



**NGH**



# PLANNING REPORT

## Muskerry Solar Power Station

March 2023

Project Number: 19-941

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**BRISBANE**

Suite 4, Level 5, 87 Wickham Terrace  
Spring Hill QLD 4000 **T.** (07) 3129 7633

**CANBERRA - NSW SE & ACT**

8/27 Yallourn Street (PO Box 62)  
Fyshwick ACT 2609 **T.** (02) 6280 5053

**GOLD COAST**

PO Box 466  
Tugun QLD 4224 **T.** (07) 3129 7633

**E.** [ngh@nghconsulting.com.au](mailto:ngh@nghconsulting.com.au)

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**SYDNEY REGION**

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Surry Hills NSW 2010 **T.** (02) 8202 8333

**WAGGA WAGGA - RIVERINA & WESTERN NSW**

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## Table of Contents

<b>Executive Summary .....</b>	<b>i</b>
Proposal summary table .....	iv
<b>1 Introduction .....</b>	<b>1</b>
1.1 Overview and supporting reports list .....	1
<b>2 The Proposal and location .....</b>	<b>2</b>
2.1 Background - Proposal site and locality .....	2
2.1.1 Locality .....	2
2.1.2 Proposal site .....	3
2.1.3 Existing land use .....	9
2.1.4 Pre-lodgement consultation .....	9
2.2 The proposal .....	10
2.2.1 Background and site selection .....	10
2.2.2 Muskerry Solar Power Station - general description of the proposal .....	14
2.2.3 Solar Array Areas .....	15
2.2.4 Medium Voltage Reticulation .....	16
2.2.5 Solar Substation .....	16
2.2.6 Battery Energy Storage System (BESS) .....	17
2.2.7 Connecting to the electricity transmission network .....	18
<b>3 Proposal phases description .....</b>	<b>20</b>
3.1 Pre-mobilisation/early works .....	20
3.2 Construction .....	21
3.2.1 Solar infrastructure .....	21
3.2.2 Site fencing and security .....	21
3.2.3 Landscaping .....	22
3.2.4 Operations and Maintenance Building .....	22
3.2.5 Proposal site access .....	22
3.2.6 Internal roads .....	24
3.2.7 Parking .....	24
3.2.8 Soil and stormwater management .....	24
3.2.9 Labour, machinery and equipment .....	25
3.2.10 Hours of operation during construction .....	25

3.3	Commissioning and operation .....	25
3.3.1	Operating hours and personnel .....	26
3.3.2	Transport, access and parking .....	26
3.3.3	Lighting and CCTV .....	26
3.3.4	Water supply .....	27
3.3.5	Sewerage .....	27
3.3.6	Soil and stormwater management .....	27
3.3.7	Vegetation management .....	27
3.3.8	Emergency management .....	27
3.3.9	Refurbishment and upgrading .....	28
3.4	Decommissioning and rehabilitation .....	28
3.5	Indicative timeline .....	29
3.6	Environmental Management Plans (EMP) .....	29
<b>4</b>	<b>Planning and policy provisions .....</b>	<b>31</b>
4.1	Campaspe and Greater Bendigo Planning Schemes .....	31
4.1.1	Land use permit triggers – Permit required .....	31
4.1.2	Zone and overlay provisions .....	32
	Clause 42.01 Environmental Significance Overlay Schedule 1 (ESO1) .....	33
	Clause 42.02 Vegetation Protection Overlay Schedule 3 (VPO3) .....	33
	Clause 44.06 Bushfire Management Overlay (BMO) .....	34
4.1.3	Particular provisions .....	34
4.1.4	Referral triggers .....	35
4.1.5	Planning Policy Framework .....	36
4.2	Other policies and guidelines .....	45
4.3	Legislation .....	48
<b>5</b>	<b>Planning assessment .....</b>	<b>55</b>
5.1	Site analysis and design response .....	55
5.1.1	Land zone .....	55
5.1.2	Suitability of the site .....	57
5.1.3	Proposal objectives, outcomes and suitability of the site .....	58
5.1.4	Strategic need .....	58
5.1.5	Socio-economic benefits .....	60
5.2	Ecology .....	61

5.3	Bushfire.....	68
5.4	Watercourses (earthworks, overland flow and flooding).....	73
5.5	Agricultural considerations.....	76
5.6	Noise.....	80
5.7	Traffic.....	82
5.8	Visual impact and amenity (including light spill and dust control).....	87
5.9	Glint and Glare.....	90
5.10	Electromagnetic fields.....	93
5.11	Heat island effect.....	94
5.12	Waste and dangerous goods.....	97
5.13	Non-Aboriginal heritage.....	98
5.14	Cumulative impacts.....	99
<b>6</b>	<b>Conclusion .....</b>	<b>103</b>
<b>7</b>	<b>References .....</b>	<b>104</b>
	<b>Appendix A Proposal plans .....</b>	<b>A-I</b>
	<b>Appendix B Ecological assessment .....</b>	<b>B-I</b>
	<b>Appendix C Bushfire report .....</b>	<b>C-I</b>
	<b>Appendix D Flood impact assessment .....</b>	<b>D-I</b>
	<b>Appendix E Noise impact and constraints assessment .....</b>	<b>E-I</b>
	<b>Appendix F Traffic impact assessment .....</b>	<b>F-I</b>
	<b>Appendix G Landscape character and visual impact assessment .....</b>	<b>G-I</b>
	<b>Appendix H Glint and Glare Assessment .....</b>	<b>H-I</b>
	<b>Appendix I Cultural Heritage Management Plan .....</b>	<b>I-I</b>

## Figures

Figure 2-1	Locality map, subject land and nearby solar projects (Source: Vic Plan, 2022).....	3
Figure 2-2	Grazing land located in the north of the proposal site (NGH, 2021).....	4
Figure 2-3	Proposal site within the subject land within the Campaspe and Greater Bendigo LGA's (directly impacted land parcels, that this report is seeking the Ministers approval for the solar facility within) (Source: VicPlan, 2022).....	8
Figure 2-4	Solar array example (Source: Edify Energy, 2020) .....	10
Figure 2-5	Proposal layout - Muskerry Solar Power Station (North).....	11
Figure 2-6	Proposal layout - Muskerry Solar Power Station (South) .....	12
Figure 2-7	Proposal layout - Muskerry Power Station (easement) .....	13

Figure 2-8 Consolidated battery installation example (Source: Edify Energy, 2020).....	14
Figure 2-9 Solar arrays (Source: Edify Energy, 2020) .....	15
Figure 2-10 Solar arrays and inverter (example). A distributed BESS system would include battery installations alongside inverters as per Appendix A (Source: Edify Energy, 2020).....	16
Figure 2-11 Substation under construction (example) (Source: Edify Energy, 2020).....	17
Figure 2-12 AC coupled (centralised BESS) system .....	18
Figure 2-13 DC coupled (decentralised BESS) system .....	18
Figure 2-14 Existing 220kV transmission lines (and underground cable) traversing the proposal site .....	19
Figure 3-1 Location of proposed site access (construction and operation) (AMBER, 2022) .....	22
Figure 3-2 Concept Diagram of proposed intersection upgrade (AMBER, 2022) .....	23
Figure 4-1 Zoning and Environmental overlays (no overlays in the north) (VicPlan, 2022).....	32
Figure 5-1 Victoria's Renewable Energy Zones (Source: State of Victoria, DELWP, 2021).....	60
Figure 5-2 Bushfire prone area mapping and the proposal site (VicPlan 2022) .....	69
Figure 5-3 Bushfire prone vegetation map (north) .....	70
Figure 5-4 Bushfire prone vegetation map (south) .....	71
Figure 5-5 Victorian Soils Map (VRO, 2022).....	76
Figure 5-6 Soil landscapes mapping (Source: NCCMA, 2022).....	77
Figure 5-7 Sensitive receivers mapped for the noise assessment (Spectrum Acoustics, 2022) ...	81
Figure 5-8 Glint and Glare Analysis - residential receptors (Accent Environmental, 2022) .....	92
Figure 5-9 Measures of air temperature within and outside of the PV array (Barron-Gafford, 2018) .....	96

## Table

Table 1-1: Accompanying Plans and Documentation .....	1
Table 2-1 Subject Land details (affected parcels the proposal site sits within).....	5
Table 2-2 Consultation summary table .....	9
Table 3-1 Traffic volumes for the construction of the proposal (AMBER, 2022) .....	24
Table 3-2 Indicative timeline. ....	29
Table 3-3 General safeguards and minimisation measures .....	29
Table 5-1 Ecology safeguards and impact minimisation measures .....	64
Table 5-2 Bushfire safeguards and design measures .....	72
Table 5-3 Soil and water safeguards and minimisation measures .....	75
Table 5-4 Agricultural impact safeguards and minimisation measures .....	79

Table 5-5 Acoustic impact safeguards and minimisation measures .....	82
Table 5-6 Traffic safeguards and management measures .....	85
Table 5-7 Visual safeguards and minimisation measures .....	89
Table 5-8 EMF safeguards and design measures .....	94
Table 5-9 Heat Island Effect safeguards and design measures .....	96
Table 5-10 Waste minimisation and management measures .....	98
Table 5-11 Major solar developments within 5km of the Proposal site.....	99

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## Acronyms and Abbreviations

BESS	Battery Energy Storage System
CEMP	Construction environmental management plan
CFA	Country Fire Authority
DELWP	Department of Environment, Land, Water and Planning (VIC)
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cwth)
EVC	Ecological Vegetation Classes
FZ	Farming Zone
ha	hectares
km	kilometres
kV	kilovolt
m	metres
MWh	megawatt hours
P&E Act	<i>Planning and Environment Act 1987</i> (VIC)
PCU	Power Conversion Unit (or inverter)
PR	this Planning Report
PS	Planning Scheme
PV	photovoltaic
the proposal	Muskerry Solar Power Station (MSPS)
The proposal site	The land directly impacted (development footprint) by the MSPS
Subject land	The land parcels that the proposal site is sited on

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## Executive Summary

The Muskerry Solar Power Station (the proposal) is located north of the Axedale-Toolleen Road, approximately 33 kilometres (km) east of Bendigo (Figure 2-1), in the localities of Muskerry and Toolleen, Victoria. The land the proposal site would be accessed from is identified as Lot 5~D\PP3243, with the site access proposed off the north-east boundary of the lot onto Toolleen Angle Road (the northern most lot of the proposal site). Works are proposed across multiple properties (under four separate ownerships) on land within the Campaspe and Greater Bendigo Local Government Areas.

This Planning Report (PR) is seeking a planning permit for the use and development of the proposal within the Farming Zone (FZ) including:

- A maximum 250 megawatt (MW) solar energy facility:
  - Up to 496.21 hectares (ha) of fenced solar arrays on tilt trackers.
  - Inverters and substation.

And additional works including:

- Utility installation:
  - Connection to the 220 kilovolt (kV) distribution system that crosses the proposal site.
  - A battery energy storage system (BESS) with a proposed capacity of up to 800MWh (i.e., 200MW power output for four hours) and comprising of lithium-ion batteries with inverters).
- Road works:
  - Proposed site entry off the Toolleen Angle Road, and secondary (emergency use only) access off Axedale-Toolleen Road.
- Native vegetation removal:
  - vegetation within the proposal site (development footprint) and for proposed road works (Toolleen Angle Road).

The proposal, see Figure 2-5, Figure 2-6, and Figure 2-7, has been designed with an iterative approach and:

- Is consistent with the provisions of the Campaspe and Greater Bendigo planning schemes, including but not limited to clauses:
  - 53.13 renewable energy facilities – The proposal has been designed to address site constraints and opportunities and avoids and minimises impacts.
  - 52.17 native vegetation – The proposal avoids and minimises impacts to the higher value native vegetation located in the subject land as much as practicably possible.
  - 13.02 bushfire planning – The site is considered low risk and bushfire impacts have been designed for the site would be managed in accordance with relevant Australian Standards, and the CFA's *Design Guidelines and Model Requirements: Renewable Energy Facilities* (CFA, 2022).

- 14.01-1S protection of agricultural land – The proposal addresses the potential for regional and local agricultural impacts, land capability, continuation of farming on the subject land, and compatibility of the proposal considering surrounding agricultural land uses.

The proposal addresses relevant site factors including cumulative impacts for all areas of assessment. Necessary specialist reports have been prepared to inform the layout, and the findings are summarised below:

- Ecology – The Ecological Assessment (NGH, 2022) shows the proposal has avoided and minimised impacts to native vegetation by designing the proposed layout with an iterative approach. Areas of higher value vegetation identified on the subject land have been avoided as much as practicable. The results from the field assessment determined the Ecological Vegetation Classes (EVCs) in the study area are Box Ironbark Forest (EVC 61), Creek line Grassy Woodland (EVC 68), Grassy Woodland (EVC 175\_61), Plains Woodland (EVC 803) and Floodplain Pond Herland (EVC 810). A total of 6.644ha including 43 large trees is proposed to be removed from the Campaspe Council area and 2.029ha including 6 large trees is proposed to be removed from the Greater Bendigo Council area. The required offsets have been determined for the proposal, with the offset strategy considered and Native Vegetation Regulations (NVR) Reports prepared.
- Traffic – A Traffic Impact Assessment (AMBER, 2022) has assessed the traffic impacts of the proposal. Access to the site would be provided via a new access to Toolleen Angle Road. The road network can accommodate the traffic generated and vehicle types (roads are designated for B-double vehicles) by the proposal during the construction, operation, and decommissioning stages. Some oversize and overmass vehicles would be required to deliver larger plant to the site such as the sub-station transformer, BESS and earthmoving equipment, these would be subject to specific licences. The proposal is expected to generate an average of 70 heavy and 64 light vehicle movements per day. Any potential combined increase in traffic generated by the proposal site and any near solar farm projects that align with construction is expected to have a minimal cumulative impact on the road network in the surrounding area. To mitigate the impacts of the proposal during construction a Traffic Management Plan would be prepared prior to commencement.
- Noise – A Noise Impact and Constraints Assessment (Spectrum Acoustics, 2022) was completed. Noise modelling was completed using worst case scenario, using the highest noise emission profile for PCU's, to conservatively predict the highest potential noise impact. The modelling considered all possible scenarios for the constructed layout including the two substation location options, and two BESS options (centralised and decentralised). Modelling also confirmed levels well below the criterion for the substation and centralised BESS options.

Due to the operating noise of batteries, the decentralised battery would require noise source exclusion zones (setback areas) in which battery system enclosures should not be located. These setback zones, approximately 240m for R51 and R12 and 325m for R9 and R10, are a worst case based on the assumption that every receiver is directly down-wind from every noise source.

- Visual – The Landscape Character and Visual Impact Assessment (VIA) (Accent Environmental, 2022) found that existing vegetation and topography restrict the majority of

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views into the proposal site for receivers within 5km. The VIA considered the landscape, including modelling of topography and location of receivers, the sensitivity and magnitude of impacts, ground truthing of topography and existing vegetation. Six viewpoints were selected for montages and show the range of potential impacts. Fourteen other viewpoints were also analysed. The impacts range from high to no impact. The VIA identified a range of measures to minimise the impacts for the higher rated viewpoints and affected receivers. This includes landscaping (a plan is included in the VIA) and a range of design related measures.

- Glint and Glare – A Glint and Glare Assessment (Accent Environmental, 2022a) was completed for the proposal and provides a modelled analysis of the potential glare impacts. The assessment concluded none of the 80 residences, 15 roads (identified routes) or the flight path for Knowsley Airpark are expected to experience glare. Most of these receptors are unlikely to have a direct line of sight to the project due to topography and intermittent vegetation. No mitigation is necessary.
- Bushfire – The entire subject land is identified as a bushfire prone area and partially subject to the Bushfire Management Overlay (BMO). A Bushfire Assessment Report (NGH, 2022) was completed to address potential bushfire impacts. The report considers changes posed by the change of land use to a solar facility and the potential design and layout of the proposal including the BESS options. The proposal can achieve a bushfire attack level of BAL-12.5 by providing suitable setbacks from the property boundary and/or landscape screening, providing the desired level of bushfire protection for solar facilities. The report concluded that the proposal poses a low risk to human life. The proposal would not significantly increase the risk of bushfire within the landscape, in terms of ignition, fuels or changes in population. The application of design measures and buffers provided around infrastructure would reduce risk to an acceptable level, considering the low-risk landscape present. Risk, Fire and Emergency Management Plans would be prepared prior to the commencement of on-site activities.
- Flooding – The Flood Impact Assessment (Alluvium, 2022) has considered the existing potential for flooding and potential flood impacts post construction of the proposal. The assessment provides guidance on the planning of internal infrastructure and to assess the external impacts of the proposal. The assessment found:
  - The majority of the North and South sites have a high level of flood protection. Riverine flooding is present only in the southern site and found to be primarily contained within the creeks with only minor incidences of flows breaking out of the creeks and onto the proposal site in the 1% AEP event.
  - The PV arrays are assumed to not alter the rainfall infiltration of overall hydraulic roughness of the site.
  - The risk to human life and infrastructure is considered to be very low.

The avoidance, minimisation and management measures set out in this PR, and supporting documents and proposal plans, have been committed to by the proponent. Prior to commencement of relevant stages, relevant Environment Management Plan (EMP) documents would be prepared. Impacts would be effectively managed through implementation of the EMP for the site. The proponent would submit the EMP to the DELWP prior to commencement of relevant stages. Sub plans would include:

- Risk, Fire and Emergency Management Plan.

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- Landscape (Flora, Fauna, Biosecurity ) Management Plan.
- Noise Management Plan.
- Traffic Management Plan.
- Soil and Water Management Plan.
- Waste Minimisation and Management Plan.

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The proposal:

- Has been designed in consideration of the relevant Planning Scheme and the Solar Energy Facilities Design and Development Guidelines (DELWP, 2019).
- Would contribute to the achievement of the Victorian Government's renewable energy policies. The proposal is estimated to generate approximately 612,000 MWh in the first year, the equivalent to supplying over 93,000 households with renewable electricity. The BESS would also assist in delivery of power during peak times to the network.
- Provides for diversification of economy, directly strengthening the resilience of the current agricultural businesses (existing farms) and the region generally.

## Proposal summary table

The key features of the proposal are summarised in the table below. The component specifications are subject to change during detailed design. Where required, upper limit quantities and power level estimates are provided to ensure the assessment and any subsequent approval maintains the flexibility required in the detailed design stage, post approval.

Summary of key features of the proposal

Proposal element	Description
Proposal	Muskerry Solar Power Station.
Proponent	Edify Energy.
Capacity	Approximately 250MW.
Subject Land	Approximately 937ha (investigation/study area).
Proposal site	Approximately 496.21ha (potential impact area-solar plant and associated works). Solar panel coverage in the north of the site is 170ha. In the south solar panel coverage is 220ha.
Site description	<b>Proposal site:</b> Rural land bound by Axedale-Toolleen Rd, Murphy's Lane, Muskerry East School Rd, and Toolleen Angle Rd, comprising land from 4 separate land holdings (A full list of parcels is provided in Table 2-1 of this report). All land zoned as Farm Zone (FZ and FZ1) under the Greater Bendigo and Campaspe Planning Scheme.

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Proposal element	Description
Local Government	Greater Bendigo City Council LGA and Campaspe Shire Council LGA.
Solar array	<p>Number of panels: Approximately 500,000.</p> <p>Area of panels: Approximately 3,900,000m<sup>2</sup>.</p> <p>Row length and spacing: Approximately 70-90m in length and 7m apart.</p> <p>Height: approximately 4.2m (at full tilt towards the horizon).</p>
Substation	<p>Approximately 1.0ha.</p> <p>220kV outdoor substation.</p> <p>275MVA x 220/33kV transformers and associated infrastructure.</p> <p>Maximum height of 20m subject to final design (i.e., lightning poles being tallest component with other equipment maximum of 8-10m high).</p>
Energy storage – Battery Energy Storage System (BESS)	<p>The project is considering two options for integrating the project's battery energy storage system.</p> <ul style="list-style-type: none"> <li>Option A considers a centralised BESS, located within the northern portion of the site close to the substation and laydown area.</li> <li>Option B considers a decentralised BESS, with battery and power conversion units distributed throughout the site, integrated in a 'DC-coupled' configuration.</li> </ul> <p>With an electricity storage capacity of up to 800MWh (i.e., 200MW power output for four hours) and comprising of lithium-ion batteries with inverters.</p> <p>Modular enclosures or shipping container style enclosures (approximately 12m in length each). The final number of units would be determined by the technology chosen, and the layout or clustering of units is dependent on option A or B configuration.</p>
Site access	<p>The site access for construction and operation vehicles would be exclusively via Toolleen Angle Road and Muskerry 'north', with a site entrance established north of the proposal site.</p> <p>Muskerry 'south' would be accessed exclusively for construction and operation vehicles via the internal access tracks from Muskerry 'north', running south through Lot 1/TP892631 and Lot 7B/D/PP3243 (the proposed transmission easement). This internal access would provide diagonal emergency access through the site.</p> <p>An emergency access point only would be provided in the south off Axedale Toolleen Road, allowing for safe access</p>

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Proposal element	Description
	away from smoke or fire spread in both the north and south.
Access tracks	Internal access tracks: Approximately 41.10km of minimum 4.0m wide unsealed tracks.
Operations and maintenance buildings	Steel framed, Colorbond finish demountable buildings to accommodate: <ul style="list-style-type: none"> <li>• 33kV switch gear.</li> <li>• Control and protection equipment.</li> <li>• Site office.</li> <li>• Staff amenities.</li> <li>• Warehouse.</li> </ul>
Security fencing, lighting, and CCTV	Steel security fence 2.3m high. Security system with CCTV and local flood lighting.
Construction hours	Standard daytime construction hours would be 7.00am to 6.00pm Monday to Friday and 8.00am to 1.00pm on Saturdays. Any construction outside of these standard construction hours, if required, would only be undertaken with prior approval from relevant authorities, or unless in emergency circumstances e.g., to make work safe.
Construction timing	About 15 to 18 months (aiming to commence in 2024).
Workforce	Construction – approximately 350 staff during peak construction (approximately 4 – 5 months). Operation – around 5 full time equivalent staff.
Operation period	Anticipated to be a minimum of 30 years.
Decommissioning	The site would be returned to its pre-works state. All above ground infrastructure would be removed to a depth of 1,200mm. The site would be rehabilitated consistent with land use requirements. All infrastructure would be removed with the exception of the T connection. The site would be rehabilitated consistent with future land use requirements.

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# 1 Introduction

## 1.1 Overview and supporting reports list

The proponent, Edify Energy, is seeking the Ministers approval of a proposed 250MW solar energy facility and 200MW / 800MWh battery energy storage system near Muskerry, Victoria 3557 (Muskerry Solar Power Station, the proposal).

The proposal would include the installation of energy generating solar infrastructure including up to 496.21 hectares (ha) of single axis (tracking) solar array, inverters, battery energy storage system (BESS) (co-located with the substation or distributed throughout the proposal site), substation (either option a or option b location), transmission line connection, access roads, site entries and buffer areas.

The land is subject to the planning provisions of the Campaspe and Greater Bendigo planning schemes and is located on land zoned Farming Zone (FZ1 and FZ). This report has addressed the relevant provisions of the planning schemes and the potential impacts of the proposal. An iterative approach has been taken to address the site constraints and the proposal avoids and minimises impacts specifically:

- Construction and operational aspects such as social and economic impacts (visual, traffic, noise, air quality, land use compatibility and cumulative impacts).
- Environmental impacts (native vegetation, water, bushfire, and agricultural impacts).

Aboriginal Heritage has been addressed as part of the Cultural Heritage Management Plan (CHMP) for the proposal at Appendix I.

This report is accompanied by the following supporting plans and reports, listed in Table 1-1.

Table 1-1: Accompanying Plans and Documentation

Appendix	Description	Prepared by
A	Proposal Plans	Terra Solutions
B	Ecological Assessment	NGH Pty Ltd
C	Bushfire Assessment	NGH Pty Ltd
D	Flood Impact Assessment	Alluvium
E	Noise Impact and Constraints Assessment	Spectrum Acoustics
F	Traffic Impact Assessment	Amber Consultants
G	Landscape Character and Visual Impact Assessment Muskerry Solar Power Station	Accent Environmental
H	Glint and Glare Assessment	Accent Environmental

The structure and content of the PR addresses the Planning Schemes relevant to the proposal site and the Solar Energy Facilities Design and Development Guideline (DELWP, 2019).

## **2 The Proposal and location**

### **2.1 Background - Proposal site and locality**

#### **2.1.1 Locality**

The proposal is located north of the Axedale-Toolleen Road, approximately 33 kilometres (km) east of Bendigo (Figure 2-1), in the localities of Muskerry and Toolleen, Victoria.

The proposal site is split over two local government areas (LGA) as follows:

- Campaspe Shire Council LGA (north of Dwyer Lane)
- Greater Bendigo City Council LGA (south of Dwyer Lane)

Greater Bendigo is the closest regional centre located in the centre of Victoria, covering almost 3,000 square (sq.) km. The city of greater Bendigo has a population of more than 110,000 and is the state's third largest economy base in Victoria. It is a service and infrastructure centre for north central Victoria, and surrounded by 40,000 hectares (ha) of regional, state and national parkland. Greater Bendigo is located in the Murray Darling Basin, the North Central Catchment Region and catchments of the Loddon and Campaspe rivers (GBCC, 2020).

Campaspe Shire covers almost 4,500sq.km and has a population of more than 34,000. Major rivers in the shire include the Murray, Campaspe, Goulburn rivers (CSC, 2020).

Renewable energy projects in the immediate area (refer to Figure 2-1), include:

- Axedale Solar Farm, proposed by UPC Renewables. Located 7.5km northeast of Axedale, 3.5km to the west of the proposal site. The project was approved in March 2020
- Fosterville Solar Farm, proposed by FRV Services Australia (FRV). 100 megawatt (MWAC) solar farm and 200MWHrs Battery Energy Storage System. Located next to the Axedale Solar Farm, 5km to the west of the proposal site. The project is under consideration.

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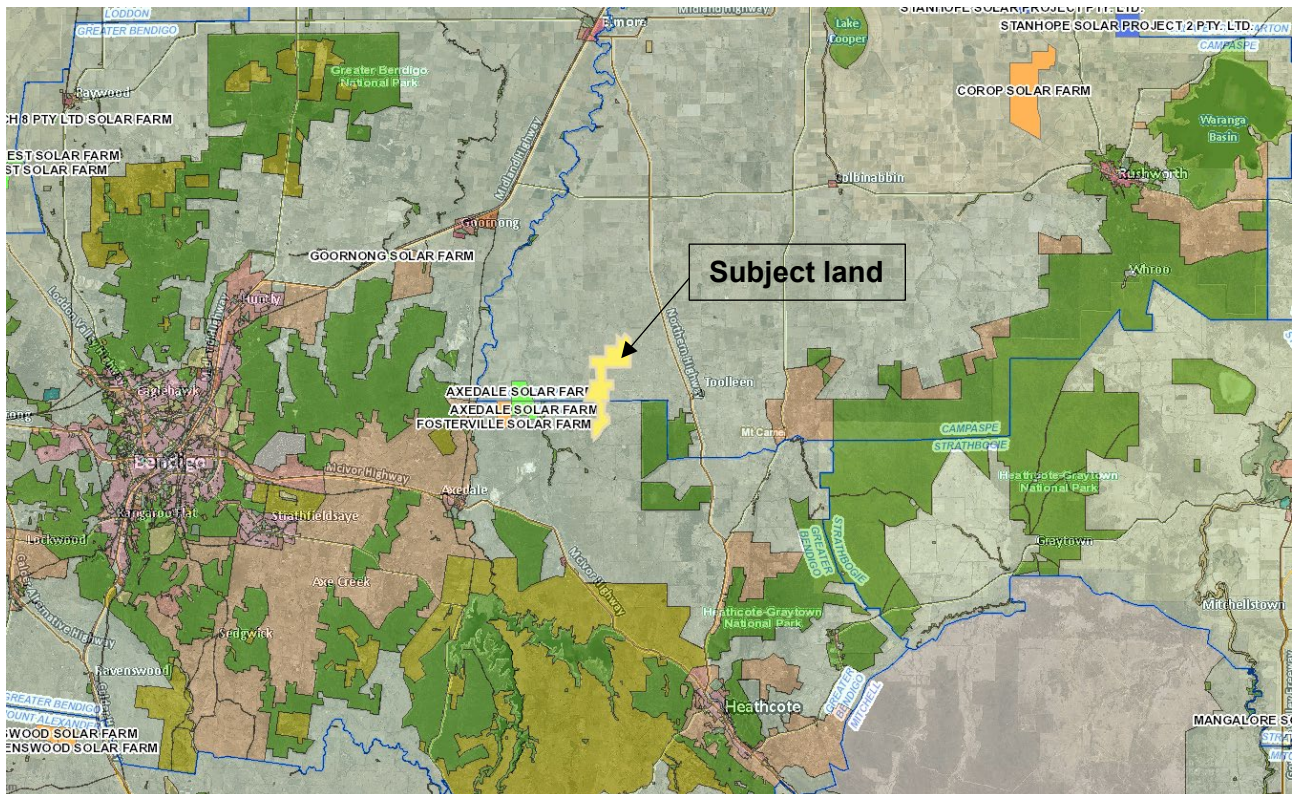


Figure 2-1 Locality map, subject land and nearby solar projects (Source: Vic Plan, 2022)

### 2.1.2 Proposal site

The proposal would cover a 496.21ha area of undulating grazing land (the proposal site) (see example landscape at Figure 2-2) within the subject land (parcels of land this report is seeking approval for the solar facility within). Refer to Figure 2-3 for a map showing the proposal site within the subject land. The subject land and proposal site is located within the area studied (activity/study area Figure 2-5, Figure 2-6, and Figure 2-7, a 927ha area of land), the original study/activity area was considered as part of the iterative design process to determine the best site option and allow for avoidance of impacts. The proposal site is owned by four separate groups of landowners. The proposal site would be accessed via Council and Department of Transport managed roads. The proposal includes creek crossing by powerlines and internal access roads and crossing of paper roads by internal access roads.

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Figure 2-2 Grazing land located in the north of the proposal site (NGH, 2021)

The subject land has road frontage to Axedale-Toolleen Rd, Murphy's Lane, Muskerry East School Rd, and Toolleen Angle Rd. The proposal site as indicated in Figure 4-1 is zoned:

- Under the Campaspe Planning Scheme:
  - Farming Zone 1 - FZ1.
- Under the Greater Bendigo Planning Scheme:
  - Farming zone - FZ; and

Pending granting of a PP, the majority of the proposal site is intended to be leased by EE. A 220kV transmission line runs southwest to northeast through the proposal site; connection to the grid would be within the proposal site using a step down transformer and T connection into the existing power lines.

The proposal site is a term used to describe all land that would be directly impacted for the construction and / or operation of the proposal, the maximum impact area, within the subject land refer to the subject land details in Table 2-1. The proposal site includes land required for the proposal including all solar infrastructure, electricity connections, site access and internal management zones such as bushfire protection zones, vegetation avoidance zones and landscape screening. The proposal's components have been marked out within the proposal site based on an indicative infrastructure layout while allowing sufficient buffers for changes to the layout that would occur during the detailed construction design phase. Defined avoidance areas would not change during the detailed construction design phase, these would remain as proposed, refer to Figure 2-5, Figure 2-6, and Figure 2-7.

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Table 2-1 Subject Land details (affected parcels the proposal site sits within)

Referred to in the PR	Proposed infrastructure	Subject land Lot and DP	Landowner	Existing use	Title restrictions and easements
The solar facility	All proposed solar facility infrastructure including solar arrays, battery storage, internal roads, and ancillary buildings.	5~D\PP3243 1\LP113736	B. Griffin & G. O'Sullivan	Agriculture	Electricity and water easements across southern section of property. No works proposed over easements. See Certificates of Title.
		8~D\PP3243	Burke Family Trust	Agriculture	A water easement runs through the property which also accounts for land affected by a notice under Section 10(1) <i>Land Acquisition and Compensation Act 1986</i> . No works are proposed over easements. See Certificates of Title.
		2\TP120975 1\TP120975 4\TP120975	A. Tuohey, J. Tuohey and C. Tuohey	Agriculture	None, see Certificates of Title.
		12D~D\PP3243 2C~D\PP3243	D.V and T.D. Roney	Agriculture	Electricity easement across the southern section of the property. No works are proposed over the easement. S173 Agreement AJ472401V affects the parcel. A copy of the agreement is provided. The agreement

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Referred to in the PR	Proposed infrastructure	Subject land Lot and DP	Landowner	Existing use	Title restrictions and easements
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		2~2\PP3801 1~2\PP3801 4~2\PP3801 2\PS704656	D.V Roney	Agriculture	Electricity easement across the property. No works are proposed over the easement. S173 Agreement AJ472401V affects the parcel. A copy of the agreement is provided. As outlined above, the proposal does not conflict with the agreement. See Certificates of Title.
		7B~D\PP3243 1\TP892631	Burke Family Trust	Agriculture	Electricity and water easements run through the property. No works are proposed over easements. See Certificates of Title.
Electricity Grid Connection	Connection to existing transmission lines/between north and south.				

