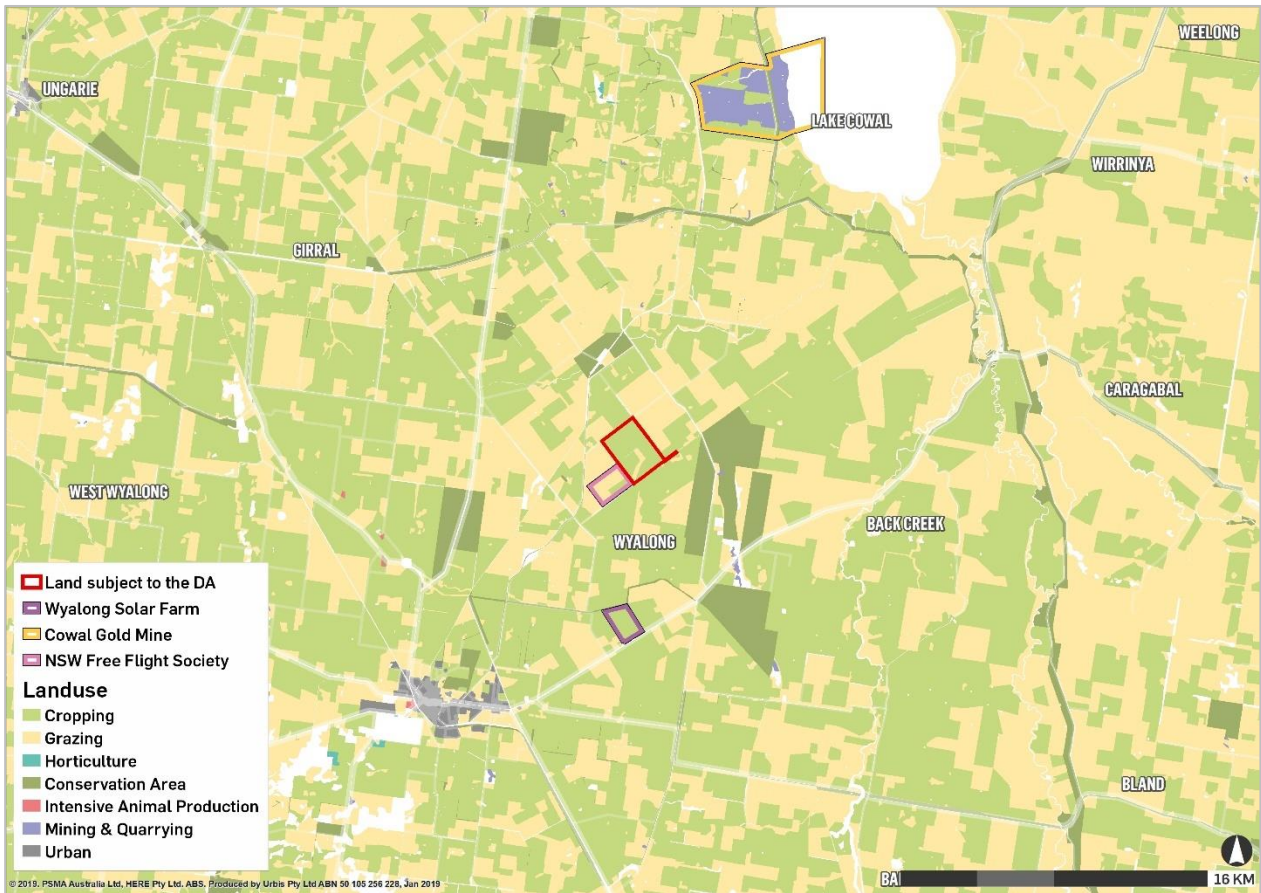
Figure 37 – Zoning map



Land Uses

The proposal site primarily used for cropping and grazing purposes. Similarly, surrounding land is predominately used for agricultural purposes followed by the mining and quarrying at the Cowal Mines located north of the subject site as shown in **Figure 38**.

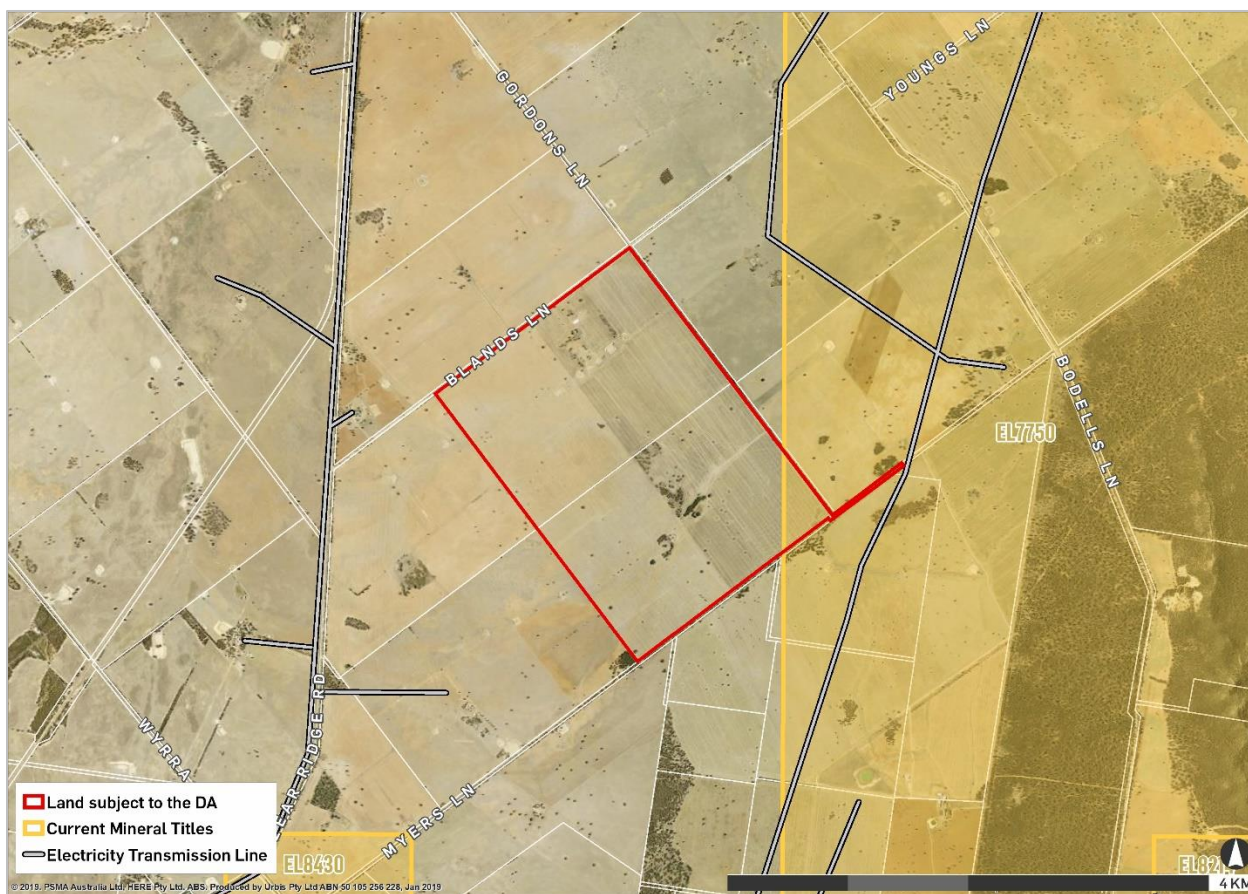
Figure 38 - Surrounding land uses



Mining, mineral or petroleum rights

As shown in **Figure 39** an existing exploration licence of EL7750 was noted affecting properties east of the subject and includes part of the south eastern portion of the site which is proposed to be used for the solar farm and Myers Lane connection.

Figure 39 - Mineral Titles within proximity of subject site



Land and soil capability

Land and Soil Capability (LSC) Mapping data and *The land and soil capability assessment scheme: second approximate* (OEH) has been analysed and reviewed to determine the site's land and soil capability. The site is classified as LSC Class 3 land which has 'moderate limitations'. LSC Class 3 can accommodate high impact land uses with the implementation of mitigation measures and ongoing management plans.

The soil landscape over the site is comprised of two predominant soil types; Spy Hill (SY) and Wah Way (WW). The Spy Hill soils in the west of the site are moderately well drained earthy sands with a high run on and water erosion potential. The site lies within the lower slopes where soils are described as moderately deep (>60cm) dark reddish brown sandy clay loam with a moderate pH (6.0). Soils associated with drainage lines include the Yellow / Brown Solodic Soils comprising sandy loam underlain by sandy clay loam with a largely neutral pH (7.0).

The Wah Way soils in the east of the site include the poorly drained clays associated with the Wah Way alluvial plain. The red and brown clays are present to a depth greater than 150cm, with a neutral pH (7.0) found in the topsoil becoming more alkaline with depth (pH 8.0 - 9.0). The Wah Way soils have a low permeability, and during flood events water erosion potential can be high if water in areas of fast moving waters.

Figure 40 provides an indication of the local soil types on and around the site. **Figure 41** provides the LSC of the site and surrounding area.

Figure 40 - Local soil types

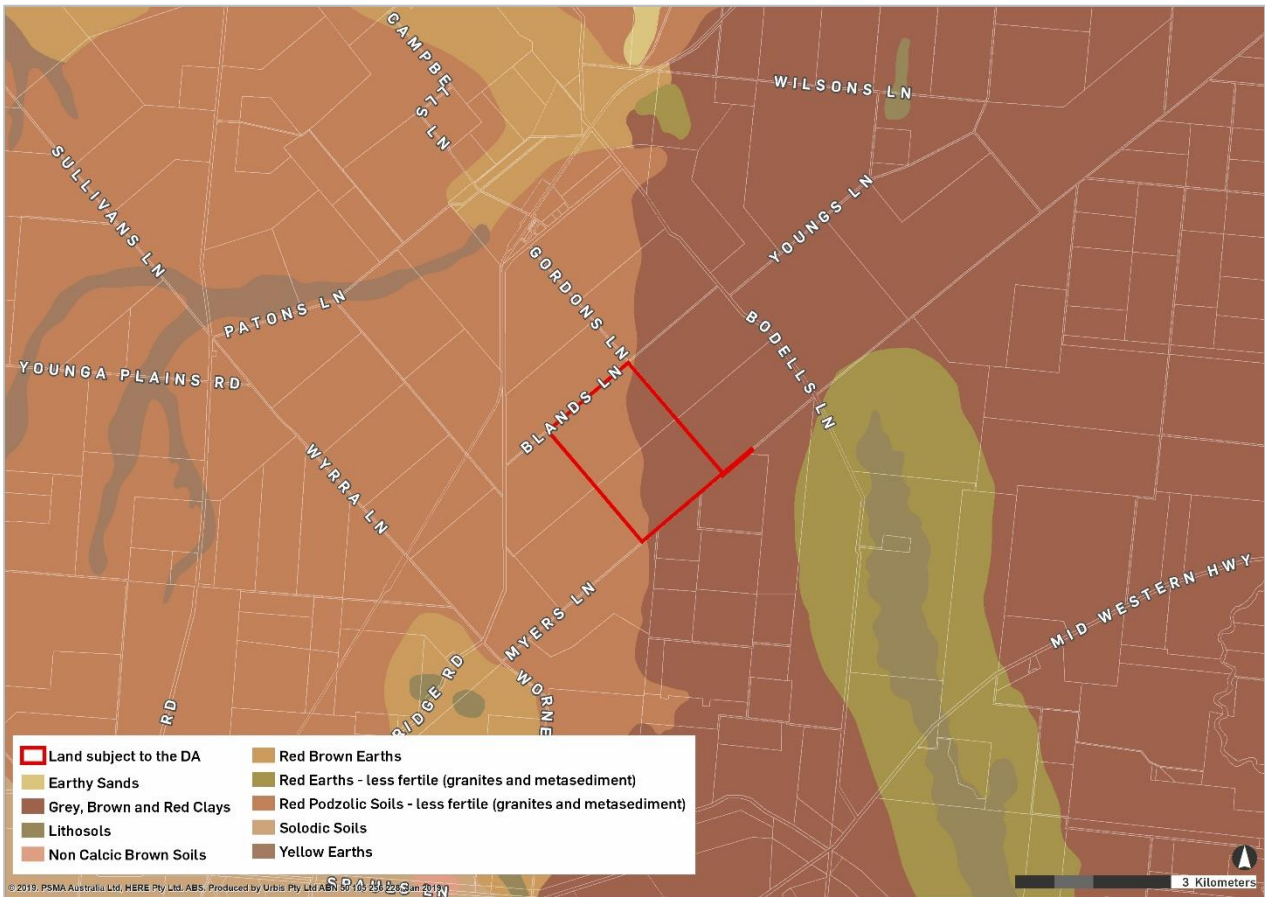
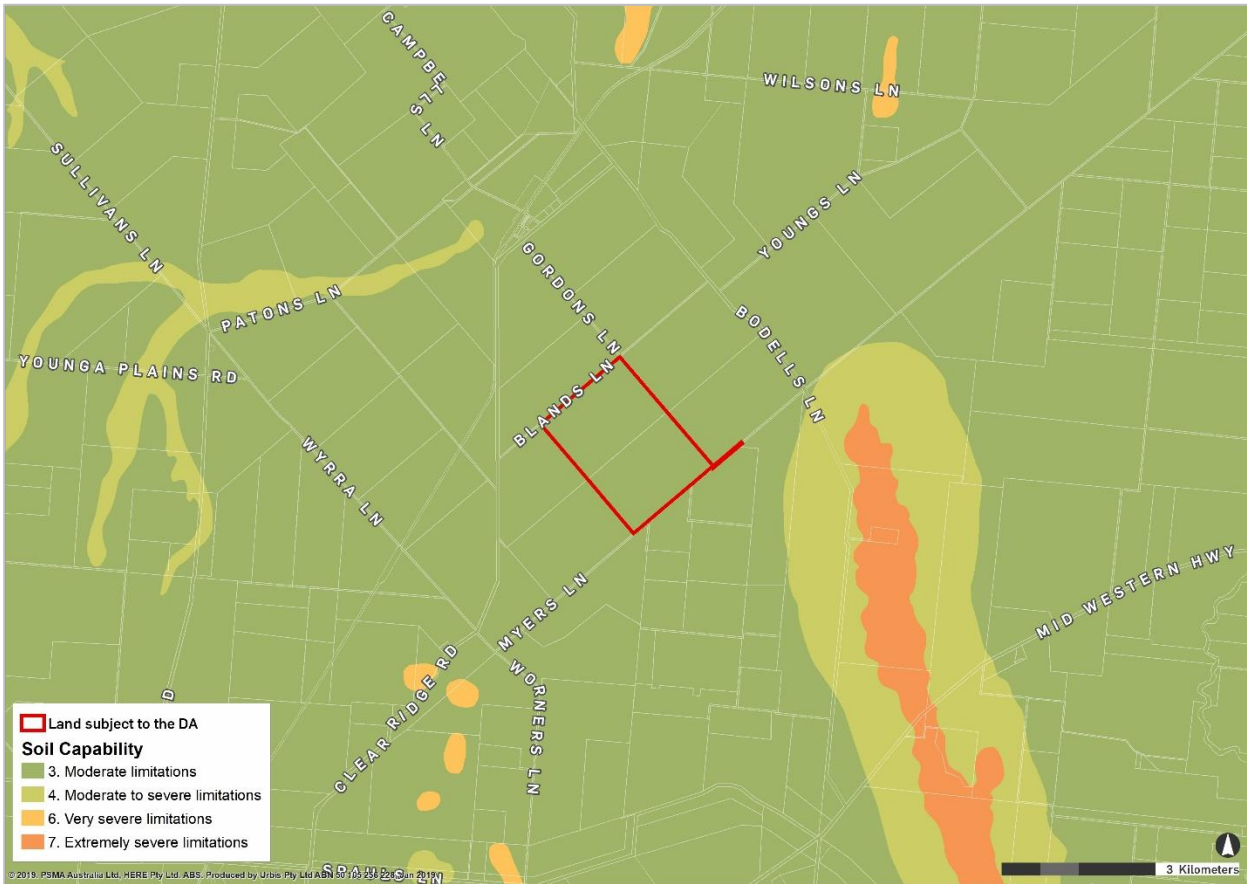


Figure 41 - Land and soil capability



7.5.3. Land Potential Impact and Mitigation Measures

Table 25 – Potential land use impact and mitigation measures

Potential Conflict	Consideration	Mitigation Measure	Risk ranking
Loss of agricultural land	Concern may be raised with the loss of Class 3 agricultural land due to the use of the subject site as a solar farm.	The subject site despite being proposed as a solar farm will continue to be used for agriculture through the grazing of livestock.	Level 5 – Negligible
Conflicts with surrounding land uses	Concerns of any conflicts with surrounding land uses	<p>Based on the specialist reports it is considered that there will be minor impacts on surrounding land uses.</p> <p>Impacts of noise, traffic and waste are anticipated to be higher during the peak construction periods however mitigation measures to limit the impacts on the local community and land uses have been detailed in each respective report.</p>	Level 3 – Moderate
Conflicts with other major proposals within the local context	<p>Locally there are number of major developments planned or in operation. Similar to the Lightsource BP proposal, there is a current proposal by ESCO Pacific for a solar farm 7km northeast of West Wyalong, that will deliver 350,000 solar panels on 259 hectares.</p> <p>Cowal Mine as shown in Figure 23 is located 40km north-east of West Wyalong and has been granted a licence extension to 2032. A proposal seeking an expansion of the operations of the mine is currently being sought.</p>	<p>It is considered that the impacts of the (2) solar farms and mine will have impacts on the local infrastructure and services.</p> <p>As a result, mitigation measures such as the following have been recommended to address conflicts between the major developments in the accompanying specialist reports including:</p> <p>Specific construction traffic routes.</p> <p>Staged construction phases.</p>	Level 3 – Moderate

Potential Conflict	Consideration	Mitigation Measure	Risk ranking
		<p>Exploration of private rental accommodation.</p> <p>Seeking short-term accommodation in surrounding townships.</p> <p>Local procurement of construction workforce.</p> <p>Local procurement of operational team workforce.</p>	
Connection of electricity powerline	The solar farm will connect via overhead or underground lines in Myers Lane to the existing 132kV overhead transmission line (Lake Cowal Mine to Temora to Wagga North).	The provision of the connection will require the approval for clearing of vegetation.	Level 3 – Moderate
Provision for future subdivision	<p>The minimum lot size applicable to the subject site under the Bland Locale Environmental Plan 2011 is 200ha.</p> <p>The subject site is zoned RU1 Primary Production zone and land in a zone to which this clause applies may, with development consent, be subdivided for the purpose of primary production to create a lot of a size that is less than the minimum size shown on the Lot Size Map in relation to that land.</p>	<p>The subject site will not prevent the potential for future subdivision following the cessation of energy generation from the approved solar farm at the end of its life span (or lease period, whichever is the sooner).</p> <p>Based on the zone it should be noted that the zoning restricts the subdivision potential of the site to rural uses.</p>	Level 5 – Negligible
Concerns by NSW Free Flight Society	Concern has been raised by the NSW Free Flight Society (south west of the site) regarding the ability to reclaim their model planes that have entered the site.	A 100-metre-wide flight clearance buffer zone has been proposed on the south western property boundary as shown the Landscape Strategy prepared by Site Image.	Level 5 – Negligible

Potential Conflict	Consideration	Mitigation Measure	Risk ranking
Flood prone land	The subject site is not identified as flood prone land	The water assessment report prepared by SLR Consulting provides mitigation strategies for high rain periods to address any potential low level site water flows.	Level 5 – Negligible
Soil survey	A soil survey was undertaken by SMEC	The geotechnical report prepared by SMEC has provided recommendations and mitigation measures.	Level 3 – Moderate
Remediation following decommissioning of the solar farm	The proposed solar farm will operate for a period of up to 40 years.	It is recommended that prior to the decommissioning of the solar farm an assessment of the remediation of land be undertaken. This should be done closer to the closure date.	Level 3 – Moderate

7.6. GEOTECHNICAL

A geotechnical assessment of the site was undertaken by SMEC (**Appendix I**) which informed the detailed design of the proposal. The assessment provides a full investigation of the geotechnical composition of the site.

