

BUSHFIRE ASSESSMENT REPORT CERTIFICATE

THIS CERTIFICATE HAS BEEN COMPLETED BY A RECOGNISED CONSULTANT IN BUSHFIRE RISK ASSESSMENT IN ACCORDANCE WITH SECTION 4.14 1(b) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 NO 203

PROPERTY ADDRESS:	LOT 67 DP 1288793 23 DROVER PLACE NARRANDERA
DESCRIPTION OF PROPOSAL:	SOLAR FARM AND POWER STORAGE SYSTEM
PLAN REFERENCE: (relied upon in report preparation)	SITE PLAN PREPARED BY AZELIO
BAL RATING:	N/A
DOES THE PROPOSAL RELY ON ALTERNATE SOLUTIONS:	YES NO

I David Cannon of SET Consultants Pty Ltd have carried out a bushfire risk assessment on the above mentioned proposal and property. A detailed Bushfire Assessment Report is attached which includes the submission requirements set out in *Appendix 2 of Planning for Bushfire Protection 2019* together with recommendations as to how the relevant specifications and requirements are to be achieved.

REPORT REFERENCE:	BAR – S022984
REPORT DATE:	16 th February 2022
CERTIFICATION NO/ACCREDITED SCHEME:	BPAD 23829 (LEVEL 3)

I David Cannon hereby certify, in accordance with *Section 4.14 of the Environmental Planning and Assessment Act 1979 No 203*:

1. That I am a person recognised by the *NSW Rural Fire Service* as a qualified consultant in bushfire risk assessment; and
2. That subject to the recommendations contained in the attached Bushfire Assessment Report the proposed development conforms to the relevant specifications and requirements.

I am aware that the Bushfire Assessment Report, prepared for the abovementioned site is to be submitted in support of a development application for this site and will be relied upon by Narrandera Shire Council as the basis for ensuring that the bushfire risk management aspects of the proposed development have been addressed in accordance with *Planning for Bushfire Protection 2019*.

SIGNATURE: _____



DATE: 16th February 2022



**BUSHFIRE
ASSESSMENT
REPORT**

**Solar Farm and
Power Storage System**

Lot 67 DP 1288793
23 Drover Place
Narrandera

16 February 2023
Reference: S022984

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		Ver 1.0 Final Issue	16 February 2023

The assessment has been prepared in accordance with Planning for Bushfire Protection - A Guide for Councils, Planners, Fire Authorities and Developers, 2019, NSW Rural Fire Service (RFS) and Planning NSW.

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Attachments

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1 INTRODUCTION

This Bushfire Assessment Report has been prepared for MPG Built Pty Ltd to accompany a development application for the construction of a solar farm over Lot 67 DP1288793, No. 23 Drover Place, Narrandera. Narrandera Shire Council's Bushfire Prone Land Map indicates that the subject site is mapped as bushfire prone (Figure 1). For the purposes of this assessment, the proposed development is considered "infill development" in accordance with PBP 2019. A development application for infill development in a bushfire prone area is required to be assessed by the relevant consent authority under section 4.14 of the Environmental Planning and Assessment Act 1979.