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**Planning report**  
Muskerry Solar Power Station

Referred to in the PR	Proposed infrastructure	Subject land Lot and DP	Landowner	Existing use	Title restrictions and easements
		4\TP120975	A. Tuohey, J. Tuohey and C. Tuohey	Agriculture	None, see Certificates of Title.
	Onsite substation (option a & b)	8~D\PP3243 5~D\PP3243	Burke Family Trust B. Griffin & G. O'Sullivan	Agriculture	A water easement runs through the property which also accounts for land affected by a notice under Section 10(1) <i>Land Acquisition and Compensation Act 1986</i> . No works are proposed over easements. See Certificates of Title.
	Waterway crossing trenching	Waterway located within: 7B~D\PP3243 4\TP120975	Burke Family Trust A. Tuohey, J. Tuohey and C. Tuohey	Waterway/ Agriculture	None, see Certificates of Title. Permit from North Central CMA
Site access	Direct access via Toolleen Angle Rd	5~D\PP3243	B. Griffin & G. O'Sullivan	Agriculture	Electricity and water easement across the southern section of the property. No works proposed over easements. No other relevant restrictions, see Certificates of Title. Works Within Road Reserve Road Permit from Council
	Direct access via Axedale-Toolleen Rd	2\PS704656	D.V Roney	Agriculture	S173 Agreement AJ472401V affects the parcel. A copy of

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Referred to in the PR	Proposed infrastructure	Subject land Lot and DP	Landowner	Existing use	Title restrictions and easements
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					Works Within Road Reserve Road Permit from Council

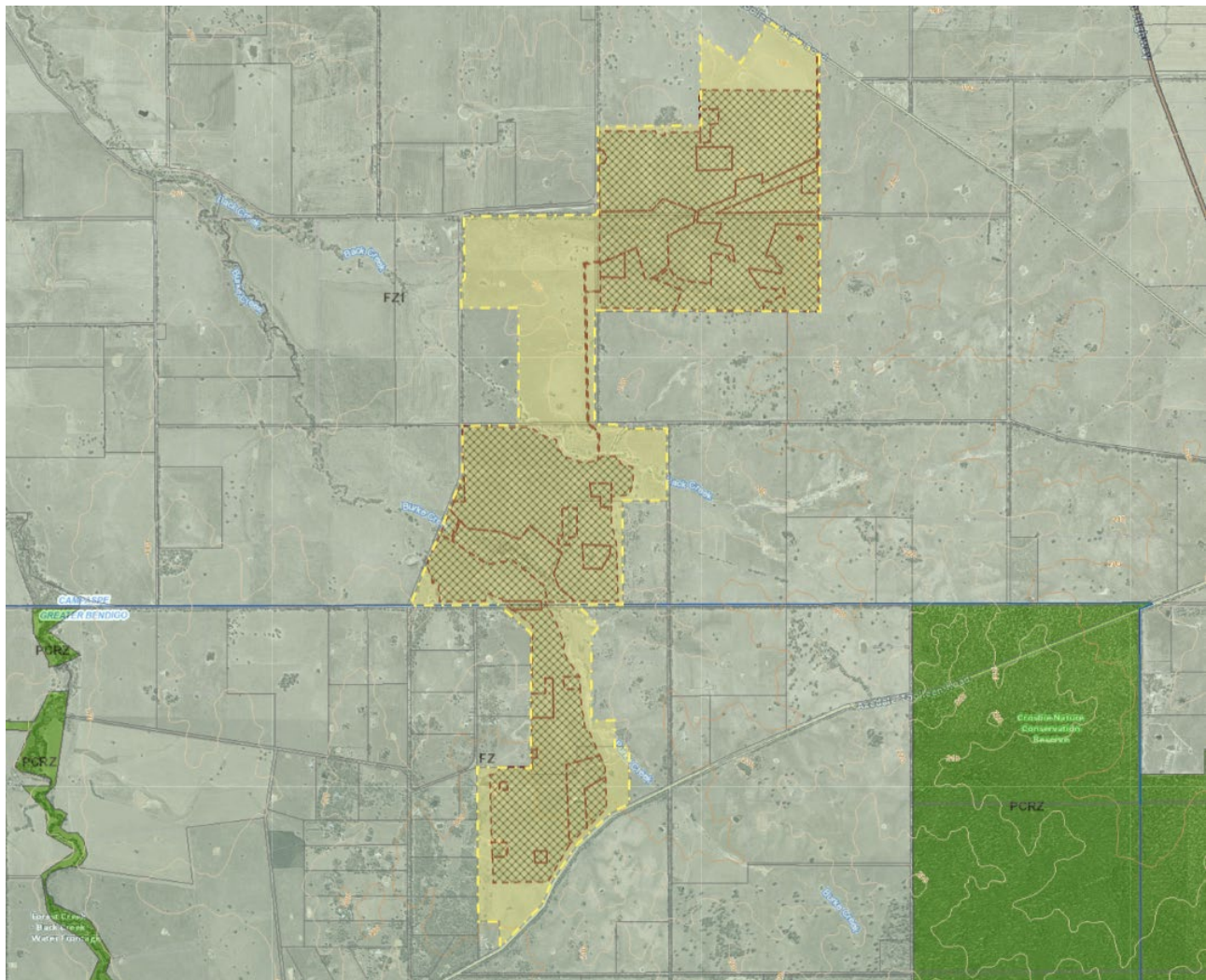


Figure 2-3 Proposal site within the subject land within the Campaspe and Greater Bendigo LGA's (directly impacted land parcels, that this report is seeking the Ministers approval for the solar facility within) (Source: VicPlan, 2022)

### 2.1.3 Existing land use

The proposal site is currently used for agricultural purposes (generally grazing). Farming operations would continue on rural land located outside of the fenced boundary of the proposal. Similar to Edify's existing Gannawarra Solar and Battery Project, located near Kerang, VIC, Edify would also consider the introduction of sheep grazing to occur within the project footprint, subject to the development of appropriate management plans. This 'agrisolar' enterprise supports the historic land use of the property and maximises the value derived from the proposal site. Edify work with stakeholders, such as the local Council, insurers and local agricultural entities to explore the potential for establishing this 'agrisolar' enterprise.

### 2.1.4 Pre-lodgement consultation

Table 2-2 below provides a summary of the consultation that has been undertaken with DELWP for the proposal prior to lodgement of the Planning Permit application.

Table 2-2 Consultation summary table

<b>Method</b>	<b>Result/Proposed action</b>
Introductory meeting with DELWP, regional representatives, etc.	<p>Method: DELWP was notified of the proposal at an introductory meeting held on 24 November 2020. This consultation comprised of the presentation of the proposal, discussion of early background research, constraints assessment results, application, and assessment process.</p> <p>Feedback: Focused on biodiversity and flora and fauna surveys. Initial feedback indicated specialists' studies, i.e. traffic impact assessment, glint and glare etc would be required to support the application.</p> <p>Action: Continue with constraints assessment and relevant assessments to support a planning permit application.</p> <p>Outcome: Significant work has been completed for ecology and heritage to determine site constraints and design to avoid constraints, minimise impacts and determine management measures and offset options. The proponent has engaged specialists to other potential key impacts such as traffic, noise, visual and glint and glare.</p>
Follow up pre-lodgement meeting with DELWP.	Further consultation with DELWP environment staff and planning staff and impact assessment team was carried out over multiple meetings (25 November 2021, 8 December 2021, 1 and 6 June 2022, 7 November 2022) to discuss the iterative avoid and minimise design process and outcomes of additional biodiversity fieldwork.

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## 2.2 The proposal

### 2.2.1 Background and site selection

The original study area was identified and chosen due to the traversing high voltage transmission line and relatively flat landscape, providing good connectivity and efficient construction opportunities and availability of land for utility scale development. The proposal has been designed iteratively to address:

- Site constraints associated with surrounding rural dwellings and the protection of reasonable amenity (setbacks as per the planning scheme have been applied and specialist's reports identified setback areas).
- Ecology of the site (significant vegetation has been avoided and impacts minimised).
- Waterways (buffers have been applied).
- Heritage considerations (a CHMP has been approved).
- Cumulative impacts of the nearby solar farms.

The built form (key elements) on the site would comprise of the following (refer to the proposal plans at:

- Solar infrastructure consisting of 'array blocks' typically of approximately 3MVA and 6MVA.
- BESS, housed in climate-controlled modular or containerised enclosures.
- Site office and car park.
- Access and perimeter tracks.
- Buildings including operations and maintenance.
- High voltage substation.

The solar panel technology utilises semiconductor material designed to absorb and convert sunlight into electricity. The panels would be mounted on tilt trackers (tilt from -55 to +55 degrees) to collect and convert solar energy into electricity. The panels provide energy in the form of direct current, which must be converted to alternative current via a solar inverter. Groups of solar panels are connected to each inverter and the inverters are linked together to collect the energy generated by the solar field. Underground or overhead lines are run from each inverter station to the facility substation where voltage is increased to match the voltage of the transmission network.



Figure 2-4 Solar array example (Source: Edify Energy, 2020)

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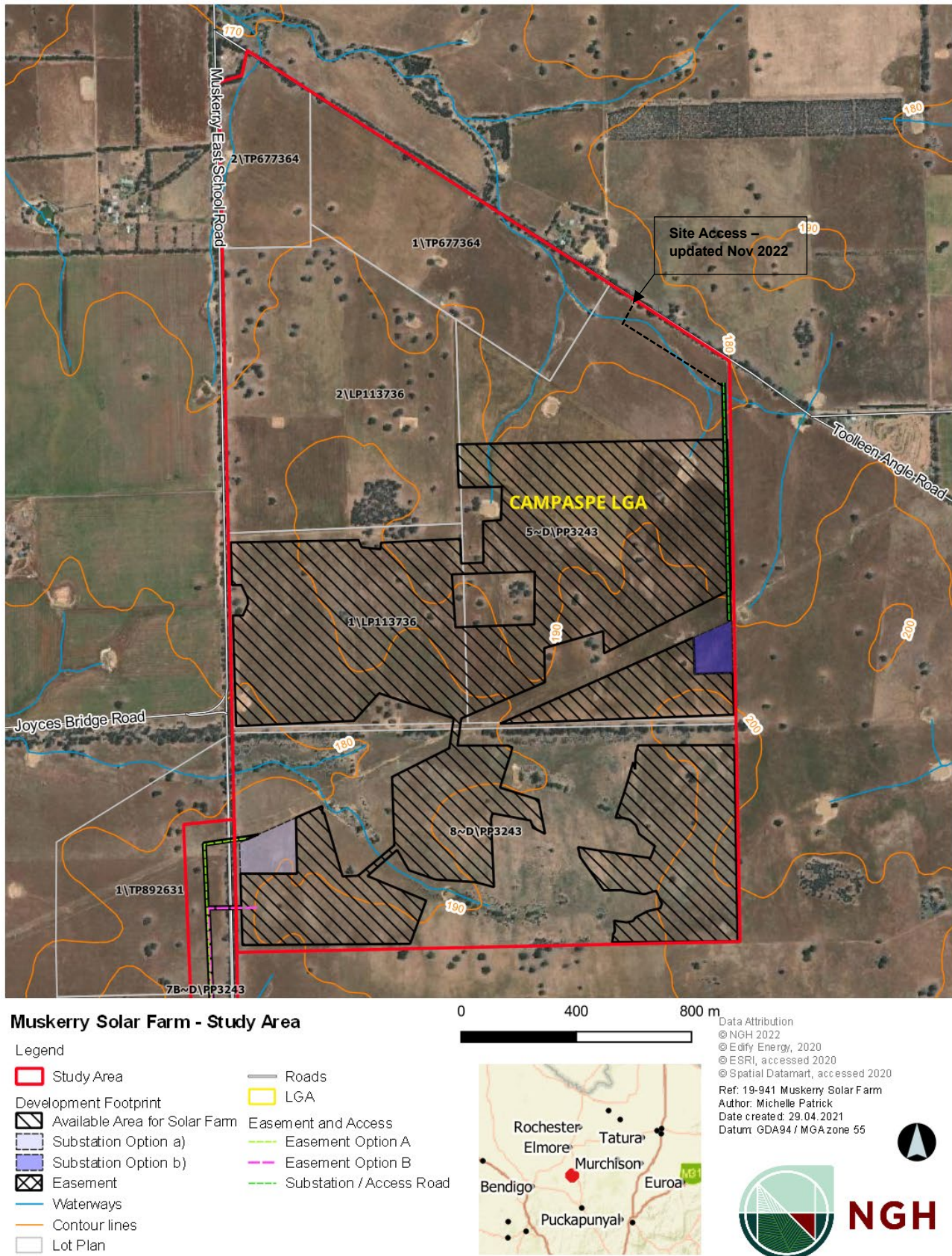


Figure 2-5 Proposal layout - Muskerry Solar Power Station (North)

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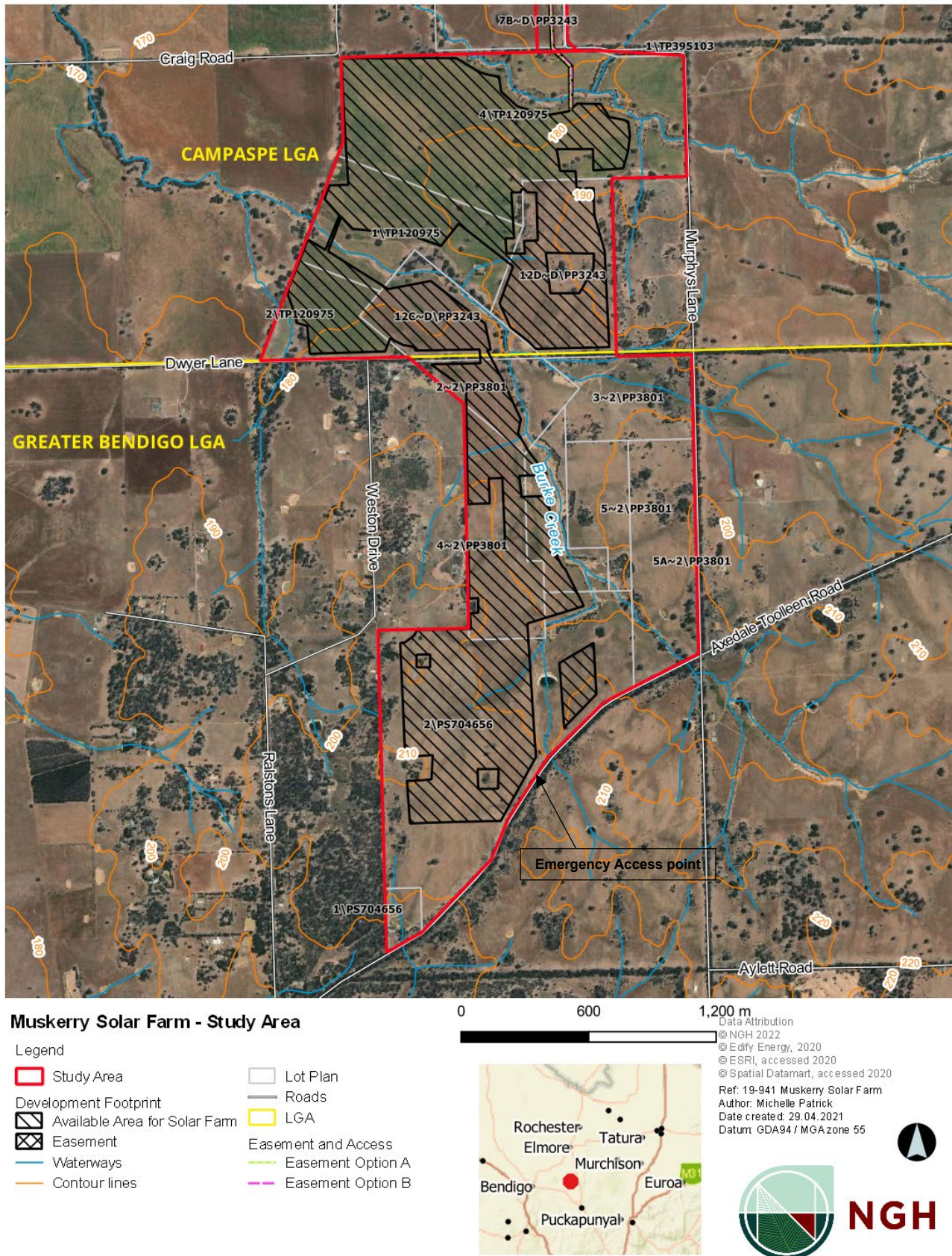


Figure 2-6 Proposal layout - Muskerry Solar Power Station (South)

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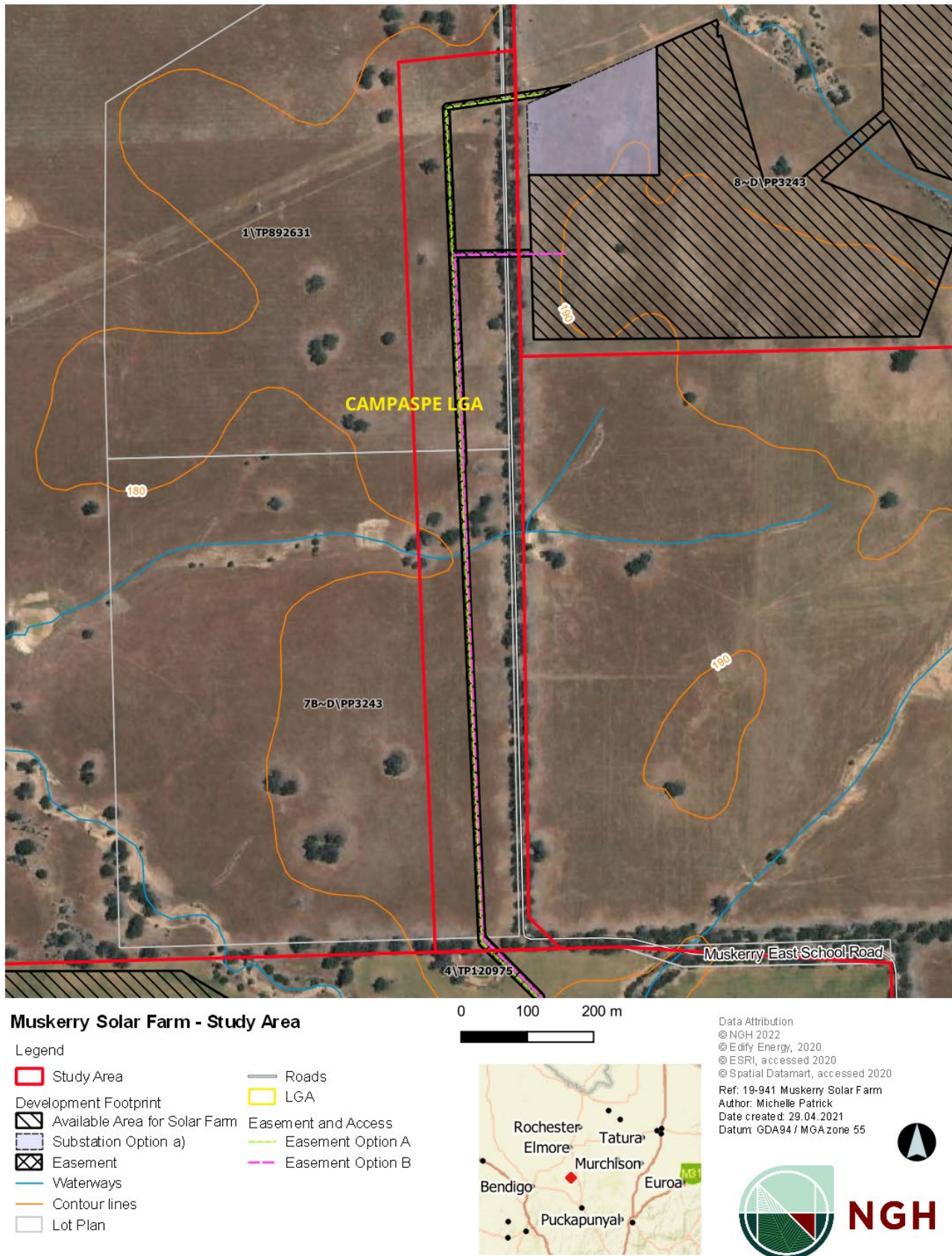


Figure 2-7 Proposal layout - Muskerry Power Station (easement)

The proposal features the incorporation of either a consolidated or a distributed battery system into the facility to allow storage of power on site (refer to Figure 2-8 for example of a consolidated installation), which would likely store sufficient power to enable power to be distributed to the network outside of sunlight hours, during the evening and morning peak times. Exact detail on the size, volume and location of the battery houses are unknown at this time as battery technology is evolving with the size and capacity of the batteries changing at rapid rate. Further information is provided in 2.2.6.



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Figure 2-8 Consolidated battery installation example (Source: Edify Energy, 2020)

## 2.2.2 Muskerry Solar Power Station - general description of the proposal

The proposal involves the construction, operation and decommissioning of a ground-mounted PV solar array.

The proposal includes:

- A change of land use from rural (agriculture) to a renewable (solar) energy facility and utility installation, however 'agrisolar' would be investigated to maximise opportunities for continued agriculture within the proposal site.
- Removal of native vegetation.
- Roadworks (site entry, and road and intersection upgrades).
- Development (construction, operation, and decommissioning) of a solar energy facility and substation (electrical installation).
- Utility installations (battery energy storage system and overhead or underground powerline - network connections from the substation to the existing network).
- Associated buildings and works:
  - Operations buildings
  - Creek crossings
  - Fencing and landscaping
  - Lighting and CCTV.

Approximately 250MW of renewable energy would be generated and supplied directly to the national electricity grid. The proposal would provide enough clean, renewable energy for approximately 93,000 average Victorian homes while displacing approximately 521,000 metric tons

of carbon dioxide annually. It would also assist the Victorian and Commonwealth Governments to meet Australia's renewable energy targets.

The proposed action would consist of solar panels mounted on a frame which tracks the sun to generate energy. The panels would be connected to inverter stations which convert the DC power to AC power, and using integrated transformers step the voltage up to 33kV. A medium voltage AC network would be installed in underground trenches to connect each inverter to a central switchgear. The switchboard is adjacent to the step-up substation, which is owned and operated by the network operator, AusNet. This substation would step up the voltage to 220kV to inject the green energy into the transmission network operated by AusNet. The proposal would contain the following infrastructure:

### 2.2.3 Solar Array Areas

The proposal would consist of a number of solar array areas or blocks comprised of photovoltaic modules arranged in a series of long rows. The modules are mounted on frames which follow the sun to optimise energy generation. The frames are fixed to piles driven into the soil. The rows interconnect to form a single array block of either 3.0MW (AC) or 6MW (AC). In each block there would be a prefabricated, containerised inverter and integrated transformer to convert and step up the voltage level. Electrical connections would also be constructed between the PV arrays, as well as associated monitoring and protection equipment and central inverters via underground or frame secured cabling.



Figure 2-9 Solar arrays (Source: Edify Energy, 2020)

The solar module frames and inverter stations would be installed on piles and sit above ground level. This ensures retention of existing grassland vegetation and habitats in situ with a minimal level of ground disturbance. Regrowth of vegetation would be enabled following temporary disturbance during installation.

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Figure 2-10 Solar arrays and inverter (example). A distributed BESS system would include battery installations alongside inverters as per Appendix A (Source: Edify Energy, 2020)

## 2.2.4 Medium Voltage Reticulation

Each inverter would be connected to the central 33kV switchboard by underground medium voltage cable reticulation. The cables would be installed in trenches not below 1m in depth and typically 1m in width. The excavation management would form part of the CEMP for the proposal. The CEMP would consider the Environment Reference Standards and comply with relevant EPA Acts and guidelines, including but not limited to the *Civil construction, building and demolition guide Publication 1834* (EPA, 2020) and any relevant building controls. The medium voltage switchboard would be connected through a step-up transformer and to the project's substation via an overhead line. Temporary disturbances to vegetation from the underground installation of the cables would rehabilitate naturally.

## 2.2.5 Solar Substation

A high voltage substation would connect the proposal to the national transmission network. The substation footprint would be approximately 100m x 100m. The substation would provide switching and protection of the electrical network and would be fenced separately from the solar arrays for safety reasons. Two substation location options have been assessed as part of the iterative design process. The options are shown in Figure 2-5, as substation Option a) and substation Option b). The final location would be determined with the detailed design. The specialist studies have considered the potential impacts of either location and both would be able to operate continuously (24 hours a day 7 days a week) with minimal traffic, overland flow, visual and acoustic impacts.

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Figure 2-11 Substation under construction (example) (Source: Edify Energy, 2020)

### 2.2.6 Battery Energy Storage System (BESS)

The BESS would have an electricity storage capacity of up to 800MWh (i.e., 200MW power output for four hours) and comprise of with inverters.

The lithium-ion batteries would be modular enclosures or shipping container style enclosures (approximately 12m in length each).

The proposal includes two options for battery location, option A and option B. The final number of units would be determined by the technology chosen, and the layout or clustering of units is dependent on option A or B configuration described below:

#### Option A:

- A typical centralised (AC coupled) system (Figure 2-12) located with the substation.
  - In an AC coupled system, the solar and energy storage units typically have two separate interconnections. That is because the solar and energy storage systems are connected to separate inverters, with the energy storage sited in a centralised location and adjacent to the project's substation.

#### Option B:

- A decentralised (DC coupled) system (Figure 2-13) where the BESS is distributed throughout the solar array.
  - In a DC coupled system, The solar and energy storage are located at the same site and share the same interconnection. In addition, they are connected on the same DC bus and use the same inverter. In a similar manner to most existing solar farms, the shared inverter (power conversion unit) is distributed throughout the array, to enable the solar and energy storage system to be dispatched together as a single facility via a shared inverter. This new distributed design arrangement eliminates the need for one set of inverters, MV switchgear and other balance of plant costs, which reduces equipment costs for the project.

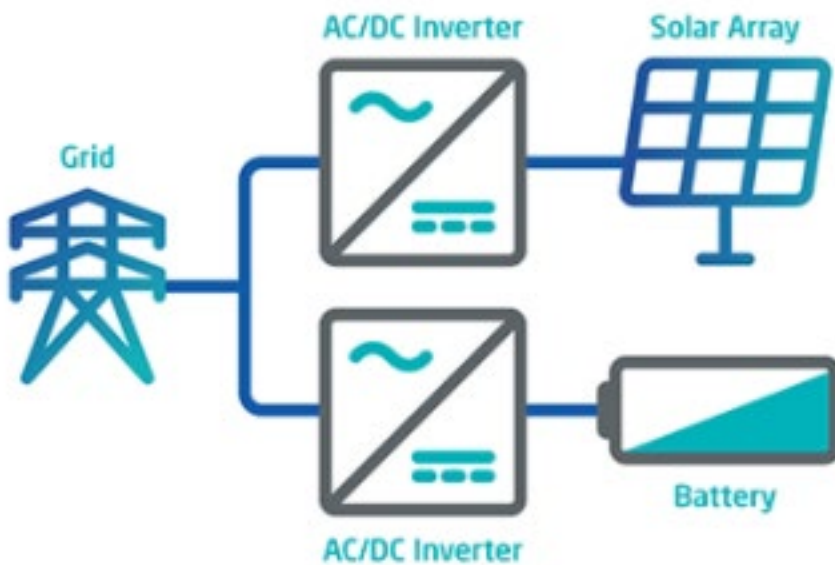


Figure 2-12 AC coupled (centralised BESS) system

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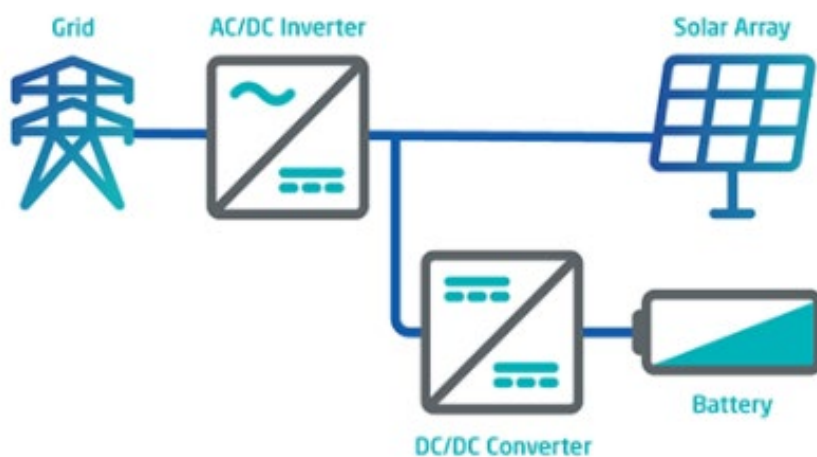


Figure 2-13 DC coupled (decentralised BESS) system

### 2.2.7 Connecting to the electricity transmission network

The proposal would connect into the existing AusNet Bendigo - Fosterville - Shepparton 220kV Line shown in Figure 2-14. This would require a new T into the existing transmission line, the construction of a new step-down substation from 220kV to 33kV. The T connection into the existing transmission line would be owned and operated by the Network Operator, AusNet. This would form part of the National Transmission Network.

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Figure 2-14 Existing 220kV transmission lines (and underground cable) traversing the proposal site

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### 3 Proposal phases description

Detailed components of the proposed action are discussed below in relation to the following proposal phases:

- Pre-mobilisation/early works.
- Construction.
- Commissioning and operation.
- De-commissioning and rehabilitation.

It is important to note that activities within the proposal site, throughout the various phases, would be guided by and comply with the safeguards and minimisation measures detailed in this report that would be incorporated into the future Environmental Management Plans.

#### 3.1 Pre-mobilisation/early works

All management plans would be prepared prior to commencement of each stage including:

- Construction Environment Management Plan
- Operation Environment Management Plan

Pre-mobilisation activities for each area of development would typically occur over a 1-2 month period and include the following as required:

1. Temporary fencing of site offices and facilities for construction.
2. Fencing of areas for development. The fence would be designed to enable movement of fauna across the site post construction.
3. Removal of any woody vegetation within the areas to be developed.
4. Laydown of temporary offices and facilities. These would be temporary prefabricated buildings used for construction projects.

The early site works requirements may include:

- Office facilities.
- Changing rooms.
- Toilets.
- Showers.
- Offices.
- First aid.
- Lunchrooms.
- Parking.
- Lay down area.
- Guard room.

All early site works would be contained to the proposal site.

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## 3.2 Construction

### 3.2.1 Solar infrastructure

Construction activities would include the installation of the PV arrays and supporting infrastructure and BESS. The PV arrays and site office components would largely be built off-site and transported to the site in modulated sections. Construction on-site would be limited to the unloading and joining together of the modulated sections and trenching electrical and control cabling to the electricity grid and control room.

Construction activities are planned to occur during daylight hours only.

The proposal would consist of installing the following components:

- Arrays of solar PV modules arranged in a series of long rows (generally 85m) typically no higher than 4.2m (when modules at full tilt - early am, late pm) above the ground and supported by a steel and/or aluminium mounting structure including framing and piles which are either screwed or driven into the ground.
- A series of prefabricated, containerised inverters distributed throughout the PV arrays.
- Electrical connections between PV arrays, associated monitoring and protection equipment, and central inverters via underground or frame secured cabling, BESS components (option A or option B).
- A tracker actuation system.
- Network connection to connect the proposal to the high voltage power lines within the site via an overhead or trenched transmission line from the proposed substation, including a main power transformer, switchgear, protection, metering and communications equipment.