7.6.1. Methodology

The methodology used by SMEC to undertake the geotechnical investigation included:

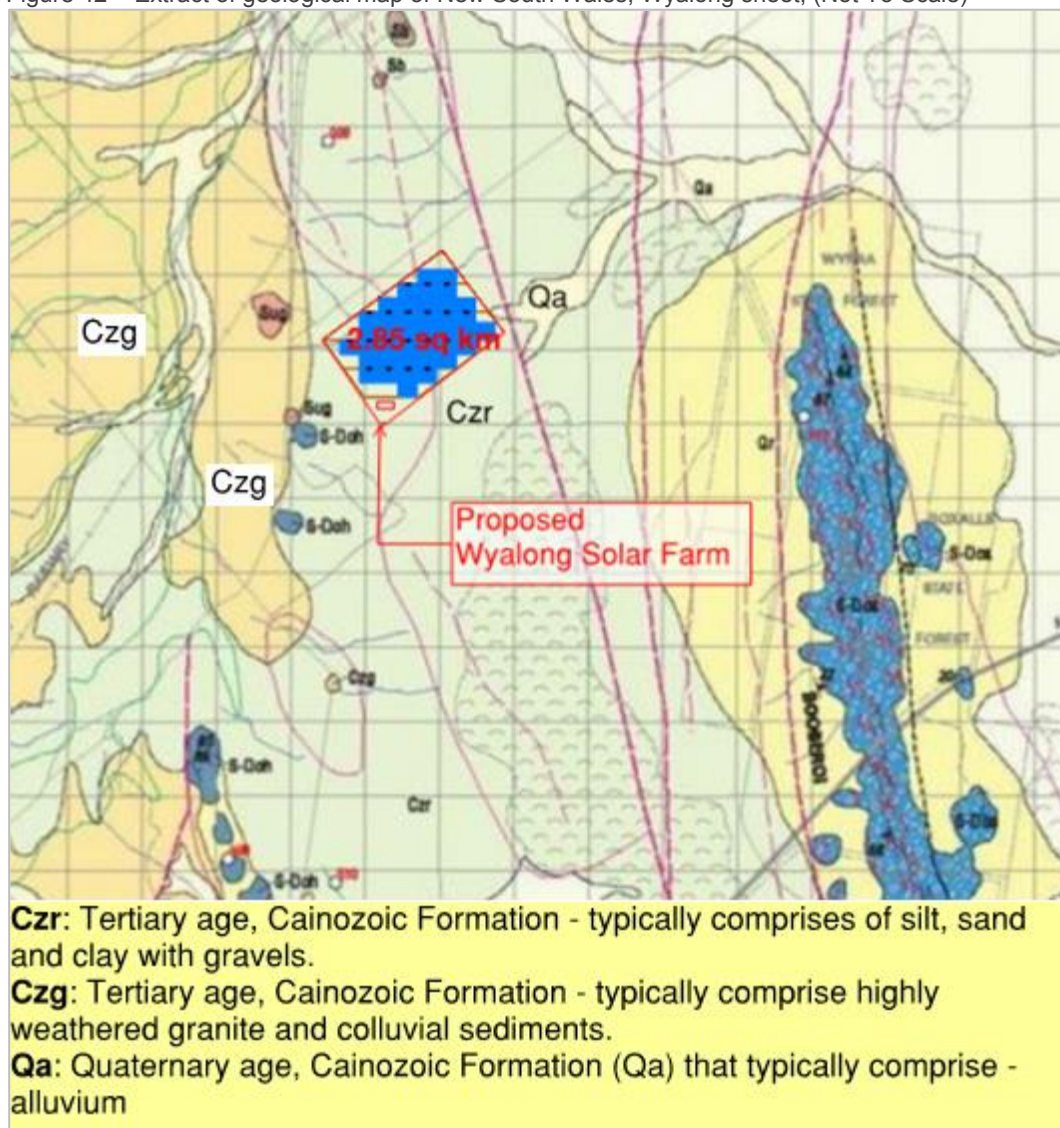
- Desktop research using topographical data.
- Fieldwork – borehole drilling (30 boreholes).
- Geotechnical Laboratory Testing.
- Fieldwork – Electrical Resistivity Testing.
- Analysis and documentation of findings.

7.6.2. Existing environment

Reference to the Geological Survey of New South Wales 1:100,000 scale 'Wyalong' map indicates that the site is underlain by Tertiary age, Cainozoic Formation (Czr) that is described as shallow slope colluvial plains, some residual veneer, with inactive alluvial plains. This type of strata typically comprises of silt, sand and clay with gravels.

The Wyalong geological map also indicates that the areas to the east of the site comprise of Quaternary age Cainozoic Formation (Qa) that typically comprise - alluvium and west of the site comprise of Tertiary age Cainozoic Formation (Czg) that typically comprise highly weathered granite and colluvial sediments. An extract of the Geological Map of New South Wales, Wyalong is shown in **Figure 42**.

Figure 42 – Extract of geological map of New South Wales, Wyalong sheet, (Not To Scale)



The geotechnical assessment identifies that the site primarily consists of topsoil over stiff to very stiff alluvial clays. In five of the 30 boreholes, granite or boulders were encountered at depths of between 3.25m and 5.75m below ground level.

The soil materials encountered can generally be excavated with conventional earth moving equipment. The ground conditions have a Mild durability exposure classification for concrete foundations (for building bases) and Moderate for steel piles (for the panel framework). Results laboratory test results obtained from the borehole drilling across the site is provided in **Table 5-3** of the Geotechnical Assessment.

7.6.3. Potential impacts and mitigation measures

Table 26 – Geotechnical impacts and mitigation measures

Impact	Issue	Mitigation Measure	Stage
Natural clays	Natural clays encountered in the investigation are considered to have a high potential for volume change with respect to variation in moisture content and are	Any changes to the existing surface profile will require reassessment based on the cut and fill profiles. It is recommended that any foundation systems be designed to accommodate	Construction

Impact	Issue	Mitigation Measure	Stage
	considered to be highly reactive.	any anticipated ground surface movements.	
Earthquake Loading	Movements resulting from earthquake activity as the site subsoil classification is considered to correlate to Class Ce for footings on soil.	For earthquake design, a hazard factor (z) of 0.08 is recommended for the NSW area as per Figure 3.2(A) in AS 1170.4.	Construction
Shallow foundations for footings	Impact on shallow footings based on existing soils.	<p>The geotechnical design parameters presented in Table 6-2 of the geotechnical assessment may be adopted in conceptual design for shallow footings.</p> <p>All the boreholes undertaken within the site have indicated that the ground conditions are likely to be suitable for shallow foundations (subject to the finished ground levels following development).</p>	Construction and Operational
Shallow foundations for structures	Impact on structures based on highly reactive nature of the site.	<p>It is recommended that a stiffened raft footing system equivalent to Class H2 be designed for the structures. The footing must be founded on natural subgrade. All foundations must extend through any uncontrolled fill or weak soils to be founded on competent subgrade (subject to design for potential shrink-swell movements).</p> <p>The allowable bearing capacities will need to be confirmed by a geotechnical engineer at the time of construction, prior to the placement of blinding concrete and/or reinforcing steel.</p>	Construction
Settlement	Total settlement of an individual footing proportioned on the basis of the recommended bearing pressures. Differential	Such settlements will occur immediately upon loading and will be built into the structure	Construction

Impact	Issue	Mitigation Measure	Stage
	movement is expected to be about 50% of the maximum pad settlement.	without impacting structural design.	
Pile (displacement)	Piles may be required to endure the uplift forces caused by wind actions as well as highly reactive nature of the ground condition. Differential upward movements between posts are considered minimal if uniform ground conditions are encountered in the adjacent post supporting the structure.	<p>Bored, screw (non-displacement) or driven (displacement) piles may be required to endure the uplift forces caused by wind actions as well as highly reactive nature of the ground condition.</p> <p>It is recommended that all piles be designed in accordance with the requirements of AS2159 – 2009. Using methods described in Woodward & Boitono (1961), the geotechnical parameters recommended for the pile design is shown in Table 6-3 of the geotechnical assessment.</p> <p>Knowledge of the pile construction specification will be applied to the construction contract.</p>	Construction
Lateral pile capacity	Consideration should be given to the possibility for loss of lateral load capacity in the near surface soil.	<p>The preliminary determination of lateral capacity would utilise the conventional closed-form solutions developed by Broms, with further detailed analysis carried out using computer-based numerical methods.</p> <p>In short-pile behaviour, the ultimate lateral resistance of the soil surrounding the pile is fully mobilised along the entire length of the pile. In long-pile behaviour, the structural strength of the pile itself is fully mobilised before the ultimate soil resistance is achieved.</p>	Construction

Impact	Issue	Mitigation Measure	Stage
		The pile must also be designed such that lateral deflections under serviceability loads are within allowable limits.	
Uplift Forces	Uplift forces impact on piles	If tension piles are required to resist the uplift forces, an average ultimate skin friction of 35 kPa for stiff clays, 40 kPa for very stiff (or better) clays and 40 kPa for residual silt and clay soils can be adopted.	Construction
Site Trafficability	Problems may arise from disturbance of the upper level soil fabric resulting from the removal of the existing vegetation.	<p>It is recommended that vegetation be trimmed (mowed) and shrubs be cut to the ground level, which will preserve the crust and improve trafficability. Whereas clearing and grubbing would present issues if the crust is breached, and this would be more pronounced after rainfall events.</p> <p>It is recommended that the following steps be taken to improve trafficability:</p> <ul style="list-style-type: none"> • The exposed surface in the construction area is proof rolled to provide a seal and assist in identifying weak or soft areas for treatment. • Dedicated construction tracks are used to control site traffic and limit trafficability issues. <p>Provision and maintenance of adequate drainage conditions at this site is essential. It should be ensured that runoff is diverted away from the construction and access tracks to prevent ponding of water.</p>	Prior to construction, construction and operation

Impact	Issue	Mitigation Measure	Stage
		<p>To assist in maintaining a workable construction site, the placement of a working platform as a final layer across structure/building platforms is recommended.</p> <p>The contractor performing the works should fully inform themselves of the ground conditions at the site prior to commencement of earthworks. This requirement should be explicit in any earthworks specifications or contract.</p>	
Earthworks and Subgrade preparation	<p>Impacts of minor cut and fill works.</p> <p>Onsite surface clayey material will cause problems with trafficability and workability should this material be wet prior to or during construction.</p>	<p>Options for earthworks at the site include:</p> <ol style="list-style-type: none"> 1. Low performance fill platform allowing construction of solar arrays and access tracks constructed from general fill; and 2. Normal performance fill platform to suit construction of pavements and structures constructed from structural fill. <p>Option 1 and Option 2 are detailed on Page 22 of the geotechnical assessment.</p>	Construction
Material Suitability for Reuse	<p>The site primarily consisted of topsoil over stiff to very stiff Clays of high plasticity. The use of high plasticity onsite clays should consider the potential reactivity of these materials which are susceptible to shrink-swell movements with changes in moisture content (i.e. shrinkage on drying and swelling on wetting).</p>	<p>Clays are considered unsuitable for use as structural fill (i.e. behind retaining walls and beneath structures).</p> <p>All site won material will require laboratory testing to confirm contamination status for reusability.</p> <p>Site won material may be used as general filling for access track construction subject to adequate compaction and selective</p>	Construction

Impact	Issue	Mitigation Measure	Stage
		rejection of any unsuitably over-wet material.	
Excavation of Material and Ground Support	Depending on excavation depths, heavy ripping conditions should be expected	<p>Use of larger plant (i.e. D9 or larger) together with rock breaking equipment to facilitate excavation and removal.</p> <p>It is recommended that a trial excavation be carried out to assess the general rippability of the rock and establish rates of production.</p>	Construction
Groundwater Control	Localised flows associated with perched water layers are a possibility.	If groundwater is encountered onsite it is anticipated that any flow emanating from these materials can be managed using sump pumping. This will require further assessment at the time of construction.	Construction
Erosion and Drainage	The laboratory tests revealed soil samples to have moderate dispersive classification and such soils are prone to erosion.	<p>To protect against erosion and dispersion exposed soils should be vegetated or covered. Proper site drainage will be required to divert surface water from sensitive areas in a controlled manner and prevent pooling water. It is recommended that where site construction drainage involves high concentration of flows, the drains be appropriately lined with geotextile or plastic to control erosion on the site.</p> <p>Adequate site drainage will be required to remove runoff from site in a controlled manner and prevent pooling water. It is important that the site is well drained. The ground around all structures should slope away at a gradient of 1:50 for a minimum of 3 m, then fall into a stormwater collection system or overland</p>	Construction

Impact	Issue	Mitigation Measure	Stage
Subgrade Evaluation and Preliminary Pavement Assessment	Laboratory testing indicates CBR values of 1.0% to 5.0% for the subgrade materials in the upper profile over the site. Swell percentages in the range 1.0% to 3.0% were measured.	<p>flow paths to prevent water from ponding adjacent to structures.</p> <p>SMEC recommends an initial design CBR value of 2.0% for clay subgrade soils based on the laboratory results.</p> <p>Site specific CBR testing to confirm the assumed design values is recommended for any critical or highly trafficked sections of pavement. Consideration could be given for subgrade treatments for the clay subgrade materials to allow more economical pavement design. Site clays must be treated as expansive. In the areas of fill, the CBR values will be dependent on the source, quality, and compaction of the fill material.</p>	Prior to construction
Thermal Resistivity	<p>Observations from the laboratory test results include:</p> <ul style="list-style-type: none"> • At field moisture content (FMC), thermal resistivity varies from 0.57 to 0.79 m K/W; • Remoulded moisture contents (RMC) varied from 14.7% to 22.8%; • Decreasing moisture content to 0.3% resulted in an increase in thermal resistivity of up to 3.85 m K/W; and • Remoulded, compacted samples achieved approximately 95% density ratios of standard compaction. 	<p>Remoulding soil changes its structure and thermal resistivity and it is expected that soils used as fill or trench backfill may have a different thermal resistivity to that of the natural material onsite. Field measurements may be required if thermal resistivity's of natural materials are required.</p>	Construction
Durability Assessment	For Steel Piles	Steel piles are suitable for use however it is recommended	Construction

Impact	Issue	Mitigation Measure	Stage
	<p>Results indicate that for durability of steel piles, the ground conditions have an exposure classification of non-aggressive to moderate; soil type B considered – low permeability soils (e.g. silts and clays) or all soils above groundwater, as per AS2159-2009.</p> <ul style="list-style-type: none"> • The samples tested between 0 to 0.431 m bgl were classified as non-aggressive. • The samples tested between 0.431 m to infinite were classified as moderate. • Assuming piled foundations would extend to 1.5 m or deeper, a moderate classification is considered here for the durability of steel onsite. • For moderate rating conditions, the durability of steel piles requires a uniform corrosion allowance of 0.02 to 0.04 mm/year. 	that steel posts be galvanised to achieve design life.	
Anticipated Construction Difficulties	<p>Removal of some trees and their associated roots will be required as their roots can be deleterious to foundations.</p> <p>Effects due to moisture change can result in settlement and cracking of the ground due to shrink-swell.</p>	Care should be taken when removing the tree roots, as incomplete removal could lead to under-draining and ground settlement when the roots decompose.	Construction
Pile and footing excavation	Ensuring ground conditions are suitable	<p>It is recommended that construction inspection of the footings / pile excavations be undertaken by a</p> <p>geotechnical engineer to confirm that the ground</p>	Construction

Impact	Issue	Mitigation Measure	Stage
		conditions are consistent with those anticipated.	

7.7. VISUAL

A Visual Impact Assessment (VIA) (**Appendix J**) of the proposal has been undertaken by Urbis. The VIA provides a full assessment of the visual impacts associated with the proposal, including:

- Landscape character and scenic vistas.
- Stakeholder values regarding visual amenity. During community consultation, no concerns were raised by surrounding residents about the visual impacts of the solar farm.
- Potential impacts on representative viewpoints.
- Addressing requirements of the SEARs.

The VIA includes a strategy to address identified impacts, including onsite vegetation screening, general design measures and a process to verify the actual visual impacts of the proposal. This improves the reliability of the measures and provides a trigger to undertake additional mitigation if required.

7.7.1. Methodology

The process used by Urbis to undertake the landscape and visual impacts assessment included:

- Desktop research using topographical data
- Field survey
- Review of the Masterplan prepared by Site Image Landscape Architects Pty Ltd;
- Review of the Bland Local Environmental Plan 2011
- Review of the 'Glare and Glint Analysis for the Murra Warra Solar Farm' prepared by AECOM dated 25 January 2017
- Identification of the landscape and visual values
- Analysis and documentation of findings

Guidance for the assessment of the visual impact was provided with the following guidance notes:

- The Landscape Institute and Institute for Environmental Management and Assessment LIIEMA, (2013), Guidelines for Landscape and Visual Impact Assessment, Routledge 3rd Edition
- United States Department of Agriculture Forest Service, (1995), Landscape Aesthetics – A Handbook for Scenery Management, Agricultural Handbook No. 701
- Guidance note EIA-N04 Guidelines for Landscape Character and Visual Impact Assessment, NSW State Government, Roads and Maritime Services (2013).
- The Guidance for Landscape and Visual Impact Assessment (GLVIA), Third Edition, Landscape Institute and Institute of Environmental Management & Assessment (2013).

7.7.2. Existing environment

The land has been largely cleared of vegetation apart from a central grouping of vegetation in the southern half of the site and perimeter road side planting. The site currently accommodates a driveway from Blands Lane that terminates at a couple of farm sheds with patches of canopy trees encircling them (refer to **Figure 43**).

Figure 43 – Existing driveway from Blands Lane towards farm sheds



The site itself lies at an elevation of between 220 to 240 m AHD gently rising in a north-westerly direction as shown in **Figure 44**.

Figure 44 –The topography of the Site rises to a gentle, low-lying central ridge



The surrounding landscape to the site is generally characterised by rural vistas in all directions. The site comprises an expansive landscape previously utilised for dryland agriculture with some pockets of mature vegetation. The groundcover is a mixture of bare soil, dry grass, and isolated dams, with clusters of vegetation.

The topography surrounding the site is gently undulating with rising elevations westerly up to 330 metres. Australian Height Datum (AHD). Ridgelines are present to the south-east area of the site associated with Wyrra State Forest (refer to **Figure 45**) and northward.

Figure 45 – The rising topography surrounding Wyrra State Forest is a dominate landscape feature in the landscape



Sandy Creek lies to the north of the site meandering through Clear Ridge State Forest to Lake Cowal Game Reserve which is located to the north-east of the site. Vegetation typically lines the rural road network (refer to **Figure 46**) and encircles rural residential homesteads that are sparsely scattered across the landscape.

Figure 46 –Road side vegetation typically lines the rural road network filtering views to the surrounding landscape



Figure 47 – Vegetation typically surrounds rural residential homesteads



The NSW Free Flight Society is located approximately 1.3 kilometres from the south-western boundary of the site (refer to **Figure 48**). Generally, sensitive receptors and surrounding development is distanced from the site (approximately 2km and beyond).

Figure 48 –Views towards the Site from the entry to the NSW Free Flight Society entrance off Clear Ridge Road



Figure 49 – View from Myers Lane looking north east (approximately 2.7 km from the Site)



7.7.3. Potential impacts

The assessment of the potential impacts was taken and assessed from five view point locations as identified in **Figure 50**. These points were selected as they were considered the highest sensitivity viewpoints from the residential, recreational facilities, local and rural roads identified in Section 6 – Visual Appraisal of the LVIA. The visual appraisal demonstrates that viewpoints that are representative of high sensitivity areas in the vicinity of the proposal is limited. The visual appraisal also demonstrates that there are no sections of open views towards the Proposal from public accessible foreground vantage points.

It should be noted that although Myers Lane borders the southern boundary of the Site, it is not accessible due to the presence of existing dense vegetation and therefore was not identified as a view point location for the purposes of this appraisal.

The following table provides the address of the residential receivers identified in **Figure 50**.

Table 27 – Associated and Non-Associated Residential Receivers

Receiver ID	Address
R1	84 Myers Lane, Wyalong
R2	1390 Clear Ridge Road, Wyalong
R3	1049 Clear Ridge Road, Wyalong
R4	1389 Clear Ridge Road, Wyalong
R5	1590 Clear Ridge Road, Wyalong
R6	114 Patons Lane, West Wyalong
R7	1049 Clear Ridge Road, Wyalong
R8	2060 Clear Ridge Road, Wyalong
R9	839 Bodells Lane, Wyalong
R10	179 Bodells Lane, Wyalong
R11	324 Bodells Lane, Back Creek
R12	175 Bodells Lane, Wyalong

Figure 50 – Viewpoint Locations & Associated and Non-Associated Residential Receivers



Source: Urbis

VIEWPOINT 1

Viewing location Residential homestead off Blands Lane (R5). Photo from resident driveway, looking south-east.

Viewing context Duration of view stationary.

VISUAL SENSITIVITY

Land use Residential

Viewing distance Background (1.7 km from closest proposal component).

Visual sensitivity level **Low.**

VISUAL MODIFICATION

Visual modification level **Low.**

Viewpoint discussion Elements of the proposal that would be visible by the residential homestead include the perimeter security fencing up to two metres high, CCTV poles up to 2.5 metres high, maintenance access track, fire break and rows of 4.01-metre-high solar panels.

It is acknowledged that the viewing experience is filtered by existing vegetation in the surrounding landscape and across a local track through agricultural related activities. Additionally, the frequency of viewers would be low. Refer to Picture 7.

The distance to the Proposal components from the viewpoint and the proportional extent of the view occupied by the proposal elements, the change is considered to be low. Refer to Picture 8.

Overall the proposal components viewed from this vantage point would be barely perceptible resulting in a minor deterioration to the view currently experienced from the residential homestead.

Operational visual impact **Low.**

Consequently, the low level of visual sensitivity combined with the low degree of modification, would result in a low adverse visual impact at operation for the residential homestead.

Residual visual impact **Very low.**

A three-metre-wide buffer planting is proposed along the northern boundary of the Site either side of the existing vegetation. Refer to Picture 9 and 10. Once mature, the effect would reduce to a very low residual impact for the residential homestead.



Picture 9 – VP1: Existing view towards the Site from resident driveway off Blands Lane looking south-east.



Picture 10 - VP1: Photo simulation: At completion, no vegetation.



Picture 11 - VP1 Photo simulation: Year 5 vegetation. Refer to **Appendix J** for larger plans.



Picture 12 - VP1 Photo simulation with wireframe: Year 5 vegetation. Refer to **Appendix J** for larger plans.

VIEWPOINT 2

Viewing location Residential homestead off Bodells Lane (R9). Photo from existing resident driveway, looking south-west.

Viewing context Duration of view stationary.

VISUAL SENSITIVITY

Land use Residential.

Viewing distance Background (2.3 km from closest proposal component).

Visual sensitivity level Low.

VISUAL MODIFICATION

Visual modification level Very low to not apparent.

Viewpoint discussion Elements of the proposal that would be visible by the residential homestead include the perimeter security fencing up to two metres high, CCTV poles up to 2.5 metres high, maintenance access track, fire break, rows of 4.01-metre-high solar panels, the 18-metre high lightening rod and substation compound.

It is acknowledged that the viewing experience is filtered or inhibited by existing vegetation in the surrounding landscape and across agricultural related activities. Additionally, the frequency of viewers would be low. Refer to Picture 11.

Due to the distance to the proposal components from the viewpoint and the proportional extent of the view occupied by the proposal elements in conjunction with the presence of existing intervening vegetation across the rural setting and around the residential homestead, it is unlikely that the Proposal would result in a prominent change for the residential homestead. Refer to Picture 12. The change is therefore considered to be not apparent or very low as the worst-case scenario.

Overall the proposal components viewed from this vantage point would be either be barely noticeable or no views experienced of the proposal components from the residential homestead.

Operational visual impact Very low to not apparent.

Consequently, the very low level of visual sensitivity combined with the very low degree of modification, would result in a very low adverse visual impact at operation from the residential homestead.

Residual visual impact Not apparent.

Infill buffer planting is proposed along the north-eastern boundary of the Site. As such, the residual impact on views from the residential homestead would become not apparent.



Picture 13 – VP2: Existing view from resident driveway off Bodells Lane looking west towards the Site.



Picture 14 – VP2: Photo simulation with wireframe: Year 5 vegetation. Refer to **Appendix J** for larger plans.

VIEWPOINT 3

Viewing location NSWFFS (R2). From driveway entry off Clear Ridge Road, looking north-east.

Viewing context Duration of view stationary.

VISUAL SENSITIVITY

Land use Parks, reserves and State Forest.

Viewing distance Background (2.3 km from closest proposal component).

Visual sensitivity level Low.

VISUAL MODIFICATION

Visual modification level Low.

Viewpoint discussion Elements of the proposal that would be visible by users of the NSWFFS include the perimeter security fencing up to two metres high, CCTV poles up to 2.5 metres high, maintenance access track, fire break, 100 metre flight clearance zone and rows of 4.01-metre-high solar panels.

It is acknowledged that the viewing experience is filtered by existing vegetation in the surrounding landscape and the rising topography. Additionally, the frequency of viewers would be low. Refer to Picture 13.

Although the proposed vertical structures would completely change the agricultural setting, the distance to the Proposal components from the viewpoint and the proportional extent of the view occupied by the proposal elements, and the rising topography, the change is considered to be low. Refer to Picture 14.

Overall the proposal components viewed from this vantage point would be barely perceptible resulting in minor deterioration to the view currently experienced for the users of the NSWFFS.

Operational visual impact Low.

Consequently, the low level of visual sensitivity combined with the low degree of modification, would result in a low adverse visual impact at operation for the users of the NSWFFS.

Residual visual impact Very low.

Due to the distance to the Proposal and the low frequency of viewers no buffer planting is proposed along the south-western boundary of the Site. The residual impact for the users of the NSWFFS would be a very low adverse residual impact. Refer to Pictures 15 and 16.



Picture 15 – VP3: Existing view from driveway to NSWFFS, off Clear Ridge Road, looking north-east.



Picture 16 – VP3: Photo simulation: At completion, no vegetation. Refer to **Appendix J** for larger plans.



Picture 17 – VP3 Photo simulation: Year 5 vegetation. Refer to **Appendix J** for larger plans.



Picture 18 – VP3 Photo simulation with wireframe: Year 5 vegetation. Refer to **Appendix J** for larger plans.

VIEWPOINT 4

<i>Viewing location</i>	From intersection of Clear Ridge Road and Gordons Lane, looking south.
<i>Viewing context</i>	Duration of view transitory.

VISUAL SENSITIVITY

<i>Land use</i>	Rural road.
<i>Viewing distance</i>	Background (4.4 km from closest proposal component).
<i>Visual sensitivity level</i>	Very low.

VISUAL MODIFICATION

<i>Visual modification level</i>	Not apparent.
<i>Viewpoint discussion</i>	The undulating topography, intervening vegetation and distance from the viewpoint would inhibit views towards the Proposal. Refer to Picture 17.
<i>Operational visual impact</i>	Not apparent. Consequently, there would be no views experienced by the users of the rural road.
<i>Residual visual impact</i>	Not apparent.



Picture 19 – VP4: Existing view from intersection of Clear Ridge Road and Gordons Lane, looking south.

VIEWPOINT 5

Viewing location

From intersection of Blands and Gordons lanes, looking south.

Viewing context

Duration of view transitory.

VISUAL SENSITIVITY

Land use

Local track through agricultural related activities.

Viewing distance

Middleground (1.45 km from closest proposal component).

Visual sensitivity level

Very low.

VISUAL MODIFICATION

Visual modification level

Low.

Viewpoint discussion

Elements of the proposal that would be visible by users of the local track include the entrance gate, perimeter security fencing up to two metres high, maintenance access track, fire break and rows of 4.01 metre high solar panels.

It is acknowledged that there is existing boundary and road side planting that would assist in filtering views. Furthermore, the viewing experience is transitory from a local track through agricultural related activities. Refer to Picture 18. Additionally, the frequency of viewers would be low.

The distance to the Proposal components from the viewpoint and the proportional extent of the view occupied by the proposal elements, the change is considered to be low.

Overall the proposal components viewed from this vantage point would be barely perceptible resulting in a minor deterioration to the view currently experienced from the users of the local track.

Operational visual impact

Very low.

Consequently, the very low level of visual sensitivity combined with the low degree of modification, would result in a very low adverse visual impact at operation for the users of the local track at the intersection of Gordons and Blands lanes.

Residual visual impact

Not apparent.

Supplementary planting to three metres in width is proposed along the northern perimeter of the Site to comprise trees and small shrubs that have a minimum trunk clearance of 0.3 metres from the ground. As such the residual visual impact for the users of the local track would be not apparent.



Picture 20 – VP5 - View from the intersection of Blands and Gordons lanes looking south.

7.7.4. Summary of visual impact

The visual appraisal demonstrates that viewpoints that are representative of high sensitivity areas in the vicinity of the proposal are limited. The visual appraisal also demonstrates that there are no sections of open views towards the Proposal from publicly accessible foreground vantage points. Although Myers Lane borders the southern boundary of the Site, it is not accessible due to the presence of existing dense vegetation.

The predominate land use from where the Proposal is viewed is from local tracks which have a low to very low level of viewer sensitivity dependent upon viewing distance. Views towards the Proposal along the local tracks are transitory and broken. The existing native vegetation along the tracks form a visual tunnel, focusing the view down the road. There are a few gaps and breaks in the existing native vegetation in the surrounding landscape that afford views towards parts of the Proposal, but these are fleeting and from vehicles travelling at 80-100 kilometres per hour. Furthermore, the viewing angle is generally oblique or perpendicular and transitory.

The viewing experience from the two residential homesteads (VP1 and VP2) are filtered or inhibited by existing vegetation immediately around the homesteads, in the surrounding landscape or across agricultural related activities. The distance to the proposal components from the residential homesteads and the proportional extent of the view occupied by the proposal elements in conjunction with the presence of existing intervening vegetation across the rural setting, it is unlikely that the Proposal would result in a prominent change for these residents.

It is considered that there would be no unreasonable visual impacts to or from Clear Ridge or Wyrra State Forests. The distance from these states forests to the Proposal is over 1.5 kilometres. As the distance increases from the land use area the field of view decreases causing the visibility of the proposal components to diminish or be absorbed in the setting. Consequently, as the distance from the viewer to the proposal increases, the level of sensitivity reduces. Given the relatively low elevation of the components of the proposal above ground level, with the exception of the 18-metre-high lightening rod structure, the visual catchment is highly constrained by the distance as well as the effect of intervening vegetation and the elevation. In these views, the proposed solar farm will not be a dominant element in the landscape but viewed as a small component (if seen at all) within a wider setting.

7.7.5. Mitigation measures

The mitigation measures provided in **Table 28** will be implemented to minimise potential impacts of the proposal.

Table 28 – View impact mitigation measures

Potential impact	Mitigation measures	Stage
Retention of existing trees	Retention of existing groups of trees that centrally traverses the northern and eastern boundary of the Site and within the western half of the Site.	Construction
Visual buffer	<p>Infill planting to be installed maintaining a 3-metre-wide boundary screening along the remaining site edges, except along the flight society flight clearance buffer. Infill planting to match surrounding retained vegetation.</p> <p>Proposed planting species will be largely comprised of dominant species already found on site, and supplementary planting from a selection of endemic species. As per PBP and Standards for Asset Protection Zones, Trees must have clear trunk to height of 2 metres, and tall - medium shrubs be maintained to be clear of the tree canopy to ensure vertical stratification. Landscape to be planted in</p>	Construction

Potential impact	Mitigation measures	Stage
	clumps and not provide continuous vegetation or canopy.	
Night lighting	<p>All external lighting associated with the Proposal would comply with Australian Standard AS 4282: 1997 – Control of the Obtrusive Effects of Outdoor Lighting.</p> <p>Restriction of night-lighting to the minimum required for operations and safety requirements.</p> <p>Use of directional lighting techniques.</p> <p>Use of light shrouds and reflectors to limit the spill of lighting.</p>	Operational
Retention of existing vegetation	<p>Retention of existing groups of trees that centrally traverses the northern half of the site.</p> <p>Retention of existing central vegetation within the western half of the site.</p>	Construction
Flight clearance buffer zone	A 100-metre flight clearance buffer adjoining the NSWFFS land in the south-western corner (approximately 1.4 kilometres in length).	Construction
Fire buffer zone	A minimum 15 metre perimeter fire buffer zone around the entire Site clear of any vegetation. Outside of this fire buffer zone is to be landscaped with buffer planting, coordinating with the requirements of the ecologist report and the visual impact assessment.	Construction
Internal vehicle access and perimeter of site	Provision for vehicle access around the perimeter of the Site and key locations internally.	Construction

7.8. ACOUSTIC

A Noise Assessment (NA) report (**Appendix K**) has been prepared by SLR Consulting for the proposed solar farm at West Wyalong. As required in the SEARs, the purpose of the NA was to quantify potential environmental noise levels associated with the construction and operational stages of the proposal and to identify mitigation measures, where required.