Construction activities for the PV arrays and their indicative timeframes (there may be overlap in timing) would include:

- Pile driving or screwing mounting pylons (~4 months).
- Trenching or underground cabling connecting PV (~2 months).
- Mounting pre constructed PV modules (~4 months)
- Network interconnection (~1 month).
- Establishing revegetation as screening (~1-2 years).

To facilitate the future operational and maintenance activities on site the following infrastructure would be constructed:

- Site office and operations and maintenance facilities.
- Site entry road, internal access tracks and car park.
- Site fencing and associated security equipment.

Further details relating to construction of this infrastructure are provided below.

### 3.2.2 Site fencing and security

The whole site would be secured with appropriate fencing and lockable gates would be placed at the main entrance, providing restricted access. CCTV and lighting would be installed within the site. Lighting would be consistent with the relevant Australian Standards for the control of obtrusive

effects of outdoor lighting and would generally be limited to areas surrounding the construction buildings.

### 3.2.3 Landscaping

Landscaping would be established and fenced off from construction works. Landscaping would be as per the landscape plan, refer to the plan in Appendix G.

### 3.2.4 Operations and Maintenance Building

The building would be a prefabricated design measuring approximately 8m by 10m and would be single storey. The facility would provide a working area for staff and amenities and may include:

- Office.
- Toilet.
- Kitchen.
- First Aid area.
- Meeting room.
- Reception area.

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### 3.2.5 Proposal site access

Construction and operational site access for the proposal would be provided from Toolleen Angle Road, see Figure 2-5 and Figure 3-1. The access from Toolleen Angle Road would be used during construction and operation and would be suitable for all vehicles including heavy and oversized vehicles. Emergency access (to meet CFA requirements) would be provided from Axedale Toolleen Road, see Figure 2-6.

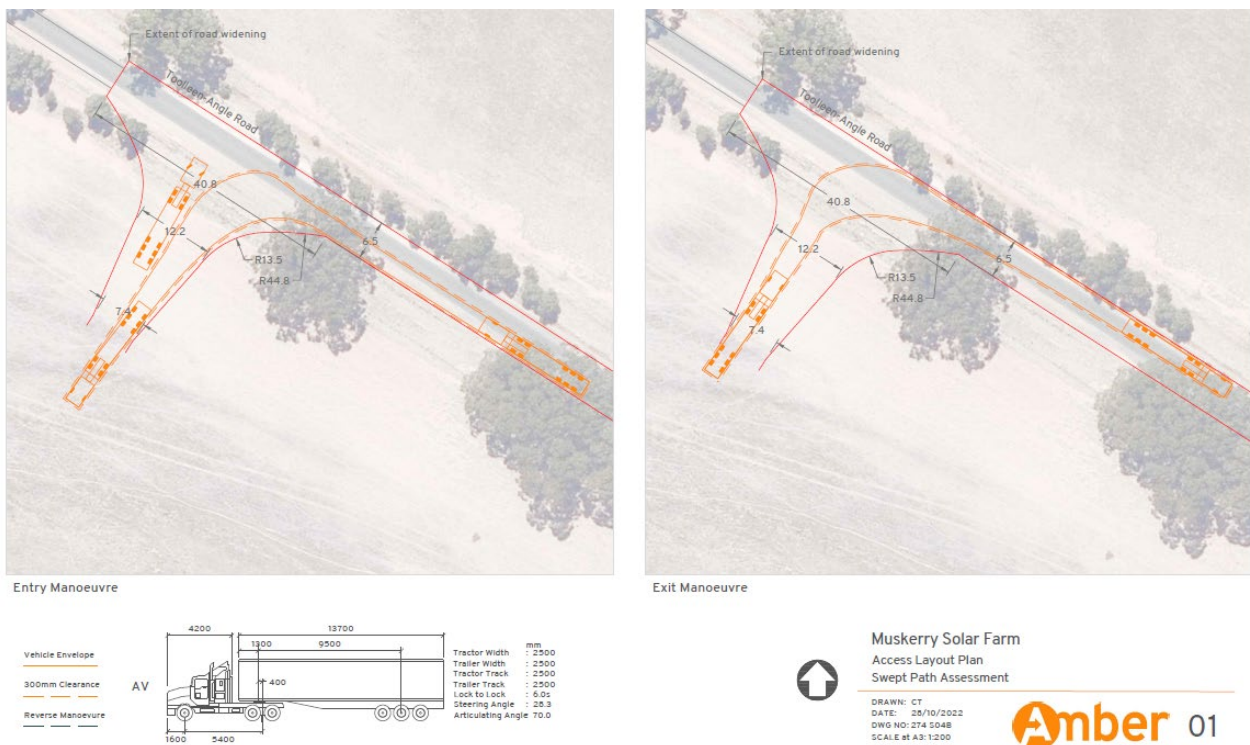


Figure 3-1 Location of proposed site access (construction and operation) (AMBER, 2022)

## Haulage route

Melbourne would be the main port of entry for much of the equipment, with the remainder being sourced locally or interstate.

Road transport is the preferred option for the delivery of construction infrastructure, as opposed to rail. It is expected that the haulage route for most vehicles, including heavy and over-dimensional vehicles during construction would be directly via the Northern Highway (B75), then to the site via Toolleen Angle Road. The proposed haulage route is an approved 19m B-double route.

## Intersection upgrade and road widening

The proposed intersection upgrade to the intersection of the Northern Highway and Toolleen Angle Road was developed in consultation with relevant roads authorities (Department of Transport, the City of Greater Bendigo Council and Campaspe Shire Council) and based on criteria within the *Austrroads Guide to Road Design*. The proposal requires basic rural road turn treatments (BAL and BAR treatments), see Figure 3-2 allowing for turning of larger vehicles and passing of turning vehicles. Toolleen Angle Road is 6.5m wide and narrows to a 3.5m wide road with a 1.5m shoulder either side. The proposal requires sealing of the road to create a 6.5m wide road up to the proposal site entry.

All works are proposed within the existing road and gravel road reserve to avoid vegetation impacts.

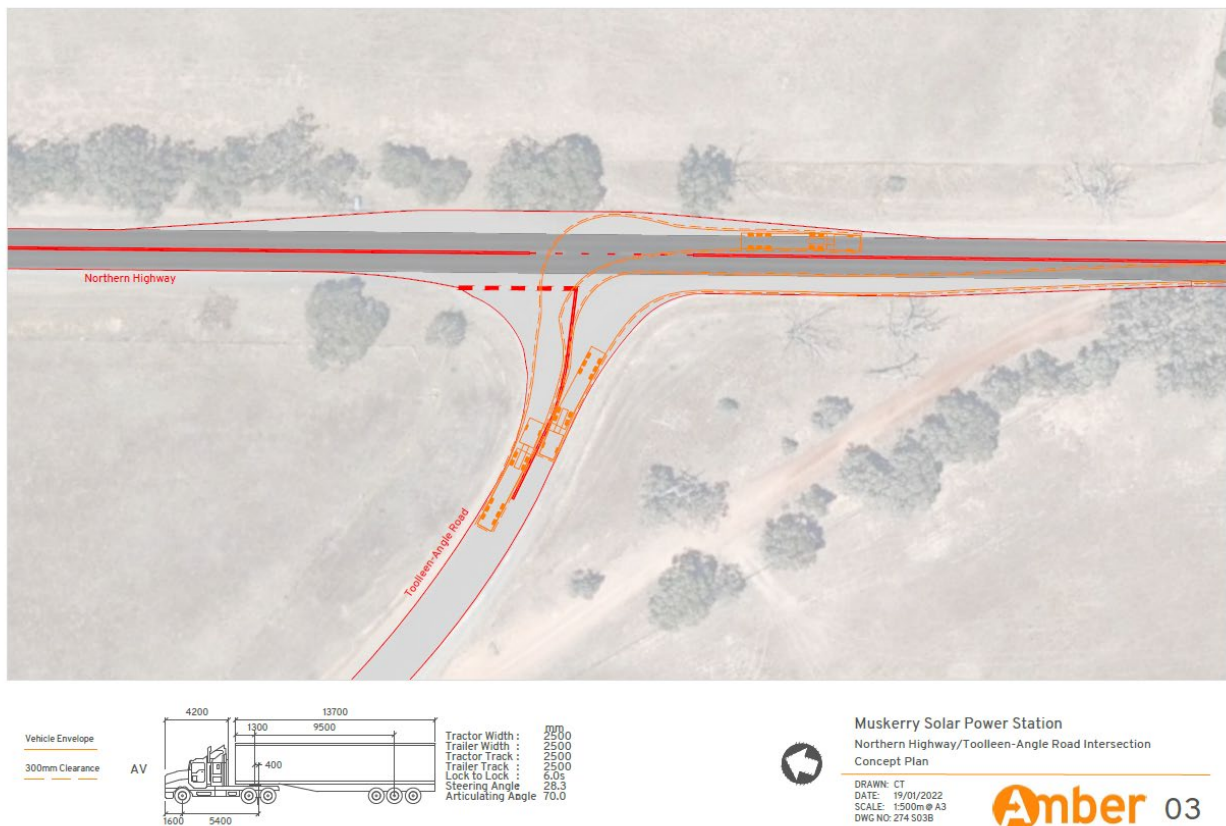


Figure 3-2 Concept Diagram of proposed intersection upgrade (AMBER, 2022)

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Planning report  
Muskerry Solar Power Station

## Traffic generation and peak hour movements

The average traffic generated is expected to be 70 heavy and 64 light vehicle movements per day. Peak hour traffic movements, existing and proposed during construction, are shown in Table 3-1.

Table 3-1 Traffic volumes for the construction of the proposal (AMBER, 2022)

Road	Existing Peak Hour Traffic Volume	Expected Peak Hour Traffic Volume
Northern Highway	381 vph	389 vph
Muskerry East School Road	20 vph	52 vph
Toolleen-Angle Road	20 vph	60 vph

During peak construction, it is anticipated that up to 350 site personnel would be required to undertake the works. A shuttle bus system would be implemented to transport personnel to the site. The combined increase in traffic generated by the site and these projects is expected to have a minimal cumulative impact on the road network in the surrounding area.

### 3.2.6 Internal roads

A number of internal access roads would connect with the site entry to the various work fronts for construction and materials. These roads are expected to be unsealed, single to dual vehicle 4m minimum width and include areas for manoeuvring. They would be located entirely within the mapped proposal site and would be designed to meet bushfire access requirements. The actual locations of the roads would be determined during the final detailed design phase of the proposal and would be guided by array areas, inverter and BESS locations. Internal access tracks would require some waterway crossings. The proposal would include a perimeter road and would also incorporate passing bays at least every 600 metres, with a length of twenty (20) metres and have a minimum trafficable width of six (6) metres.

The site access road/s and all internal tracks would be maintained throughout the construction and operation of the proposal. If required, water trucks would be used to suppress dust on unsealed access roads and tracks during construction. Additional stabilising techniques and/or environmentally acceptable dust control would also be applied if required to suppress dust.

### 3.2.7 Parking

Parking for staff and visitors would be provided within the laydown areas.

### 3.2.8 Soil and stormwater management

There are no major earthworks anticipated for the proposal and as a result there would be no significant changes to the drainage regime of the site. The soil and stormwater management for the proposal would be designed and maintained in accordance with the Australian Rainfall and Runoff Guidelines (Geoscience Australia, 2019) and Victorian EPA guidelines including:

- Publication 1894, Manage soil disturbance (EPA, 2020a).
- Publication 1893, Use a treatment train (multiple control) approach (EPA, 2020b).
- Publication 1895, Manage stockpiles (EPA, 2020c).
- Publication 1897, Manage truck and other vehicle movement (EPA, 2020d).
- publication 1896, Manage how you work within or adjacent to waterways (EPA, 2020e).

A soil and water management plan would be included in the CEMP for the proposal.

### 3.2.9 Labour, machinery and equipment

It is anticipated that up to 350 construction staff comprising of supervisors, tradesmen and labourers would be engaged to complete the work during the peak construction phase (6 – 9 months). Up to 350 workers is a maximum estimation, the amount of workers required for proposal would likely be less. Every effort would be made to hire staff locally.

Staff would be accommodated in Bendigo or nearby surrounding areas.

Plant to be used during construction would likely include:

- Small pile driving rig.
- Crane.
- Drum roller.
- Padfoot roller.
- Wheeled loader.
- Dump truck.
- 30t excavator.
- Grader.
- Chain trencher.
- Water truck.
- Telehandler.
- Forklift.

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### 3.2.10 Hours of operation during construction

During the construction phase of the proposal, work would be undertaken during the following hours:

- Monday – Friday: 7am – 6pm
- Saturday: 8am – 1pm

There may be a need to work outside these hours, for example:

- To avoid disrupting traffic when delivering bulky equipment.
- To avoid taking outages of existing high voltage transmission lines during periods of high load.
- To undertake emergency work to avoid serious injury or loss of property.

Any construction outside of these standard construction hours, if required, would only be undertaken with prior approval from relevant authorities.

## 3.3 Commissioning and operation

The commissioning phase of the proposal would involve testing of the PV system prior to connection to network. It is anticipated that this would take approximately 4 months for each area to be developed.

Activities undertaken during operation would include:

- Solar panel maintenance.
- Monitoring the performance of the proposal.
- Inspection of the installation.
- Routine preventative maintenance.
- Emergency repair response (24 hours).
- Site security response (24 hours).
- Vegetation management within the proposal site in accordance with the fire management and biodiversity management plans.

### 3.3.1 Operating hours and personnel

Once in operation, the normal operating hours of the proposal would be during daylight hours between the hours of sunrise to sunset, i.e. 7:00 am to 7:00 pm. The BESS would have ability to run at any time including during the night.

Low levels of noise would be expected during operation based on the proposed setback commitments for location of certain infrastructure to minimise noise impacts. Refer to the Noise Assessment at Appendix E.

A total of 10 equivalent full time staff would be employed onsite when the proposal is operational. Associated work would be undertaken during the standard working hours of:

- Monday – Friday: 7am – 6pm
- Saturday: 8am – 1pm

Work would only be undertaken outside of these hours in an emergency and would be kept to a minimum.

During the life of the facility, it may be necessary to engage contract staff to undertake specific major tasks at which time there could be greater numbers of people onsite. Such work would most likely relate to the replacement/refurbishment of electrical, PV or battery equipment.

### 3.3.2 Transport, access and parking

The travel demand during the operation phase of the proposal is anticipated to be significantly less than the construction phase. It is estimated that the daily peak travel demand during operation would be approximately 10 vehicle two-way movements a day (generally less unless maintenance is being undertaken). Operation access would be via the site access proposed from Toolleen Angle Road. It is anticipated that the staff would drive light vehicles to the site. Parking would be provided within the fenced area of the site with direct access to the O&M building and amenities.

A traffic management plan would be included in the OEMP for the proposal and implemented for any emergency works or as required for maintenance.

### 3.3.3 Lighting and CCTV

Under normal circumstances, there would be no night lighting located on site.

External lighting would be provided around the buildings, and in the high voltage substation but they would only be used on the rare occasions that staff are working on the site during the hours of darkness.

There may be some security lighting at critical locations around the perimeter of the site, but these would only be activated when the automatic security system senses an unauthorised site entry. Task lighting would be provided at PCU's.

CCTV security cameras would be located at the entrance gate and around the substation and battery storage, and O&M building, facilities and office areas.

### 3.3.4 Water supply

As there is no reticulated water to site, any water use would need to be brought on to the site or captured on site. Water tanks may be connected to the O&M building. Prior to construction commencing, the proponent, or their contractors as the 'duty holder' will engage with Campaspe Shire Council and Greater Bendigo City Council regarding potential water sources within the region that can supply the project's water requirements.

Cleaning materials and spare parts would be made available on site for use by the maintenance staff. Water may also be required for routine cleaning of panels and potentially for dust suppression on site. This activity would likely take place once per annum based upon current Australian best practice. Panel cleaning may be required during drought conditions. As such, additional panel cleaning may also be required on occasion. This may require a small mobile water tanker, although dry techniques are available and will be investigated further.

Establishment of proposed landscape screening would also require water access.

During construction, water would be trucked in, and wastewater would be pumped out by engaging the services of a local provider.

### 3.3.5 Sewerage

Solid waste and putrescible waste disposal would be by the regular service of a licensed waste management contractor. Site storage of waste would be in approved waste containers provided by the contractor.

### 3.3.6 Soil and stormwater management

There are no major earthworks anticipated for the proposal and as a result there would be no significant changes to the drainage regime of the site. The operational management plan would include monitoring of run-off from array areas and relevant maintenance, including installation of sediment and erosion controls as required and revegetation of disturbed areas.

### 3.3.7 Vegetation management

Regular vegetation maintenance would occur within the proposal site throughout the operational phase to control re-emerging woody vegetation and weeds and to maintain low fuel loads to reduce risks associated with bushfire.

Vegetation maintenance may include co-location of stock (sheep).

### 3.3.8 Emergency management

Emergency management, including bushfire and fire would be undertaken in accordance with the Emergency and Fire Management Plan/s that would be developed prior to construction in

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consultation with the Country Fire Authority (CFA) and local Fire Brigade. Asset Protection Zones (defendable space) and other protection measures would be provided for the proposal.

### 3.3.9 Refurbishment and upgrading

It is estimated that the solar equipment would have a minimum life of 30 years and the benefits of refurbishing the equipment would be considered closer to this time.

It is anticipated that the batteries that would be used in energy storage system would have a warranted life of 20 years. Following this, it is anticipated that they would need to be replaced at least once during operation of the proposal.

## 3.4 Decommissioning and rehabilitation

Upon decommissioning of the proposal, the site would be subject to certain rehabilitation regimes to restore the land to a standard appropriate for rural use. Restoration of the disturbed areas within the proposal site would include removal of all above ground structures and footings and capping of services.

The intention is to operate the facility for a minimum period of 30 years and if viable at the end of the 30-year period look at replacing plant to extend the life for a further 25–30 years. In the event the plant is decommissioned, the works would be managed in accordance with the EMP that would be developed for the proposal.

The expected life of the proposal is a minimum of 30 years with the exception of the energy storage equipment which, because of the battery technology, is expected to have a life of approximately 20 years. It is anticipated that after 20 years the batteries would be replaced. Similarly, after 30 years, other infrastructure may be refurbished to continue operations or be decommissioned.

When the proposal is no longer viable, the proposal would be dismantled. Components would be reused for other purposes with lower power demands and duty cycles, refurbished, recycled, or disposed of offsite in accordance with Victorian environment protection waste management requirements.

A Decommissioning EMP (DEMP) would be prepared in consultation with relevant agencies as needed and would incorporate a Decommissioning Waste Minimisation and Management Plan to facilitate the recycling and reuse of infrastructure components and materials. The DEMP would be prepared in accordance with relevant government guidance and reuse and recycle principles.

To avoid disposal of used materials/components, the DEMP may need to include measures such as shipping used materials, not recyclable in Australia, to overseas sites for recycling and reuse. Items that cannot be recycled or reused would be disposed of at licenced facilities within Australia where appropriate.

A National approach is being considered by the government to address e-waste and specifically solar waste (Sustainability Victoria, 2021), the DEMP would be consistent with any National and Victorian approach developed and would be adaptable to utilise emerging technologies and processes as they evolve.

A DEMP with an indicative timeline would be prepared in consultation with relevant agencies and DELWP as required, prior to the commencement of decommissioning. A Traffic Management Plan

would be prepared prior to decommissioning commencing. Traffic over the decommissioning period would be similar to the standard construction period.

The objective of this stage is to return the site to its existing land capability, for continued agricultural or other compatible land use options. The impacts of the proposal area are considered to be largely reversible, except for the proposed removal of large trees and proposed impacts to Aboriginal cultural heritage.

## 3.5 Indicative timeline

The earliest proposed construction timing, pending all relevant approvals, appointment of contractors and environmental planning requirements, is 2024.

Table 3-2 Indicative timeline.

Phase	Approximate commencement	Approximate duration
Construction	2024	12 - 18 months
Operation	2025 - 2026	30 years
Decommissioning	2055 or later	9 months

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## 3.6. Environmental Management Plans (EMP)

An EMP and relevant sub plans would be provided to DELWP for approval prior to construction commencing.

The EMP's would provide contingent requirements for ongoing environmental response planning to key issues. This approach allows planning and management techniques to be mindful of worst-case scenarios and representative impacts as response strategies are developed.

The EMP's would cover, the three key phases and EMP goals are:

- Construction – Minimising pollution, waste generation and other potential environmental impacts during construction stages of the proposal.
- Operations – Minimising potential environmental impacts during operational stages, managing site interface issues, and maintaining good neighbour relations.
- Decommissioning – Removal of site facilities. Minimising legacy issues and arrangements to make-good with any proposed decommissioning and rehabilitation.

The proposal includes commitment to preparing the EMP's for the proposal is listed in Table 3-3.

Table 3-3 General safeguards and minimisation measures

No.	Safeguards and minimisation measures	C	O	D
G1	Prior to the commencement of each stage (construction, operation, and decommissioning) the Environmental Management Plan (EMP) for that Stage would be prepared and	C	O	D

No.	Safeguards and minimisation measures	C	O	D
	submitted for approval from DELWP and/or relevant agencies. Each stage would fully implement relevant approved EMP's.			

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## **4 Planning and policy provisions**

### **4.1 Campaspe and Greater Bendigo Planning Schemes**

The proposal is located within the Campaspe and Greater Bendigo LGA's and is subject to the Campaspe Planning Scheme and Greater Bendigo Planning Scheme (the schemes). A separate planning permit will be required under each local government area (two separate planning permits). Refer to Figure 2-1 for the location plan showing the proposal and LGA boundaries.

#### **4.1.1 Land use permit triggers – Permit required**

##### **Campaspe LGA**

- Clause 35.07 Farming Zone – Use and development for a solar energy facility.
- Clause 35.07 Farming Zone – Use and development for a utility installation.
- Clause 35.07 Farming Zone – Earthworks specified in a schedule to this zone, if on land specified in a schedule. Earthworks which change the rate of flow or the discharge point of water across a property boundary – All land.
- Clause 52.17 Removal of native vegetation.
- Clause 52.05 Signs – display of business identification signage

Matters not a trigger however has been considered in this report:

- Clause 52.06 Car Parking – no permit trigger applies however this application seeks the consent of the responsible authority as per 52.06-6.

##### **Greater Bendigo**

- Clause 35.07 Farming Zone – Use and development for a solar energy facility.
- Clause 35.07 Farming Zone – Use and development for a utility installation.
- Clause 35.07 Farming Zone – Earthworks specified in a schedule to this zone, if on land specified in a schedule. Earthworks which change the rate of flow or the discharge point of water across a property boundary – All land.
- Clause 52.17 Removal of native vegetation.
- Clause 52.05 Signs – display of business identification signage
- Clause 42.01 Environmental Significance Overlay (ESO1) – There are no proposed vegetation impacts within land subject to the ESO1, however building works may be located within this zone.

Matters not a trigger however has been considered in this report:

- Clause 42.02 Vegetation Protection Overlay (VPO3) – The proposal would utilise an existing farm access for the emergency access in the south of the site. This would be located within the VPO3. There are no proposed impacts to vegetation within the Axedale-Toolleen Road subject to the VPO, as such, there is no permit trigger for this overlay.
- Clause 44.06 – Bushfire Management Overlay – The proposal is not a development type listed and therefore no permit trigger applies.

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## 4.1.2 Zone and overlay provisions

### Clause 35.07 Farming zone

The proposal site is within the Farming Zone (FZ and FZ1) as shown in Figure 4-1. The purposes of the FZ are:

- To implement the Municipal Planning Strategy and the Planning Policy Framework.
- To provide for the use of land for agriculture.
- To encourage the retention of productive agricultural land.
- To ensure that non-agricultural uses, including dwellings, do not adversely affect the use of land for agriculture.
- To encourage the retention of employment and population to support rural communities.
- To encourage use and development of land based on comprehensive and sustainable land management practices and infrastructure provision.
- To provide for the use and development of land for the specific purposes identified in a schedule to this zone.

The proposal would be consistent with the relevant purposes specifically, to ensure compatibility and minimise impacts on surrounding agricultural land (and associated dwellings) during construction, operation and post remediation. The proposal would create additional employment in the locality and support the landowners with additional income. The proposal includes measures and safeguards to avoid, minimise impacts and protect the natural environment and systems.

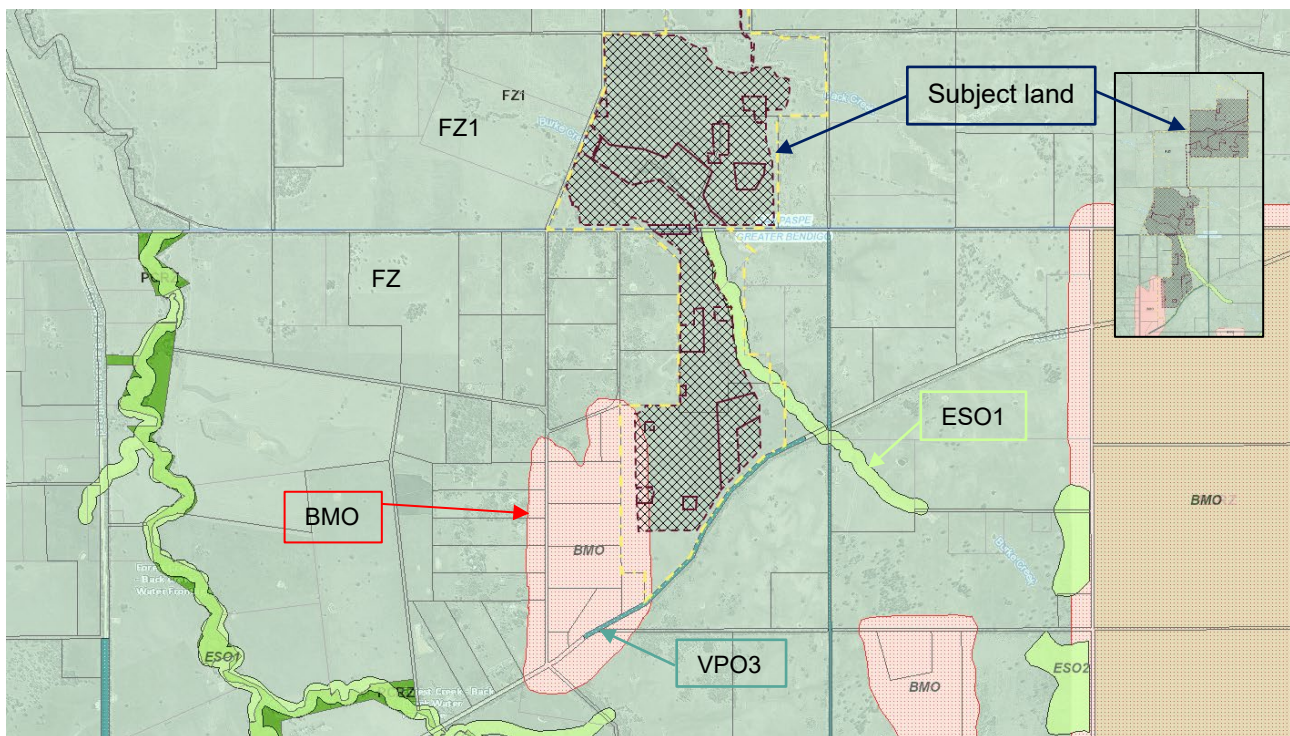


Figure 4-1 Zoning and Environmental overlays (no overlays in the north) (VicPlan, 2022)

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## Proposed land use

The proposal would be defined as **solar energy facility** and associated **utility installation**.

The proposal (arrays and associated works) would be a:

- **Solar energy facility** meaning *land used to generate electricity from solar energy using ground-mounted photovoltaic and thermal technology, where the primary role is to export power to the electricity network.*

The BESS, substation and overhead line connected to the electricity network would be a:

- **Utility installation** meaning land used: a) for telecommunications; b) to transmit or distribute gas or oil; c) to transmit, distribute or store power; d) to collect, treat, transmit, store, or distribute water; or e) to collect, treat, or dispose of storm or flood water, sewage, or sillage. It includes any associated flow measurement device or a structure to gauge waterway flow.

Under the FZ Table of uses, the proposal requires a Planning Permit and must meet Clause 53.13, refer to section 4.1.3 for discussion.

## Clause 42.01 Environmental Significance Overlay Schedule 1 (ESO1)

The land is subject to the Environmental Significance Overlay Schedule 1 (ESO1) under the Greater Bendigo Planning Scheme, as shown in Figure 4-1.

ESO1 relates to watercourse protection. A permit is required for any works within the area mapped by this overlay including removal of native vegetation. No native vegetation removal is proposed within the area mapped as ESO1. As such, this report considers the decision guidelines under Clause 42.01 (6.0).

The application is accompanied by plans and mapping showing:

- The proposed disturbance area and types of works associated with the proposal.
- The total extent of vegetation on the property and the extent of native vegetation proposed to be removed, lopped, or destroyed.

The application also includes an Ecological Assessment (NGH, 2022) prepared by NGH's ecologists. The report describes the steps taken to avoid and minimise the removal of native vegetation. The report findings and proposed safeguards and minimisation measures are summarised in section 5.2 of this PR and provided in full at Appendix B. Specific measures to avoid impacts to the creek include:

- The EMP's for the site would include relevant vegetation management plans including establishment of no-go areas within the site. An erosion and sediment control (soil and water management) plan would be prepared in conjunction with the final design and implemented, and spill management procedures would be implemented.

## Clause 42.02 Vegetation Protection Overlay Schedule 3 (VPO3)

Under the Greater Bendigo Planning Scheme, the Axedale-Toolleen Road is mapped with the Vegetation Protection Overlay (VPO3) adjacent to the proposal sites southern boundary. An emergency access would be provided to the Axedale-Toolleen Road.

VPO3 relates to roadside remnant vegetation. No vegetation would be impacted. An existing access and farm gate location would be used for the emergency access.

The application is accompanied by plans and mapping showing:

- The proposed disturbance area and types of works associated with the proposal.
- The total extent of vegetation on the property and the extent of native vegetation proposed to be removed, lopped, or destroyed.

The application also includes an Ecological Assessment (NGH, 2022) prepared by NGH's qualified ecologists. The report describes the steps taken to avoid and minimise the removal of native vegetation. The report findings and proposed safeguards and minimisation measures are summarised in section 5.2 of this PR and provided in full at Appendix B. Specific measures to avoid impacts to the remnant roadside vegetation include:

- The EMP's for the site would include relevant vegetation management plans including establishment of no-go areas within the road reserve.

## **Clause 44.06 Bushfire Management Overlay (BMO)**

Part of the subject land located within the Greater Bendigo LGA is subject to the Bushfire Management Overlay (BMO), refer to Figure 4-1. Clause 44.06-2 states the permit triggers for developments subject to a BMO. The proposal is not a development type listed and therefore this Clause does not apply to the proposal.

The CFA Guidelines, however, have been considered as part of this application. Clause 13.02-1S Bushfire Planning has also been considered. A bushfire assessment has also been prepared to confirm the proposal site is suitable for the proposal, and that the site provides for design options within the development footprint to enable a final design that minimises risk to life and property. Refer to section 5.3 summarising the bushfire assessment and full report at Appendix C.

## **4.1.3 Particular provisions**

### **Clause 52.05 Signs**

Minimal business identification and site safety and directional signage would be installed at the site entry. Signs would be of a size similar to business/biosecurity type signs seen on farm gates to be compatible with the amenity and visual appearance of the rural area. Business identification signs would not exceed a maximum area of 3sqm.

### **Clause 52.06 Car parking**

The proposal is not a use of land specified in Table 1 of Clause 52.06-6 *Number of car parking spaces required for other uses*. The proposed informal parking within the fenced site area is considered suitable to cater to the low operational staff numbers (up to 10) and minimal onsite work during operation. No parking spaces would be marked out on site. Parking areas would be determined based on safe distances from electrical installations and managed by the site operator with details included in the operational EMP.

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## Clause 52.17 Native vegetation

The application includes an Ecology Report prepared by NGH's ecologists. The report describes the steps taken to avoid and minimise the removal of native vegetation. The report findings and proposed safeguards and minimisation measures are summarised in section 5.2 of this PR and provided in full at Appendix B.