The assessment by SLR Consulting was carried out in accordance with NSW regulatory requirements identified in the SEARs issued for the development.

7.8.1. Methodology

The methodology used to assess the cumulative noise impacts of the proposal, on the surrounding environment included the following:

- Identification of the sensitive receivers within proximity of the subject site.
- Assessment of the proposal against the following guidelines:

- *Interim Construction Noise Guideline (ICNG)* sets out ways to assess and manage the impacts of construction noise on residences and other sensitive land uses. It does this by presenting assessment approaches that are tailored to the scale of the construction works.
 - *Noise Policy for Industry (NPfI)* was released in 2017 and sets out the NSW Environment Protection Authority's (EPA's) requirements for the assessment and management of noise from industry in NSW.
 - *NSW Road Noise Policy (RNP)* provides an assessment of noise assessment resulting from construction related traffic.
 - Department of Environment and Conservation's (DEC) *Assessing Vibration: a technical guideline* (2006) provides guideline values for continuous, transient and intermittent events that are based on a Vibration Dose Value (VDV) rather than a continuous vibration level.
 - *Australian Standard AS 2187: Part 2-2006 Explosives - Storage and Use - Part 2: Use of Explosives and British Standard BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings Part 2*. The Standards provide frequency-dependent vibration limits related to cosmetic damage, noting that cosmetic damage is very minor in nature, is readily repairable and does not affect the structural integrity of the building.
- Identification of potential impacts and mitigation measures.
 - Preparation of a draft noise management plan (if required).

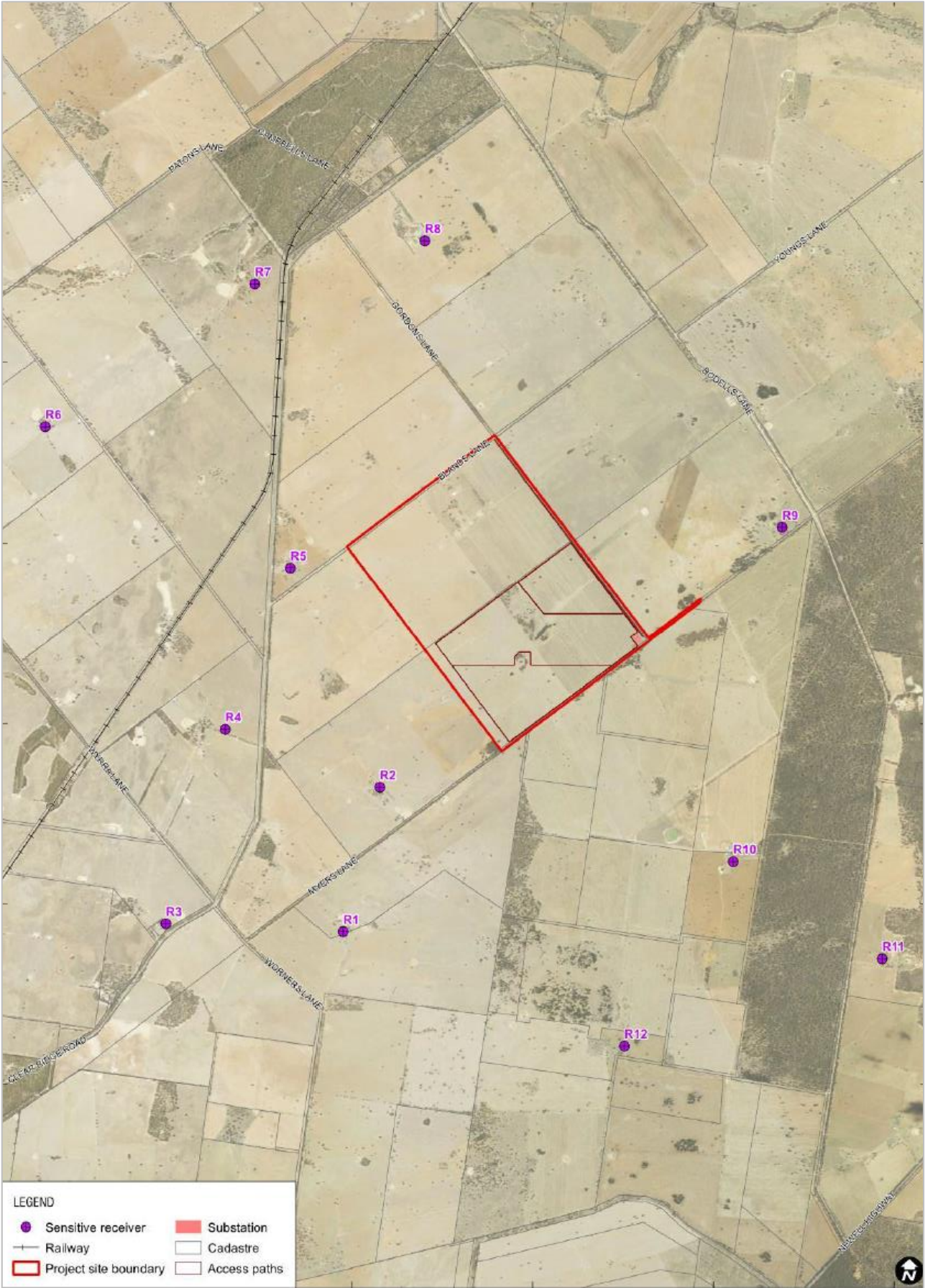
7.8.2. Existing environment

A total of twelve sensitive receivers were identified as shown in by SLR Consulting. The nearest noise receiver to the site boundary was found to be approximately 1,300m to the north east.

Table 29 – Sensitive receivers

Receiver ID	Address
R1	84 Myers Lane, Wyalong
R2	1390 Clear Ridge Road, Wyalong
R3	1049 Clear Ridge Road, Wyalong
R4	1389 Clear Ridge Road, Wyalong
R5	1590 Clear Ridge Road, Wyalong
R6	114 Patons Lane, West Wyalong
R7	1049 Clear Ridge Road, Wyalong
R8	2060 Clear Ridge Road, Wyalong
R9	839 Bodells Lane, Wyalong
R10	179 Bodells Lane, Wyalong
R11	324 Bodells Lane, Back Creek
R12	175 Bodells Lane, Wyalong

Figure 51 - Sensitive Receivers Map



Source: SLR

7.8.3. Potential Noise Impacts

The main sources of noise identified in the NA report which has been considered as part of the assessment includes:

- Solar arrays mounted on frames, with associated underground cabling.
- Electrical substation/transformer and connection to transmission line.
- Battery storage and transformers and inverters.
- Construction of site access roads.
- Site facilities/office.
- Temporary laydown area during the construction phase.

The impacts of the proposal are broken down into the construction and operation phases of the development and provided as follows:

Phase 1 - Construction Noise

Table 30 provides a scenario assessment of the proposed construction noise based on time of noise and phase of construction. As per Section 5.3 of the NA, vibration activities are proposed to occur during the specified operation hours on site and therefore no impacts are raised.

Table 30 – Noise management scenario assessment

Receiver ID	Noise Management Levels (NML)				Predicted LAeq(15minute) Noise Level (dBA) ¹						
	Standard Daytime	DayOOH	Evening	Night-time	W.0001- Early Works – Site Establishment	W.0002- Earthworks – Main Earthworks	W.0003- Earthworks – Easement excavation/utilities	W.0004- Earthworks - Concrete Works	W.0005- Construction – piling Activities	W.0006- Construction – Installation of Solar Panels, transformers, etc	W.0007- General Works - Landscaping
					Operating Period						
					DAY	DAY	DAY	DAY	DAY	DAY	DAY
Residential											
R1	45	40	35	35	<30	<30	<30	<30	<30	<30	<30
R2	45	40	35	35	30	34	<30	30	32	30	<30
R3	45	40	35	35	<30	<30	<30	<30	<30	<30	<30
R4	45	40	35	35	<30	<30	<30	<30	<30	<30	<30
R5	45	40	35	35	37	41	34	37	39	37	36
R6	45	40	35	35	<30	<30	<30	<30	<30	<30	<30
R7	45	40	35	35	<30	<30	<30	<30	<30	<30	<30
R8	45	40	35	35	<30	<30	<30	<30	<30	<30	<30
R9	45	40	35	35	30	34	<30	30	32	30	<30
R10	45	40	35	35	<30	<30	<30	<30	<30	<30	<30
R11	45	40	35	35	<30	<30	<30	<30	<30	<30	<30
R12	45	40	35	35	<30	<30	<30	<30	<30	<30	<30

For most construction activities, it is expected that the construction noise levels would frequently be lower than predicted at the most-exposed receiver, as the noise levels presented in the NA are based on each scenario occurring at the site boundary.

Phase 2 - Operational Noise

Table 31 – Proposed machinery and activities during operational

Noise source	Description	Sound power level
Transformers and inverters systems	A series of 30 Power Electronics transformers/inverter configurations are proposed to be positioned around the proposal site as indicated in the proposed site plan.	100 dBA ^{1,2}
Substation	<p>The substation is proposed to consist of:</p> <ul style="list-style-type: none"> • 2 x 40/50MVA Ground Mounted Transformer. • 2 x 45/50MVA Ground Mount Transformer. • 1 x 150KVA Earthing Transformer. 	<ul style="list-style-type: none"> • 70 dBA_{2,3} • 70 dBA_{2,3} • 55 dBA_{2,3}
Maintenance activities	<p>A limited number of up to 20 staff members will be on site to operate and maintain the solar plant equipment.</p> <p>Maintenance activities are expected to involve low noise generating manual hand tools, be infrequent and be conducted on an as-needs basis during daytime hours.</p>	
Tracking mechanism on solar panels	Noise from the tracking mechanism on the solar panels is expected to be insignificant in comparison to that of the above identified sources.	

Note 1 Based on the manufactures specification.

Note 2 includes 5 dB penalty for potential tonal noise

Note 3 Based on SWL's used for a previous substation noise assessment provided by Lightsource BP proposed to be utilizing the same units.

7.8.4. Noise Mitigation measures

The mitigation measures provided in **Table 32** will be implemented to minimise potential noise impacts of the proposal.

Table 32 – Noise impact mitigation measures

Potential impact	Mitigation measures	Stage
Construction		
Construction work noise	<p>Restriction of hours of work to the ICGBN standard construction hours:</p> <ul style="list-style-type: none"> • Monday to Friday: 7.00am to 6.00pm; and • Saturday: 8.00am to 1.00pm. 	Construction

Potential impact	Mitigation measures	Stage
Construction – All works	Adoption of Universal Work Practices including: <ul style="list-style-type: none"> • Regular reinforcement (such as at toolbox talks) of the need to minimise noise; • Regular identification of noisy activities and adoption of improvement techniques; • Avoiding the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon nearby residents; • Where possible, avoiding the use of equipment that generates impulsive noise; • Minimising the need for vehicle reversing for example (particularly at night), by arranging for one-way site traffic routes; • Use of broadband audible alarms on vehicles and elevating work platforms used on site; • Minimising the movement of materials and plant and unnecessary metal-on-metal contact; and • Minimising truck movements. 	Construction
Construction Traffic	The proposed construction traffic is recommended to travel east along Blands Lane, then south on Bodell Lane before accessing the Newell Highway.	Construction
Operation		
Ongoing use	Assessment has shown that noise emissions from the development are expected to comply with the relevant criteria.	Operational

Based on the assessment by SLR Consulting it was determined that a draft noise management plan would not be required as the expected noise levels comply with the relevant criteria.

7.9. TRAFFIC AND ACCESS

A Traffic Impact Assessment (TIA) has been prepared by Ason Group (**Appendix L**) and provides an assessment of the access, traffic and transport requirements for the proposed solar farm development.

The subject TIA generally focusses on the impacts of the construction and operational phases of the solar farm development. Given the proposed solar farm development is envisaged to have a predicted lifetime of 30-40 years, it is considered appropriate that the traffic impacts of the decommissioning phase of the West Wyalong Development be reviewed at least 6 months prior to the commencement of the decommissioning works by the Developer.

The consideration of the traffic management at the time of decommissioning is deemed appropriate as a number of factors relating to the road networks and impact to surrounding development within proximity of the site may have changed over the course of the development lifetime. Therefore, it is suggested that the

approval Authority, subject to approval, impose a condition on the consent requiring the Developer to submit a Traffic Management Plan to the satisfaction of Council at least six months prior to the decommissioning of the West Wyalong Solar Farm detailing the proposed traffic impacts and mitigation measures necessary as part of this phase of works.

7.9.1. Methodology

The methodology used to prepare the Traffic Impact Assessment by Ason Group includes:

- A desktop assessment of other sub-regional developments has been undertaken, referencing proposals detailed on the DP&E Major Proposals Register.
- The assessment of the traffic impact has been undertaken with reference to Section 4 of the RMS Guide. This Section of the Guide provides criteria for the assessment and determination of the Level of Service (LoS) for a roadway or similar. This criterion has been used for the assessment of both surrounding urban and rural roads and traffic flows.
- Real-time traffic flow data was gathered through counters and surveys by Bland Council, Ason Group and Roads and Maritime Services (RMS). The data collection methods include:

Automatic Tube Counters

Bland Shire Council installed a number of Automatic Tube Counters (counters) on behalf of Ason Group on key roads providing access to the site. These include the following locations:

- Newell Highway west of Bodells Lane
- Bodells Lane north of Newell Highway;
- Clear Ridge Road south of Blands Lane; and
- Blands Lane east of Clear Ridge Road.

Intersection Sample Surveys

Ason Group also conducted sample surveys at the key intersections in November 2018.

RMS Count Station Data

The RMS operates a Permanent Classifier (Count) Station at the following locations:

- Count Station T0253: Newell Highway south of Mid-Western Highway at Caragabal: and
- Count Station 6143: Newell Highway west of Goldfields Highway, West Wyalong.

This data was used to reference the data collected by the Council's counters.

The correlation of the data obtained using the above collection methods was used to determine the daily traffic flows, traffic flows in the AM and traffic flows in the PM and depicted in Figures 16 -18 of the Ason TIA.

- The TIA also includes a review of the following planning documents, guidelines and standards:
 - Bland Shire Council Development Control Plan (2012) (ACP 2012).
 - Bland Shire Council Local Environmental Plan (2011) (LEP 2011).
 - Roads and Maritime Services, Guide to Traffic Generating Developments (RMS Guide).
 - Austroads Guide to Road Design (Austroads GRD).
 - Australian Road Research Board Unsealed Roads Manual (ARRB URM).
 - Australian Standard 2890.1: Parking Facilities – Off Street Car Parking (AS 2890.1).
 - Australian Standard 2890.2: Parking Facilities – Off Street Commercial Vehicle Facilities (AS 2890.2).

7.9.2. Existing Environment

Newell Highway

The Newell Highway is a National Highway (A39) which extends from Goondiwindi, Queensland in the north through north-western NSW to Tocomwal where it continues south as the Goulbourn Valley Highway. The highway is a sealed carriageway and has a posted speed limit of 110km/hr.

Figure 52 - Newell Highway at Bodells Lane (Looking West)



Source: Ason Group

Clear Ridge Road

Based on the TIA Clear Ridge Road is a rural collector road which extends from Blow Clear Road in the north to the Newell Highway in the south. The road has a sealed carriageway with a width of 8.0m. Clear Ridge Road in the vicinity of Blands Lane has a nominal (unposted) speed limit of 100km/h whilst the road north of the Newell Highway has a speed of 50km/hr posted.

Figure 53 - Clear Ridge Road at Blands Lane



Source: Ason Group

Blands Lane

Blands Lane is an undivided road that runs along the northern boundary of the site and joins to Clear Ridge Road. These roads will be used for site access and the major transport route for delivery during construction and operation.

Figure 54 - Blands Lane West off Bodells Lane



Source: Ason Group

Bodells Lane

Bodells Lane is a rural lane which extends from north of Blands Lane south to the Newell Highway. Bodells Lane generally provides an unsealed carriage (with a short section of sealed/gravel carriageway immediately north of Newell Highway) with a width that varies between approximately 4.5m at Blands Lane; approximately 5.5 – 6.0m at a mid-point between Blands Lane and the Newell Highway; and approximately 6.5m at the Newell Highway.

Figure 55 - Bodells Lane at Blands Lane



Source: Ason Group

The Site

At present, there are no formal roads or car parking arrangements within the site. Vehicle access to the site is provided via a private unsealed driveway from Blands Lane.

Blands Lane connects to Bodells Lane to the east of the site, and to Clear Ridge Road to west of the site. Both Bodells Lane and Clear Ridge Road in turn connect south to the Newell Highway.

It is proposed that construction and operation traffic would pass through West Wyalong to access the site.

Existing Levels of Service

Urban Roads

Based on the traffic data survey of both Newell Highway and Clear Ridge Road within West Wyalong. Based on the assessment it is determined that both roads currently operate at LoS A.

Under the criteria of the RMS Guide *LoS A* is defined as:

***‘LoS A:** This, the top level is a condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.’*

Rural roads

Based on the traffic survey data, both the Newell Highway and Clear Ridge Road outside of Wyalong currently operate at LoS B, though given that the flows in both roads are well below the minimum LoS B totals, each would generally be considered to operate at a LoS A (as defined above).

Unsealed Road Capacity

With reference to the *Australian Road Research Board Unsealed Roads Manual* (ARRB URM), both Blands Lane and Bodells Lane would generally be classed as Class 4B minor roads. With reference to the traffic survey data, both Blands Lane and Bodells Lane currently operate well below their target traffic flows limits.

7.9.3. Potential Traffic Impacts

The potential traffic impacts of the proposed solar farm development can be considered under the two main phases including:

Table 33 – Phases of development with timeframe and intended scope of work

Phase	Timeframe	Scope of work
Phase 1 - Construction Phase - comprising of three stages	Stage 1 – 2 months Stage 2 – 3-4 months Stage 3 - 3 – 6 months	Stage 1 - Site preparation and earthworks. Stage 2 - Solar farm and sub-station works, site infrastructure provisioning and transport and construction requirements. Stage 3 - Solar farm and sub-station works and construction, testing and commissioning.
Phase 2 - Operational	Ongoing	Ongoing management of the solar farm until decommissioned.

Construction Impacts

Construction of the solar farm is expected to be completed over a 9 - 12 month period. Each of the three stages of the construction has been incorporated into a schedule to identify the peak staff and vehicle impacts based on timeframe of stage and scope of works entailed.

The proposed construction schedule is outlined in **Figure 56**.

Figure 56 - Proposed Construction Schedule for West Wyalong Solar Farm

Construction Stage	Timeframe	Peak Daily Staff	Peak Daily Vehicles
Stage 1 Site Preparation & Earthworks	2 months	60 per day	10 light vehicles 4 shuttle buses 10 trucks
Stage 2 Solar Farm & Sub-Station Site Infrastructure Transport & Construction	3 - 4 months	300 per day	10 light vehicles 20 shuttle buses 25 trucks
Stage 3 Solar Farm & Sub-Station Construction	3 – 6 months	300 per day	10 light vehicles 20 shuttle buses 10 trucks

Source: Ason Group

The traffic impacts resulting from the three stages of construction (provided above) have been individually profiled by Ason Group in Section 5 of the TIA. A summary of the each of the three Stages is provided as follows:

Stage 1 – Traffic impacts

Based on the Stage 1 – Construction Traffic Profile the amount of traffic generation by the type of activities involved with this stage and number of staff required is considered minimal by Ason Group.

Stage 2 – Traffic impacts

- **Construction Staff:** During Stage 2 construction, up to 300 staff would be employed on-site. Stage 2 construction staff are expected to be accommodated in Wyalong and perhaps an additional 2 – 3 sub-regional centres, and require transport by up to 20 shuttle buses to and from the Site each day.

It is estimated that during Stage 2 construction staff would generate:

- Up to 40 shuttle bus trips during the AM Site peak hour, expected to be in the hour prior to 7:00am for a 7:00am shift start;
- Up to 40 shuttle bus trips during the PM Site peak hour, expected to be after 6:00pm following a 6:00pm shift end; and
- Up to 80 shuttle bus trips per day.
- **Construction Contractor & Visitor Trips:** Proposal managers, specialist contractors and construction visitor are expected to generate no more than 10 light vehicle trips per day, with up to 2 light vehicle trips generated during the AM and PM Site peak hours.
- **Construction Trucks:** This stage will involve the transportation and equipment to the site daily including transportation of solar panels from Botany Bay to the subject site. A total of up to 600 B-Doubles will be required to transport the solar panels to the site over the Stage 2 construction period, generating at least 1,200 B-Double trips. This has been based on the information that that each (20ft) container can transport approximately 550 solar panels.

It is estimated that during this stage approximately 3,400 trucks may be generated by the site. Noting that the primary transport task is expected to be undertaken over approximately 3 months and that construction will occur 5.5 days per week.

It is estimated that the peak daily truck demand during the Stage 2 construction period would be up to 25 trucks per day, or 50 truck trips per day. Only a small number of construction truck trips are expected to occur during the site peak hours.

A summary of the trips and trucks required for Stage 2 is provided in the following figure.

Figure 57 - Stage 2 – Summary of Construction Traffic Generation

Arrival/Departure Direction	Vehicle Route	Vehicle Type	Site Peak Hour Vehicle Trips	Daily Vehicle Trips
East	Newell (east) – Bodells - Blands	B-Double, Articulated, Concrete, Shuttle Bus, Light Vehicles	2 light vehicle trips 32 shuttle bus trips 4 truck trips	8 light vehicle trips 64 shuttle bus trips 44 truck trips
South	Newell (south) – Showground – Central – Clear Ridge - Blands	B-Double, Articulated, Concrete		6 truck trips
South	Newell (west) – Clear Ridge - Bodells	Shuttle Bus, Light Vehicles	8 shuttle bus trips	2 light vehicle trips 16 shuttle bus trips

Source: Ason Group

Stage 3 – Traffic impacts

- **Construction Staff:** the number of construction will initially be the same as that proposed in Stage 2, tapering off as the core construction activities are completed.
- **Construction Contractor & Visitor Trips:** will initially be the same as proposed in Stage 2.
- **Construction trucks:** During Stage 3 construction, trucks will transport equipment and materials to the site on a daily basis, but in much fewer numbers than during Stage 2. Based on information provided by Lightsource BP, up to 10 trucks would visit the Site each day whereas during Stage 2 a total of 20 truck trips per day would be generated. These would be a mix of B-Doubles and articulated vehicles. Few if any of these trips are expected to be generated in the AM or PM Site peak periods.

A summary of the trips and trucks required for Stage 3 is provided in the following figure.

Figure 58 - Stage 3 – Summary of Construction Traffic Generation

Arrival/Departure Direction	Vehicle Route	Vehicle Type	Site Peak Hour Vehicle Trips	Daily Vehicle Trips
East	Newell (east) – Bodells - Blands	B-Double, Articulated, Concrete, Shuttle Bus, Light Vehicles	2 light vehicle trips 32 shuttle bus trips 2 truck trips	8 light vehicle trips 64 shuttle bus trips 16 truck trips
South	Newell (south) – Showground – Central – Clear Ridge - Blands	B-Double, Articulated, Concrete		4 truck trips
South	Newell (west) – Clear Ridge - Bodells	Shuttle Bus, Light Vehicles	8 shuttle bus trips	2 light vehicle trips 16 shuttle bus trips

Source: Ason Group

Total Construction Impact

Based on the three stages of the construction phase it is considered that Stage 2 which will range between 3-4 months will generate the most traffic impacts:

- The peak trip generation of the site will occur during the Stage 2 construction period:
 - Up to 140 vehicle trips per day; and
 - Up to 46 vehicle trips in the AM and PM Site peak hours.
- The majority of trips will utilise the Newell Highway (east) – Bodells Lane – Blands Lane route, with only a small number of trips generated to/from the south via either the Newell Highway (west) – Clear Ridge Road – Blands Lane route (light vehicles and shuttle buses) or the Newell Highway (south) – West Wyalong Heavy Vehicle Bypass – Clear Ridge Road – Blands Lane route (trucks).

Level of Service – Urban Roads

With reference to the RMS Guide, the additional flows generated during the Stage 2 construction period would have little if any impact of the existing LoS or general operations of the Newell Highway and Clear Ridge Road within Wyalong.

Level of Service – Rural Roads

With reference to the RMS Guide, the additional flows generated during the Stage 2 construction period would have little if any impact of the existing LoS or general operations of the Newell Highway and Clear Ridge Road outside of Wyalong.

- **Unsealed Road Capacity**

With reference to the ARRB USM, the additional flows generated during the Stage 2 construction period would have little if any impact of the existing general operations Blands Lane and Bodells Lane, with total traffic flows remaining below the nominal Type 4B unsealed road capacity limits.

- **Level of Service at Key Intersections**

With reference to the additional flows generated during the Stage 2 construction period, and existing traffic flows. The additional trips generated to the key intersections providing access to the site would not compromise the good levels of service observed at these intersections. It is noted that background testing of the intersection of Newell Highway / Bodells Lane (using the SIDRA model) indicates that the intersection would continue to operate at a LoS A, with no delays and – with specific reference to the auxiliary right turn lane – with very minimal queue lengths.

Operational Impacts

In Section 7 *Operational Traffic Assessment* of the TIA, it is considered that once the solar farm is operational, the development will generate little traffic on a daily basis. Each month scheduled maintenance will be required, however due to the number of staff required to undertake such works, it is envisaged that staff would utilise transit vans, 4x4s or standard cars to travel to and from the site.

7.9.4. Traffic Mitigation Measures

The proposed traffic movements during the construction phase based on the RMS assessment will not impact on the existing LoS of on both urban and rural roads or the general operations of the Newell Highway and Clear Ridge Road outside of Wyalong. Each phase has been assessed, including Stage 2 which is intended to generate the highest level of daily vehicle trips in particular transporting of solar panels and staff accommodated in Wyalong or in nearby sub-regional centres.

Despite this, Ason Group have identified the following potential impacts and mitigation measures at the various stages of the proposal.

Table 34 – Traffic Mitigation Measures

Potential impact	Mitigation measures	Stage
Flooding of Blands Lane	Prior to construction commencing, the Proposal Manager will meet with Council's Assets Manager (or like) to inventory the existing local road conditions, and particularly the unsealed sections of Blands Lane and Bodells Lane.	Prior to Stage 1 Construction
Unsealed roads and damage of roads	In the event damage is noted to sections of road. Lightsource BP is to consult with Council regarding remediation for the sections of the road.	Stages 1-3 of construction phase
Local road review	The Proposal Manager would again meet with Council's Asset Manager to ensure that conditions in the local roads are commensurate with existing (pre-construction) conditions. In the event damage is noted to sections of road. Lightsource BP is to consult with Council regarding remediation for the sections of the road.	Completion of construction phase prior to operation phase

A Draft Construction Traffic Management Plan has been prepared by Ason Group and included as Section 6 of the TIA for consideration by the approval Authority. The draft outlines the general management strategies expected to be employed during the construction period of solar farm at West Wyalong.

7.10. WATER

A Water Assessment (WA) has been prepared by SLR Consulting (**Appendix M**) and provides an environmental assessment of the surface and groundwater aspects of the West Wyalong Solar Proposal during the construction, operation and decommissioning phases of the proposal.

7.10.1. Methodology

The methodology used to undertake the Water Assessment by SLR Consulting includes:

- Desktop assessment to define existing conditions, an identification of potential impacts.
- Assessment of the proposal against the relevant legislation including:
 - *Water Act 2007 which provides the legislative framework for management of water resources in the Murray-Darling Basin.*
 - *NSW Water Management Act 2000 enables allocation of water for the environmental health of NSW's rivers and groundwater systems.*
 - *NSW Murray and Lower Darling Regulated Rivers Water Sources – Water Sharing Plan 2016 includes the operational rules for allocating and trading water.*
- Identification of proposal features to mitigate and manage those impacts.

7.10.2. Existing Environment

Existing waterways

As illustrated in **Figure 59**, the site has two distinct drainage paths which traverse it, running parallel to the North-western and South-eastern boundaries. The watercourses are not incised into the landform and form broad depressions or swales generally less than 0.3m deep without clearly defined banks.

It was found that several broad and very shallow overland flow paths join each watercourse within the site. The most northern watercourse has a string of small farm dams which capture water for agricultural purposes. The proposal seeks to retain these dams. The grades through these ephemeral watercourses are gentle, with drainage slopes of 0.25% and 0.32% in the northern and southern swales respectively.

The contributing catchment area of 1674 Ha to the southern drainage path is three times greater than the contributing catchment to the northern drainage path. The runoff volume to the south is therefore significantly greater than to the north.

Figure 59 - Existing watercourses and site topography



Source: SLR

Site Topography

Elevations across the site vary from approximately 235.9m AHD in the west, to 226m AHD on the eastern boundary, indicating a maximum fall of around 10m over a distance of 2 km. Elevations undulate in the centre and north of the site which are associated with areas of vegetation.

Acid Sulfate Soils

The risk of encountering acid sulfate soils is very low since there are no known occurrences of acid sulphate soils within the site boundary, and also since the proposal will not involve any significant excavation other than shallow trenching for electrical cables. The NSW Government SEED database does not indicate the presence of any known risk of acid sulfate soils (database accessed 21 September 2018).

7.10.3. Potential Impacts

Groundwater Impacts

The site is located within an area mapped as having groundwater vulnerability under the Bland LEP, indicating areas in which the hydrological functions of groundwater systems should be maintained to protect vulnerable groundwater resources from depletion and contamination as a result of development. The Bland LEP Clause 6.6 – Groundwater Vulnerability states that:

“Before determining a development application for development on land to which this clause applies, the consent authority must consider the following:

(a) whether or not the development (including any on-site storage or disposal of solid or liquid waste and chemicals) is likely to cause any groundwater contamination or have any adverse effect on groundwater dependent ecosystems, and

(b) the cumulative impact (including the impact on nearby groundwater extraction for potable water supply or stock water supply) of the development and any other existing development on groundwater.”

The proposal does not include any licensed groundwater bores. Based on the assessment by SLR Consulting, the site is found to be affected by low potential groundwater dependent ecosystems (refer to **Figure 60**). As a result, it was determined that the proposal is unlikely to have any impacts to groundwater during construction and operation of the solar farm given the following:

- The pattern of surface drainage and associated groundwater recharge will remain unchanged;
- Soil infiltration across the broader surface of the site will be unchanged, and therefore the rates of groundwater recharge will be unaffected;
- The proposal does not include any excavation with potential to interact with groundwater; and
- No solar arrays or other infrastructure are proposed at or close to the locations of groundwater dependent ecosystems within the site.

URBIS
WEST WYALONG SOLAR FARM EIS

Impacts on Rainwater Infiltration, Harvesting and catchment yield

Based on the WaterNSW Harvestable Rights Calculator, the Mean Annual Runoff (MAR) for the proposal site is 434 ML, based on a contributing catchment area of 560ha, with the average annual rainfall of 453.8mm, and low volumetric runoff coefficient of 0.013. Based on the result, the proposal will not alter the existing runoff characteristics of the site.

Although the proposal involves the installation of solar panels with impervious surfaces, it is considered that runoff volumes will not be increased as it is intended that rainwater will drain to the ground underneath the panels, be dispersed by vegetation maintained below, and infiltrate into the existing soils which will provide the same overall soil surface area available for rainfall infiltration.

Furthermore, it is regarded that overland flows will follow flow paths to those currently present on the site. SLR concluded that this is supported by the study by Cook and McCuen (2013) into the impact of solar farms on hydrology, which found that solar farms with pole mounted PV arrays would not have a significant impact on the surface water run-off rate, or volume. This study found that underlying groundcover was the primary determinant of run-off rate.

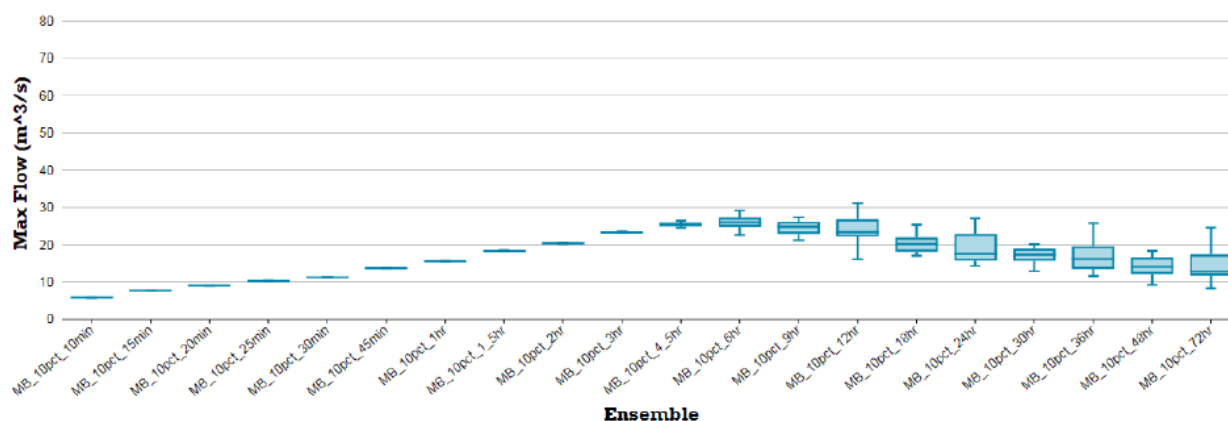
Therefore, it is determined that there will be no change to the annual runoff generated by the site as the retention of grass cover across the site and the run-off water from panels would be absorbed into the ground similar to current conditions. Furthermore, no additional dams are proposed on site as part of this proposal and existing farm dams will be retained.

Impacts on hydrology and flood behaviour

At present there are no existing flood studies which cover the subject site. As part of the assessment, SLR Consulting undertook hydrological and hydraulic modelling to estimate the peak flows and flood behaviour for the existing and developed site scenarios (refer to modelling provided as Attachment A of **Appendix M**).