## Clause 53.02-4 Bushfire Protection Objectives

The subject land is identified as a bushfire prone area (BPA). The proposal is not a development type subject to Clause 44.06 and therefore this Clause does not apply to the proposal. However, the CFA Guidelines (CFA, 2022) and requirements for fire protection measures have been considered, refer to Section 4.2 and 5.3 of this PR and the Bushfire Assessment report provided at Appendix C.

## Clause 53.13 Renewable Energy Facility (Other Than Wind Energy Facility)

This PR and supporting documents include site and context analysis and design response. The application includes:

- Plans, details, maps and description of the proposal including construction, operation and decommissioning information
- An ecology report to address vegetation removal.
- Potential for impacts to Aboriginal Heritage have been addressed in an approved CHMP.
- Measures to avoid, minimise and control potential amenity impacts including visual analysis, land use compatibility.
- Consideration of increases in light spill, noise, traffic, flooding, electromagnetic fields, and heat island effect.

The proposal is consistent with Clause 53.13 as it is considered compatible with the use of the surrounding land having the purpose of agriculture and associated rural dwellings. The proposal site is suitable for co-location solar and agriculture during operation. The proposal includes decommissioning and would return the proposal site to a state suitable for agriculture. The location is suitable for the proposal refer to the justification provided in Section 5.1 of this PR.

### 4.1.4 Referral triggers

Agency	Referral or Notice
DELWP Environment (Secretary to DELWP)	Recommending referral due to proposed removal of native vegetation under the detailed assessment pathway of both Campaspe and Greater Bendigo PS under Clause 52.17 and 66.02-2.  Also, for ESO1 under Clause 42.01 of the Greater Bendigo PS.
Country Fire Authority	Notice, as a permit is not triggered by Clause 44.06.

Agency	Referral or Notice
Ausnet (relevant electricity transmission authority)	Determining referral authority under Clause 66.02-7 for works within 60 metres of a major electricity transmission line (220 Kilovolts or more).
Victorian WorkCover Authority	Determining referral authority under Clause 66.02-7 for fire protection quantity of lithium batteries exceeding 20 tonnes.

## 4.1.5 Planning Policy Framework

This section outlines the policies of the scheme that are of particular relevance to this application.

This includes the Municipal Strategic Statement and Local Planning Policies that are to be integrated into a combined Planning Policy Framework consistent with all Victorian Planning Schemes. Accordingly, the policies are grouped thematically.

### Municipal Strategic Statement (MSS)

Clause 21.01-4 outlines the Campaspe Shire Council's vision to be *a vibrant place to live, grow and visit, with a thriving, diverse and healthy lifestyle*, with the land use objective of *sustainable use of land, which encourages population growth whilst ensuring the viability of farming and industry, and development which consolidates and respects the historical built environment*. The proposal would be consistent with the vision and objective for the Shire. Clause 21.02 of the MSS sets out the key elements of the Campaspe Shire Strategic Framework Plan. The map identifies the area near the proposal site as an area to promote intensive animal industries. The proposal would not conflict with any development of this type on the subject or surrounding land.

Clause 02.02 outlines the Greater Bendigo's Council's vision to be the *World's Most Liveable Community*. The proposal is consistent with the following aims of Council:

- *Effectively respond to new and emerging issues including adaptation to climate change.*
- *Be increasingly self-sufficient in energy generation, food and water production, and generally have a lighter impact on the environment.*
- *Have a strong economy that supports job growth, attracts visitors, and is diversified.*
- *Plan and facilitate development and infrastructure projects that increase liveability and pride of place.*

### Environmental and landscape values

These clauses focus on protecting ecological systems, biodiversity, and identified environments or landscapes.

#### Protection of biodiversity

Clause 12.01-S has the objective to assist the protection and conservation of Victoria's biodiversity.

*Strategies:*

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- Use biodiversity information to identify important areas of biodiversity, including key habitat for rare or threatened species and communities, and strategically valuable biodiversity sites.
- Strategically plan for the protection and conservation of Victoria's important areas of biodiversity.
- Ensure that decision-making takes into account the impacts of land use and development on Victoria's biodiversity, including consideration of:
  - Cumulative impacts.
  - Fragmentation of habitat.
  - The spread of pest plants, animals and pathogens into natural ecosystems.
- Avoid impacts of land use and development on important areas of biodiversity.
- Consider impacts of any change in land use or development that may affect the biodiversity value of national parks and conservation reserves or nationally and internationally significant sites; including wetlands and wetland wildlife habitat designated under the Convention on Wetlands of International Importance (the Ramsar Convention) and sites utilised by species listed under the Japan-Australia Migratory Birds Agreement (JAMBA), the China-Australia Migratory Birds Agreement (CAMBA), or the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).
- Assist in the identification, protection and management of important areas of biodiversity.

The proposal addresses protection of biodiversity of the site, including avian fauna. Refer to the included Ecological Assessment, at Appendix B.

## Native Vegetation Management

Clause 12.01-2S relates to native vegetation.

### Objective:

- To ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation.

### Strategies:

- Ensure decisions that involve, or would lead to, the removal, destruction or lopping of native vegetation, apply the three-step approach in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (Department of Environment, Land, Water and Planning, 2017):
  - Avoid the removal, destruction or lopping of native vegetation.
  - Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
  - Provide an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation.

Clause 21.03 relates to natural vegetation communities and remnant vegetation.

### Objective 2

- To protect, manage and restore native vegetation, including grasslands and wetland vegetation.

### Strategy 2.2

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- *Encourage the retention of existing riparian vegetation.*

## Objective 4:

- *To avoid and minimise impacts on environmental and biodiversity values.*

## Strategy 4.1:

- *Protect native vegetation with a biodiversity risk of high or moderate in areas subject to land use change, including future industrial and residential areas and road reserves.*

Clause 52.17 Native Vegetation regulates the removal of native vegetation. A permit is required under this provision to remove, destroy, or lop native vegetation, including dead vegetation.

The purposes of this clause are:

- *To manage the removal, destruction or lopping of native vegetation to minimise land and water degradation and to ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. This is achieved by applying the following three step approach in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (Department of Environment, Land, Water and Planning, 2017) (the Guidelines):*
  - *Avoid the removal, destruction or lopping of native vegetation*
  - *Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided*
  - *Provide an offset to compensate for the biodiversity impact if a permit is granted to remove, destroy or lop native vegetation.*

The proposal is consistent with the environmental and landscape values and objectives and strategies of the scheme. The Ecological Assessment, refer to Appendix B, describes the biodiversity of the site and identifies measures to avoid and minimise potential impacts.

## Landscapes

Clause 12.05-2S has the objective to protect and enhance significant landscapes and open spaces that contribute to character, identity and sustainable environments.

## Strategies:

- *Recognise the natural landscape for its aesthetic value and as a fully functioning system.*
- *Ensure important natural features are protected and enhanced.*

This PR addresses the aesthetic values, natural systems and features of the site. The proposal includes plans that show measures including provision of appropriate setbacks. Consideration of the visual impacts are addressed in section 5.8 of this PR, and Appendix G.

## Environmental Risks and Amenity

These clauses address environmental risks and amenity.

## Natural hazards and climate change

The head provision of Clause 13 outlines the following policies:

- *Planning should strengthen the resilience and safety of communities by adopting a best practice environmental management and risk management approach.*

- *Planning should identify, prevent and minimise the risk of harm to the environment, human health, and amenity through:*
  - *Land use and development compatibility.*
  - *Effective controls to prevent or mitigate significant impacts.*
- *Planning should identify and manage the potential for the environment and environmental changes to impact on the economic, environmental or social wellbeing of society.*
- *Planning should ensure development and risk mitigation does not detrimentally interfere with important natural processes.*
- *Planning should prepare for and respond to the impacts of climate change.*

The proposal addressed matters relevant to climate change, for example through the production of renewable energy, consideration of environmental effects, waste minimisation and management, responsible management of the site, minimising water use, and addressing any increased fire risk.

**Objective:**

- *To minimise the impacts of natural hazards and adapt to the impacts of climate change through risk-based planning.*

**Strategies:**

- *Consider the risks associated with climate change in planning and management decision making processes.*
- *Identify at risk areas using the best available data and climate change science.*
- *Integrate strategic land use planning with emergency management decision making.*
- *Direct population growth and development to low risk locations.*
- *Develop adaptation response strategies for existing settlements in risk areas to accommodate change over time.*
- *Ensure planning controls allow for risk mitigation or risk adaptation strategies to be implemented.*
- *Site and design development to minimise risk to life, property, the natural environment and community infrastructure from natural hazards.*

Climate change presents several significant challenges including loss of biodiversity, increased fire risk, increased frequency of drought and high temperatures. The proposal has been designed to reduce greenhouse gas emissions, avoid and minimise impacts to biodiversity and address potential hazards including bushfire risk.

The proposal would result in reduced greenhouse gas emissions and includes measures to reduce impacts to biodiversity and the required measures to manage bushfire risks.

## **Bushfire planning**

Clause 13.02-1S applies to all land within a designated BPA, therefore applies to the subject site. Bushfire risk is a consideration for any solar and battery proposal.

**Objective:**

- *To strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life.*

**Strategies:**

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- *The protection of human life is given priority through appropriate planning.*

In relation to bushfire hazard identification and assessment the Clause includes strategies to identify bushfire hazard and undertake appropriate risk assessment by:

- *Applying the best available science to identify vegetation, topographic and climatic conditions that create a bushfire hazard.*
- *Considering the best available information about bushfire hazard including the map of designated bushfire prone areas prepared under the Building Act 1993 or regulations made under that Act.*
- *Considering and assessing the bushfire hazard on the basis of:*
  - *Landscape conditions – meaning conditions in the landscape within 20 kilometres (and potentially up to 75 kilometres) of a site;*
  - *Local conditions – meaning conditions in the area within approximately 1 kilometre of a site;*
  - *Neighbourhood conditions – meaning conditions in the area within 400 metres of a site; and*
  - *The site for the development.*
- *Consulting with emergency management agencies and the relevant fire authority early in the process to receive their recommendations and implement appropriate bushfire protection measures*

The proposal includes a Bushfire Assessment report (NGH, 2022) outlining measures to reduce risk and measures to manage bushfire and protect life and property (refer the summary at section 5.3 and full report at Appendix C). The detailed design of the proposal would be consistent with CFA's Guidelines (CFA, 2022).

## Noise abatement

The objective of Clause 13.05-1S is to assist the control of noise effects on sensitive land uses.

The strategy is to ensure that development is not prejudiced, and community amenity is not reduced by noise emissions, using a range of building design, urban design, and land use separation techniques as appropriate to the land use functions and character of the area.

A Noise Impact and Constraint Assessment (Spectrum Acoustics, 2022) has been prepared for the proposal. The report findings and proposed minimisation measures are summarised in section 5.6 of this PR and provided in full at Appendix E.

## Land use compatibility

Clause 13.07-1S has the objective to protect community amenity, human health and safety while facilitating appropriate commercial, industrial, infrastructure or other uses with potential adverse off-site impacts.

### Strategies:

- *Ensure that use or development of land is compatible with adjoining and nearby land uses.*
- *Avoid locating incompatible uses in areas that may be impacted by adverse off-site impacts from commercial, industrial and other uses.*
- *Avoid or otherwise minimise adverse off-site impacts from commercial, industrial and other uses through land use separation, siting, building design and operational measures.*

This PR addresses compatibility including potential amenity impacts and agricultural impacts for the proposal. Consideration of the setting including visual impacts are addressed in section 5.8 of this PR, and Appendix G. Potential agricultural impacts are addressed in section 5.5 has been prepared for the proposal.

## Agriculture

Clause 14.01-1S relates to the protection of agricultural land and includes the objective to protect the state's agricultural base by preserving productive farmland.

Relevant strategies include:

- *Identify areas of productive agricultural land, including land for primary production and intensive agriculture.*
- *Consider state, regional and local, issues and characteristics when assessing agricultural quality and productivity.*
- *Avoid permanent removal of productive agricultural land from the state's agricultural base without consideration of the economic importance of the land for the agricultural production and processing sectors.*
- *Protect productive farmland that is of strategic significance in the local or regional context.*
- *Protect productive agricultural land from unplanned loss due to permanent changes in land use.*
- *Protect strategically important agricultural and primary production land from incompatible uses.*

*In considering a proposal to use, subdivide or develop agricultural land, consider the:*

- *Desirability and impacts of removing the land from primary production, given its agricultural productivity.*
- *Impacts on the continuation of primary production on adjacent land, with particular regard to land values and the viability of infrastructure for such production.*
- *Compatibility between the proposed or likely development and the existing use of the surrounding land.*
- *The potential impacts of land use and development on the spread of plant and animal pests from areas of known infestation into agricultural areas.*
- *Land capability.*

*Balance the potential off-site effects of a use or development proposal (such as degradation of soil or water quality and land salinisation) against the benefits of the proposal.*

Clause 14.01-2S relates to sustainable agricultural land use. The relevant strategies include:

- *Ensure agricultural and productive rural land use activities are managed to maintain the long-term sustainable use and management of existing natural resources.*
- *Support the development of innovative and sustainable approaches to agricultural and associated rural land use practices.*
- *Support adaptation of the agricultural sector to respond to the potential risks arising from climate change.*

- *Encourage diversification and value-adding of agriculture through effective agricultural production and processing, rural industry and farm-related retailing.*
- *Assist genuine farming enterprises to embrace opportunities and adjust flexibly to market changes.*
- *Support agricultural investment through the protection and enhancement of appropriate infrastructure.*
- *Facilitate ongoing productivity and investment in high value agriculture.*
- *Facilitate the establishment and expansion of cattle feedlots, pig farms, poultry farms and other intensive animal industries in a manner consistent with orderly and proper planning and protection of the environment.*
- *Ensure that the use and development of land for animal keeping or training is appropriately located and does not detrimentally impact the environment, the operation of surrounding land uses and the amenity of the surrounding area.*

The proposal is considered consistent with the relevant goals and objectives. Potential agricultural impacts are addressed in section 5.5.

## **Catchment planning and management**

Clause 14.02-1S has the objective to assist the protection and restoration of catchments, water bodies, groundwater, and the marine environment.

### *Strategies:*

- *Ensure that development at or near waterways provide for the protection and enhancement of the environmental qualities of waterways and their instream uses.*
- *Require appropriate measures to restrict sediment discharges from construction sites.*
- *Ensure planning is coordinated with the activities of catchment management authorities.*

The proposal minimises impacts and avoids as much as practicable the watercourses on the site and the environmental qualities have been considered in the ecological report provided at Appendix B, which is further explained in section 5.4. Due to the minimal groundwork required, and minimal change in terrain, there are no likely impacts to the local catchment. A Soil and Water Management Plan would be prepared for the proposal prior to construction and would include necessary erosion and sediment controls.

## **Built environment and heritage**

### **Design for rural areas**

Clause 15.01-6S includes the objective to ensure development respects valued areas of rural character.

### *Strategies:*

- *Ensure that the siting, scale and appearance of development protects and enhances rural character.*
- *Protect the visual amenity of valued rural landscapes and character areas along township approaches and sensitive tourist routes by ensuring new development is sympathetically located.*

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- *Site and design development to minimise visual impacts on surrounding natural scenery and landscape features including ridgelines, hill tops, waterways, lakes and wetlands.*

The proposal site was selected and chosen specifically as it avoids and minimises potential adverse impacts as the priority. The proposal site specifically allows for a design respecting the rural setting and surrounding developments.

### **Energy resource efficiency**

Clause 15.02-1S includes the objective to encourage land use and development that is energy and resource efficient, supports a cooler environment and minimises greenhouse gas emissions.

Relevant strategies are to improve efficiency in energy use through greater use of renewable energy technologies and other energy efficiency upgrades.

### **Heritage conservation**

Clause 15.03-2S includes the objective to ensure the protection and conservation of places of Aboriginal cultural heritage significance.

A CHMP has been approved for the proposal to protect and conserve any Aboriginal cultural heritage significance within the subject land.

### **Economic development**

Clause 17.01-1S Diversified economy has the objective to strengthen and diversify the economy.

Clause 17.01R Diversified economy Loddon Mallee North (Campaspe) has the strategy to support emerging and potential growth sectors such as nature-based tourism, mining and renewable energy generation and protect these activities from urban encroachment.

Clause 17.01R Diversified economy Loddon Mallee South (Greater Bendigo) has the strategy to support and develop emerging and potential growth sectors such as tourism, renewable energy, resource recovery and other green industries.

Clause 21.07 Economic Development and Employment includes relevant objectives for rural communities within Campaspe LGA to facilitate a vibrant and dynamic economic environment.

The relevant strategy is:

#### **Strategy 1.2**

- *Facilitate new development and employment opportunities in the Shire of Campaspe.*

The proposal is consistent with the above Clauses as the proposal provides diversification of employment and economy in the area. The proposal will create 350 FTE staff during peak construction and 10 positions during operation. The proposal will also provide additional income to the landowners potentially providing benefits to the local economy.

### **Infrastructure**

#### **Clause 18.02-4S Roads**

*Objective:*

- *To facilitate an efficient and safe road network that integrates all movement networks and makes best use of existing infrastructure.*

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**Strategies:**

- *Plan and develop the road network to:*
  - *Ensure people are safe on and around roads.*
- *Plan an adequate supply of car parking that is designed and located to:*
  - *Protect the role and function of nearby roads.*
  - *Enable the efficient movement and delivery of goods.*
  - *Enable easy and efficient use*

**Clause 19.01-1S Energy Supply**

**Objective:**

- *To facilitate appropriate development of energy supply infrastructure.*

**Strategies:**

- *Support the development of energy facilities in appropriate locations where they take advantage of existing infrastructure and provide benefits to industry and the community.*
- *Support transition to a low-carbon economy with renewable energy and greenhouse emission reductions including geothermal, clean coal processing and carbon capture and storage.*
- *Facilitate local energy generation to help diversify the local economy and improve sustainability outcomes.*

**Clause 19.01-2S Renewable Energy**

**Objective:**

- *To promote the provision of renewable energy in a manner that ensures appropriate siting and design considerations are met.*

**Strategies:**

- *Facilitate renewable energy development in appropriate locations.*
- *Protect energy infrastructure against competing and incompatible uses.*
- *Develop appropriate infrastructure to meet community demand for energy services.*
- *Set aside suitable land for future energy infrastructure.*
- *Consider the economic and environmental benefits to the broader community of renewable energy generation while also considering the need to minimise the effects of a proposal on the local community and environment.*

The proposal is for a renewable energy facility. The location has been selected as it allows for design that avoids and minimises impacts. By adopting various mitigation strategies and setback zones, the proposal is considered compatible with surrounding land uses. The proposal would provide benefits to the broader community as the proposal is estimated to generate approximately 612,000 MWh in the first year, the equivalent to supplying over 93,000 households with renewable electricity. The BESS would also assist in delivery of power during peak times to the network to meet community demand for energy need.

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## 4.2 Other policies and guidelines

### Solar Energy Facilities – Design and Development Guideline

The Victorian Government has developed the Solar Energy Facilities – Design and Development Guideline (DELWP, 2019) aiming to help outline the assessment and development process for large-scale solar energy facilities in Victoria.

This guideline provides:

1. Information for solar farm developers (proponents), the community, regulators and decision-makers (responsible authorities) relating to the Planning and Environment Act 1987 (the P&E Act) and the Victoria Planning Provisions.
2. Information and direction about the policy, legislative and statutory planning requirements
3. Relating to the siting and design of solar energy facilities.
4. An overview of best-practice advice relating to each stage of the site selection, design, construction, operation and decommissioning continuum.



The document outlines what solar facilities are, how to identify suitable locations, best practice for proponents, and information and considerations for applying for a planning permit.

The Guidelines require a site analysis and design response to be prepared. There are detailed matters that are required as part of the design response as follows:

1. Detailed plans and elevations of the proposed development including the layout and height of the facility and associated building and works, and their materials, reflectivity, colour, lighting and landscaping
2. Detailed plans and elevations of the proposed transmission infrastructure and electricity utility works required to connect the facility to the electricity network, access roads and parking areas
3. Accurate visual simulations illustrating the development in the context of the surrounding area and from key public viewpoints
4. The extent and assessment of any vegetation removal
5. A rehabilitation plan for the site.

The design response should also include one or more written reports and assessments including:

1. A description of the proposal including the types of process to be utilised, materials to be stored and the treatment of waste.
2. An explanation of how the proposed design derives from and responds to the site analysis including cumulative impacts with any other existing and proposed renewable energy facilities in the surrounding area.
3. An explanation of agricultural values and production including irrigation infrastructure impacts and whether any land is productive farmland of strategic significance.
4. Whether a works approval or licence is required from EPA Victoria or another authority administering the regulatory requirements of the Dangerous Goods Act 1985.

5. A description of how the proposal responds to any significant landscape features for the area identified in the planning scheme.

An assessment of:

1. The potential amenity impacts (such as noise; glint or glare; light spill; emissions to air, land or water; vibration; smell and electromagnetic interference): an assessment of potential noise impacts should have regard to EPA Victoria's Noise from industry in regional Victoria guidelines.
2. The effects of traffic to be generated on roads.
3. The visual impact of the proposal on the surrounding landscape.
4. The visual impact on abutting land that is described in a schedule to the National Parks Act 1975 and Ramsar wetlands and coastal areas.
5. The impact of the proposal on any species (including birds and bats) listed under the Flora and Fauna Guarantee Act 1988 or the Environment Protection and Biodiversity Conservation Act 1999.
6. The impacts on Aboriginal or non-Aboriginal cultural heritage.

The Guideline also gives further detail around the decision guidelines of Clause 53.13 Renewable Energy Facility as follows:

1. The effect of the proposal on the surrounding area in terms of noise, glint, light spill, vibration, smell and electromagnetic interference.
2. Whether the impact is acceptable or can be managed in accordance with relevant Australian and New Zealand standards or other regulatory requirements.
3. If the assessment was undertaken by a suitably qualified person.
4. The spatial extent, length and duration of the impact and whether it is for a limited or extended period.
5. Whether the impact can be mitigated via an appropriate built form, landscaping or other management response.

The impact on significant views including visual corridors and sightlines:

1. The amount of change proposed by works including earthworks, and the sensitivity of the landscape features to that change.
2. The visibility of the solar energy facility from vantage points accessible to the public and the ability to screen areas of development from view.
3. The locations and distances from which a solar energy facility can be viewed from a sensitive land use.
4. The significance of the landscape as described in the planning scheme including in an overlay, a relevant strategic study or by landscape features referenced in the planning scheme.
5. Landscape values associated with nearby land such as specified areas of landscape and environmental significance, specified coastal locations and areas identified to accommodate future population growth of regional cities and centres.

The impact of the proposal on strategically important agricultural land, particularly within a declared irrigation district:

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1. The impact on (including numbers of) irrigators downstream of the proposed site that depend on the ongoing operation of irrigation assets traversing the site.
2. The usage level of water compared to the actual capacity of the irrigation infrastructure servicing the site, based on rural water corporation mapping.
3. Whether or not the irrigation infrastructure servicing the site has benefitted from commonwealth or state government investment in infrastructure modernisation.
4. Whether the proposed site is connected to the modernised irrigation infrastructure and is integral to the rural water corporation's current and/or future planning for the viability of the irrigation district.
5. Whether or not the overall change in land use at the site aligns with a rural water corporation's asset management planning strategy for the viability of the irrigation district.
6. Whether the change in land use closes off any future opportunities for a rural water corporation to make irrigation footprint adjustments identified under a plan or strategy.

The impact of the proposal on the natural environment and natural systems:

1. How any onsite earthworks, buildings or other works will alter the natural processes occurring on land.
2. Whether the removal, lopping or destroying of any vegetation can be avoided or minimised through alternative design arrangements.
3. Proximity to natural and man-made water courses and the establishment of appropriate setbacks from these to maintain habitat and natural processes.
4. Impacts on landscape values associated with nearby public land described in a schedule to the National Parks Act 1975 or with Ramsar wetlands.
5. How bushfire and flood management measures will be dealt with to the satisfaction of the relevant referral authorities.

The impact of a proposal on the local road network:

1. Whether access to and from the site meets requirements established by the relevant road management authority
2. The impact of traffic movements to and from the site with the road network operating normally
3. The impact of traffic movements causing wear and tear on the road network.

This PR and supporting documents show that the general considerations of Solar Energy Facilities – Design and Development Guideline (DELWP, 2019) and the provisions of Clause 53.13 have been addressed. The potential impacts to views, agricultural land, natural environment and systems and the local road network have been avoided or minimised.

## Design Guidelines and Model Requirements: Renewable Energy Facilities (CFA Guidelines) (March 2022)

The purpose of these guidelines is to provide details about standard measures and processes in relation to fire safety, risk and emergency management that should be considered when designing, constructing, and operating new renewable energy facilities, and upgrading existing facilities.

Renewable energy facilities that support the generation of electricity in Victoria include wind farms, solar farms, and battery storage facilities, which are the focus of this guideline.

There are certain access requirements some of which include:

1. *Adequate access to and within the facility will assist CFA in responding to and managing fires on-site. To enable access for fire vehicles, CFA requires that the following provisions be considered:*
2. *3.1.1 A four (4) metre perimeter road should be constructed within the ten (10) metre perimeter fire break.*
3. *3.1.2 Roads are to be of all-weather construction and capable of accommodating a vehicle of 15 tonnes.*
4. *3.1.3 Constructed roads should be a minimum of four (4) metres in trafficable width with a four (4) metre vertical clearance for the width of the formed road surface.*

Specific guidelines for solar energy facilities include:

1. *6.1.1 Solar facilities are to have a 6 metre separation between solar panel banks/rows.*
2. *6.2.1 Solar farm operators must provide specifications for safe operating conditions for temperature and the safety issues related to electricity generation, including isolation and shut-down procedures, if solar panels are involved in fire. This information must be provided within the content of the emergency information book.*
3. *6.3.1 Solar arrays are to have grass vegetation maintained to 100mm under the array installation or mineral earth or non-combustible mulch such as stone.*
4. *6.3.2 Where practicable, solar energy installations can be sited on grazed paddocks. In this case, vegetation is to be managed as per the requirements of this guideline, or as informed through a risk management process.*

The subject site is partially within a Bushfire Management Overlay (BMO) and the recommendations for fuel management would be considered and contained in any Fire Management Plan that would be prepared. Fuel Management includes “Solar energy facilities must have grass maintained to no more than 100mm under solar panels during the Fire Danger Period. Operators of solar energy facilities on grazed paddocks must ensure that if additional measures to maintain grass to this level are required, they are implemented prior to, and for the duration of the Fire Danger Period”.

There are model requirements for the design of the facility, that can be modified in consultation with the CFA. Separation must be to at least the distance where a fire would not create the potential for ignition of the adjacent infrastructure. The proposal was discussed with the CFA. The proposal would include a minimum 10-metre fire break around the perimeter and relevant infrastructure and required emergency access. Onsite water supply would be a static water supply, or a reticulated source as needed. The CFA recommended that facility operators prepare an Emergency Management Plan, a Risk Management and Fire Management Plan.

## 4.3 Legislation

### Planning and Environment Act 1987 (Vic)

The purpose of the Planning and Environment Act is to establish a framework for planning the use, development, and protection of land in Victoria in the present and long-term interests of all Victorians.

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The Planning and Environment Act 1987 objectives are:

- (a) *To provide for the fair, orderly, economic and sustainable use and development of land.*
- (b) *To provide for the protection of natural and man-made resources and the maintenance of ecological processes and genetic diversity.*
- (c) *To secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria.*
- (d) *To conserve and enhance those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest, or otherwise of special cultural value.*
- (e) *To protect public utilities and other assets and enable the orderly provision and co-ordination of public utilities and other facilities for the benefit of the community.*
- (f) *To facilitate development in accordance with the objectives set out in paragraphs (a), (b), (c), (d) and I.*
- (g) *To balance the present and future interests of all Victorians.*

The Act gives effect to the planning schemes that apply to the proposal. The P&E Act also includes provisions for planning permits, developer contributions, etc that would guide the process for determination of the proposal.

This planning permit application complies with Part 4, section 47 of the P&E Act and section 13 of the Planning and Environment Regulations 2015.

The matters set out in s. 60(1) and (1A) of the P&E Act and relevant provisions of the planning scheme have been considered where possible in this PR.

## Environment Protection Act 2017 (Vic)

The *Environment Protection Act 2017* and the *Environment Protection Amendment Act 2018* (which replaced the *Environment Protection Act 1970* on 1 July 2021) establish the legislative framework for protecting the environment in Victoria from pollution and waste. The project is being developed under the provisions of the new *Environment Protection Amendment Act 2018*.

In contrast to the *Environment Protection Act 1970*, which focused on managing pollution and waste impacts after they occurred, the new *Environment Protection Amendment Act 2018* seeks to prevent these impacts from occurring. At the centre of this act is the 'general environmental duty', which requires any person in Victoria (businesses, industry, and the community) engaging in an activity that may risk harming human health and the environment from pollution and waste to minimise those risks, so far as reasonably practicable. This can be achieved by implementing appropriate controls that are proportionate to the risk (i.e., the greater the risk of potential harm, the greater the management expectation). The proposal includes measures to protect the ecology of the site, addresses earthworks, overland flow and flooding and waste and dangerous goods, refer to section 5 for discussion.

The proposal would be subject to duties such as the duty to notify certain pollution incidents and a duty to clean up after a pollution incident.

The proposal is not a scheduled activity under the EP Act and does not require works approval.

Preventative measures to reduce risks as far as reasonably practicable would form part of any CEMP prepared for the proposal consistent with the EP Act. This would include a detailed risk assessment of likelihood and consequence for all activities on site. This report has considered

general risks of the proposal. The proponent would utilise Environment Protection Authority (EPA) guidance documents in preparing the CEMP for the proposal.

The proponent, or their contractors as the 'duty holder' would be responsible for applying for any required permits or licences from the EPA or using an appropriate contractor to carry out relevant works, such as waste removal to comply with relevant EPA legislation.

## Environment Protection and Biodiversity Conservation Act 1999 (Aus)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) came into force on 16 July 2000. The EPBC Act protects matters of National Environmental Significance. The objectives of the EPBC Act are as follows:

1. *To provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance;*
2. *To promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources;*
3. *To promote the conservation of biodiversity;*
4. *To provide for the protection and conservation of heritage;*
5. *To promote a cooperative approach to the protection and management of the environment involving governments, the community, landholders and Indigenous peoples;*
6. *To assist in the cooperative implementation of Australia's international environmental responsibilities;*
7. *To recognise the role of Indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and*
8. *To promote the use of Indigenous peoples' knowledge of biodiversity with the involvement of, and in cooperation with, the owners of the knowledge.*

An EPBC referral is not recommended for this proposal as all EPBC matters have been assessed and impacts to these matters have been avoided on site, as stated in the Ecological Assessment (NGH, 2022).

## Flora and Fauna Guarantee Act 1988 (Vic)

Victoria's *Flora and Fauna Guarantee Act 1988* (FFG Act) provides a framework for biodiversity conservation in Victoria. The FFG Act provides for the listing of threatened species, communities of flora and fauna and potentially threatening processes. A number of non-threatened flora species are also protected under the Act.

A permit is required to remove species protected under the Act from public land and may also be required to remove protected species from private land in certain circumstances. No threatened FFG communities are present on site, refer to the Ecological Assessment (NGH, 2022), Appendix B, for further details.

## Climate Change Act 2017 (Vic)

The *Climate Change Act 2017* commenced operation on 1 November 2017 and seeks, among other purposes, to set a long-term greenhouse gas emissions reduction target and to provide the setting for five-yearly interim reduction targets to reach the long-term target. Section 6 states that

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for the purposes of the Act, “the long-term emissions reduction target for the State is an amount of net zero greenhouse gas emissions by the year 2050”.

Section 20 states:

- *The Government of Victoria will endeavour to ensure that any decision made by the Government and any policy, program or process developed or implemented by the Government appropriately takes account of climate change if it is relevant by having regard to the policy objectives and the guiding principles.*

The proposal would provide benefits to the broader community to address climate change as the proposal is estimated to generate approximately 612,000 MWh of renewable energy in the first year, the equivalent to supplying over 93,000 households with renewable electricity.

## Renewable Energy Target (RET) legislation

The Australian RET includes legislated targets which would require significant investment in new renewable energy generation capacity in coming years. Reducing Australia’s emissions by 43% by 2030, in line with Australia’s proposed target under the Paris Agreement, moving to a National outcome of net zero by 2050. The Victorian Government has launched a second Victorian Renewable Energy Target to help meet its commitment of sourcing 100% renewable electricity for all Victorian Government operations by 2025.