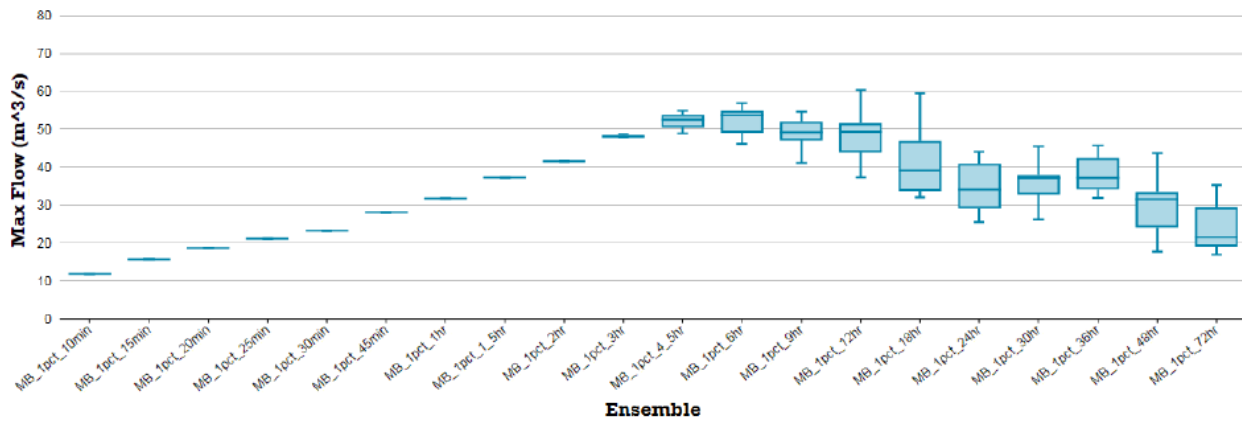
In terms of critical duration storms a total of 10 different temporal patterns were tested with respect to duration and magnitude of storm. The maximum of each of the 10 tests is considered to be the critical duration for the catchment area. The following three graphs shows the range of peak flows immediately downstream of the Site for 200 storms simulated for each of the 10% (refer to Figure 61), 1% (refer to **Figure 62**) and 1 in 200 AEP magnitude storms (refer to **Figure 63**) to determine the critical duration storm.

Figure 61 – 10% AEP storm event peak flow ranges for each ensemble of temporal patterns



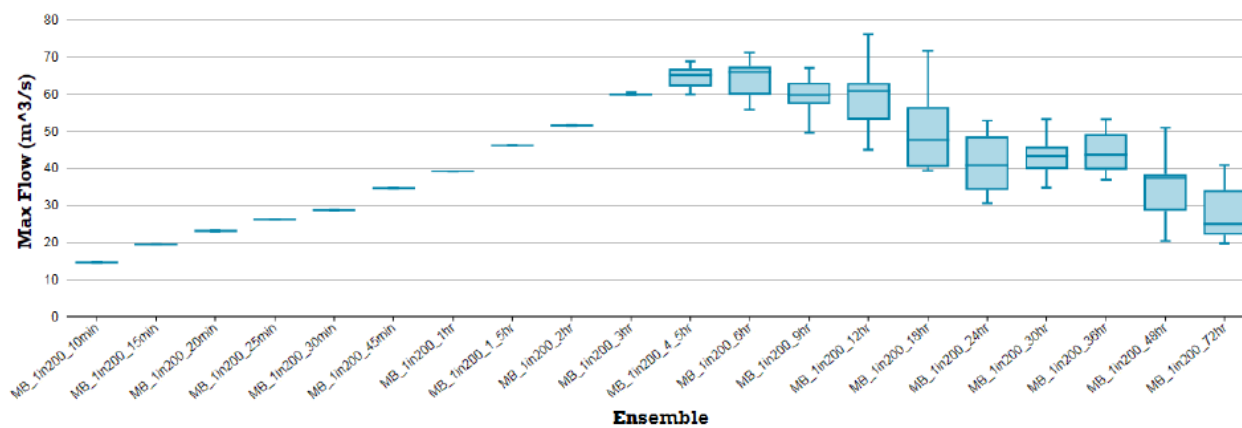
The result of this testing revealed that the 6 hour, temporal pattern No.3 is the critical 10% AEP storm for the catchment.

Figure 62 – 1% AEP storm event peak flow ranges for each ensemble of temporal patterns



The result of this testing found that the 6 hour, temporal pattern No.9 is the critical 1% AEP storm for the catchment.

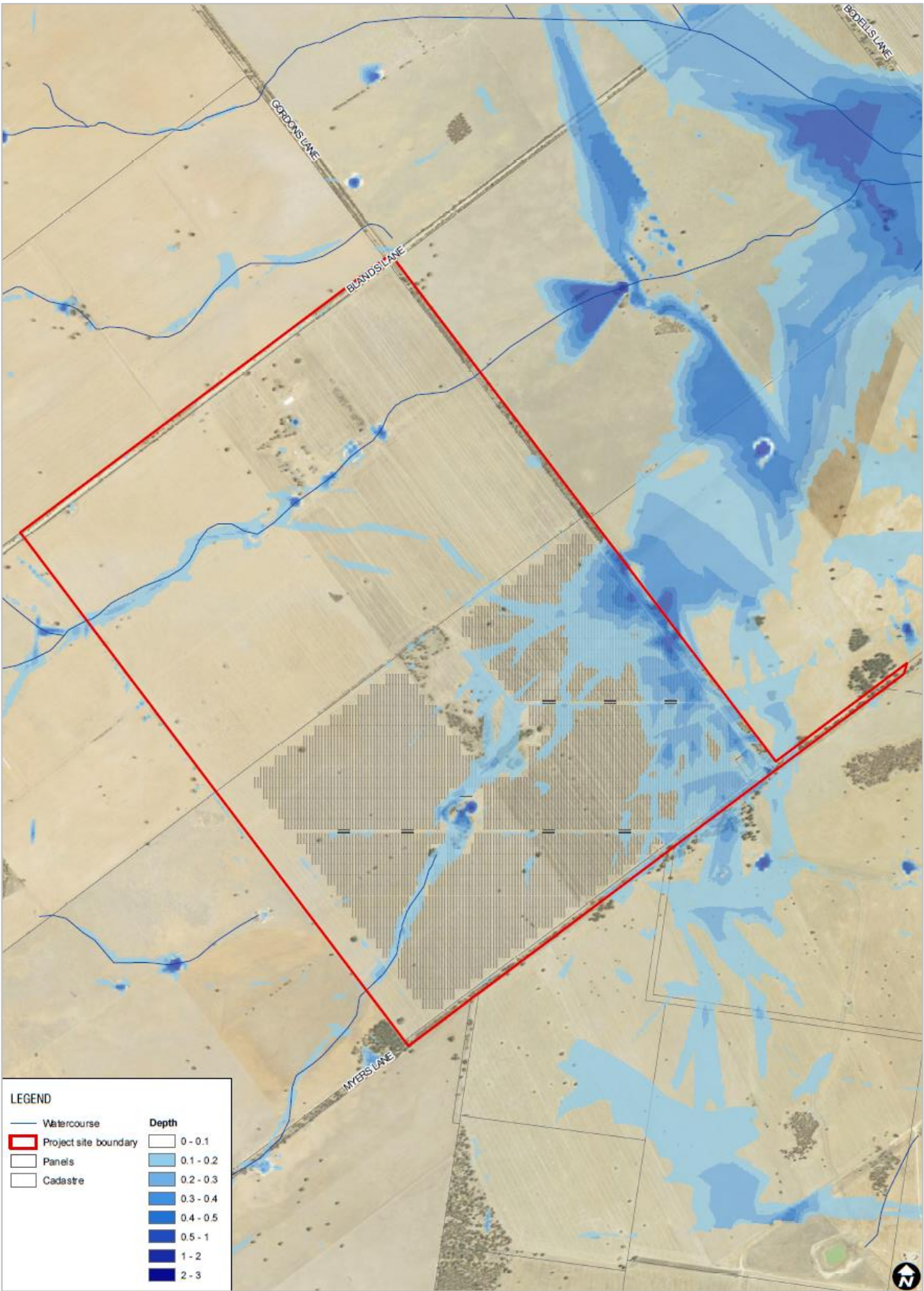
Figure 63 – 1 in 200 AEP storm event peak flow ranges for each ensemble of temporal patterns



The result of this testing found that the 4.5hour, temporal pattern No.7 is the critical 1 in 200 AEP storm for the catchment.

Figure 64 shows the potential impacts on flood waters for a 1% AEP flood event post-development. **Table 35** provides a series of mitigation measures to adequately address water inundation.

Figure 64 - Post-development inundation during a 1% AEP flood



Source: SLR

The following table summarises the potential impacts from the WA and highlights the issues for consideration and mitigation in the following section.

Table 35 – Water Potential Impacts and Mitigation Measures

Potential impact	Identification of issue	Mitigation measure
Erosion and Sediment Control	Construction activities which disturb the land surface typically increase the potential for erosion of soils during rainfall events and increase the risk of sediment-laden stormwater runoff discharging to the receiving environment.	A site wide Erosion and Sediment Control Plan (ESCP) will be prepared as part of the Construction Environmental Management Plan (CEMP) for the Proposal.
Storage and use of hydrocarbons and Chemicals	The storage and use of hydrocarbon fuels and other chemicals on site present a potential risk if spilled substances contaminate site soils or are mobilised and spread to the downstream receiving environment.	<p>The risk of hydrocarbon contamination will be mitigated by:</p> <ul style="list-style-type: none"> • Storage of chemicals in accordance with Australian Standards. • Storage of hydrocarbon fuels within bunded storage areas. • Bunding of substation or other infrastructure that utilises oil. • Minimise usage of herbicides, and avoid spraying when rain is predicted. • A Spill Response Plan, including emergency response and EPA notification procedures. <p>Requirements for the storage and use of hydrocarbon fuels and other chemicals on site will be documented in both the Construction and Operational Management Plans.</p>
Solar Arrays	The maximum flood depth attained during the 1 in 200 AEP is approximately 0.75m.	This level would require the arrays within the north eastern portion of the Proposal Site to be designed appropriately to withstand the inundation without damage.

Potential impact	Identification of issue	Mitigation measure
Substation and battery sites	Flood modelling estimates the depth of inundation of the substation during the 1 in 200 AEP is 0.45m.	Appropriate freeboard should be applied to the infrastructure above this level.
Changes to pattern of runoff and discharges from site	<p>Modelling of site hydrology and hydraulics shows the proposal design marginally reduces flood depths and velocities downstream as a result of a slight increase in surface roughness associated with change in land-use.</p> <p>The installation of panels do not result in an increase in runoff since the same area of soil is available for infiltration, and vegetative groundcover will be maintained to distribute runoff.</p>	Nil required, as the proposal results in minimal impact as discussed under groundwater, hydrology and flood behaviour and rainwater infiltration section of this EIS.
Environmental flows and Annual yield of catchment	<p>Refer to Section 6.1</p> <p>Other than maintaining the existing farm dams, no additional harvesting of surface water is proposed. There will be no change to low or environmental flows as a result of the proposal. The annual yield of runoff from the site catchments will be unchanged from the current rural activities.</p>	
Construction phase water quality	<p>Refer to Section 9.1</p> <p>Since the existing site is very flat there are very low rates of erosion and sediment transport from site. No broad scale earthworks or soil disturbance is proposed, and any localised soil disturbance will be progressively revegetated such that the total area of denuded soil is minimised. Sediment fences and contour bunds (very shallow bunds aligned across the slope to provide temporary pooling of runoff) will be used to mitigate the risk of sediment transport.</p>	Preparation of a Construction Environment Management Plan will include an Erosion and Sediment Control Plan, which will further detail requirements and procedures for erosion and sediment control, water quality monitoring, bunding of hydrocarbon storages, and spill response.
Water management during operations	<p>Refer to Section 9.2</p> <p>With regard to water quality monitoring, the default water quality triggers from ANZG 2018 will be used as an initial baseline for water quality trigger values.</p>	<p>Preparation of OEMP Minimum requirements for inclusion within the OEMP include:</p> <ul style="list-style-type: none"> • Development of a suitable strategy for monitoring and reporting on water quality;

Potential impact	Identification of issue	Mitigation measure
		<ul style="list-style-type: none"> • A procedure for erosion and sediment controls for ground disturbance activities; and • Requirements for storage and use of hydrocarbons and chemicals, and a spill response plan.
Unsealed roads and damage of roads	An operational environment management plan (OEMP) will be prepared during the detailed design phase of the proposal, and will outline the environmental measures, monitoring and reporting required to ensure satisfactory environmental performance.	Preparation of OEMP (refer to above for inclusions)

7.10.4. Mitigation Measures

The WA provides two plans to allow for the monitoring, licensing and reporting of the proposal during the construction and operational phases of the solar farm.

Table 36 – Mitigation measures stages

Potential stage impact	Mitigation measures	Stage
Construction Impacts	<p>A construction environment management plan (CEMP) will be prepared during the detailed design phase of the proposal, and will outline the environmental measures, monitoring and reporting required to ensure satisfactory environmental performance. Minimum requirements for inclusion within the CEMP include:</p> <ul style="list-style-type: none"> • Water quality monitoring during the construction phase, will be carried out as described below for the OEMP. • An Erosion and Sediment Control Plan (ESCP) for construction activities that is consistent with the measures outlined in this EIS. 	Prepare prior to Stage 1 Construction
Operational Impacts	<p>An operational environment management plan (OEMP) will be prepared during the detailed design phase of the proposal, and will outline the environmental measures, monitoring and reporting required to ensure satisfactory environmental performance.</p> <p>Minimum requirements for inclusion within the OEMP include:</p>	Prepare prior to Stage 1 Construction

Potential stage impact	Mitigation measures	Stage
	<ul style="list-style-type: none"> • Development of a suitable strategy for monitoring and reporting on water quality; • A procedure for erosion and sediment controls for ground disturbance activities; and • Requirements for storage and use of hydrocarbons and chemicals, and a spill response plan. 	

7.11. HAZARDS AND RISKS

A report on the assessment of the proposed solar farm at West Wyalong against the provisions of State Environmental Planning Policy No. 33 (SEPP 33) has been prepared by RiskCon Engineering (RiskCon) (refer to **Appendix N**).

Furthermore, a bushfire assessment has been prepared by SLR Consulting refer to **Appendix Q** to determine the impacts of bushfire with proximity of the site and proposal.

7.11.1. Methodology

The methodology used for the SEPP 33 assessment includes:

- Review the types and proposed quantities of Dangerous Goods (DGs) to be stored at the site.
- Compare the quantities of DGs the threshold quantities listed in “*Applying SEPP 33 – Hazardous and Offensive Development*” (Ref. [1]) to identify whether the storage location or quantity triggers SEPP 33.
- Review the likely vehicular movements involving DGs and compare against the applicable thresholds detailed in Applying SEPP 33 (Ref. [1]) and assessment against the *National Transport Commission (NTC), “Australian Code for the Transport of Dangerous Goods by Road & Rail, 7th Edition,” 2011*
- Report on the findings of the SEPP 33 assessment.

The methodology applied to determine appropriate APZs and manageable fuel loads for managing bushfire risk includes:

- Determine vegetation formation in all directions around the asset to a distance of 140 metres. For the current proposal, this distance has been measured from the outer limit of the solar panel array and out from the proposed substation buildings.
- Determine the effective slope of the land from the building for a distance of 100 metres.
- Determine the relevant Fire Danger Index (FDI) for the council area in which the development is to be undertaken.
- Match the relevant FDI, vegetation formation and effective slope to determine the APZ required by referring to **Appendix A** of PBP.
- Assessment of bushfire risk against the following:
 - NSW Rural Fires Act 1997.
 - Environmental Planning and Assessment Act 1979.

7.11.2. Existing environment

Bushfire Prone Land

The proposal site is comprised of cleared agricultural landscape, where much of the original native vegetation has been removed for agricultural land uses. Native vegetation within and adjoining the site is limited to small discrete patches of low open woodland or woodland, as well as narrow belts of mallee and

woodland along road reserves around the perimeter of the site, interspersed with large expanses of open grassland that is subject to grazing.

A review of the Rural Fire Services Bushfire Prone Land Mapping Tool (RFS 2018c) shows that the subject site is not identified as 'Bushfire Prone Land'.

7.11.3. Potential Bushfire Hazards

Table 37 – Potential Bushfire Hazards

Hazard identified	Sources of risk
Grass fires	Cleared agricultural land
Construction impacts	<p>Site maintenance activities such as petrol power tools including:</p> <ul style="list-style-type: none"> • Mowing and slashing. • Disposal of cigarettes by site staff. • Hot works, such as soldering or welding activities. • Operation of motor vehicles around or on areas containing combustible material. • Operation of plant around or on areas containing combustible material.
Operation impacts	Repairs and maintenance activities during operation.

7.11.4. Bushfire mitigation measures

The mitigation measures provided in **Table 38** will be implemented to minimise potential impacts of the proposal.