The proposed renewable facility would produce clean energy and offset approximately 521,000 tonnes of carbon emissions per year.

## Environment Effects Act 1978

*The Environment Effects Act 1978 (EE Act) provides for assessment of proposed projects (works) that are capable of having a significant effect on the environment. The Act does this by enabling the Minister administering the Environment Effects Act to decide that an Environment Effects Statement (EES) should be prepared (DSE, 2006).*

The criteria for determining whether a project triggers the requirement for an EES have been considered as part of this application. This is consistent with the Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978 (DSE, 2006) and subsequent amendments to Ministerial guidelines (Vic Govt. 2012).

The proposal does not trigger any of the individual potential effects on the environment and would not have a combination of two or more of the potential effects on the environment as shown within this report and within the supporting Ecological Assessment, see Appendix B. As such, referral of the proposal has not been carried out by the proponent. It is understood that DELWP as the assessing authority may still refer the application for consideration.

## Aboriginal Heritage Act 2006 and Aboriginal Heritage Regulations 2007

A proponent must consider potential impacts and the views of relevant Aboriginal people before lodging a planning application.

Land used to generate electricity is defined as a high-impact activity under Division 5 of the *Aboriginal Heritage Regulations 2007*. A Cultural Heritage Management Plan (CHMP) may be required under these regulations if the proposal:

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- requires an EES under the *Environment Effects Act 1978*.
- is in an area of cultural heritage sensitivity that has not previously had significant ground disturbance.

The proposal site contains areas of cultural heritage sensitivity that has not previously had significant ground disturbance. A CHMP has been approved and is included at Appendix I.

## **Water Act 1989**

The *Water Act 1989* (Water Act) has the following purposes relevant to the proposal:

- *To provide for the integrated management of all elements of the terrestrial phase of the water cycle*
- *To promote the orderly, equitable and efficient use of water resources*
- *To make sure that water resources are conserved and properly managed for sustainable use for the benefit of present and future Victorians*
- *To eliminate inconsistencies in the treatment of surface and groundwater resources and waterways*
- *To provide formal means for the protection and enhancement of the environmental qualities of waterways and their in-stream uses*
- *To provide for the protection of catchment conditions.*

Generally, the works would be located a minimum of 30m from all waterways within the proposal site consistent with the requirements of the Campaspe and Greater Bendigo Planning Schemes. The buffer applied would support the purpose of the Water Act.

Some works are proposed within the waterways. This includes crossings required to access between the north and south parts of the proposal site for construction and ongoing maintenance during operation. An easement is also proposed over one waterway with above or below ground (preferred trenching option) powerline connection. Refer to section 5.4 for the consideration of impacts to watercourses.

## **Building Act 1993**

The main purposes of the *Building Act 1993* are:

- (a) *to regulate building work and building standards; and*
- (b) *to provide for the accreditation of building products, construction methods, building components and building systems; and*
- (c) *to provide an efficient and effective system for issuing building and occupancy permits and administering and enforcing related building and safety matters and resolving building disputes; and*
- (d) *to regulate building practitioners and plumbers; and*
- (e) *to regulate plumbing work and plumbing standards; and*
- (f) *to provide for the accreditation, certification and authorisation of plumbing work, products and materials; and*
- (g) *to regulate cooling tower systems; and*
- (h) *to limit the periods within which building actions and plumbing actions may be brought.*

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The project includes building and plumbing works associated with the O&M building, etc and is therefore subject to the Building Act. The project site is also located in a Bushfire Prone Area (BPA) with fire management requirements linked with the Building Act.

As the project is located within a rural and regional area, the Country Fire Authority's (CFA's) Guidelines for renewable energy installations has been considered for information about bushfire risk management and other risk management matters. Refer to the bushfire report at Appendix C for the consideration of bushfire requirements, and CFA consultation outcomes.

## **Dangerous Goods Act 1985 (WorkSafe Victoria considerations)**

The objects of this Act relevant to the proposal and information provided in this PR are:

- *To promote the safety of persons and property in relation to the manufacture, storage, transport, transfer, sale and use of dangerous goods and the import of explosives into Victoria*
- *To ensure that adequate precautions are taken against certain fires, explosions, leakages and spillages of dangerous goods and that when they occur they are reported to the emergency services and the inspectors without delay*
- *To ensure that information relating to dangerous goods is provided by occupiers and owners of premises to the relevant authorities*
- *To allocate responsibilities to occupiers and owners of premises to ensure that the health and safety of workers and the general public is protected*
- *To provide for licensing of persons required by the regulations to hold a licence in relation to dangerous goods*
- *To provide for the implementation of the ADG Code*
- *To provide for the management of risks arising out of security concerns associated with explosives and high consequence dangerous goods.*

The proposal includes a BESS. Batteries are a potential dangerous good and have associated fire risk in transportation and storage on site. The proposed BESS would exceed 20 tonnes of, shipping container style, lithium ion batteries to be installed on site (the batteries would be stored adjacent to the proposed substation or would be decentralised and distributed throughout the arrays). Refer to Section 5.3 of this PR and the bushfire report at Appendix C for the consideration of bushfire requirements.

## **Electricity Safety Act 1998**

The purpose of the *Electricity Safety Act 1998* (ES Act) are *to make further provision relating to:*

- *The safety of electricity supply and use*
- *The reliability and security of electricity supply*
- *The efficiency of electrical equipment.*

The ES Act includes provisions relevant to construction of solar facilities as an electrical installation. This includes bushfire provisions, underground powerlines and construction near railway lines (present to the east of the subject site).

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Clause 75 lists the general duties of owners or operators of complex electrical installations and railways, specifically it states:

*An owner or operator of a complex electrical installation must take reasonable care to ensure that all parts of the complex electrical installation that it owns or operates:*

- *Are designed, constructed, operated, maintained and decommissioned in accordance with the regulations*
- *Are safe and operated safely.*

Clause 76 lists the provisions for underground electric lines, specifically it states:

*A person who controls an underground electric line on public land (other than an electric line forming part of a railway):*

- *Must maintain a record of that underground electric line*
- *Before the line is connected to an electricity supply or within 2 business days after relocating the line, give sufficient information to enable every cable of the line to be located and identified to:*
- *A person or body specified by Energy Safe Victoria as the asset recording service for the area in which the line is located, or*
- *If no such person or body is so specified, the distribution company for that area.*

Clause 76 lists the obligations of distribution companies for underground electric lines, specifically it states:

- *A distribution company must keep a register containing sufficient information to enable every cable of the underground electric lines that are under its control within its distribution area to be located and identified.*

The ES Act also outlines the responsibilities and powers of enforcement for Energy Safe Victoria. The proponent, or their contractors would be responsible for compliance with the ES Act and any relevant directions of Energy Safe Victoria, including compliance with The Blue Book 2017 (Energy Safe Victoria, 2017).

The contractor and operator for the proposal would be responsible for compliance with relevant electrical requirements.

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## 5 Planning assessment

This section provides the assessment of the proposal against the relevant provisions of the Campaspe Planning Scheme and Greater Bendigo Planning Scheme and relevant guidelines. It also provides an assessment of the project against relevant renewable energy policy. The assessment is undertaken thematically.

### 5.1 Site analysis and design response

#### 5.1.1 Land zone

The subject land is within the Farming Zone (FZ and FZ1) as shown in Figure 4-1. The works are permissible in the zone subject to receiving a planning permit and compliance with clause 53.13 of the scheme.

The proposal would be consistent with the relevant purpose of the FZ, specifically, the proposal is considered compatible and minimises impacts on surrounding agricultural land during operation and post remediation. The proposal would create additional employment in the locality and support the landowner with additional income, specifically agriculture would continue in a capacity suitable for the landowners on remaining productive agricultural land, in addition to the stock (sheep) carrying potential within the solar farm proposal. The proposal includes avoidance and minimisation measures and safeguards to protect the natural environment and systems.

The proposal would be consistent with provisions under the FZ schedule, specifically the proposal would be setback a minimum of 100m from the nearest dwelling not in the same ownership as the subject land, setback 30m from all lot boundaries associated with non-involved landholders and setback a minimum of 5m from all other boundaries.

A minimum 20m setback from the boundaries to roads is proposed and would be consistent with the decision guidelines. The Council and Department of Transport has been consulted in the design process for the proposal.

Before deciding on an application to use land, construct a building or construct or carry out works, in addition to the decision guidelines in Clause 65, the responsible authority must consider Clause 35.07-6 specifically:

- **General issues** – *The Municipal Planning Strategy and the Planning Policy Framework. Any Regional Catchment Strategy and associated plan applying to the land. The capability of the land to accommodate the proposed use or development, including the disposal of effluent. How the use or development relates to sustainable land management. Whether the site is suitable for the use or development and whether the proposal is compatible with adjoining and nearby land uses. How the use and development makes use of existing infrastructure and services.*
  - The Municipal Planning Strategy and the Planning Policy Framework are addressed in section 4.1.5 of this PR.
  - The proposal is generally consistent with the North Central Regional Catchment Strategy 2021-27 including:
    - Maintaining healthy waterways managed for shared benefits.

- Maintaining healthy landscapes and soil considering co-location of agricultural activities within the proposal site and returning to agricultural use post decommissioning.
    - Protection of diversity and connected landscapes.
    - Providing alternative income streams for landowners, providing for active and resilient communities and adapting to climate change through the development of renewable energy sources.
  - The proposal would be sustainably managed, as outlined in the Ecological Assessment report.
  - The subject land is considered suitable for the proposal as described generally in this PR. The proposal is compatible with agricultural activities on the subject and surrounding land. Potential impacts would be avoided or minimised for near rural dwellings.
  - There were various reasons for choosing the proposal site related to making use of existing infrastructure and services, two include ease of access to the site and grid connection directly within the front of the site, refer to suitability of the site discussion in section 5.1.2.
- **Agricultural issues and the impacts from non-agricultural uses** – *Whether the use or development will support and enhance agricultural production. Whether the use or development will adversely affect soil quality or permanently remove land from agricultural production. The potential for the use or development to limit the operation and expansion of adjoining and nearby agricultural uses. The capacity of the site to sustain the agricultural use. The agricultural qualities of the land, such as soil quality, access to water and access to rural infrastructure. Any integrated land management plan prepared for the site.*
  - The proposal would potentially support and sustain agriculture production on the site. The proposal is compatible with continuing agriculture practices (generally cropping and grazing) on surrounding land as discussed generally in this report, particularly considering control of heat island effect, soil and water management, and vegetation management.
- **Environmental issues** – *The impact of the proposal on the natural physical features and resources of the area, in particular on soil and water quality. The impact of the use or development on the flora and fauna on the site and its surrounds. The need to protect and enhance the biodiversity of the area, including the retention of vegetation and faunal habitat and the need to revegetate land including riparian buffers along waterways, gullies, ridgelines, property boundaries and saline discharge and recharge area. The location of on-site effluent disposal areas to minimise the impact of nutrient loads on waterways and native vegetation.*
  - The proposal would be sustainably managed, and a site specific Environmental Management Plan would be developed for both construction and operation phases, with sub-plans for management of soil, water, flora, fauna, biosecurity and waste. There are no likely adverse impacts to watercourses within the proposal site as outlined in this PR and as considered in the Ecological Assessment (NGH, 2022) (Appendix B) and Flood Impact Assessment (Alluvium, 2022) (Appendix D). The Ecological Assessment considered the natural functions of the site and native vegetation removal impacts (refer to section 5.2 of this PR for a summary of findings).

- **Design and siting issues** – *The need to locate buildings in one area to avoid any adverse impacts on surrounding agricultural uses and to minimise the loss of productive agricultural land. The impact of the siting, design, height, bulk, colours and materials to be used, on the natural environment, major roads, vistas and water features and the measures to be undertaken to minimise any adverse impacts. The impact on the character and appearance of the area or features of architectural, historic or scientific significance or of natural scenic beauty or importance. The location and design of existing and proposed infrastructure including roads, gas, water, drainage, telecommunications and sewerage facilities. Whether the use and development will require traffic management measures.*
  - The proposal has been sited to be as far as practicable from dwellings. The proposal is compatible with surrounding developments when considering height and scale, specifically height of dwellings, vegetation present in the area and generally flat topography, visibility of the proposal as shown in the Landscape Character and Visual Impact Assessment (Accent Environmental, 2022) (Appendix G) and Glint and Glare Assessment (Accent Environmental, 2022a) (Appendix H). Proposed vegetation screening would minimise the potential impacts for affected landholders and the proposed siting minimises amenity impacts and land use impacts. The proposal would connect to existing electrical distribution services within the site, refer to discussion in section 2.2.7. Traffic would noticeably increase in the area during construction and decommissioning, traffic during operation would be minimal. A Traffic Impact Assessment (AMBER, 2022) has been completed for the proposal and impacts would be managed with appropriate traffic management plans, refer to section 5.7 and the report at Appendix F.

## 5.1.2 Suitability of the site

The proposal site was selected and chosen specifically as it enabled selection of a site that avoids and minimises potential adverse impacts as the priority to address clause 53.13 of the scheme and the Farming Zone decision guidelines as referenced in section 5.1.1. The proposal site specifically:

- Provides for a design where environmental and social impacts would be avoided, minimised, or mitigated to provide for positive environmental outcomes and protection of amenity, as shown on the plans, in this PR, and included specialist studies.
- Provides for a proposal of a viable scale while responding to site constraints and minimising environmental impacts to the site and surrounding locations.
- Avoids and minimises impacts to areas of quality native vegetation and watercourses in the region, locally and within the subject land.
- Minimises impacts of noise and traffic (specifically volumes and access impacts).
- Provides for avoidance of glint and glare impacts and minimisation of visual impacts and allows for screening where needed.
- Allows for avoidance with application of buffers or where avoidance is not possible (water crossings), the minimisation of impacts to waterways and mapped areas of Aboriginal cultural sensitivity.
- Is of a suitable size that allows for quality solar gain and best practice bushfire management, specifically with response to the existing vegetation on the property and on surrounding land.

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- Allows for design and construction that would minimise soil disturbance and have minimal change to overland flow.
- Can access sewage collection (porta-loo) and water delivery services required for the proposal.
- Allows for design and construction that would be compatible with farming on the remaining parts of the subject land and is not located within the Irrigation Districts. Agriculture would continue in a capacity suitable for the landowners. Once the proposal reaches the end of its operational life, the site can be remediated to a suitable agricultural condition so cropping or grazing can be resumed.
- Allows for design and construction that would be compatible with surrounding farm zone land uses.
- It has optimal solar resources, suitable land, capacity to rehabilitate, proximity to electrical network and connection capacity. The connection to the power network can be made via a short overhead line.

The siting of the infrastructure for the proposal has been an iterative process, allowing for changes to the layout as needed to allow for necessary protect amenity and mitigate impacts.

The constraints and opportunities for the site are discussed below and in the supporting reports that accompany this PR.

### 5.1.3 Proposal objectives, outcomes and suitability of the site

The development of the proposal would:

- Assist the Victorian and Commonwealth Governments to meet Australia's renewable energy targets.
- Provide a clean and renewable energy source to assist in reducing greenhouse gas emissions.
- Generation of enough clean, renewable energy for about 93,000 average Victorian homes.
- Displace approximately 521,000 metric tonnes of carbon dioxide, currently generated by non-renewable sources.
- Assist in improving electricity reliability and security benefits within Australia as the energy supply from coal-fired power stations are reduced.
- Provide direct and indirect employment opportunities during the construction and operating phases of the proposal. As well injection of expenditure in the local area.
- The proposal would be a new land use thereby diversifying the local land use within the region, providing a drought resilient revenue stream for the agricultural economy.

### 5.1.4 Strategic need

#### National strategic action

##### Paris Agreement

In December 2015, the Australian Commonwealth Government ratified the Paris Agreement and the Doha Amendment to the Kyoto Protocol, reinforcing its commitment to action on climate change. Australia has committed to the following greenhouse gas emission reduction targets:

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- 5% below 2000 levels by 2020.
- 26 to 28% below 2005 levels by 2030.
- Net zero emissions in the second half of the century.

Electricity generation is the largest single emitter of greenhouse gas in Australia contributing 35% of total greenhouse emissions. It is to be expected that significant effort would be applied to transition to renewable energy sources of electricity generation.

Utility scale solar photovoltaic facilities like the proposal have the capacity to make a significant contribution towards these goals because of the relatively shorter times required to construct and commission solar facility infrastructure.

### **National Energy Guarantee (NEG)**

The future of the NEG is not certain in Australia. Nonetheless, this utility scale renewable energy proposal would contribute to the NEG as it was proposed, in that it would:

*“... retain existing resources and encourage new investment in the National Energy Market (NEM) while ensuring that emissions standards are met and the system operates reliably.”*

The energy generated from the proposal would provide opportunities for the electricity sector by supporting two key objectives of the NEG:

1. Increased competition and improving affordability: creating additional competition in the generation sector and providing new low cost electricity options for the retail market.
2. Emissions guarantee: meet defined emissions target for wholesale electricity purchased.

The Energy Security Board (ESB) predicts that 28 – 36% of electricity generation in 2030 would be renewable energy, under the NEG.

### **Victorian goals and policies**

#### **Renewable Energy Zones supporting the proposal location**

The Australian Energy Market Operator (AEMO) has assessed 6 Victorian Renewable Energy Zones (REZs) as shown in Figure 5-1. Victoria's Renewable Energy Zones (REZs) are supported by a \$540 million REZ Fund to invest in needed REZ network infrastructure and the establishment of a new co-ordinating body, VicGrid.

The proposal site is within the Murray River REZ, supported by existing transmission strength and capacity and potentially by the proposed Stage 1 transmission line upgrades within the Murray River REZ.

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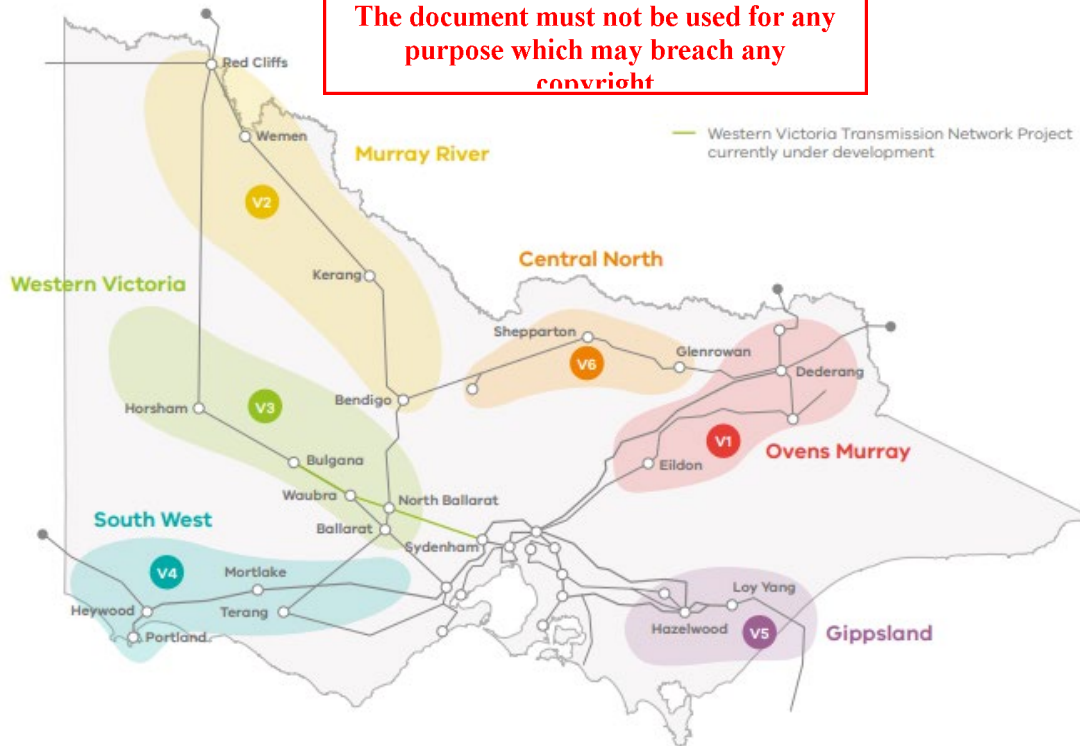


Figure 5-1 Victoria's Renewable Energy Zones (Source: State of Victoria, DELWP, 2021)

### Victoria's Renewable Energy Action Plan

The Renewable Energy Action Plan (State of Victoria, DELWP, 2017) outlines the action that the Victorian Government is taking to encourage investment in our energy sector and to ensure Victorians continue to benefit from a renewable, affordable and reliable energy system into the future.

The Action Plan invests across three focus areas:

- Supporting sector growth
- Empowering communities and consumers
- Modernising our energy system

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The proposal would form part of the Victorian renewable energy sector that would be putting the action plan into practice and specifically assist in achieving the modernisation of the Victorian energy system.

### 5.1.5 Socio-economic benefits

#### Employment and local economic benefits

The proposal would generate around 350 construction jobs during the peak construction phase. Once the proposal is operational, around 10 equivalent full-time staff would be employed.

Employment opportunities would extend through the local supply chain to fuel supply, vehicle servicing, hotels/motels, cafes, hotels catering and cleaning companies, tradespeople, tool and equipment suppliers and many other businesses.

In summary, the proposal would provide significant local economic benefits including:

- Direct and indirect employment opportunities during the construction and operating phases of the proposal.
- Injection of expenditure in the local area.
- Development of a new land use thereby diversifying the local land use within the region, providing a drought resilient revenue stream for the agricultural economy.

These benefits would mostly be during construction. A smaller proportion would occur during operation mainly in relation to the maintenance and upgrade of infrastructure over the lifetime of the proposal.

## Electricity prices

The Australian Electricity Market Commission (AEMC) predicts residential electricity prices would fall 7.1% on average between 2019 and 2022, a reduction primarily driven by an 11.6% reduction in wholesale prices as 8,594 MW of new, mostly renewable energy, comes online (CEC, 2020). The commissioning of new renewable energy facilities would increase competition in wholesale energy market and, as with any market, increased competition would tend to reduce prices. Photovoltaic solar facilities operate with no fuel costs and can, with the correct policy framework, be used to reduce the overall wholesale prices of electricity. Both the Commonwealth and State Governments have established frameworks to support this objective.

## 5.2 Ecology

NGH Pty Ltd, on behalf of the proponent, has completed the detailed Ecological Assessment (NGH, 2022) for the proposal, refer to the summary below and full report at Appendix B. The assessment considered the entire subject land, approximately 900ha study area to determine the best location for the proposal within the site, the iterative process to avoid and minimise impacts is detailed in the assessment and summarised below. The assessment:

- Undertook a desktop search of threatened species and communities listed under the *Flora and Fauna Guarantee Act, 1988 (FFG)* and the *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC)* and desktop assessment of Ecological Vegetation Classes (EVC) modelling and aerial imagery to determine the extent of native vegetation within the defined Study Area.
- Addressed legislative requirements including Clause 52.17 of the scheme and the permit requirement for removal, destruction or lopping of native vegetation.
- Completed a site assessment to determine the extent of native vegetation and complete a habitat hectares assessment and determined the offset requirements.

The assessment included the native vegetation assessment, scattered tree assessment, vegetation mapping and incidental and targeted fauna observations. The key findings were:

- Ecological Vegetation Classes (EVCs) in the study area are Box Ironbark Forest (EVC 61), Creek line Grassy Woodland (EVC 68), Grassy Woodland (EVC 175\_61), Plains Woodland (EVC 803) and Floodplain Pond Herland (EVC 810).
- The native vegetation on site includes eleven habitat zones covering 129.60ha, 691 large trees and 67 scattered trees.

- The study area includes a creek that is subject to Environmental Significance Overlay (ESO1) that relates to the protection of watercourses. This area has been avoided.
- The study area is located in the Goldfields Bioregion in central Victoria.
- No threatened FFG communities are present on site. No EPBC referral is needed.
- Surveys in January and February 2021 observed the Brush-tailed Phascogale and Lace Monitor. Further targeted surveys in August 2022 were completed for the Swift Parrot and Striped Legless Lizard. No Swift Parrots were detected over three surveys. There were two small areas of moderate habitat mapped for the Striped Legless Lizard and these areas have been avoided by the proposal. There are no further assessments required for these species.
- Weeds and pests were observed during the site inspection.
- The study area included a mix of exotic vegetation, mostly understory herbs and grasses.

The proposal has been designed to avoid and reduce the potential for ecological impacts including the following steps:

- The proposed development footprint was modified and reduced to avoid native vegetation. The proposal would need to remove a total of 8.673ha of native vegetation including 49 trees, comprising:
  - 6.644ha of native vegetation including 43 large trees under the Campaspe PS; and
  - 2.029ha of native vegetation including 6 large trees under the Greater Bendigo PS.
- The impacts to EVC's patches have been reduced from 60.57 ha (October 2020) to 5.76 ha (September 2022). This is a 90.49% reduction from the original infrastructure design.
- No native vegetation removal would occur in creek lines and erosion gullies. Some of these areas are fenced to exclude stock. The creek lines in Muskerry South have established revegetation (replanting and natural regeneration). Underboring of the creek line for the easement would occur to avoid impacts to the creek line and to native vegetation.
- Trees in unmade road reserves and on roadsides would be retained except for a small number of trees on Muskerry East School Road where the transmission line would connect Muskerry North and South. Two small areas of roadside vegetation would be impacted (Option A and Option B). The two options have been included as Option A relies on utilising AusNet's 220kV transmission line easement, which is typically considered an exclusion zone for any works. However, Option A also creates less impact to roadside vegetation, as AusNet's 220kV easement has removed and maintains clearance from vegetation. Option B provides an alternative easement path, in the event AusNet does not approve any easement works or crossing within the existing 220kV transmission line easement.
- Roadside vegetation would be retained as much as possible to retain canopy connection for the Brush-tailed Phascogale.
- Large and small scattered trees and patches of native vegetation on boundaries would be avoided. A buffer has been included in the development footprint to protect these areas.
- The development footprint has avoided habitat zones in Muskerry South on Axedale-Toolleen Road, Habitat Zone 5, and the southwest corner (Axedale-Toolleen Road and Murphys Lane).
- The development footprint has been reduced in Muskerry North to retain the large scattered trees.

- A 30-metre buffer has been applied to the creeks.
- Large patches of native vegetation or scattered trees have been retained to maintain the stepping-stones within the landscape to ensure habitat connectivity. This includes Habitat Zones 1, 4, 6 and 8.
- Habitat Zones with higher quality vegetation (Habitat Zones 7 and 9) have been retained.
- The bioregional conservation status of each EVC has been given further consideration and impacts have been avoided as much as possible. The habitat zones impacted are modified low condition vegetation.
- No EPBC vegetation communities would be impacted.
- All overhanging trees from the road reserve have a 15-metre buffer applied.
- Only the large trees impacted by the Solar Power Station development footprint are proposed to be removed. These trees would be appropriately offset within the site or as close to the site as possible.
- Larger patches of mature Eucalypts would be retained. The net gain of these areas can be improved through revegetation with shrubs.
- Mitigation measures to minimise the biodiversity loss includes:
  - Fauna identification, monitoring, protection, salvage and relocation measures for works that disturb large trees within the development footprint.
  - Hollow bearing trees would be assessed by a licensed native fauna handler prior to removal and hollows and logs reused within the site as much as practical.
  - Animal handling to be completed by appropriately qualified Zoologist or Wildlife handler.
  - Sediment Control measures for creek lines and erosion gullies during construction.
  - Mulch to be reused on site where possible, rather than new material being introduced to the site.
  - Rocks and logs reused on site and strategically placed in offset areas.
- Measures taken to mitigate impacts to vegetation associated with habitat for the Swift Parrot and Striped Legless Lizard include:
  - All areas of potential foraging habitat for the Swift parrot greater than 1 ha and some individual trees have been avoided by the development footprint including any disturbance to foraging habitat associated with the road reserve.
  - Areas identified as moderate habitat that provide basis to a low likelihood of occurrence within the study area have been avoided by the development footprint.
- Development of a Biodiversity Management Plan would include:
  - Revegetation on creek lines to improve landscape connectivity.
  - Select local indigenous species suitable for Swift Parrot and Temperate Woodland Birds to replace the loss of some large scattered trees.
  - Ensure landscaping and revegetation selects locally indigenous species.
  - Appropriately manage vegetation removal works prior to construction.
  - Processes required to mitigate impacts to both the Swift Parrot and Striped Legless lizard should they be encountered opportunistically before and during construction activities.

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Measures to avoid and minimise potential impacts to ecology of the site are provided in Table 5-1.

Table 5-1 Ecology safeguards and impact minimisation measures

No.	Safeguards and impact minimisation measures	C	O	D
E1	Management Plans (Fauna, Flora, Weed and Pest, etc) would be prepared and form part of the EMP. The management plans would be implemented through all stages of the proposal in accordance with the Ecological Assessment (NGH, 2022).	C	O	D
E2	<p>A fauna management plan should be prepared by a suitably qualified Zoologist and would include:</p> <ul style="list-style-type: none"> <li>• An unexpected finds protocol which includes measures for the management of Brush-tailed Phascogale, Swift Parrot and Lace Monitor during construction and operation.</li> <li>• Staff Induction should include a species profile and information hand-outs of the Brush-tailed Phascogale, Swift Parrot, Striped Legless Lizard, and Lace Monitor.</li> <li>• A suitably qualified Zoologist or Wildlife Handler needs to be present during tree clearing.</li> <li>• Any fauna relocation should be completed by a suitably qualified wildlife handler or Wildlife Victoria on (03) 9445 0310.</li> </ul>	C		
E3	<p>As part of a fauna management plan the following would be undertaken for the Brush-tailed Phascogale:</p> <ul style="list-style-type: none"> <li>• Step 1 - Avoid tree removal from mid-May to July during the Brush-tailed Phascogales breeding season.</li> <li>• Step 2 – if Step 1 cannot be completed then a pre-clearance survey needs to be completed by a suitably qualified Zoologist</li> <li>• Salvaged hollows should be relocated in suitable habitat in consultation with a Zoologist.</li> </ul>	C	O	D
E4	<p>As part of a fauna management plan the following would be undertaken for the Swift Parrot during the autumn-winter migration:</p> <ul style="list-style-type: none"> <li>• Pre-clearance surveys carried out by a suitably qualified Zoologist.</li> <li>• Any sighting should be recorded such as time, date, tree species, number of individuals, duration of presence in the study area.</li> <li>• Inclusion in an unexpected finds protocol (including preferred feed trees) and a procedure if the species is present during tree removal.</li> <li>• Minimise noise near the location where the species is present and allow natural migration away from impact areas by gradually increasing noise levels.</li> <li>• Where appropriate temporary fence 'no-go' areas in close</li> </ul>	C	O	D

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No.	Safeguards and impact minimisation measures	C	O	D
	proximity to individual trees in flower and established patches of habitat greater than 1 ha between where construction activities occur between May and August.			
E5	<p>As part of a fauna management plan the following would be undertaken for Striped Legless Lizard during construction in proximity to mapped moderate habitat areas, or any other area mapped as native grassland being removed as part of construction:</p> <ul style="list-style-type: none"> <li>• Pre-clearance surveys carried out by a suitably qualified Zoologist.</li> <li>• Any sighting should be recorded such as time, date, number of individuals, duration of presence in the study area.</li> <li>• Inclusion in an unexpected finds protocol (including habitat values) and a procedure if the species is present during vegetation removal.</li> <li>• Minimise noise and traffic near the location where the species is presumed to have likelihood of presence and allow natural migration away from impact areas by gradually increasing noise levels.</li> <li>• Where appropriate temporary fence 'no-go' areas in close proximity to moderate habitat areas during construction activities.</li> </ul>	C	O	D
E6	<p>As part of a fauna management plan the following would be undertaken for the Lace Monitor:</p> <ul style="list-style-type: none"> <li>• Unexpected finds protocol should include appropriate management and handling of the Lace Monitors.</li> <li>• Relocation needs to be completed by a suitably qualified Zoologist or wildlife handler.</li> </ul>	C	O	D
E7	Tree-clearing procedure includes relocation of habitat features to adjacent areas for habitat enhancement.	C		
E8	<p>Prior to any tree removal, a flora management plan must be completed and include the following:</p> <ul style="list-style-type: none"> <li>• Ensure the Fauna Management Plan is completed and approved.</li> <li>• Ensure necessary pre-clearance fauna surveys have been completed and identify management requirements for tree removal.</li> <li>• A Zoologist or suitably qualified Wildlife Handler is present during tree removal.</li> </ul>	C		

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Muskerry Solar Power Station

No.	Safeguards and impact minimisation measures	C	O	D
	<ul style="list-style-type: none"> <li>Identify trees to be retained or removed</li> <li>An unexpected, threatened flora species finds.</li> <li>Exclusion of vehicles through sensitive areas.</li> <li>Determine Tree Protection Zones (TPZ) or Vegetation Protection Zones (VPZ).</li> </ul>			
E9	<p>Prior to construction the Tree Protection Fencing (TPZ) or Vegetation Protection Fencing (VPZ) must be set up.</p> <ul style="list-style-type: none"> <li>The fencing can be cyclone fencing or parawebbing.</li> <li>This fencing must have clear signage stating these areas are 'no-go zones.'</li> <li>No-go zones must be identified in site inductions,</li> <li>The following cannot be undertaken in TPZ or VPZs: <ul style="list-style-type: none"> <li>No storage of machinery or equipment.</li> <li>No stockpiling or equipment, soil, debris, or rubbish.</li> <li>No soil disturbance.</li> </ul> </li> <li>Fencing to be checked by site supervisor during construction and maintained or repaired.</li> </ul>	C		
E10	<p>Construction Environmental Management Plan would include measures such as:</p> <ul style="list-style-type: none"> <li>Avoid noise encroachment on adjacent habitats.</li> <li>Avoid night works as much as possible.</li> <li>Avoid light spill towards vegetation.</li> <li>Bury cabling where possible to mitigate asset damages due to rodents and fauna.</li> </ul>	C	O	D
E11	<ul style="list-style-type: none"> <li>Daily monitoring of dust generated by construction activities; and</li> <li>Construction would cease if dust observed being blown from site until control measures were implemented; and</li> <li>All activities relating to the proposal would be undertaken with the objective of preventing visible dust emissions from the proposal site.</li> </ul>	C		D
E12	<ul style="list-style-type: none"> <li>A Weed Management procedure would be developed for the proposal to prevent and minimise the spread of weeds. This would include: <ul style="list-style-type: none"> <li>Management protocol for declared priority weeds under the Catchment and Land Protection Act, 1994 during and after construction.</li> <li>Weed hygiene protocol in relation to plant, machinery, and fill.</li> </ul> </li> <li>Any occurrences of pathogens such as Myrtle Rust and</li> </ul>	C		

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No.	Safeguards and impact minimisation measures	C	O	D
	Phytophthora would be monitored, treated, and reported; and <ul style="list-style-type: none"> <li>The weed management procedure would be incorporated into the Biodiversity Management Plan.</li> </ul>			
E13	<ul style="list-style-type: none"> <li>An erosion and sediment control plan would be prepared in conjunction with the final design and implemented.</li> </ul>	C		
E14	<ul style="list-style-type: none"> <li>An erosion and sediment control plan would be prepared in conjunction with the final design and implemented; and</li> <li>Spill management procedures would be implemented.</li> </ul>	C	O	D
E15	<ul style="list-style-type: none"> <li>Landscape plantings would be comprised of local indigenous species</li> <li>Inclusion of Grey Box, Yellow Box, Ironbarks, and Yellow Gum in any revegetation plans to replace the loss of local mature trees for Swift Parrot.</li> </ul>	C	O	
E16	<ul style="list-style-type: none"> <li>Awareness training during site inductions regarding enforcing site speed limits; and</li> <li>Site speed limits to be enforced to minimise fauna strike.</li> </ul>	C	O	D

*C: Construction (prior to and/or during); O: Operation; D: Decommissioning*

## Consistency with planning provisions

Under Greater Bendigo PS Clause 42.01 ESO1, the proposal triggers a permit as works would be proposed within land mapped by the ESO, however no native vegetation would be impacted. The proposal is considered consistent with clause 52.17 of the scheme as well as state planning policy framework provisions, clause 12.01 and farming zone decision guidelines as discussed in section 5.1 being consistent with the regional catchment strategy and the proposal would be sustainably managed.

The proposal has shown compliance with the environmental issues raised in clause 35.07-6, *the need to protect and enhance the biodiversity of the area, including the retention of vegetation and faunal habitat. The proposal is consistent with the general decision guidelines clause 65.01, requiring consideration of the extent and character of native vegetation and the likelihood of its destruction, whether native vegetation is to be or can be protected, planted or allowed to regenerate:*

- The Ecological Assessment (NGH, 2022), has addressed the potential removal of native vegetation and impacts on biodiversity and fragmentation of the landscape. To ensure that there is no net loss to biodiversity, measures of avoidance, minimisation and offsetting have been the focus for the siting of the proposal. Removal of native vegetation and protection of habitat would be carefully managed with the commitment and inclusion of appropriate avoidance safeguards and minimisation measures. The measures would be incorporated into EMP's for the proposal and implemented as needed through all stages of the proposal.

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## 5.3 Bushfire

The Solar Energy Facilities Design and Development Guideline (DELP, 2019) states:

- VPP Clause 13.02-1 Bushfire planning sets out policy objectives and strategies for managing bushfire risk in Victoria. Local planning schemes may identify an area as bushfire-prone by applying the Bushfire Management Overlay (BMO). If a site is located within the BMO, a referral to a relevant fire management authority will be required as part of the planning permit application process. Not all areas requiring bushfire risk management are within the BMO. A site might be located in a Bushfire Prone Area (BPA) with fire management requirements linked with the Building Act 1993. Proponents should consult the relevant fire management authority early in the site selection and design process, to ensure a facility avoids unnecessary bushfire risk exposure and has fire management planning in place to manage risk.

The entire subject land is identified as a bushfire prone area and partially subject to the Bushfire Management Overlay (BMO) as shown in Figure 5-2. A Bushfire Assessment Report (NGH, 2022) was completed for the proposal to address potential bushfire impacts. The existing and potential bushfire hazards present through the surrounding landscape were assessed against the matters identified in the Country Fire Authority (CFA) Design Guidelines and Model Requirements: Renewable Energy Facilities (CFA, 2022). The report has considered the Solar Energy Facilities Design and Development Guideline and Clause 13.02-1S of the planning schemes. An assessment against the CFA guidelines is included at section 8.1 of the Bushfire Assessment Report.

The purpose of the CFA guidelines is to provide standard measures and processes in relation to fire safety, risk and emergency management that should be considered when designing, constructing, and operating new renewable energy facilities and upgrading existing facilities. Requirements such as siting and design, access and fire protection measures associated with solar and BESS infrastructure is outlined in the Bushfire Assessment Report (NGH, 2022).

The report considers the existing fire risk associated with land use and vegetation and any changes posed by the change of land use to a solar facility and the potential design and layout of the proposal including the BESS options.

The proposal's site access would be exclusively via Toolleen Angle Road (Muskerry 'north'), with a site entrance established north of the proposal site. Muskerry 'south' would be accessed exclusively via the internal access tracks from Muskerry 'north', running south through 1//TP892631 and Lot 7B/D/PP3243. An emergency access point only would be provided in the south off Axedale Toolleen Road, allowing for safe access away from smoke or fire spread in both the north and south. Refer to Figure 5-3 and Figure 5-4. The proposal would also include a perimeter road and incorporate passing bays at least every 600 metres, with a length of twenty (20) metres and have a minimum trafficable width of six (6) metres.

Most of the historical native vegetation on the proposal site has been cleared and agricultural (grazing and cropping) and horticulture are prevailing land uses. Most of the proposal site is considered a low fuel load environment, typically comprises grassland vegetation. Scattered trees, and areas of woodland are present in limited areas throughout the proposal site. An area adjacent the south-western boundary of the proposal site contained wooded vegetation; however a limited fire run is available due to sporadic rural-residential settlements and a continuation of agricultural land uses is the broader locality, refer to Figure 5-3 and Figure 5-4. The proposal can achieve a

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bushfire attack level of BAL-12.5 by providing suitable setbacks from the property boundary and/or landscape screening, providing the desired level of bushfire protection for solar facilities.

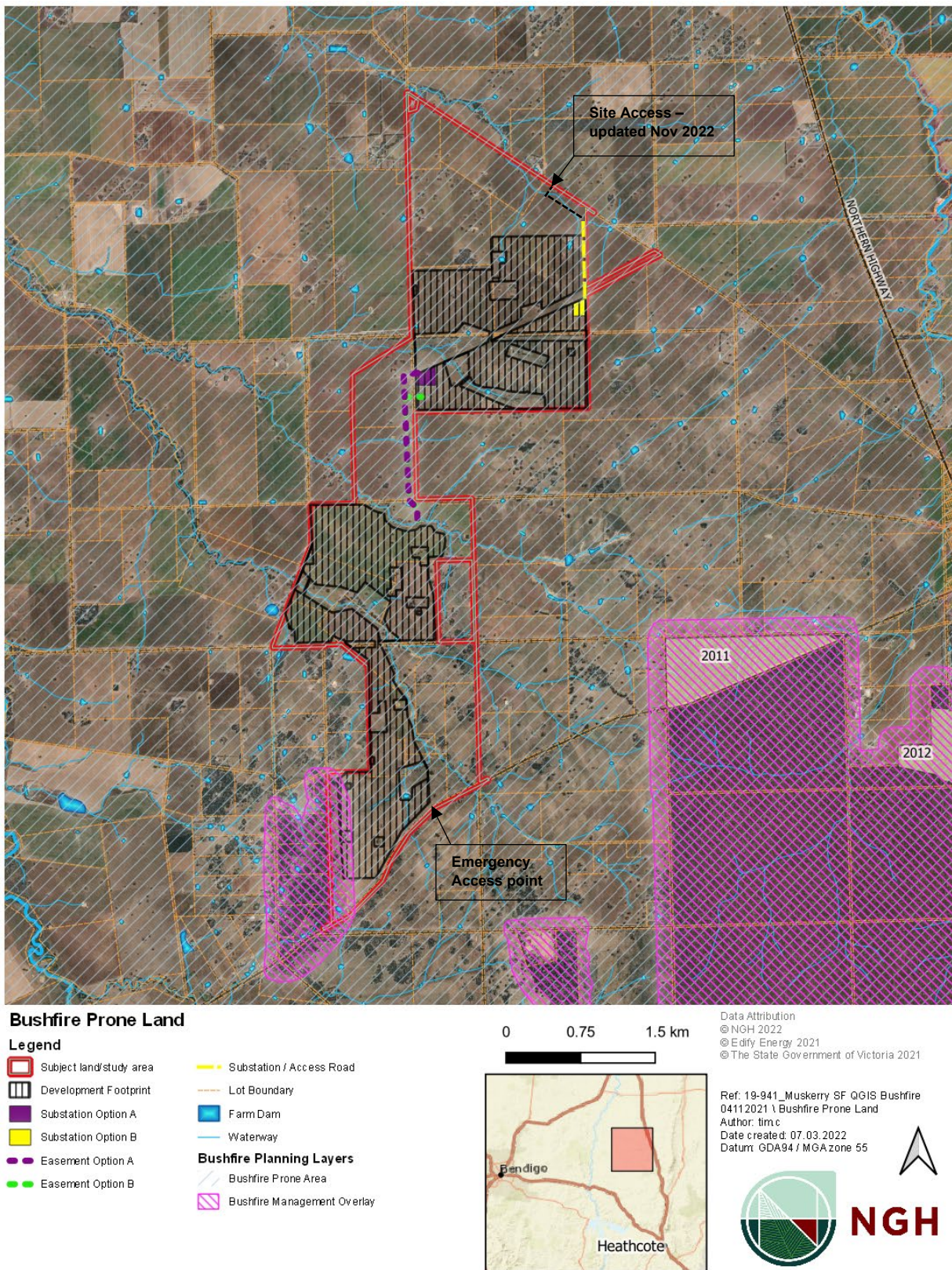


Figure 5-2 Bushfire prone area mapping and the proposal site (VicPlan 2022)

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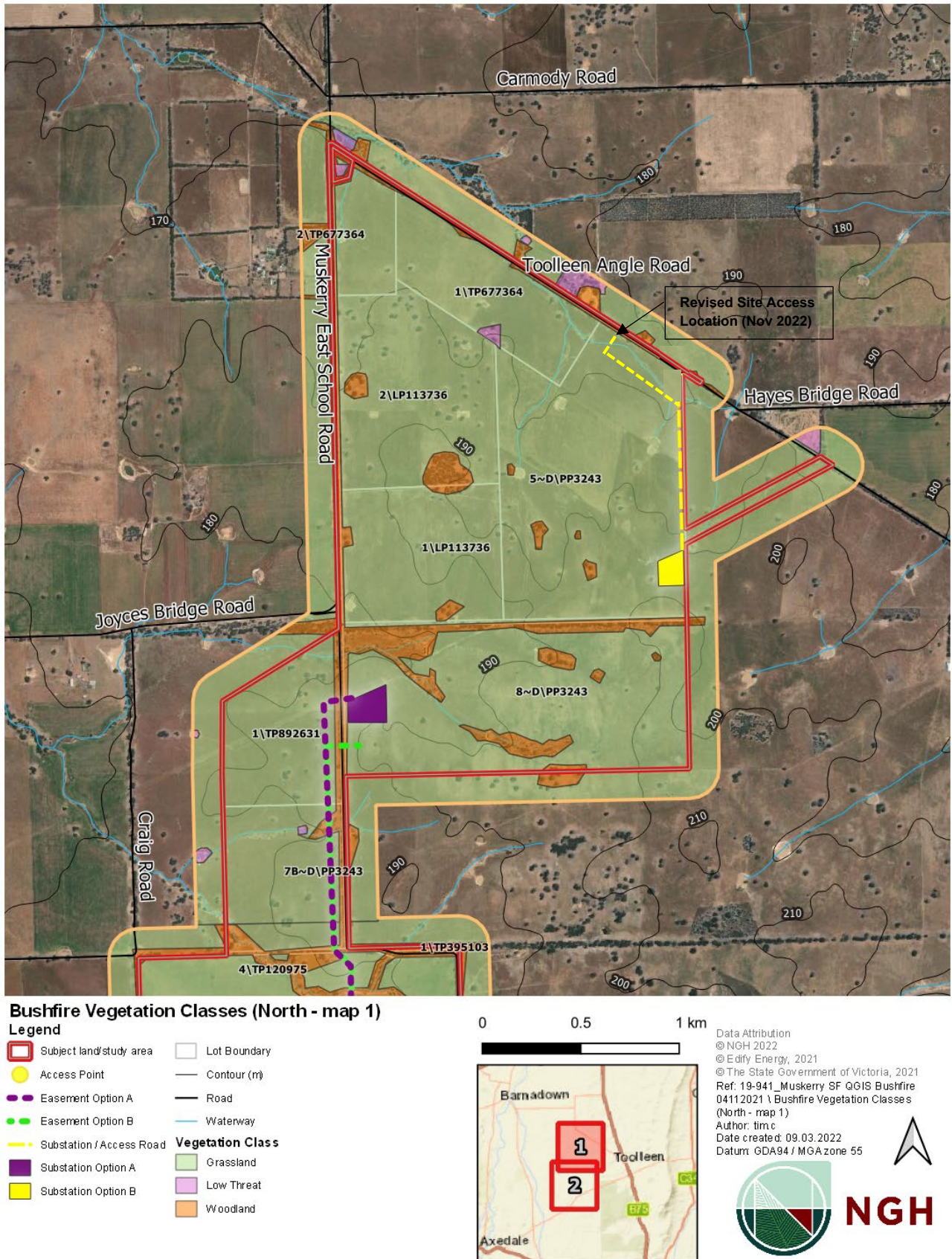


Figure 5-3 Bushfire prone vegetation map (north)

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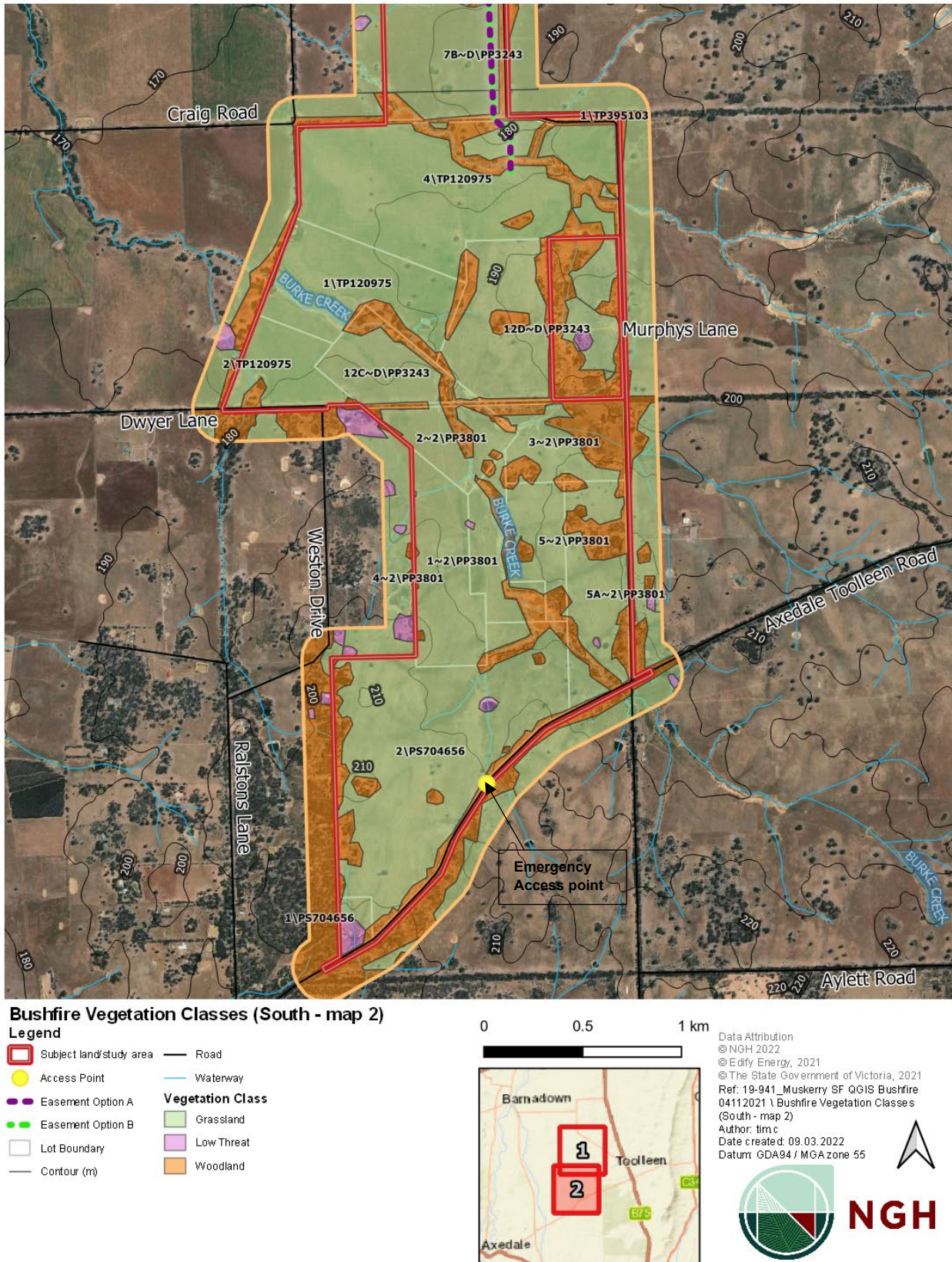


Figure 5-4 Bushfire prone vegetation map (south)

Some risks would be generated from the construction and operation of the MSPS, due to required operations and employment of up to 350 MSPS staff required on site during the construction phase. The risks would be minimised through application of CFA Guidelines, which would reduce the vulnerabilities of communities to bushfire, due to a considered design and well-equipped proposal site.

Following consideration of the proposed use and the potential bushfire threat that could generate from within the MSPS site and surrounding area, it is concluded that the proposal poses a low risk to human life. The proposal would not significantly increase the risk of bushfire within the landscape, in terms of ignition, fuels or changes in population. The application of design measures and buffers provided around infrastructure would reduce risk to an acceptable level, in light of the low-risk landscape present.

Risk, Fire and Emergency Management Plans would be prepared prior to the commencement of on-site activities, which would consider broader landscape risks, on site risks, and evacuation protocols in the event of an emergency.

The proponent commits to the following measures for the proposal, as outlined in Table 5-2.

Table 5-2 Bushfire safeguards and design measures

No.	Safeguards and design measures	C	O	D
BF1	<p>Prior to construction the following plans would be prepared to form part of the EMP's for the site:</p> <ul style="list-style-type: none"> <li>• Emergency Management Plan.</li> <li>• Risk Management.</li> <li>• Fire Management Plan.</li> </ul> <p>The EMP would be implemented during construction, operation and decommissioning as required.</p>	C	O	D
BF2	The plans for construction would be consistent with the EMP documents for the site in consultation with the CFA as required consistent with the CFA guidelines (CFA, 2022).	C		
BF3	The vegetation management plan should be prepared in consultation with an ecologist as needed. The plan would include planting lists for the site. Any planted vegetation would be Fire Resistant and Retardant Plants as the priority, or as otherwise guided by the management plans.	C	O	
BF4	Regular vegetation maintenance would occur within the fenced area of the proposal site throughout the operational phase to maintain low fuel loads to reduce risks associated with bushfire during the bushfire season and any buffer period necessary, or as otherwise guided by the management plans.	C	O	D

*C: Construction (prior to and/or during); O: Operation; D: Decommissioning*

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## Consistency with planning provisions

The proposal is considered consistent with particular provisions of the state planning policy framework, clause 13.02 of the scheme as discussed below:

- The provision of all bushfire management areas within the site would be consistent with the farming zone purpose to ensure that non-agricultural uses, including dwellings, do not adversely affect the use of land for agriculture. The proposal has been designed to give priority to the protection of human life and property.
- Consistent with the general decision guidelines clause 65.01, the proposal has been designed with consideration of the degree of fire hazard associated with the location of the land and the use, development, or management of the land to minimise any such hazard. The proposal would not significantly increase the risk of bushfire within the landscape, in terms of ignition, fuels or changes in population. The application of design measures and buffers provided around infrastructure would reduce risk to an acceptable level, considering the low-risk landscape present.
- The proposal has included measures to avoid and minimise risk from grass fires and electrical fires on the proposal plans included at Appendix A, including providing perimeter fire breaks.
- The proposal would have appropriate management plans prepared prior to construction and would form part of the EMP for the site. Advice from meetings with the CFA has been incorporated into the design. If required further consultation with the CFA would occur as part of the preparation of the EMP.

## 5.4 Watercourses (earthworks, overland flow and flooding)

The Solar Energy Facilities Design and Development Guideline (DELWP, 2019) states

- A solar energy facility should not lead to increased exposure of the area to flood or other natural or environmental hazard. A solar energy facility should not increase flood risks on the site or in the immediate area. Flood risks (unlike most other natural hazards) are predictable in terms of their location, depth and extent. This means a proponent can implement measures to reduce flood damage, including:
  - Minimising grading or levelling of the site, to avoid changes to overland water flow and discharge patterns.
  - Avoiding locations within the immediate floodplain or a watercourse or river system.

There is low potential for erosion or sediment impacting watercourses in the area and specifically the water courses that are within the proposal subject land. There are no likely impacts to the water table as infrastructure is limited to pile or screw driven posts, minimal trenching for connecting power between arrays and substation, and minor building/structure footings. There are no major earthworks anticipated for the proposal and as a result there would be no significant changes to the drainage regime of the site during construction and operation. The solar panels are raised above the ground and batteries would be hermetically sealed in modules that are housed within climate-controlled enclosures, and therefore would not be in direct contact with stormwater runoff.

The site is not subject to any erosion management or salinity management overlays. The soil and stormwater management for the proposal would be designed and maintained in accordance with the Victorian EPA 2020 guidelines including:

- Publication 1894, Manage soil disturbance.
- Publication 1893, Use a treatment train (multiple control) approach.
- Publication 1895, Manage stockpiles.
- Publication 1897, Manage truck and other vehicle movement.
- Publication 1896, Manage how you work within or adjacent to waterways.

The Muskerry Solar Power Station Flood Impact Assessment (Alluvium, 2022) (FIA) was prepared for the proposal to address the localised flooding which originates from rainfall runoff impacts through both the proposal site and areas immediately downstream of the proposal. For the Muskerry South development, flood impacts from Back and Burke Creek were also considered, as they are the major flow paths near or adjacent to the proposal. The proposal site, however, would not be located within designated flood affected land.

The FIA investigated the impacts from the 1% Annual Exceedance Probability (AEP) including flood levels, depths, velocities, and hazards.

The study area vegetation conditions would be reinstated like pre-developed conditions following construction and additional runoff from the study area is unlikely to occur. Small increases in imperviousness are unlikely to increase effects. Therefore, the modelled existing conditions are likely to reflect the impact of the solar panels on the downstream runoff.

The two potential impacts the proposal could have on flooding and runoff external to the study area are:

- Impacts on flood levels due to the study area obstructing flow.
- Impacts on flood levels due to the study area producing extra runoff.

Maximum flood depths of up to 1.6m were recorded and these typically occurred around the edges of Burke Creek and within farm dams. Note farm dams within the proposal area may be filled and levelled as part of the project removing potential flooding associated with dams. Most of the southern area of the proposal experience flood depths below 0.1m. Existing flow conditions were found to be typically safe, flood impacts found to be primarily contained within the creeks with only minor incidences of flows breaking out of the creeks and onto the development area in the 1% AEP event. Most of the proposal site would have a high level of flood immunity.

The proposed creek crossings were considered within the proposal site. Internal access roads within the proposal would be required for delivery of construction materials and for operations and maintenance longer term. Access in the Muskerry North site only needs to consider standard civil drainage as the catchments are very small and flows are distributed. However, accessing the Muskerry South site would require crossing both Back Creek and Burke Creek. Low profile crossings are proposed and would allow water to flow over the road and do not store or impede the flow to downstream properties, nor create a backwater impact on upstream landholders. During times of flooding these causeways are likely to be temporarily impassable but are the preferred option over raised crossings with culverts.

The FIA concluded that the risk to human life and infrastructure is considered very low.

The potential risks associated with waterways for the proposal can be reduced by designing in accordance with relevant codes and best practice standards. These measures are outlined in Table 5-3.

Table 5-3 Soil and water safeguards and minimisation measures

No.	Safeguards and minimisation measures	C	O	D
W1	A Soil and Water Management Plan would be included in the EMP for the proposal. The plan would specifically address overland flow and sediment and erosion control and management of any works within the watercourses. The plan would avoid or minimise earthworks which change the rate of flow or the discharge point of water across a property boundary and control and avoid impacts to watercourses on the subject land.	C	O	D
W2	Prior to commencement of construction civil design plans would be provided to DELWP for approval for the proposed creek crossings.	C		
W3	The facilities should still be designed with consideration of the flood modelling results to ensure assets are set to an appropriate height above ground to avoid nuisance flooding from local runoff.	C		

*C: Construction (prior to and/or during); O: Operation; D: Decommissioning*

## Consistency with planning provisions

The proposal is considered to be consistent with the provisions of the scheme, specifically the provisions of State Planning Policy Framework Clause 12.03-1S as it relates to river corridors and waterways, Clause 13.01-1S Natural hazards and climate change as it relates to minimising the impacts of natural hazards and adapting to the impacts of climate change through risk-based planning, and Local Planning Policy Framework Clause 21.05 Natural Environment of the Campaspe PS and Strategic directions of the Greater Bendigo PS. Appropriate management plans would be prepared prior to construction to manage soil and water impacts of the proposal.

The proposal has shown consistency with the farming zone decision guidelines as discussed in section 5.1, specifically being consistent with the regional catchment strategy and the proposal would be sustainably managed. The proposal has addressed the environmental issues raised in clause 35.07-6, *the impact of the proposal on the natural physical features and resources of the area, in particular on soil and water quality*, and clause 65.01 *the degree of flood or erosion hazard associated with the location of the land and the use, development or management of the land so as to minimise any such hazard*:

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- The proposal would be sustainably managed, and a site specific Soil and Water Management Plan would be developed prior to construction. Overland water flow can be controlled (with interventions) within the proposal site boundaries, including direction of overland flow (other than clean water) away from waterways, but may not be needed depending on the outcomes of the Soil and Water Management Plan developed for the site.

## 5.5 Agricultural considerations

The Solar Energy Facilities Design and Development Guideline (DELWP, 2019) requires assessment of:

- Potential impacts to agricultural lands that may be high value and of strategic importance.
- Agricultural productivity/carrying capacity of the land.
- Agricultural use, pre, during and post operation.
- Agricultural values and impacts to the wider agricultural land use in the region.

The subject land has minimal slope, with drainage to water courses that traverse the property. Most of the subject land has been established over time as agricultural grazing land, some areas of natural vegetation are present along water courses, singular and grouped paddock trees, and small and larger patches including along boundaries. The subject land is not within the mapped areas of significant landscapes. The proposal is located within the Campaspe River basin within the North Central Catchment Management Authority region.

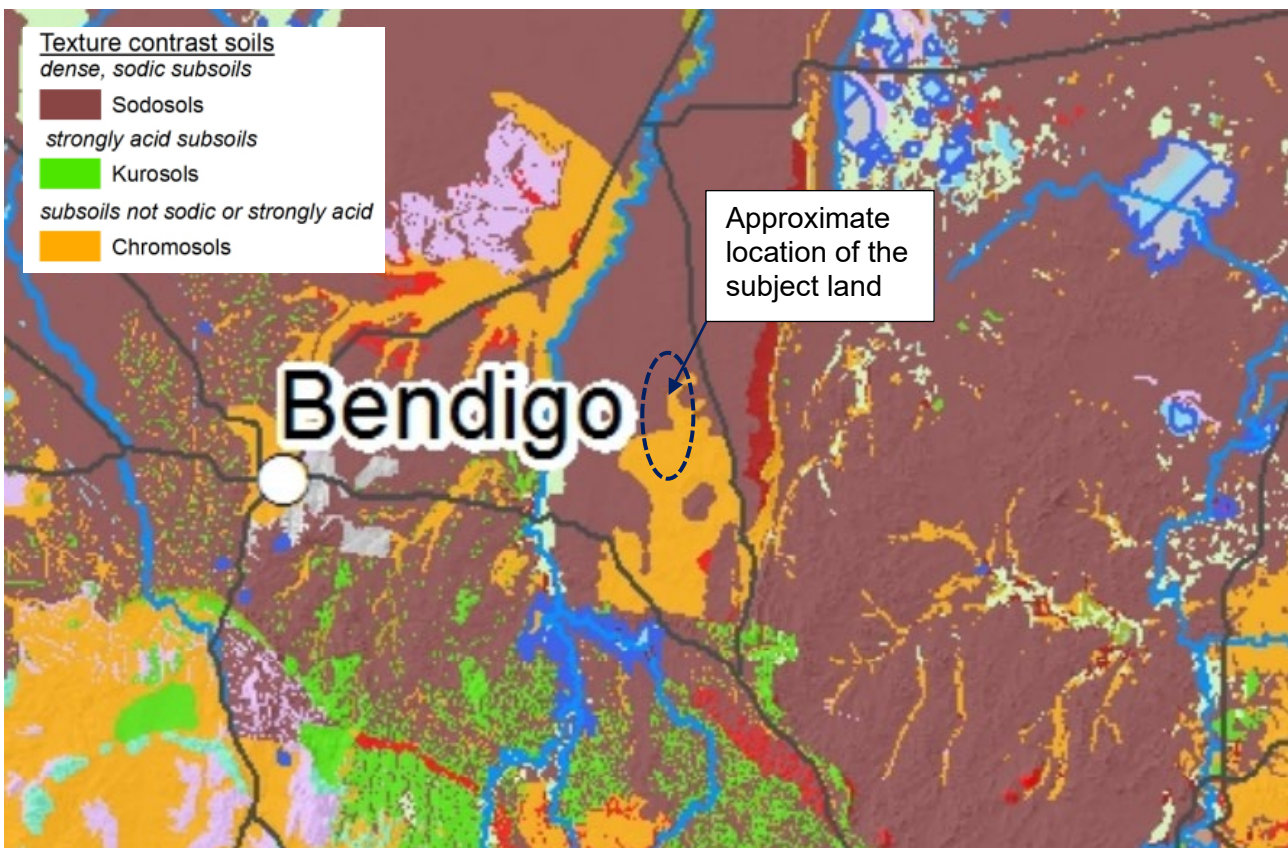


Figure 5-5 Victorian Soils Map (VRO, 2022)

The subject land, as shown in Figure 5-5 and Figure 5-6, includes the following soils and soil landscapes:

- Sodosols (Red) and Chromosols.
- Alluvial Floodplains, Granitic Terrain and Undulating Terrain including northern foothills.