Table 38 – Hazard and risk mitigation measures

Mitigation	Measures	Stage
Asset Protection Zones (APZs)	<p>APZs are provided in Table 3 of the Bushfire and Fire response assessment prepared by SLR Consulting.</p> <p>Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 15 % of the APZ area.</p> <p>The conceptual development design will require vegetation to be along the boundary to allow for construction of the perimeter access road.</p> <p>The conceptual design allows for a 15 m fire break between the solar panels and the site boundary which is inclusive of a six meter, sealed perimeter access road.</p>	Construction and operation
Grassland	The distance from the edge of the solar panels to the south western site boundary is over 100 m, which is enough to implement the recommended 50 m APZ.	Construction and operation

Mitigation	Measures	Stage
Building Construction and Design	<p>BAL-12.5 construction and design standards in accordance with Australian Standard AS 3959 are recommended for the outer facades of buildings proposed to be constructed as part of the solar farm development. Relevant design standards for BAL-12.5 include:</p> <ul style="list-style-type: none"> • Metal framing and cladding materials. • Automatic sprinkler systems. • Hose reels and hydrants installed at selected locations around the buildings (on the alignment of the perimeter fire trail where possible). 	Construction and operation
Responder Access – Perimeter Road Access requirements	<ul style="list-style-type: none"> • Provide firefighters with easier access to structures (assets). • Provide a safe retreat (egress) for firefighters. • Create a clear ‘control line’ from which to conduct hazard reduction or back burning. • Carriageway with a minimum width of six metres. • Allow for parking outside of carriageway width. • Curves of the roads have a minimum inner radius of 6 m. • Maximum grade of the road is 15° and the average is 10°. • Road crossfall does not exceed 3°; and Vertical clearance of 4 m above the road surface (for overhanging branches, etc.). 	
Internal access roads	<ul style="list-style-type: none"> • Road width be a minimum of 5.5 m with parking provided outside of the carriageway. • The conceptual design for the West Wyalong Solar Farm includes an 8m wide access road and 6m wide internal roads, with a two-lane perimeter road included along the north eastern site boundary. 	Construction and operation
Water Supply for Firefighting	<ul style="list-style-type: none"> • The site is not connected to a reticulated water supply as such a dedicated static water supply is required to support the proposal. Two above ground water tanks are provided in the north east of the conceptual layout, providing combined capacity of 45,000L. 	Construction and operation

Mitigation	Measures	Stage
Fuel Load Management	<p>Fuel load management measures include:</p> <ul style="list-style-type: none"> • Strategic grazing of sheep within the Proposal Site during operation to maintain the length of grass under the solar panels. • Raking or removal of fine fuels like leaves, twigs and bark on a regular basis. • Mowing or slashing of grass within APZs and fire breaks, only as required. • Pruning of existing trees and shrubs so as to not have a continuous tree canopy leading from the hazard to the asset. 	Construction and operation
Landscaping	<p>When maintain vegetation in an APZ the following is recommended:</p> <ul style="list-style-type: none"> • Vegetation should not provide a continuous path to the asset. • All noxious environmental weeds (particularly priority weeds listed under the NSW Biosecurity Act 2016) should be removed. • Vegetation should be cleared or planted in clumps to avoid continuation. • Prune low branches two meters from the ground to avoid ground fires spreading into the canopy. • Locate plants far enough away from the asset so that in the event of a fire there is no direct flame contact or radiant heat emission. 	Construction and operation

7.11.5. Spontaneous Ignition

The operation of the solar farm will require the use of transformers. The product specifications are provided below.

Product Name: 76 Transformer Oil
Product Code: 1041410
Intended Use: Insulating Oil
Synonyms: Conoco Transformer Oil
Phillips Transformer Oil
Chemical Family: Petroleum Hydrocarbon

Unusual Fire & Explosion Hazards: This material may burn but will not ignite readily. Vapours are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

Based on the assessment of the product materials data sheet, the material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. To stop spill/release if it can be done with minimal risk and will require the respondent to wear appropriate protective equipment including respiratory protection as conditions warrant.

7.11.5.1. Mitigation measures

The mitigation measures provided in **Table 39** will be implemented to minimise potential impacts of the proposal.

Table 39 – Hazard and risk mitigation measures

Potential impact	Mitigation measures	Stage
Empty containers - may explode and cause injury or death	<ol style="list-style-type: none">1. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition.2. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner.3. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.4. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.	Operation
Storage	<ol style="list-style-type: none">1. Keep container(s) tightly closed.2. Use and store this material in cool, dry, well-ventilated areas away from heat and all sources of ignition.3. Storage temperatures above 113°F may lead to thermal decomposition, resulting in the generation of hydrogen sulfide and other sulphur containing gases.4. Store only in approved containers.5. Keep away from any incompatible material.6. Protect container(s) against physical damage.	Operation

7.11.6. Electromagnetic Fields

An electric field is a phenomenon generated between two objects at different voltages, and a magnetic field is generated by current flowing in one or more electrical conductors. Together these constitute electromagnetic fields (EMFs). EMFs are produced by overhead power lines, cables and electrical equipment.

The EMFs produced by solar farms are below the internationally recognised safety guidelines.

All equipment installed within the solar farm is required to meet EMF requirements as per the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and relevant EMR standards and legislation.

Solar panels (which make up the majority of the solar farm) produce Direct Current energy, and have much lower EMF outputs than household appliances operating off the Alternating Current grid network. The underground cable, connecting the solar farm to the existing overhead line, will have a magnetic field voltage of less than 1uT in the ground directly above it – this is at least 100 times lower than the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines. There are no electric fields associated

with underground cables, because of their protective sheath. The existing overhead line is likely to have an electric field of approximately 240V/m directly under the line; this is less than 5% of the ICNIRP guidelines (5kV/m or 5000V/m).

7.11.6.1. Mitigation measures

The buffers to the site boundaries provide mitigation to adjoining properties.

7.11.7. Hazardous Materials

Classification

The proposed goods and amounts to be stored at the subject site are summarised as follows:

Class	Description	PG	Quantity (kg)
2.2	Sulphur Hexafluoride (SF6)	n/a	8 kgs/switch gear = <100 kgs
C1	Transformer oils	n/a	1,500 L/transformer = <10,000 L

Based on the assessment of the above goods against the provisions of SEPP 33, it is considered that combustible liquids are not subject to SEPP 33, therefore the C1 and C2.2 products have been eliminated from further assessment.

Storage Thresholds

The proposed good have been assessed against the threshold limited of SEPP 33 and the results are summarised as follows:

Class	Description	PG	Quantity (kg)	SEPP 33 Threshold (kg)	Does SEPP 33 Apply?
2.2	SF6	n/a	100	n/a*	No
C1	Transformer Oil	n/a	10,000	n/a*	No

Given that the products C1 and C2.2 are not subject to assessment under SEPP 33, thresholds therefore do not apply.

Transport

Based on the assessment by RiskCon that the products stored at the site are not subject to SEPP 33. Hence, not further assessment has been prepared for transport requirements.

Assessment

Overall, as the solar farm is not classified as potentially hazardous, it is not necessary to prepare a Preliminary Hazard Analysis for the solar farm as SEPP 33 does not apply.

7.11.7.1. Mitigation measures

The mitigation measures provided in **Table 40** will be implemented to minimise potential impacts of the proposal.

Table 40 – Hazard and risk mitigation measures

Potential impact	Mitigation measures	Stage
Exposure with chemicals and/or dangerous goods	The results of this analysis indicates the threshold quantities for the DGs to be stored and transported are not exceeded.	Not applicable
Health and Safety, including exposure to electricity	As per Materials Handling Data Sheet	Operation

7.12. WASTE

7.12.1. Methodology

This section has been prepared based on the waste management practices undertaken by Lightsource BP in implementation and operation of solar farms worldwide.

7.12.2. Potential Impacts and Mitigation Measures

It is expected that during the construction and operational phases of the development lifecycle waste will be generated. The waste generated is expected to fall into three categories for management which include:

- **Reuse:** If surplus materials can be used in the permanent works they are classified as materials which have been reused.
- **Recycle:** If the surplus materials cannot be reused in its present form but could be used in a different form it is sent for recycling.
- **Landfill:** If neither of the above applies then the only option is to send the surplus materials to landfill. This must be a last resort.

Table 41 – Impacts and mitigation measures during construction and operation

Potential Impact	Mitigation measure	Responsibility
Damaged panels	Damaged panels will be returned to manufacturers for repair and subsequent re-use.	Contractor
Solar & Framework Packaging	The packaging surrounding the solar panels and framework will be collected in a designated skip and will be collected once every working day for appropriate recycling. Pallets used for delivering the panels and cable drums will be stored until sufficient numbers make collection by the supplier.	Contractor
Framework cuttings	The excess metal cuttings from both the frame and screw pile foundation will be collected in a designated skip and will be collected once every working day for appropriate recycling.	Contractor
Excavated soil	The sites require some ground works for access tracks, cable trenching, cabinet platforms. Excavated soil will be used for backfilling activities.	Contractor
Mess Room / Dry Room	Where relevant, the mess and dry rooms will be fitted out with appropriate recycling bins for the separate sorting and collection of paper, cardboard and aluminium waste.	Contractor
Portaloos	During the construction phase of the development the portaloos will be made available at appropriate locations within the application site. The portaloos will be sourced, supplied and managed by a reputable contractor. The principle contractor will ensure that the waste is collected and disposed of by an appropriate licensed waste contractor.	Contractor

Potential Impact	Mitigation measure	Responsibility
Cable & Cable trench	Any excess cable will be stored in a designated skip and will be collected by a reputable recycling company for either reuse or recycling. Excess trench material will be suitably segregated on site and collected by a reputable recycling company for reuse or recycling.	Contractor
Waste by workers	Personal rubbish will be collected along with non-recyclable packing materials, for disposal at an appropriate landfill.	Contractor
Waste during operations	Very little waste will be generated during operation. The O&M team will be required to remove any waste materials (i.e. for example packaging for any replacement parts, or food waste) when they leave site each day.	Operation and maintenance team of Lightsource BP

7.13. SOCIO-ECONOMIC

An on the assessment of the social and economic impacts of the proposed solar farm at West Wyalong has been prepared by Urbis (refer to **Appendix O**) to address the SEAR requirements issued by the Department.

7.13.1. Methodology

A desktop review of the following policies was undertaken to inform the SEIA:

- NSW Renewable Energy Action Plan (2013).
- Australian Renewable Energy Target (2001).
- NSW Climate Change Policy Framework (2016).
- Riverina Murray Regional Plan 2036 (2013).
- Bland Shire Council Community Strategic Plan 2017 – 2027 (2017).
- South West Slopes Regional Economic Development Strategy.
- The following technical studies were reviewed to inform the SEIA:
 - Traffic Impact Assessment, Ason Group (Nov 2018).
 - Landscape and Visual Impact Assessment, Urbis (Nov 2018).
 - Ecology Summary, SLR Consulting (Oct 2018).
 - Landscape Concept Design Report, Site Image Landscape Architects (Nov 2018).
 - Noise Impact Assessment, SLR Consulting (Nov 2018).
- Community consultation was undertaken during October and November 2018 by Urban Unity. The outcome of the report has been considered as part of the key themes and questions rising from the consultation process.

7.13.2. Potential Impacts and mitigation measures

Table 42 – Socio-economic impacts and mitigation measures

Potential Impact	Mitigation measure	Affected stakeholders
Increased renewable energy production	The proposal will increase the production of renewable energy and contribution to renewable energy targets.	Local and national economy
Increased pressure on local infrastructure and services	The introduction of up to 300 workers during peak construction represents a 7.9% increase in population for the West Wyalong and Wyalong area. This impact will be limited to the construction period only and for a short period of time.	Local Bland community
Cumulative impacts of major development in Bland Shire	The contribution of the proposal to cumulative visual impacts or loss of agricultural land is likely to be limited. The proposal site is not identified as Biophysical Strategic Agricultural and a landscape strategy has been prepared to minimise any potential visual impacts.	Local Bland community
Construction Phase Economic Benefits	Based on the estimated total construction cost, the proposal would contribute \$51 million GVA to the economy through the construction phase. Total employment generated from the construction phase could therefore be up to 242 jobs over the development timeframe. Over the total construction phase up to a total Gross Value Added (GVA) of \$64 million could be generated.	Local and national economy
Operational Phase Economic Benefits	The operational phase could be in the order of five jobs ongoing throughout the operational phase. The total economic benefit from the operational phase could therefore be in the order of \$2.1 million in GVA in each year of operation.	Local and national economy
Local area economic benefits	Increase in job growth in other sectors resulting from indirect employment opportunities in the sectors of: <ul style="list-style-type: none"> • Construction. • Health Care and social assistance. • Administrative and support services. 	Local Bland community
Unemployment	The unemployment rate has fallen significantly since 2015, with the number of unemployed persons	Local Bland community

Potential Impact	Mitigation measure	Affected stakeholders
	<p>declining from 184 in September quarter 2015, to a low of 87 in the December quarter 2017.</p> <p>Given the tight labour market in Bland LGA there will likely be a need to employ temporary workers for the construction of the proposed solar farm, in particularly during the peak period which will require up to 300 construction workers.</p>	
Employment uplift	The modelling presented in Table 10.8 of the SEIA presents an uplift in most of the sectors resulting from the proposed solar farm development including a 160.6% uplift in the construction sector.	Local and national economy
Retail spend	<p>A range of retail spend assuming a 50% temporary workforce and a 100% temporary workforce results in the following spend categories:</p> <ol style="list-style-type: none"> 1. Food Retail – This category captures spend on groceries and is estimated to be \$6,136 per annum (\$511 per month). 2. Food Catering – This category captures food and beverage spend (restaurants, bars and take-away) and is estimated to be \$1,945 per annum (\$162 per month). 3. Retail Services – This category captures spend on services (hairdressers, optometry, mechanics etc.) and is estimated to be \$466 per annum (\$39 per month). <p>The spending profiles of those employees over the construction phase is estimated to amount to \$8,546 per annum per worker (\$712 per month per worker). It is therefore estimated that the workers (annualised equivalent of 142 workers) during the construction period will generate between \$0.607 million and \$1.214 million in retail expenditure.</p> <p>This increase in retail spend presents the opportunity to support local retail trade jobs which have decreased by 3.4% per annum between 2011 and 2016 within the Bland LGA.</p>	Local and national economy
Short term accommodation	It will be necessary to seek short-term accommodation for the proposal construction workforce beyond West Wyalong. Within an approximate 1-hour 45-minute drive time of the subject site there are approximately 1,293 rooms, of which 151 (12%) are located within West Wyalong.	Construction workers and surrounding local areas

Potential Impact	Mitigation measure	Affected stakeholders
	There will be an increasing requirement for accommodation to be organised in the larger townships of Forbes, Cowra, Young and Parkes, with workers commuting to the proposal each day. Alternatively, private rental market accommodation options should also be considered.	
Private rental market	<p>Due to the competition for short term accommodation within the region (both from tourists and other developments requiring short-term accommodation), there is a possibility that the private rental market will be required to meet accommodation needs.</p> <p>Therefore, planning for the solar farm workforce will need to consider the trade-off between available accommodation and travel times.</p> <p>Furthermore, in 2016 there were roughly 3,100 unoccupied private dwellings within surrounding regions. The stock of unoccupied private dwellings ranges from 21 in Rankins Springs, to 558 in Parkes. Drawing these un-utilised properties into the market will require real estate agents to contact property owners to determine if they are unoccupied and available for rent.</p> <p>As these properties are not necessarily available for lease, it would not be expected that they would all be available.</p>	Local and surrounding community

7.14. CUMULATIVE IMPACTS

Biodiversity

The Biodiversity Development Assessment Report (BDAR) has identified the key physical features of the site, including soil types, slopes, plant species and vegetation communities, ecological communities and the presence of fauna species within the site.

The Biodiversity Assessment informed the layout of the proposal in order to avoid areas of high biodiversity value such as remnant large woodland patches within the site. As such the impact of the proposal in terms of removal of vegetation has been limited and restricted to a small portion of the site and involves only the removal of

- The removal of 1.83 hectares of native vegetation comprising:
 - 0.80 hectares of 'Belah woodland' (PCT 55); and
 - 1.03 hectares of Weeping Myall open woodland (PCT 26).
- The removal of 32 paddock trees.
- The removal of 1.83 hectares of woodland habitat for fauna species.
- The removal of 11 habitat trees (containing 16 hollows).

In addition to avoiding areas of high quality vegetation within the site the proposal includes a number of mitigation measures to limit the potential for impact from the cumulative loss of vegetation on site in a regional context.

These mitigation measures are to be implemented during construction, operational and decommissioning phases in order to protect the biodiversity values of the site. The mitigation measures include not only implementation of erosion, dust and sedimentation controls but the implementation of protocols for survey, pre-clearing and clearing of vegetation to protect the retained vegetation and to protect the fauna present on site so reducing direct and cumulative impact.

During the operational phase monitoring of mobile fauna will be undertaken and recommendations acted on to refine site conditions should there be any signs of adverse impacts to fauna.

The impact assessment did not identify any uncertain impacts arising from the proposal that would require implementation of an adaptive management strategy.

The BDAR has adopted the BAM Calculator to determine the offset obligation for the removal of native vegetation (habitat for threatened species) and the removal of paddock trees within the development footprint of the site. The purchase and retirement of 68 ecosystem credits is required to meet the offset obligation and so limit the impact of the proposal on the biodiversity values of the region.

Aboriginal Heritage

The Aboriginal Heritage assessment was undertaken to identify Aboriginal cultural heritage values that may be impacted by the proposed works, including consideration of cumulative impacts, and measures to avoid significant impacts. The assessment identified that *A cumulative impact is an impact on Aboriginal cultural heritage resulting from the incremental impact of the action/s of a development when added to other past, present and reasonably foreseeable future actions:*

To mitigate against the potential for any cumulative loss of Aboriginal cultural heritage values within the site as a result of past, present and future developments it is proposed that a heritage interpretation strategy is prepared.

This is considered an appropriate action concurrent with the removal of WWSF IF01 (AHIMS ID 43-4-0056), WWSF IF02 (AHIMS ID 43-4-0071) and WWSF AS01 (AHIMS ID 43-4-0057) to avoid any potential adverse cumulative impact on cultural significance of the site.

Land

The assessment of the site has revealed that no major land use conflicts will arise between the proposal and the existing adjacent land uses. No other solar farms are located in close proximity to the site. While another solar farm is proposed in the district it is not in the visual or physical catchment of the site.

While pressure may be experienced on availability of accommodation and services in local townships during the construction phase of the proposal, should the proposal and the second solar farm proposal proceed concurrently with the proposed extension of the Cowal Mines, this will be a short-term impact, for a period of less than 12 months and is not representative of a long term cumulative impact.

Management plans for the peak construction periods will be prepared to address issues of temporary conflicts in traffic, noise and demand for local services.

The proposal will not result in the loss of agricultural land. The site has historically been used for grazing. The proposal includes the planting of paddock grasses and the placement and design of the solar arrays will enable the grazing of sheep on site. Following the decommissioning of the proposal the all infrastructure will be removed and areas of the site that have been disturbed will be harrowed and either reseeded with a grass mix or left for cropping depending on the landowners preference at the time.

Visual

The landscape and visual impact assessment evaluated the impacts of the proposal on the landscape and visual values of the site and the surrounding area having regard to the sensitivity level of a viewer and the level of modification to the landscape arising from the proposal. The assessment considered the change to the landscape setting arising from the proposal, including the ability of the landscape to absorb the change.