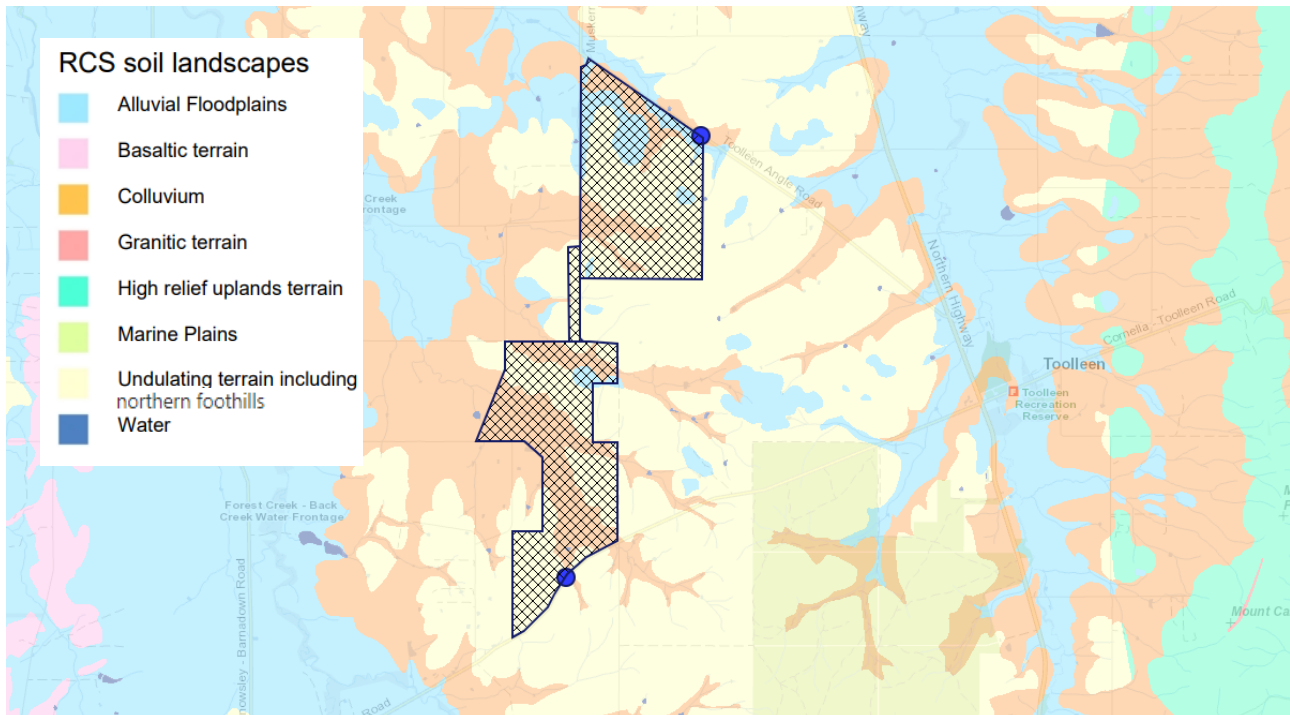


Figure 5-6 Soil landscapes mapping (Source: NCCMA, 2022)

Red Sodosols include older alluvial plains lighter soils that have higher productivity. Gentle hillslopes are generally land used mostly for grazing. Productivity is limited by factors such as low rainfall, poor soil structure, sheet erosion and gully erosion.

Chromosols can be found on hillslopes in the uplands and on volcanic plains. Structure and permeability are favourable, but land use is mainly grazing.

Clause 21.02 of the MSS sets out the key elements of the Campaspe Shire Strategic Framework Plan. The map identifies the area near the proposal site as an area to promote intensive animal industries. The proposal would not conflict with any development of this type on the subject or surrounding land. The proposal site, however, has no direct strategic importance and is also not within an irrigation district.

As the impacted areas of land would be limited due to the proposed construction measures, there would be continued growth of pasture after the construction of the solar proposal.

There would be medium-term loss of part of the agricultural land of the site, but this would not prohibit grazing of cattle or sheep, or cropping, on the remainder of the subject land during operation of the proposal. Co-location, sheep grazing, within the solar array may be a future agricultural option depending on operational management constraints and animal welfare:

- *The proposal would continue to investigate the viability of co-locating sheep grazing within the proposal site. Edify anticipates this proposal would represents the best use of the site,*

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as it would co-locate a productive and viable sheep grazing activity alongside a renewable energy project.

- *Edify Energy is experienced in co-locating sheep grazing within solar facility boundaries, establishing one of the first 'AgriSolar' projects in Victoria. In 2020, Edify introduced the grazing of 300 sheep to their operational Gannawarra Solar and Energy Storage Farm in Victoria, in partnership with the host-landholder. By proving the practical success of co-locating solar and sheep farming to industry participants, insurance providers and government regulators, Edify's AgriSolar model helped establish an improved industry practice, with this benchmark now commonplace throughout the industry.*
- *Edify's Muskerry project would build on the experience and inhouse success of Edify's existing Victorian AgriSolar project, the Gannawarra Solar Farm. Edify aims to establish the Muskerry Solar Power Station development to further showcase that solar generation projects can occur in collaboration with an agricultural activity and thus derive the highest value and best use of land.*
- *Edify's agricultural investigations indicate the land can accommodate approximately 1,000 head of sheep. The intention for the project is to sustainably maximise the head of sheep on the land to continue the agricultural use of the site, in an attempt to honour and preserve the agricultural activity to that currently operated on the land.*
- *Sheep grazing has been proven to be one of the most compatible livestock when grazing around a solar array, and investigations by Edify Energy have identified that merino sheep are being grazed in the Bendigo and Campaspe regions. To introduce sheep grazing into the project is considered both a positive outcome of the project and the growth of the sheep grazing industry in the region.*
- *Edify anticipates the following benefits would be derived from co-locating sheep grazing within the proposal site:*
  - *The sheep growth rate and fertility should be higher under the solar panels compared to the direct sunlight, due to the abundant shade and lower temperatures;*
  - *The shading effect of solar panels creates a micro-climate under the panels with differences in air temperature, humidity, wind speed and soil moisture. This leads to higher water efficiency and soil moisture retention which would help with pasture production for the sheep;*
  - *Increased sheep stock and health would ensure a better product for farmers, resulting in lower mortality rates and increased profit potential. The benefits would follow on through to customers of the sheep products; and*
  - *Controlled grazing of the sheep would reduce the risk of fire and reduce the cost of slashing, which in turn lowers the operational cost of the project and supports the provision of low-cost electricity supply for Victorian customers.*

The proposal would have no effect on the ability of surrounding property owners to operate, nor would it impact on the agricultural sector in the wider region.

When the proposal is decommissioned, there would be no likely adverse impact on the agricultural potential of the proposal site. Measures to manage any decline in soil fertility would need to be addressed as part of site rehabilitation.

The proposed agricultural management measures are outlined in Table 5-4.

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Table 5-4 Agricultural impact safeguards and minimisation measures

No.	Safeguards and design measures	C	O	D
A1	The landscape management plan for the proposal would include measures for revegetation of disturbed ground as needed. Specific management measures would be included if co-location (sheep grazing or other suitable agricultural activity) would occur within the proposal site.	C	O	D
A2	As part of decommissioning rehabilitation works, the management plan would need to include as needed any measures to address any decline in soil fertility and would provide for land to be returned to a state suitable for agriculture/the proposed land use.			D

### Consistency with policy provisions

This PR has addressed the potential for state, regional and local agricultural impacts, land capability, continuation of farming on the subject land, and compatibility of the proposal considering surrounding agricultural land uses.

The proposal is considered consistent with the farming zone purpose. The assessment demonstrates that the proposal is consistent with the Natural Resources Management provisions of the scheme, specifically the provisions of State Planning Policy Framework Clause 14.01-1S Protection of Agricultural Land and Local Planning Policy Framework for Campaspe Clause 21.05 Natural Resource Management.

The proposal has shown consistency with the farming zone decision guidelines as discussed in section 5.1, specifically being consistent with the regional catchment strategy water and land provisions and the proposal would be sustainably managed. The proposal has addressed the environmental issues raised in clause 35.07-6, *whether the use or development will support and enhance agricultural production, whether the use or development will adversely affect soil quality or permanently remove land from agricultural production, the potential for the use or development to limit the operation and expansion of adjoining and nearby agricultural uses, the capacity of the site to sustain the agricultural use, the agricultural qualities of the land, such as soil quality, access to water and access to rural infrastructure* and clause 65.01, *factors likely to cause or contribute to land degradation*:

- The proposal would be sustainably managed and support the farming enterprise on the subject land and a site specific Soil and Water Management Plan would be developed. There are no foreseen compatibility or adverse impacts to agriculture continuing on the subject and surrounding land (during, construction, operation, and post rehabilitation).

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## **5.6 Noise**

The Solar Energy Facilities Design and Development Guideline (DELWP, 2019) requires assessment of noise impacts and requires levels at or below the levels in EPA Victoria's Noise from industry in regional Victoria guideline.

A Noise Impact and Constraint Assessment (Spectrum Acoustics, 2022) (NICA) has been prepared for the proposal to determine noise levels, the findings are summarised below, and the report is provided at Appendix E. The NICA was prepared to assist with the iterative design process and establishes noise mitigation and plant setback zones to ensure the project would comply with noise criteria for non-associated residential receivers.

Background noise modelling was not required due to the rural nature of the proposal site and minimal traffic noise and background noise impacts. Using the EPA publication 1413 Noise from Industry in Regional Victoria (NIRV) the night time noise criterion of 32 dB(A), Leq(15min) was used to determine potential impacts for surrounding residential receivers. 51 receivers are located within approximately 3.5km of the proposal site.

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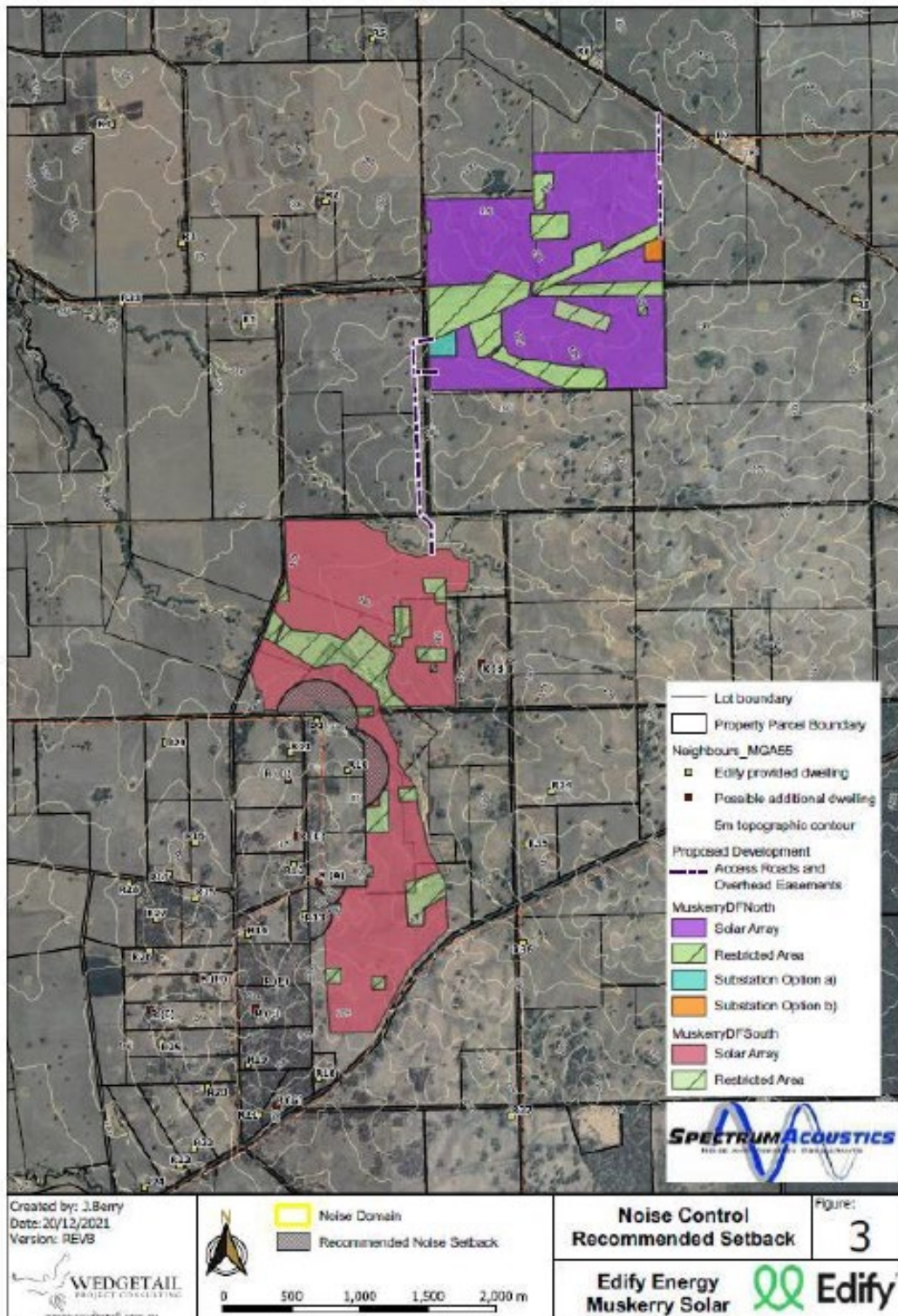


Figure 5-7 Sensitive receivers mapped for the noise assessment (Spectrum Acoustics, 2022)

Noise modelling was completed using worst case scenario, using the highest noise emission profile for PCU's, to conservatively predict the highest potential noise impact. The modelling considered all possible scenarios for the constructed layout including the two substation location options, and two BESS options (centralised and decentralised).

Preliminary noise modelling predicted off-site noise levels well below 20 dB(A) for either substation location option. Modelling also confirmed levels well below the criterion for the centralised BESS option.

Due to the operating noise of battery's, the decentralised battery option could potentially place batteries close to receivers near the proposed southern section of the site, Muskerry South. The design noise criterion is not exceeded for the decentralised BESS option under calm atmospheric conditions. The noise contours expand under adverse (wind) conditions to produce levels exceeding the criterion at receivers R9 and R10 and approaching the criterion at R12 and R51 near the proposed southern section. To avoid impacts to these receivers, noise source exclusion zones (setback areas) in which battery system enclosures should not be located have been recommended. These setback zones, approximately 240 m for R51 and R12 and 325m for R9 and R10, are a worst case based on the assumption that every receiver is directly down-wind from every noise source. These setback zones may be open to refinement (reduction) in future design stages of the project.

The proposed noise management measures are outlined in Table 5-5.

Table 5-5 Acoustic impact safeguards and minimisation measures

No.	Safeguards and minimisation measures	C	O	D
A1	Implement construction noise mitigation measures outlined in the Acoustic Assessment (Spectrum Acoustics, 2022), incorporate relevant measures into EMP's and final design plans.	C		
A2	Ensure adequate procedures are in place for addressing any complaints received during construction and operation	C	O	

## Consistency with planning provisions

The proposal is considered consistent with the provisions of the scheme, specifically the provisions of clause 53.13 as it relates to noise and protection of amenity. Appropriate management plans would be prepared prior to construction to manage noise impacts of the proposal.

The proposal has addressed the general decision guidelines Clause 65.01, specifically *the effect on the environment, human health and amenity of the area*. No adverse noise impacts are anticipated.

The proposal suitably considers and addresses potential noise impacts and provides proposed mitigations consistent with the Solar Energy Facilities— Design and Development Guideline (DELWP, 2019).

## 5.7 Traffic

The Solar Energy Facilities Design and Development Guideline (DELWP, 2019) requires preparation of a Traffic Impact Assessment (TIA). The TIA should:

- Identify access routes and all roads that would be used to transport construction materials.
- Identify access routes, types of vehicles and traffic generation when the facility operates.
- Specify the timing, type of vehicle, daily volume, and scheduled delivery times of construction materials.
- Provide timelines for the whole construction stage.
- Identify intersection upgrades and any road works required to accommodate access to the site and specify if these are temporary arrangements.

A Traffic Impact Assessment (TIA) (AMBER, 2022) has been prepared for the proposal, the findings are summarised below, and the report is provided at Appendix F. The TIA has included consultation with Department of Transport, the City of Greater Bendigo Council and Campaspe Shire Council.

Construction and Operational access to the proposal site would be via a new crossover entry to Toolleen Angle Road (northern end of the site). An emergency use only exit would be located at the southern end of the site using an existing farm gate location with access to Axedale Toolleen Road. Staff are expected to primarily be staying in Bendigo and surrounds with most plant and equipment expected to be delivered from Port of Melbourne, with the remainder being sourced locally or interstate.

Road transport is the preferred option for the delivery of construction infrastructure. It is expected that the haulage route for most heavy and over-dimensional vehicles during construction would be directly via the Northern Highway and Toolleen Angle Road as all site access would be via the site entry off Toolleen Angle Road.

The TIA details how road impacts of the project traffic, particularly from heavy vehicle use and oversize and overmass vehicles, would be avoided or managed using road-use management strategies.

Toolleen Angle Road:

- Is a B-Double declared road.
- Between Northern Highway and the site access has a sealed carriageway width of approximately 6.5m extending from Northern Highway for approximately 150m, which then reduces to a width of approximately 3.5m and has 1.5m wide unsealed shoulders on both sides of the road.
- Provides a sight distance of more than 300m at the site access.
- Is expected to have a low level of traffic (no specific data was available).

Victorian survey data (two-way movements per day) was considered for other roads to determine traffic volumes:

- The Northern Highway - 1947 vehicles per day (vpd)
- Mclvor Highway - 1740vpd
- Axedale Tooleen Road - 379vpd

These roads have a moderate to low traffic volume, Northern highway was found to have a higher than normal proportion of heavy vehicles.

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The construction is expected to take approximately 12-16 months, with the peak construction period expected to take 4-5 months.

A maximum of 350 staff would be on-site during peak construction periods. It is understood that shuttle buses would be provided that can accommodate most staff, with the remaining staff to access the site using private vehicles.

The estimated total and (peak) maximum daily traffic movements (one way) during construction are detailed in the TIA and summarised below:

The following provides a breakdown of activities and staff numbers and vehicle movements:

- Construction
  - During peak construction the proposal could generate up to 70 heavy and 64 light vehicle movements per day. A *vehicle movement* means a vehicle travelling in one direction (i.e. a truck accessing the site would generate one movement towards the site and one movement away from the site when it departs).
  - 40 vehicle movements are likely during the morning and evening peak hours.
  - Most light vehicle movements are expected to access the site from the north-western end of Toolleen-Angle Road (Muskerry East School Road) and most heavy vehicles are expected to access the site from the south-eastern end of Toolleen-Angle Road (Northern Highway).
  - These traffic volumes can be readily accommodated on the road network and all roads are expected to continue to operate with a good level of service. Accordingly, it is concluded that the road network can accommodate the traffic generated by the Solar Power Station during the construction period.
  - Construction activities would be undertaken during standard daytime construction hours, as follows:
    - Monday to Friday: 7am–6pm.
    - Saturday: 7am–1pm.
    - No work on Sundays or public holidays.
  - Any construction outside of these normal working hours would only be undertaken with prior approval from relevant authorities.
  - Construction traffic would include:
    - Light vehicles including shuttle buses – to transport staff.
    - Medium and heavy rigid trucks – to deliver raw materials and small plant.
    - Articulated vehicles and B-Doubles – to transport larger plant.
    - Restricted access vehicles/oversized and overmass (subject to specific road permits) – to transport oversize plant such as the substation transformer.
- Operations— based on 10 FTE staff (emergency and refurbishment excluded)
  - Up to 10 vehicle trips may be generated per day. During operation the proposal is expected to generate a minimal level of traffic associated with maintenance and operation services. The proposal is expected to be operated by up to 10 staff resulting in a traffic generation of up to 10 vehicle movements per day (noting this is the worst case and would not be a daily occurrence as operational staff would be

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expected to visit the site intermittently) which would result in a negligible change to the traffic environment.

Access to the site would be designed in accordance with *Guideline Drawing AGRD Part 4 – Typical Design to Rural Properties* (Vic Roads, 2020).

The road network can accommodate the traffic generated by the proposal with some minor upgrades to the Northern Highway/Toolleen Angle Road intersection and widening of the sealed section of Toolleen Angle Road to the site entry:

- The intersection of Northern Highway and Toolleen-Angle Road is proposed to be provided with a Basic Right Turn and Basic Left Turn treatment to allow for safe vehicle movement from the arterial road network.
- Toolleen-Angle Road is proposed to be widened to a minimum width of 6.5 metres between Northern Highway and the site access to allow for simultaneous two-way vehicle movement.

Traffic Management Plans would be implemented for all stages of the proposal. Safeguards are outlined in Table 5-6.

Table 5-6 Traffic safeguards and management measures

No.	Safeguards and management measures	C	O	D
T1	<p>Prior to construction a Construction Traffic Management Plan (CTMP) would be prepared (by the appointed contractor), this would form part of the EMP for the proposal. The CTMP would provide additional information regarding the traffic volumes and distribution of construction vehicles that is not available at this time, including:</p> <ul style="list-style-type: none"> <li>• Road transport volumes, distribution and vehicle types broken down into: <ul style="list-style-type: none"> <li>○ Hours and days of construction.</li> <li>○ Schedule for phasing/staging of the project.</li> </ul> </li> <li>• The origin, destination, and routes for: <ul style="list-style-type: none"> <li>○ Employee and contractor light traffic.</li> <li>○ Heavy vehicle traffic.</li> <li>○ Oversize and overmass traffic.</li> </ul> </li> </ul>	C		
T2	<p>The following measures would be adopted within the CTMP to minimise the impact of construction traffic along the road network:</p> <ul style="list-style-type: none"> <li>• Neighbours of the Solar Power Station be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.</li> <li>• Loading and unloading is proposed to occur within the work area. No street or roads would be used for material storage at any time.</li> <li>• All vehicles would enter and exit the site in a forward</li> </ul>	C		

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No.	Safeguards and management measures	C	O	D
	<p>direction.</p> <ul style="list-style-type: none"> <li>Management of vehicular access to and from the site is essential to maintain the safety of the general public as well as the labour force. The following code is to be implemented as a measure to maintain safety within the site: <ul style="list-style-type: none"> <li>Utilisation of only the designated transport routes.</li> <li>Construction vehicle movements are to abide by finalised schedules as agreed by the relevant authorities.</li> </ul> </li> <li>Implementation of a proactive erosion and sediment control plan for on-site roads, hardstands, and laydown areas.</li> <li>Engagement with local schools and school bus operator to avoid deliveries to site that coincide when school buses are sharing designated transport route(s).</li> <li>All permits for working within the road reserve must be received from the relevant authority prior to works commencing.</li> <li>A map of the primary haulage routes highlighting critical locations.</li> <li>An induction process for vehicle operators and regular toolbox meetings.</li> <li>A complaint resolution and disciplinary procedure.</li> <li>Local climatic conditions that may impact road safety of employees throughout all project phases (e.g., fog, wet and significant dry, dusty weather).</li> </ul>			
T2	The operational EMP would include measures for management of traffic for maintenance and emergency.		O	
T3	A Traffic Management Plan would be prepared prior to the decommissioning phase in conjunction with the relevant road authorities.			D
T4	All TMP's and EMP documents would be prepared in accordance with recommendations in the TIA (AMBER, 2022).	C	O	D

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## Consistency with planning provisions

The proposal is considered consistent with the provisions of the scheme, specifically the provisions of clause 53.13 as it relates to traffic generation and road safety and impacts on roads that would be used for the proposal. Appropriate management plans would be prepared prior to construction to manage traffic impacts of the proposal.

The proposal has shown consistency with the farming zone decision guidelines as discussed in section 5.1. The proposal has addressed the design and siting issues raised in clause 35.07-6, *whether the use and development will require traffic management measures* and general decision

guidelines clause 65.01 specifically *the adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts, the impact the use or development will have on the current and future development and operation of the transport system, and the effect on the environment, human health and amenity of the area*. All anticipated traffic impacts would be managed by the implantation of a Traffic Management Plan and safe access designs that would form part of the EMP for the site.

The proposal suitably considers and addresses potential traffic impacts and provides proposed mitigations consistent with the Solar Energy Facilities - Design and Development Guideline (DELWP, 2019).

## 5.8 Visual impact and amenity (including light spill and dust control)

The Solar Energy Facilities Design and Development Guideline (DELWP, 2019) requires assessment of the visual impact of a solar energy facility, including:

- The sensitivity of the landscape and its ability to absorb change.
- The size, height, scale, spacing, colour and surface reflectivity of the facility's components.
- The number of solar energy facilities located close to each other another within the same landscape.
- The excessive removal, or planting of inappropriate species of vegetation.
- The location and scale of other ancillary uses, buildings and works including transmission lines, battery storage units and associated access roads.
- The proximity to environmentally sensitive areas such as public land, water courses and low-lying areas.

To address the requirements of the guideline, a Landscape Character and Visual Impact Assessment (VIA) was completed for the proposal. The report is summarised below and included in Appendix G.

The project site is comprised of two sections, the northern portion bounded to the north by Toolleen-Angle Road and west by Muskerry East School Road and the southern portion bounded to the south by Axedale-Toolleen Road and north by Craig Lane. Key visual elements of the project include:

- Solar panels interconnected to form solar arrays.
- Inverters and integrated transformers combined in prefabricated enclosures (one inverter and transformer for each solar array).
- Metal mounting structures.
- Above-ground (and underground) DC cabling.
- Central 33 kV switchboard (ring main unit).
- Battery energy storage system (BESS) units comprising sealed lithium-ion batteries housed in enclosures that resemble shipping containers in dimensions and appearance and are up to 3m in height.
- A high voltage (HV) substation, fitted with lightning rods, to connect the proposal to the transmission network. There are currently two options for the substation location along the existing transmission line running northeast-southwest through the northern portion, option a in the west and option b to the east (see Figure 1.2).

- A prefabricated operations and maintenance (O&M) building.
- Permanent staff and contractor car parking area.
- Permanent all-weather site access (south from Toolleen Angle Road) and an access road approximately 10 m wide connecting from the northern portion to the southern portion leading to the office and substation.
- A permanent CFA access to the southern portion of the site (north from Axedale-Toolleen Road).
- Internal vehicle access tracks (4 m wide) leading to solar arrays and power control units (PCUs).
- Perimeter safety fencing and a fixed, closed-circuit television (CCTV) system.
- Temporary site compound, lay-down area/s, and equipment storage areas during construction.
- The high voltage substation would be installed adjacent to an existing AusNet 220 kV transmission line that crosses the northern portion of the project site from east to west. The BESS units would either be distributed in groups throughout the site (decentralised) or consolidated in a single location next to the substation (centralised).

The VIA is based on a combination of professional qualitative judgement and commonly accepted industry criteria and guidelines.

The assessment methodology included the following, but not limited to:

- A desktop review of aerial photography to identify landscape character and potential visual receptors.
- Ground-truthing of desktop research by Accent representatives on 30<sup>th</sup> March to 1st April 2022, during which viewpoints were finalised and photographed to reflect key views of sensitive receivers of the project site.
- Brief discussions with the sensitive receivers to take the most representative photographs and record the specific sensitivities of receivers.
- Description and evaluation of the existing landscape character and visual environment.
- Assessment of potential visual impacts of project night lighting on surrounding residences, scenic/significant vistas, air traffic and road corridors.
- Assessment of the degree of potential reflective visual nuisance (glare and glint) based on the proposed solar arrays, buildings, and the existing environment.
- Preparation of photomontages from six key viewpoints.
- Visual impact assessment providing a grading the sensitivity of the landscape and receptors and magnitude of any likely site development impacts.

The report found:

- The landscape which hosts the proposal is an undesignated landscape with few distinctive landscape characteristics. Whilst there are few landscape detractors (mainly power lines and towers, which is consistent with the proposed solar infrastructure) the landscape has a moderate ability to absorb change. As such the landscape receptor has limited sensitivity to disturbance or change in character due to the proposal.
- The magnitude of the landscape effects due to the proposal has been determined as Medium.
- 98 non-associated residences located within 5 km of the project site, 45 of the residences (R1-43, R45 and R47) were identified receivers requiring detailed visual assessment.

- The proposal site is visible from the nearest roads (Toolleen Angle Road and Axedale Toolleen Road and several smaller local roads). These roads are therefore also classified as visual receivers, requiring a detailed visual assessment. Roads in the vicinity of the project site are used for functional purposes (e.g., movement to a major highway, or access to farmland via local roads).
- The viewpoints for potential montages were chosen based on modelling of potential views based on topography and design of the proposal. 6 viewpoints (VP1-VP6) for analysis and photomontage. 14 additional viewpoints (VP7-VP20) were analysed but montages were not required.
- Visual impact ratings for the 6 viewpoints were:
  - VP1 had a visual impact rating of Moderate/High (representing a view from a residence).
  - VP2a had a visual impact rating of Moderate/High (representing a view from a residence).
  - VP2b had a visual impact rating of Low (representing a view from a road and residence).
  - VP3 had a visual impact rating of Moderate (representing a view from a residence).
  - VP4 had a visual impact rating of Moderate (representing a view from a road and residence).
  - VP5 had a visual impact rating of Very Low (representing a view from a residence).
  - VP6 had a visual impact rating of Low (representing a view from a residence).
  - All other viewpoints rated as Low/Moderate, Low, Very low or No impact.
- A minor/negligible amount of light spill from the proposal may be visible from residences, between the winter construction period between approximately 5 pm and 6pm (particularly R1, R2, R3, R7 and R8). There are no likely lighting impacts for roads or aircraft.

Glint and Glare was considered as part of the VIA. The assessment concluded that there would be minimal likelihood of any glint or glare impacts due to reflectivity levels of the solar panels, design of the solar tracking system limiting solar angles that create glare, and relative glare in relation to the existing environment. The resulting specular glare is likely to have a negligible influence on sensitive receivers, and any glare would reflect away from ground-based receivers. Existing and proposed vegetation provides appropriate minimisation, no further management would be required.

The VIA identified operational mitigation and management measures, including consideration of the necessity for site landscaping and visual screening, the measures are provided in Table 5-7.

Table 5-7 Visual safeguards and minimisation measures

No.	Safeguards and minimisation measures	C	O	D
V1	The proposals would include landscaping as identified on the Landscape Plan included in the Landscape Character and Visual Impact Assessment (Accent Environmental, 2022). Landscaping would be planted early in the construction phase and maintained for the life of the proposal. A maintenance plan would form part of the EMP for the proposal.	C	O	
V2	The detailed design and EMP's for the proposal would be consistent with the general recommendations for minimising and	C	O	

No.	Safeguards and minimisation measures	C	O	D
	managing visual impacts and maintaining the landscape character as described in section 5.1 of the Landscape Character and Visual Impact Assessment (Accent Environmental, 2022).			

## Consistency with planning provisions

The proposal is considered consistent with the provisions of the schemes, as follows:

Clause 12.05-2S Environmental and landscape values. Although not subject to a significant landscape overlay, the VIA has considered the aesthetic values of the landscape and enhancement with natural features, screening vegetation, to minimise visual impacts.

Clause 13.07-1S Land use compatibility. The VIA has considered amenity of residents within 5km of the proposal site. From a visual perspective, the proposal is considered compatible with the surrounding developments as the proposal with the measures proposed has been sited, to avoid incompatibility.

Clause 15.01-6S Design for rural areas. The VIA has considered the aesthetic values of the rural area the proposal would be located within. The proposal has been sited, and with the measures proposed would minimise visual impacts on surrounding natural scenery and landscape features.