The landscape and visual impact assessment concluded that there would be no unreasonable visual impacts to or from Clear Ridge or Wyrra State Forests. The distance from these State forests to the site is over 1.5

kilometres. As the distance increases from the site, the field of view decreases causing the visibility of the proposal components to either diminish or to be absorbed in the overall setting. Consequently, as the distance from the viewer to the proposal increases, the level of sensitivity reduces.

Further, the viewing experience from two proximate homesteads was filtered or inhibited by existing vegetation immediately around the homesteads, in the surrounding landscape or across agricultural related activities. The distance to the proposal components from the residential homesteads and the proportional extent of the view occupied by the proposal elements in conjunction with the presence of existing intervening vegetation across the rural setting, means it is unlikely that the Proposal would result in a prominent change in the visual catchment for these residents.

The potential for visual impact on sensitive receivers is low and the separation between the site and the proposed Wyalong Solar Farm and the Cowal mine site is significant. As such the proposal does not present an opportunity for a cumulative loss of the rural landscape in the short or long term.

Noise

The assessment by SLR Consulting concluded that due to the extensive distance from the proposal site to other nearby proposals (approximately 14 km from Wyalong Airport, 17 km from the Lake Cowal Gold Mine and 7km from the proposed Wyalong Solar Farm currently on exhibition) there are no expected cumulative noise effects associated with the proposal.

The assessment revealed that that no exceedances of the management levels are predicted and no adverse acoustic impacts are expected due to the separation of the site from the surrounding receivers. Further, it was concluded that due to the low noise impact levels a noise management plan would not be required for the construction, operation or decommissioning of the proposal.

Traffic and Access

Based on a desktop review of the DP&E Major Proposals Register, the following two sub-regional proposals were identified:

Wyalong Solar Farm which is proposed to be located north of the Newell Highway west of Bodells Lane, with proposed access to be provided via a new intersection (Priority with BAR/BAL treatments) at the Newell Highway. The construction of the Wyalong Solar Farm is estimated to generate up to 46 vehicle movements per day during construction, and then two vehicle trips per day once operational. The construction trip generation is expected to be similar to that of the proposal that is the subject of this EIS. However, the majority of the Wyalong Solar Farm construction trips would be through trips at the key site access intersection of Newell Highway/Bodells Lane which has appropriate ancillary right turn infrastructure.

The Coal Gold Mine is sited immediately north of the subject West Wyalong Solar Farm. The gold mine has sought modifications to allow for extension of time for operation and increase in staff numbers. It is understood that the current traffic conditions will be maintained and it is not expected that the Coal Gold Mine site would generate additional traffic to Clear Ridge Road than that at present.

The traffic assessment by Ason Group concluded that the construction of the proposal would have no significant impacts on the local road network based on the following observations from the traffic impact assessment:

- *Even during the peak period of construction (Stage 2) the total traffic generation of the Site is very moderate, estimated at 140 daily vehicle trips and up to 46 AM and PM Site peak hour trips.*
- *The Stage 2 peak flows would be generated over a period of approximately 3 - 4 months only, while the total construction proposal would be completed in 9 - 12 months.*
- *The introduction of these construction flows, even during the peak Stage 2 construction period, would not alter the existing levels of service in the key roads or at key intersections providing access to the Site.*
- *The introduction of these construction flows, even during the peak Stage 2 construction period, would not warrant the upgrade of any minor intersections.*
- *Appropriate management conditions can be introduced to ensure that Blands Lane and Bodells Lane are maintained to an appropriate standard throughout and after the construction period. (refer to Section below – Mitigation measures).*

Water

The site is located within an area mapped as having groundwater vulnerability under the Bland LEP, indicating areas in which the hydrological functions of groundwater systems should be maintained to protect vulnerable groundwater resources from depletion and contamination as a result of development.

The Water Assessment prepared by SLR has examined the potential of the proposal to impact the groundwater and hydrological functions of the site.

There are no current groundwater bores located on site and the proposal does not include the provision of ground water bores, rather the proposal includes the provision of water tanks for maintenance and emergency purposes.

The Water Assessment concludes that the proposal is unlikely to have any impact on groundwater resources or groundwater dependent ecosystems. Impacts to groundwater during construction and operation of the solar farm are unlikely to occur due to:

- The pattern of surface drainage and associated groundwater recharge will remain unchanged.
- Soil infiltration across the broader surface of the site will be unchanged and therefore the rates of groundwater recharge will be unaffected.
- The Proposal does not include any excavation with potential to interact with groundwater.
- No solar arrays or other infrastructure are proposed at or close to the locations of ground sensitive ecosystems within the site.

The proposal will have a very low impact on the environment and the existing behaviour of surface and ground waters and will not result in any adverse impact on the ground water resource of the region.

Hazards and Risks

As the solar farm is not classified as potentially hazardous, it is not necessary to prepare a Preliminary Hazard Analysis for the proposal.

The quantities of dangerous goods to be stored within the solar farm are limited and the nature of the panel arrays proposed to be installed presents limited risk to the site or the surrounding environs.

The site is not identified as bushfire prone land notwithstanding this the proposal layout incorporates asset protection zones around the boundary of the site and the proposal during construction, operation and decommissioning phases will implement management practices to address bushfire risk, soil erosion, sediment control traffic and water management.

The proposal does not present risks to the site or the surrounding locality.

Waste

During the construction, operational and decommissioning phases of the proposal waste will be generated. The waste generated is expected to fall into three categories for management which include:

- **Reuse:** If surplus materials can be used in the permanent works they are classified as materials which have been reused.
- **Recycle:** If the surplus materials cannot be reused in its present form but could be used in a different form it is sent for recycling.
- **Landfill:** If neither of the above applies then the only option is to send the surplus materials to landfill. This must be a last resort.

During the construction phase waste management will be the responsibility of the contractor and will be managed on site. The priority of Lightsource BP is to reuse and recycle materials wherever possible and so reduce the quantum of material ending as waste required to be landfilled.

Operational and management guidelines will direct the management of waste material generated on site within each of the proposal's life cycle stages. Responsible practices will result in a well-managed site with personal and operational waste removed from site on a regular basis by licenced waste contractors so removing impacts on site and minimising demand for land fill space.

Socio-Economic

The socio-economic assessment identified that in the short term, during the construction phase there is likely to be a period of increased pressure on local services, infrastructure and housing. This could be exacerbated should the construction of the Wyalong Solar Farm and the Cowal Gold Mine extension works be undertaken concurrently. This impact will be short term.

While there will be a positive economic benefit in the region during the construction phase there will be increased demand for services and housing. This can be mitigated by:

- Implementation of a local procurement plan for the construction workforce to reduce the demand on accommodation and other local infrastructure and services.
- Consultation with surrounding townships that may be required to assist in the supply of workforce accommodation.
- Further stakeholder and community consultation to understand capacity of local services and infrastructure.
- Consideration of construction staging and coordination with other proposals in the Bland Shire LGA

Notwithstanding the potential for the short-term impact on local services and accommodation the socio-economic assessment has found that overall the proposal is very likely to have a long term positive impact for NSW by increasing the supply of renewable energy in NSW and reducing emissions.

The proposal is able to deliver a range of employment and economic benefits within the region and across New South Wales and it is estimated that the proposal will generate 142 direct construction jobs (based on a 12-month average), 100 jobs in direct supply chain employment and would contribute \$51 million gross value added during the construction phase. It will also deliver local employment and economic benefits to Bland Shire LGA during the operational and eventual decommissioning phase.

8. RISK ASSESSMENT & MITIGATION MEASURES

The SEARs require an environmental risk analysis to identify potential environmental impacts associated with the proposal. This analysis comprises a qualitative assessment consistent with AS/NZS ISO 31000:2009 *Risk Management—Principles and Guidelines* (Standards Australia 2009). The level of risk was assessed by considering the potential impacts of the proposal prior to application of any mitigation measures.

Risk comprises the likelihood of an event occurring and the consequences of that event. For the proposal, the following descriptors were adopted for 'likelihood' and 'consequence'.

The following methodology provides a framework for systematic assessment of identified impacts.

Table 43 – Level of Impact

			Consequence level				
			1	2	3	4	5
			Minimal	Minor	Moderate	Major	Extreme
Likelihood	A	Almost certain	A1	A2	A3	A4	A5
	B	Likely	B1	B2	B3	B4	B5
	C	Possible	C1	C2	C3	C4	C5
	D	Unlikely	D1	D2	D3	D4	D5
	E	Rare	E1	E2	E3	E4	E5

Risk Level

Low		Moderate		High		Extreme	
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Consequence of impact

The following criteria will be used to assess the consequence level of a potential social impact:

- Duration – The timeframe over which the impact occurs or the frequency of potential impacts.
- Extent – The geographical area or the number of people affected.
- Severity – Scale or degree of change from the existing condition as a result of an impact.
- Sensitivity – The vulnerability of receivers or the receiving environment and the extent to which people or resources can adapt to or mitigate the impact.

The following table outlines a matrix for understanding the consequence criteria.

Table 44 – Consequence of impact

Level	Duration	Extent	Severity	Sensitivity
Minimal	Short-term impact or low frequency	Individual or single household affected	Low level of change from existing condition.	Low sensitivity of receivers or receiving environment. Receivers have the capacity to adapt to the change with relative ease.
Moderate	Medium-term impact or intermittent frequency	Group of people or number of households affected	Moderate level of change from existing condition and will take substantial time and effort to reverse or ameliorate	Receivers or receiving environment can adapt with some difficulty.
Extreme	Long-term impact or constant frequency	Large area or large part of a community affected	High degree of change from existing condition and is a potentially irreversible change.	High importance or vulnerability of impacted receivers or receiving environment. Limited capacity to adapt to changes.

Likelihood of impact

The following scale outlines the likelihood of a potential impact occurring throughout the proposal lifecycle, without mitigation.

Table 45 – Likelihood scale

Level	Description
Rare	Extremely unlikely that the impact will occur, at any stage throughout the proposal lifecycle
Unlikely	Unlikely that the impact will occur, at any stage throughout the proposal lifecycle
Possible	Possible that the impact will occur, at any stage throughout the proposal lifecycle
Likely	Likely that the impact will occur, at any stage throughout the proposal lifecycle
Almost Certain	Highly likely that the impact will occur, at any stage throughout the proposal lifecycle.

The results of the environmental risk assessment for the proposal are presented in **Table 46** and are based on the range of technical and specialist consultant reports appended to this EIS.

The table has directly related mitigation measures responding to each impact (satisfying the SEAR for a consolidated summary of all proposed mitigation measures) also based upon the range of technical and specialist consultant reports appended to this EIS.

The following risk assessment matrix demonstrates that for each of the likely impacts identified in the assessment of the key issues will either be positive or can be appropriately mitigated. In many cases, the environmental management controls and operational protocols inherent to the construction, operation and decommissioning of the proposal adequately manage the potential impacts, and mitigation measures are not required.

Table 46 – Risk Assessment and Mitigation Measures

Matter	Potential Impact	Likelihood	Consequence	Risk Level	Mitigation Measure
Biodiversity	Loss of native vegetation and fauna habitat	Possible	Moderate	A3	Refer to Section 7.3.4 of the EIS for recommended mitigation measures.
	Disturbance of aquatic habitat	Rare	Minimal	E1	
	Loss of hollows	Possible	Moderate	C3	
	Impacts to fauna	Possible	Moderate	C3	
	Water quality, chemical and fuel impacts on flora and fauna	Possible	Moderate	C3	
Aboriginal Heritage	Impacts on Aboriginal heritage items	Unlikely	Minimal	D1	Refer to Section 7.4.4 of the EIS for recommended mitigation measures.
	Impacts on salvaged Aboriginal heritage items	Unlikely	Minimal	D1	
	Protection of Aboriginal heritage items not within site	Unlikely	Minimal	D1	

Matter	Potential Impact	Likelihood	Consequence	Risk Level	Mitigation Measure
	Identification of potential human remains	Rare	Minimal	E1	
	Identification of unknown items	Unlikely	Minimal	D1	
Visual and Landscape	Visual impact of solar farm	Unlikely	Minimal	D1	Refer to Section 7.7.4 of the EIS for recommended mitigation measures.
	Visual impact of structures (glare)	Unlikely	Minimal	D1	
	Visual impact during construction	Possible	Moderate	C3	
Noise and Vibration	Impact from construction noise and vibration	Possible	Moderate	C3	Refer to Section 7.8.4 of the EIS for recommended mitigation measures.
	Noise impact from increased traffic	Possible	Moderate	C3	
	Impact from operational noise generated on site	Unlikely	Moderate	D3	
Traffic	Traffic impact during construction	Likely	Moderate	B3 – B4	Refer to Section 7.9.4 of the EIS for recommended mitigation measures.
Water & Soil	Impact and threat from flooding	Unlikely	Minimal	D1	Refer to Sections 7.6.3 and 7.10.4 of the EIS for recommended mitigation measures.

Matter	Potential Impact	Likelihood	Consequence	Risk Level	Mitigation Measure
	Impact from soil erosion and dust pollution during demolition and construction	Possible	Moderate	C3	
	Water quality impact on ground water	Unlikely	Minimal	D1	
Risk & Hazards	Impact from potential land contamination	Unlikely	Minimal	D1	Refer to Section 7.11.3 of the EIS for recommended mitigation measures.
	Impact from potential hazardous materials	Unlikely	Minimal	D1	
Bushfire	Impact for potential bushfire threat	Unlikely	Minimal	D1	Refer to Section 7.11.3 of the EIS for recommended mitigation measures for bushfire.
Waste	Impacts associated with construction waste	Possible	Minimal	C1	Refer to Section 7.12.2 of the EIS for recommended mitigation measures.
	Impacts associated with operation waste	Unlikely	Minimal	D1	

Matter	Potential Impact	Likelihood	Consequence	Risk Level	Mitigation Measure
Land	Impacts with surrounding land uses	Unlikely	Minimal	D1	Refer to Section 7.5.3 of the EIS for recommended mitigation measures.
	Impacts with surrounding solar farms	Possible	Minimal	C1	
	Impacts with surrounding mines	Unlikely	Minimal	D1	
	Impacts on mineral licences	Unlikely	Minimal	D1	
	Impacts on the agricultural use of land	Unlikely	Minimal	D1	
Socio-Economic	Social impacts	Possible	Extreme	C5	Refer to Section 7.13.2 of the EIS for recommended mitigation measures.
	Economic impacts	Possible	Extreme	C5	
Cumulative impacts	Various impacts	Possible	Moderate	C3	Refer to Section 7.14 of the EIS for cumulative impacts

9. CONCLUSION

This EIS provides a consolidated assessment of potential environmental impacts that may arise as a result of the proposed construction, operation and decommissioning of the West Wyalong 90MW AC solar farm. In making this assessment, the EIS addresses the issues listed in the SEARs and accords with the relevant parts of the EP&A Act, Schedule 2 of the EP&A Regulations, S&R SEPP, and the Large-Scale Solar Energy Guideline.

The key issues for all components of the proposal identified in the SEARs have been assessed in detail, with specialist reports underpinning the key findings and recommendations outlined in the Environmental Impact Assessment. It has been demonstrated that each of the likely impacts identified in the assessment of the key issues will either be positive or can be appropriately mitigated. In many cases, the environmental management controls and operational protocols inherent to construction, operation and decommissioning of the solar farm adequately manage the potential impacts, and mitigation measures are not required.

Extensive stakeholder engagement has occurred during the preparation of this EIS, including the community consultation undertaken by Urban Unity during October and November 2018. Feedback on the proposed SSD DA was positive and supportive of the objectives of the proposal. The community comments from the consultation have been included in the various strategies developed by the respective specialists to ensure the concerns raised have been incorporated into the proposal and satisfactorily addressed.

It is considered that based on the current energy demand crisis facing the Australian market, a *'Do Nothing'* scenario is not appropriate given the increase in energy prices and shortage in supplies experienced throughout the nation. Furthermore, investment in renewable energy, will help Australia better compete with other market leading nations and ensure a reduction in harmful carbon emissions.

The proposal represents a positive development outcome for the site and surrounding area for the following reasons:

- The proposal will deliver a long-term positive impact by increasing renewable energy supply to the Australian energy grid and reduce harmful carbon emissions.
- The proposal is a low risk investment with a long-term benefit for the broader Australian community.
- The proposal will allow for the introduction of up to 300 workers during peak construction representing a 7.9% increase in population for the West Wyalong and Wyalong area. This will help to generate economic benefits for the local community with short and long-term employment opportunities (direct and indirect employment).
- The visual impacts of the solar farm will be limited. The proposed landscape strategy has been designed to ensure minimal impacts on visual amenity resulting from the proposed installation of solar panels and associated infrastructure.
- The loss of agricultural land will be negligible as the proposed use is complimentary to the surrounding land uses and the site will be used for grazing purposes during the operation of the solar farm. Furthermore, once operations have ceased the site will be rehabilitated with the removal of infrastructure.
- Environmental impacts within the site will be minor as the flora and fauna will be suitably managed during the construction phases. Management practices to ensure minimal impact has been extensively documented for implementation during the various phases of the proposal.
- Suitable management practices have been proposed for the conservation and management of the four aboriginal items discovered during the field investigation. The proposed management practices have been referred for consultation and approval by the RAP to ensure the significance and value of these items are maintained and observed in accordance with the requirements of the local Aboriginal community.
- Potential impacts in terms of noise, traffic and waste impacts will be limited to the construction period of 9 to 12 months. Suitable management practices have been proposed for this period to ensure the impacts are limited.

The proposal of the West Wyalong Solar Farm represents a positive and sustainable planning outcome for the site.

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