Clause 19.01-2S Renewable Energy. As the proposal has been designed to have appropriate siting and design considerations met, specifically to minimise the effects of a proposal on the local community and environment.

## 5.9 Glint and Glare

The Solar Energy Facilities Design and Development Guideline (DELWP, 2019) requires analysis of glint and glare. The analysis should consider impacts on:

- Dwellings and roads within 1 km of the proposed facility, taking into consideration their height within the landscape.
- Aviation infrastructure including any air traffic control tower or runway approach path close to the proposed facility.
- Any other receptor to which a responsible authority considers solar reflection may be a hazard.

A Glint and Glare Assessment (Accent Environmental, 2022a) has been prepared for the proposal, the findings are summarised below, and the report is provided at Appendix H.

The Solar Glare Hazard Analysis Tool (SGHAT) was used to assess the glint and glare hazard from the proposal at different locations to determine the potential for any safety or amenity impacts. The site has favourable topography for visual amenity with undulating land across the site. There are also clusters of vegetation within the site to be retained and trees bordering two of the adjacent public roads, Axedale-Toolleen Road and the Toolleen-Angle Road.

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The assessment considers the following aspects to ascertain the potential for reflective nuisance from the proposal's:

- Surface material of solar panels procured by the project.
- The mechanical behaviour (solar tracking method and maximum and resting tilt angles) and orientation of the solar modules.
- The existing environment.

Glint and glare modelling for the proposal evaluated glare resulting from solar farms at specific receiver viewpoints and along receiver routes based on the location, elevation and PV module specifications. The analysis tool simulates the annual sun path based on the proposal location and calculates the impacts for each receiver.

For the proposal, the assessment has identified the following receptors, see Figure 5-8:

- 80 potential point receptors up to a maximum distance of 4.169 km from the site (referred to within GlareGauge as observation points (OPs)) during the visual impact assessment (Accent 2022) of these receptors.
- 15 route receptors (roads both made and unmade surrounding the development footprint)
- One flight path (this was added as a precaution due to a small flight school at Knowsley Airfield, approximately 5 km south of the development footprint).

For each of the point and route receptors, a viewer height of 1.5 m above ground was assumed to be the typical viewing height whether standing or driving. The route receptors view angle (field of view left and right of centre) was input as 50 degrees. The modelling considered the maximum panel height of 4.2m. A conservative approach as a greater area of panels has been modelled than will actually be constructed across the site.

The results of the Glint and Glare Assessment indicated the selected receptors (points, routes and flight path) are unlikely to be subjected to glare as a result of the proposal. Glint which would potentially be experienced by road users and aircraft is also not expected for the proposal.

Existing vegetation along roads and surrounding the proposed site are expected to constitute physical obstructions between the identified receptors (residents at points and road users along routes) further reducing the risk of glare-related visual impact from the project.

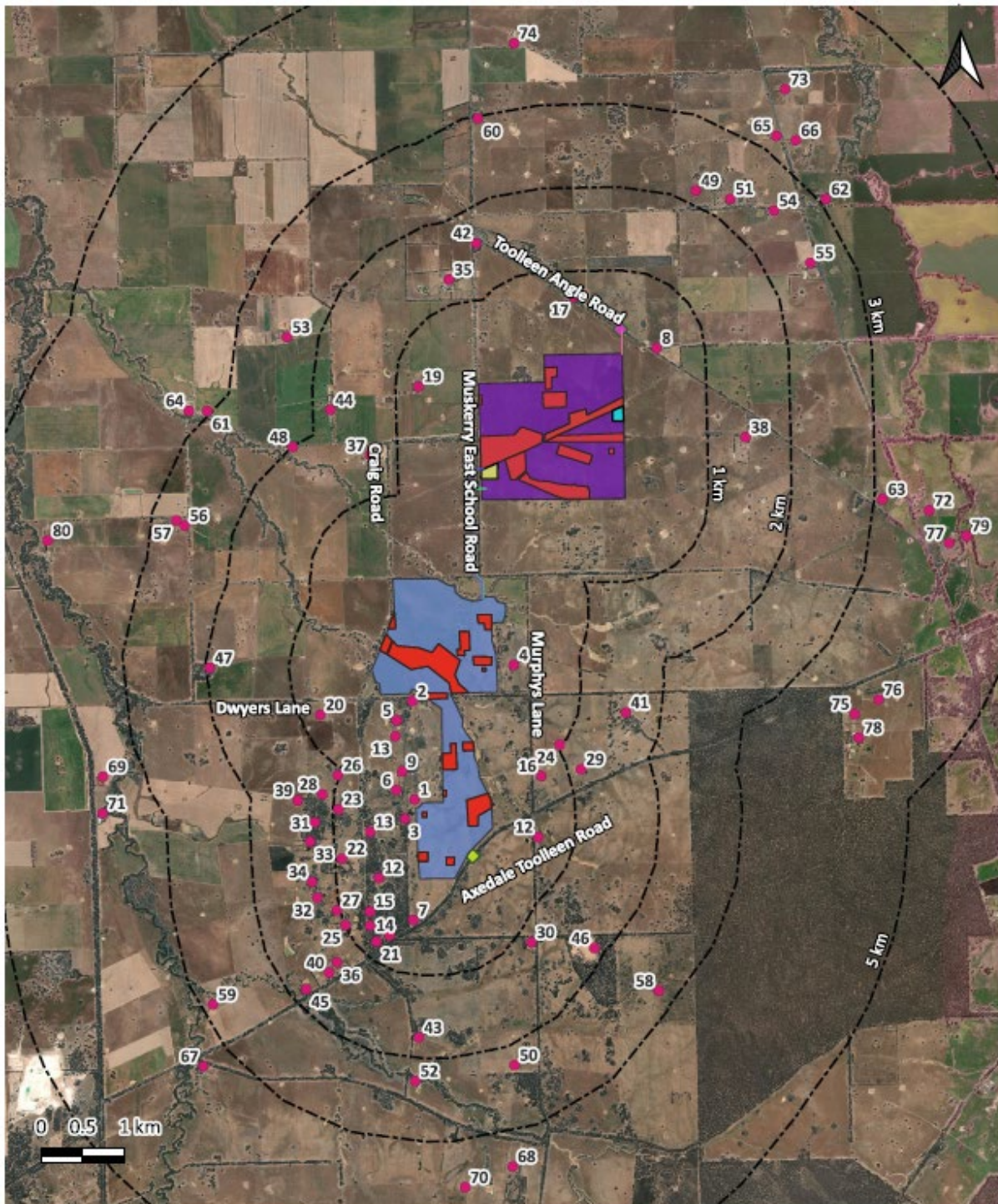
## Consistency with planning provisions

The proposal is considered consistent with the provisions of the schemes, as follows:

Clause 13.07-1S Land use compatibility. The Glint and Glare Assessment has considered potential for glint or glare impacts to residents and road users surrounding the proposal site. As there will be no glare impact, the proposal is considered compatible with the surrounding developments. The proposal has been sited, to avoid incompatibility.

Clause 15.01-6S Design for rural areas. The Glint and Glare Assessment has considered potential to impact the rural area the proposal would be located within. The proposal has been sited to avoid and minimise impacts. There are no likely glare impacts for the surrounding areas.

Clause 19.01-2S Renewable Energy. The proposal has been designed to have appropriate siting and design considerations met, specifically to minimise the effects of a proposal on the local community and environment.



- Point receptors (OPs)
- Northern portion of Muskerry SPS
- Southern portion of Muskerry SPS
- Restricted Area
- Substation Option a)
- Substation Option b)
- Easement Option A
- Easement Option B
- Proposed Site Access
- ◆ Emergency Site Access - CFA
- ◆ Main site access

AE1185 Muskerry SPS

Figure 3.1 Receptors

Created: 18/11/2022

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CRS: GDA 2020 MGA zone 55

Additional data sources: ESRI satellite



Figure 5-8 Glint and Glare Analysis - residential receptors (Accent Environmental, 2022)

## **5.10 Electromagnetic fields**

The (DELWP, 2019) solar facility guidelines state electrical equipment produces electromagnetic radiation. Radiation produced by transformers and inverters is reduced through performance standards that apply to standard components. The Australian Radiation Protection and Nuclear Safety Agency advises that the strength of this radiation will decrease with distance from the source, and it will become indistinguishable from background radiation within 50m of a high voltage power line and within 5 to 10m of a substation. The design and layout of the facility should account for this information.

Electric and magnetic fields (EMFs) are produced whenever electricity is used. EMFs also occur naturally in the environment, such as the Earth's magnetic field and discharges during thunderstorms (WHO, n.d.).

Electric fields are produced by voltage and magnetic fields are produced by current. When electricity flows, EMFs exist close to the wires that carry electricity and close to operating electrical devices and appliances (WHO, 2007). Electric and magnetic field strength reduces rapidly with distance from the source.

Over decades of EMF research, no major public health risks have emerged, but uncertainties remain (WHO, 2007). While it is accepted that short-term exposure to very high levels of electromagnetic fields can be harmful to health, the International EMF Project, established by the World Health Organisation, has thus far concluded that there are no substantive health consequences from exposure to Extremely Low Frequency (ELF) electric fields at the low levels generally encountered by the public (WHO, 2007), such as those that would be produced by electricity generation at the proposal site.

The proposal includes six main types of infrastructure that could create EMFs:

1. Solar arrays.
2. Inverters.
3. Underground cables.
4. Overhead transmission lines.
5. Onsite substation.
6. BESS.

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There is low potential for EMF impacts during the construction and decommissioning phases of the proposal. Staff would be exposed to EMFs over intermittent periods during works at and around the existing 220kV transmission line. Exposure to EMFs during the operation would be short term, therefore the effects are likely to be negligible.

The site is surrounded by agricultural land and public access would be restricted. Given the levels associated with the infrastructure components, and the distance to the site perimeter fence, EMFs from the proposal are likely to be indistinguishable from background levels at the boundary fence. The underground cabling would not produce external electric fields due to shielding from soil, and its magnetic fields are expected to be well within the public and occupational exposure levels recommended by ARPANSA and ICNIRP.

By prudently designing and siting infrastructure, exposure to EMFs and potential for adverse health impacts can be further reduced. Adverse health impacts from EMFs are therefore unlikely because of the proposal.

The potential risks associated with EMFs for the proposal can be reduced by designing the infrastructure in accordance with the codes and best practice standards by a suitable qualified person. These measures are outlined in Table 5-8.

Table 5-8 EMF safeguards and design measures

No.	Safeguards and design measures	C	O	D
E1	All electrical equipment would be designed in accordance with relevant codes and industry best practice standards in Australia.	C		
E2	All design and engineering would be undertaken by qualified and competent person/s with the support of specialists as required. Work to be carried out in accordance with relevant Victorian standards, for example, The Blue Book 2017 (Energy Safe Victoria, 2017).	C	O	
E3	Design of electrical infrastructure would minimise EMFs.	C		

## Consistency with planning provisions

The proposal is considered consistent with the provisions of the schemes, specifically the provisions of clause 53.13 as it relates to protection of amenity and impacts of electromagnetic fields. Appropriate plans would be prepared prior to construction, showing measures to manage impacts associated with electrical equipment. All construction would be undertaken by appropriately qualified and licenced persons. The proposal has addressed the general decision guidelines Clause 65.01, specifically *the effect on the environment, human health and amenity of the area*. No adverse impacts from potential electromagnetic fields are anticipated.

The proposal suitably considers and addresses potential electromagnetic field impacts and provides proposed mitigations consistent with the Solar Energy Facilities - Design and Development Guideline (DELWP, 2019).

## 5.11 Heat island effect

The (DELWP, 2019) solar facility guidelines state where a solar energy facility is proposed adjacent to existing horticultural or cropping activities, a minimum 30m separation distance is appropriate, measured from the property boundary to any part of the physical structure of the facility. The PV heat island effect on sensitive vegetation (such as cold-climate horticultural cropping) describes the transfer of heat from built form to its surrounds, where the ambient temperature around the built form is higher than that of surrounding vegetated areas, particularly at night. While there are few studies of spatial heat dissipation from solar infrastructure, those that exist acknowledge the potential for ambient air temperatures within the perimeter of a solar energy facility to potentially increase by 3 to 4 degrees Celsius. However, those studies also found that the

heat that was generated dissipated rapidly over a short distance. Some found that at 30m from the solar PV array, the air temperature variation was indistinguishable from ambient air temperature.

‘Heat island’ is defined as an area having higher average temperature than its surroundings owing to the greater absorption, retention, and generation of heat by buildings, pavements, and activities. This is usually used in reference to the impact of an urban area on its rural surroundings. Studies have shown that Photovoltaic (PV) panels convert incident solar radiation into heat, and this can alter the airflow and temperature profiles near the panels. Whether such changes may subsequently affect the thermal environment of near-by populations of humans and other species have been questioned (Fthenakis and Yu, 2013). However, to date there have been limited empirical studies on the potential for a heat island effect in utility scale solar facilities.

The limited studies that do exist also show results that can be seen as contradictory, as they are site and project specific. Some studies suggest that PV systems can cause a cooling effect on the local environment, depending on the efficiency and placement of the PV panels while others demonstrate a warming effect (Barron-Gafford, Minor, Allen, Cronin, Brooks, and Pavao-Zuckerman, 2016). Other studies conclude that whilst air temperatures may increase within the solar farm itself, they rapidly decrease to the ambient temperature beyond the perimeter of the solar farm (Fthenakis and Yu, 2013).

Fthenakis and Yu (2013) undertook an analysis of the potential for large solar farms to generate a heat island effect and increase air temperature within the solar farm area. The study found at the centre of the solar farm, the annual average air temperature at a height of 2.5m increased by up to 1.9°C. However, this increase in temperature dissipated at a height of 5m. Additionally, the solar farm completely cooled overnight.

The research suggested a small potential effect on climate within the proposal site. This effect may enhance retention of ground cover in very cold or hot conditions onsite. No impacts on adjacent properties and agricultural activities would occur.

The topic has also been subject to recent consideration by a Victorian Planning Panel for solar farms proposed in Greater Shepparton for solar farms proposed by Neoen and X-Elio. This is detailed in the *Panel Report for the Greater Shepparton Solar Energy Facility Planning Permit Application 2017-162, 2017-274, 2017-301 and 2017-344* (Panel Report, 2018). One of the Greater Shepparton proponents, in preparation of a response to key issues raised in objecting submissions, commissioned a *Statement of Evidence by Greg Barron-Gafford* from the Research Group Biography, Ecosystem Science (University of Arizona) (Barron-Gafford, 2018).

Barron-Gafford (2018), in his Statement of Evidence (SoE) to the Victorian Planning Panel included results on the radius of the measured heat effects. This identified that the PVHI effect was indistinguishable from air temperatures over native vegetation when measured at a distance of 30m from the edge of the PV array (Figure 5-8). In his SoE he states that:

*‘this pattern held true for both daytime and night-time conditions. Because the PV panels themselves trap the energy from diffuse sunlight that was able to reach the ground underneath them, air temperatures remain elevated within a PV array. As you leave this “overstorey” of PV panels, energy is able to radiate back towards the atmosphere, as it does in a natural setting, and the PVHI quickly dissipates’.*

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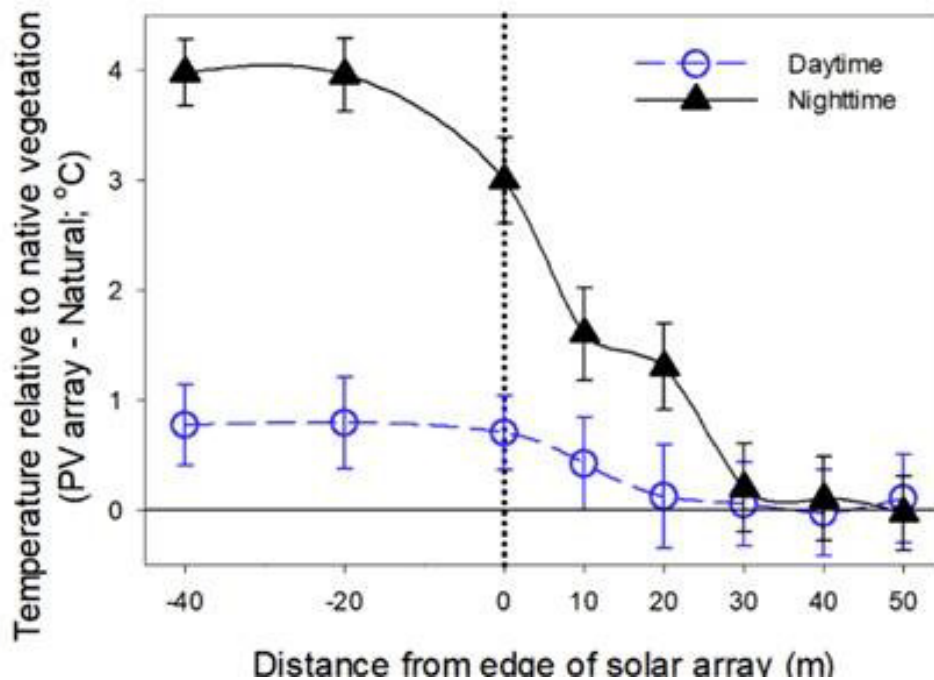


Figure 5-9 Measures of air temperature within and outside of the PV array (Barron-Gafford, 2018)

In conclusion, the Victorian Planning Panel Report (Panel Report, 2018), accepted that solar arrays would affect air and soil temperatures within the solar array perimeter, but that in relation to outside of the solar array perimeter a heat island effect is unlikely to occur, but where orchards and the like are present, a 30m buffer should be maintained.

The proposal (solar infrastructure) would include setbacks of a minimum of 100m from dwellings and 5m or greater from all other boundaries, refer to the proposed mitigation measures in Table 5-9. The setbacks proposed are considered acceptable based on the land uses, agricultural activities of adjoining land (mostly cropping and grazing) and large rural lifestyle lots. As such there are no likely potential heat island effects from the proposal on adjoining land and no sensitive receivers or orchards or the like within relevant proximity to 30m of the infrastructure. The closest non-associated dwelling is located approximately 100m from the array.

Table 5-9 Heat Island Effect safeguards and design measures

No.	Safeguards and design measures	C	O	D
HIE1	The proposal would include setbacks of a minimum of 100m from all non-associated dwellings.	C		
HIE2	The proposal would include setbacks of minimum 30m from all non-associated lot boundaries.	C		

## Consistency with planning provisions

The proposal is considered to be consistent with the provisions of the scheme, specifically the provisions of clause 53.13 as it relates to protection of amenity and potential climate impacts. The

plans provided at Appendix A show setbacks complying with the proposed mitigation measures. The proposal has addressed the general decision guidelines Clause 65.01, specifically *the effect on the environment, human health and amenity of the area*. No adverse impacts from potential heat island effect are anticipated.

The proposal suitably considers and addresses potential heat island effect impacts and provides proposed mitigations consistent with the Solar Energy Facilities - Design and Development Guideline (DELWP, 2019).

## 5.12 Waste and dangerous goods

The proposal includes works that require management of waste and use of dangerous goods.

Dangerous goods would be required to be transported, stored, and disposed of as part of the proposal. This relates to the proposed ancillary battery energy storage facility.

Management of waste would be required during construction, operation (maintenance and general waste) and decommissioning of the proposal. Installation, operational maintenance, and decommissioning of the ancillary battery energy storage facility.

Dangerous goods would be required to be transported, stored, and disposed of as part of the proposal. This relates to the proposed BESS and proposed use of lithium-ion batteries.

Batteries may require replacement up to a maximum of two times during the life of the proposal. The batteries are designed for outdoor use, generally only require a secure foundation i.e., concrete slab, and specified clearances for service access.

Lithium-ion batteries are considered to pose little threat to people or property, although they may pose an environmental hazard or fire risk. The batteries, however, would be classified as a Class 9 miscellaneous dangerous goods and Class 9 hazardous goods (both new and waste batteries).

Lithium-ion batteries are classified as hazardous waste under the Commonwealth Hazardous Waste Act 1989 and are classified as Dangerous Goods under the ADG Code. The ADG Code requires dangerous goods to be carried in a secure, safe, and environmentally controlled manner. The code specifies 'special provisions' and 'packing instructions' applying to the transportation of Lithium-ion batteries.

Lithium-ion batteries do not contain any heavy metals. They do contain valuable material that can be recycled. The Australian Battery Recycling Initiative (ABRI) website indicates four companies which provide a collection and recycling service for used lithium-ion batteries, with the proponent in discussions with various parties regarding future recycling strategies and responsibilities for this and other related projects.

The major hazard offered by lithium-ion battery technologies is fire. The proposal includes measures to minimise fire risk associated with the BESS. The proponent and/or their contractor would be responsible for identifying the need for and notifying of WorkSafe Victoria as appropriate for transport and or storage/handling of dangerous or hazardous goods associated with the proposed BESS.

The potential risks associated with waste and dangerous goods for the proposal can be reduced by handling them in accordance with Australian Standards and codes as well as developing protocols for maintenance and incident response. These measures are outlined in Table 5-10.

Table 5-10 Waste minimisation and management measures

No.	Minimisation and management measures	C	O	D
H1	A waste minimisation and management plan would be developed as part of the Construction and Operation EMP for the proposal.  Waste would only be disposed of at a facility lawfully permitted to accept the waste.	C	O	D
H2	The proponent and/or their contractor would be responsible for identifying the need for and notifying of WorkSafe Victoria as appropriate for transport and or storage/handling of dangerous or hazardous goods associated with the proposed ancillary battery energy storage facility.  The transportation of new and waste lithium-ion batteries would comply with the requirements of the Dangerous Goods Code, including specific 'special provisions' and 'packing instructions' applying to the transportation of Li-ion batteries.	C	O	D
H3	Dangerous or hazardous materials would be stored and handled in accordance with AS1940-2004: The storage and handling of flammable and combustible liquids.	C	O	D
H4	Protocols would be developed for lithium-ion battery storage, maintenance, and incident response to mitigate Li-ion fire risks.	C	O	D

## Consistency with planning provisions

The proposal is considered to be consistent with the provisions of the scheme, specifically the provisions of clause 53.13 as it relates to protection of amenity and waste impacts associated with the construction, operation, and decommissioning of the proposal. Appropriate management plans would be prepared prior to construction to manage waste for the proposal.

The proposal has addressed the general decision guidelines Clause 65.01, specifically *the effect on the environment, human health and amenity of the area*. No adverse impacts from potential waste are anticipated.

The proposal suitably considers and addresses potential waste generation and impacts and provides proposed mitigations consistent with the Solar Energy Facilities - Design and Development Guideline (DELWP, 2019).

## 5.13 Non-Aboriginal heritage

A desktop study was undertaken to identify any historic heritage (non-Aboriginal specific heritage) items or places in proximity to the study area, with a focus on the proposal site and surrounding landscape. Research was limited to relevant databases and publicly available mapping.

Heritage databases searched as part of this assessment were:

- The Australian Heritage Database, this includes items on the National and Commonwealth Heritage Lists, to identify any items that are currently listed within or adjacent to the proposal site.
- VicPlan heritage overlays.

The results of the desktop searches were that no known historic items or places occur on the site. There are no safeguard or minimisation measures required.

## 5.14 Cumulative impacts

The Solar Energy Facilities Design and Development Guideline (DELWP, 2019) requires consideration of cumulative impacts. The clustering of solar energy (or other renewable energy) facilities in an area can result in efficiencies by sharing existing, or augmenting, electricity network infrastructure. However, too many facilities in an area can:

- Reduce the availability and/or productivity of strategic agricultural land, particularly in irrigation districts.
- Result in landscape-scale visual impacts, due to an overconcentration of built form in an area.
- Impact the area's biodiversity, habitat, or wildlife, due to an overconcentration of built form.

The cumulative impacts of solar energy facilities on an area can be reduced by:

- Having a mix of land use activities including solar energy facilities in the area.
- Agrophotovoltaics — the dual use of a site with agriculture.
- Having enough distance between solar energy facilities within an area to minimise or avoid environmental impacts and natural hazard risk exposure.

Cumulative impacts relate to the combined effect of impacts from several activities on a particular value or receiver. They may occur concurrently or sequentially. This report has considered the relevant cumulative impacts as they relate to other known or foreseeable solar facility developments occurring in proximity to the proposal.

Major solar projects mapped on VicPlan are shown in Figure 2-1 with the sites within 5km presented in Table 5-11. In summary, the proposal has potential to generate cumulative impact risks during construction and operation.

Table 5-11 Major solar developments within 5km of the Proposal site.

Project title	Status	Potential for cumulative impact	Cumulative impact type
<b>Axedale Solar Farm</b>	Approved.	Subject to the granting of the PP, the proponent would seek to commence works on the proposal in 2023/24. Construction of the	Axedale Solar Farm is approximately 24km east of Bendigo. The project is likely to share a haulage route via the Northern highway, and for contractors staying within Bendigo, accommodation and services within the region access to the site via the Axedale-Toolleen Rd.

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Project title	Status	Potential for cumulative impact	Cumulative impact type
		Axedale Solar Farm may occur at the same time.	<p>The proximity of the sites also has a potential cumulative noise, visual and socio-economic impact on smaller rural residential holdings in the vicinity.</p> <p>Therefore, the cumulative impacts are related to:</p> <ul style="list-style-type: none"> <li>• Traffic.</li> <li>• Noise</li> <li>• Pressure on local facilities, goods and services.</li> <li>• Visual changes to the existing character including removal of vegetation.</li> <li>• Change of land use.</li> <li>• Socio-economic impacts.</li> </ul>
<b>Fosterville Solar Farm</b>	Under Consideration	Anticipated construction timing is unknown as the proposal is under consideration.	<p>There may be potential for cumulative impacts related to:</p> <ul style="list-style-type: none"> <li>• Traffic.</li> <li>• Noise</li> <li>• Pressure on local facilities, goods and services.</li> <li>• Visual changes to the existing character including removal of vegetation.</li> <li>• Change of land use.</li> <li>• Socio-economic impacts.</li> </ul>

Whilst noting these proposed and proximate developments, overlapping construction periods and cumulative impacts are unlikely, as these projects are impacted by the limited transmission capacity that is available via the 220kV (Shepparton-Bendigo) line, with each proposal seeking to secure this limited capacity.

Potential cumulative impacts are primarily associated with the following issues:

## Biodiversity

Most of the proposal site would consist of solar panels in modified pasture landscapes. The proposal layout shows substantial peripheral areas, including creek lines and larger areas of vegetation would be avoided allowing for continued connection of vegetation in the broader landscape and protection of waterways. This lessens the long term cumulative impacts and provides greater opportunities for rehabilitation of the site at the decommissioning stage.

## Visual and landscape character impacts

Due to the locality of the Axedale and Fosterville Solar Farms to the proposal, there is potential for cumulative visual impact for associated receivers surrounding these projects. Generally, adverse cumulative visual impacts are anticipated to be avoided or minimal due to the existing and retained vegetative screening and generally flat/gently sloping nature of the Proposal site and surrounding land that limits or blocks most views as shown in the montages included in the VIA. Specifically, for the proposal, larger buffers have been incorporated in certain areas a part of the iterative

design process to minimise impacts and retain vegetation. The proposed plantings as outlined in the VIA would screen, soften, and further filter potential views for the affected landowners.

## Noise impacts

Noise impacts from plant, machinery and vehicles would ordinarily be increased if the construction of other developments is undertaken concurrently.

Axedale Solar Farm is within approximately 3.5 km of the proposal site and has the potential to overlap the construction period of proposal. An additional solar farm is mapped directly to the west of Axedale Solar Farm, there is also potential for overlap of construction with this proposed facility.

Construction hours and differing peak periods of construction would likely control noise levels avoiding adverse cumulative impacts.

During operation, the proposal would generate low noise impacts. With the operation of Axedale Solar Farm to the west of the proposal site, the potential cumulative operational noise is also likely to be low due to the noise nature of solar facilities.

Cumulative impacts are therefore unlikely to increase noise impacts and are expected to be minimal and manageable.

## Traffic impacts

Cumulative traffic impacts may occur if construction of the proposal occurs concurrently with the solar farms identified in Figure 2-1.

The TIA considered cumulative impacts and stated:

*The surrounding major projects have the potential to generate a number of staff vehicle movements during the peak periods associated with construction of the Solar Power Station. In particular, a number of staff will be located in Bendigo. Notwithstanding this, the combined increase in traffic generated by the site and these projects is expected to have a minimal cumulative impact on the road network in the surrounding area.*

During operation of proposal, traffic generation would be almost unnoticeable. There is unlikely to be a cumulative impact with the operation of the near solar farms due to the low operational traffic numbers for the projects and location of their site access.

## Pressures on local facilities, goods, and services

The construction of large scale developments has would result in an influx of workers required for the projects. It is likely for the proposal, and nearby solar facilities that workers would be accommodated in Bendigo and other surrounding towns throughout the construction period.

This has the potential to put strain on local facilities, good and services. The use of accommodation for workers would reduce the amount of accommodation available for tourists visiting the region. However, there is also a potential for positive cumulative economic effects from the construction of multiple developments in the area. Socio-economic benefit in relation to developments in the region would be a continuous ongoing benefit for the community with increased jobs and economic input into local business.

Consultation with representatives for the near solar farms and Council would allow for management to not place stress on stakeholders including business owners in Bendigo, as such it is unlikely that there would be negative cumulative impacts to local facilities, goods and services.

### **Land compatibility impacts**

Approximately 496.21ha of agricultural land would be used for the proposal. Continued use of the land for sheep grazing or other suitable co-location agriculture would be investigated during operation. Upon decommissioning of the proposal, the proposal site would require rehabilitation to restore it to a suitable productive capacity for agricultural land use.

The Greater Bendigo LGA and Campaspe Shire LGA covers an area of approximately 7500km<sup>2</sup> (~750,000 ha). The temporary loss of 496.21ha of agricultural land, for the life of the proposal, represents a small fraction of the LGA. As such, no significant cumulative impacts to agricultural enterprise or local agricultural land use are expected. The diversification of land use may help the farmers whose land the project is proposed upon to better manage and continue farming practices on remaining land despite seasonal and climate change challenges.

There are no specific cumulative safeguard or minimisation measures required.

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## 6 Conclusion

The proposed Muskerry Solar Power Station meets the relevant provisions of the Campaspe Planning Scheme and Greater Bendigo Planning Scheme and is consistent with the relevant matters that a responsible authority must consider under Section 60 of the *Planning and Environment Act 1987*. The proposal has taken into consideration all matters relevant to renewable energy facilities outlined in DELWP's Solar Energy Generating Facility Guidelines. The proposal has shown compliance with the Municipal Planning Strategy and the Planning Policy Framework and is consistent with the requirements of the Solar Energy Facilities Design and Development Guideline (DELWP, 2019).

The proposal has considered objectives of the various applicable State and Federal legislation, and addressed these objectives through the specialist studies, as well as identifying mitigating measures to be implemented during construction and operation of the proposal.

This report and specialists' studies have shown impacts have been avoided and minimised through design, including for the following factors:

- The effect of the proposal on the surrounding area in terms of noise, glint, light spill, vibration, smell and electromagnetic interference.
- The impact of the proposal on significant views, including visual corridors and sightlines.
- The impact of the proposal on agricultural land.
- The impact of the proposal on the natural environment and natural systems.
- The impact of the proposal on the road network.

The proponent commits to carrying out the proposal in accordance with the safeguards and minimisation of impacts as outlined in this PR. Overall, the proposal is expected to have minimal environmental, and amenity impacts and would result in a positive impact for the community and local economy.

The proposal would provide the following benefits:

- Producing clean energy, offsetting approximately 521,000 tonnes of carbon emissions per year.
- The BESS would aid peak energy needs, which are critical to the power system's security.
- It would diversify income and increase revenue to ancillary services such as food, lodging and tourism for the local area during construction.
- It would create jobs – up to 350 staff on site at any time during construction (peak times) and up to 10 FTE during operation over the life of the proposal.
- The proposal is consistent with the Clause 53.13 Renewable Energy Facility and other relevant provisions of the planning scheme.
- The nature of the proposal would not negatively impact the character and amenity of the site and the adjoining land uses, specifically for rural dwellings in proximity to the proposal site.

This PR and all supporting documents have shown that the proposal accords with the relevant policies and warrants issuing a planning permit. The measures designed into the proposal site area and committed to by the proponent in this PR would enable a proposal that avoids and minimises impacts on the amenity of the community and the environment.

## 7 References

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