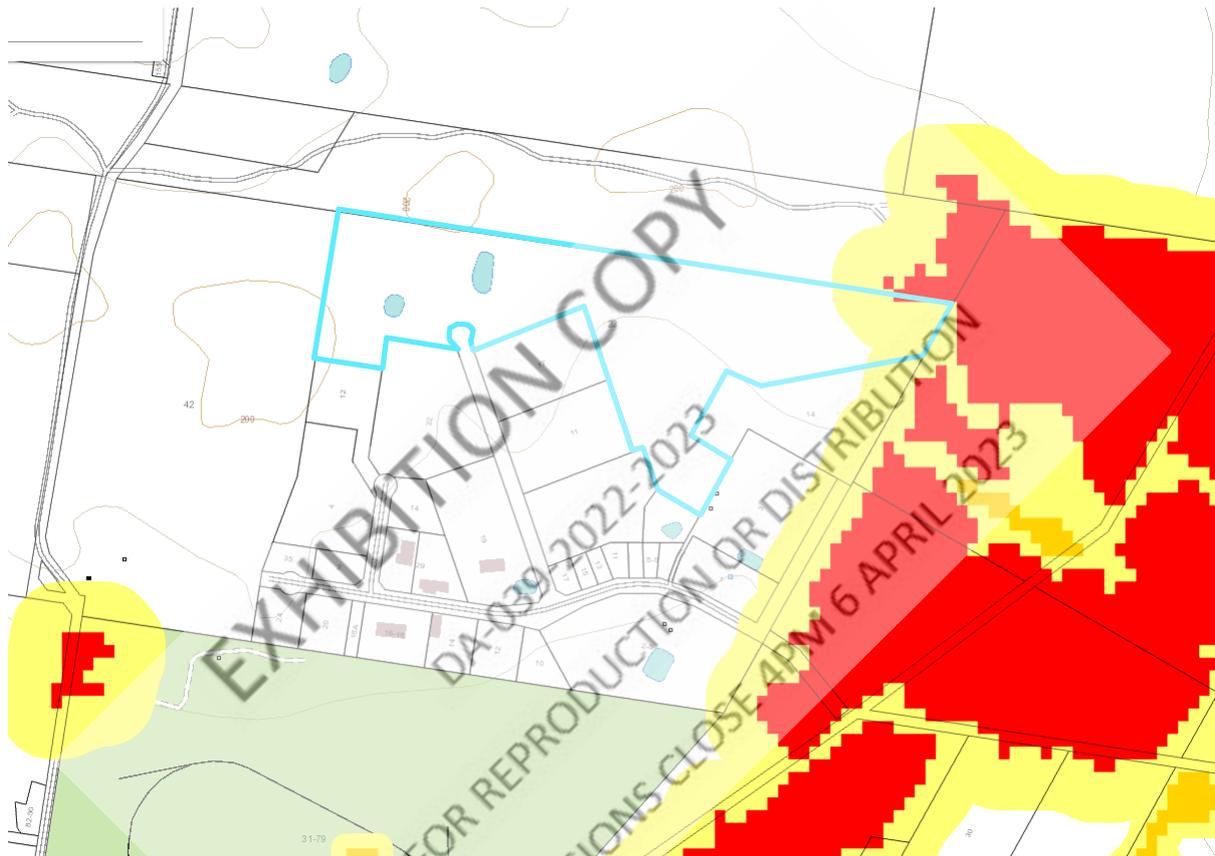


Figure 1: Narrandera Council's Bushfire Prone Land Map subject site outlined in blue

The assessment of the site is based on the results of a desk top analysis conducted by Mr. Peter Dowse. The following current legislation and guidelines were referred to when preparing this report:

- Planning for Bushfire Protection, A Guide for Council, Planner, Fire Authorities and Developers' (NSW Rural Fire Service (RFS) in cooperation with the Department of Planning (2019);
- Rural Fires Act 1997;
- Australian Standard 3959-2018 Construction of Buildings in Bushfire Prone Areas; and
- Rural Fires Regulation 2022.

NOTE: that the 'Planning for Bushfire Protection, A Guide for Council, Planners, Fire Authorities, and Developers (NSW Rural Fire Service (RFS) in cooperation with the Department of Planning (NSW) (2019)' mentioned above, will herein be referred to as the 'PBP 2019'.

1.1 OBJECTIVES

All development on Bushfire Prone Land must satisfy the aim and objectives of PBP 2019. PBP 2019 states:

"The aim of PBP is to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.

More specifically, the objectives are to:

- a) *afford buildings and their occupants protection from exposure to a bush fire;*
- b) *provide for a defensible space to be located around buildings;*
- c) *provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;*
- d) *ensure that appropriate operational access and egress for emergency service personnel and occupants is available;*
- e) *provide for ongoing management and maintenance of BPMs; and*
- f) *ensure that utility services are adequate to meet the needs of firefighters.*

In relation Solar Farms the NSW has development specific objectives which aim to promote fire suppression and minimize the risk of fire occurring within the site. Facility design will be required to incorporate the following measures;

- Asset protection zones (APZ);
- Measures to prevent a fire occurring within the site from developing into a bush/grass fire risk to the surrounding area;
- Water supply for fire fighting purposes;
- Land and vegetation management;
- Emergency management procedures, including the development of a Fire Management Plan in consultation with the local NSW RFS District Fire Control Centre; and
- Vehicular access and defensible space around the solar array.

Protection for solar facilities from bush fires can be achieved through a combination of strategies which will:

- Minimise the impact of radiant heat and direct flame contact by separating development from bush fire hazards;
- Minimise the vulnerability of buildings to ignition and fire spread from flames, radiation and embers;
- Enable appropriate access and egress for the public and firefighters;
- Provide adequate water supplies for bush fire suppression operations;
- Focus on facility preparedness, including emergency planning and property maintenance requirements; and
- Facilitate the maintenance of asset protection zones, access for firefighting and on-site equipment for fire suppression and prevention of fire spreading from the site.

This assessment includes an analysis of the potential hazard persisting and affecting the subject site and the standards and bushfire mitigation measures that should be introduced to address the objectives of the PBP 2019. The mitigation measures have been derived from the provisions (performance criteria and acceptable solutions) as outlined within the PBP 2019.

1.2 PROPOSAL

The proposal relates to the construction of a sustainable solar farm and will consist of a solar power plant and Azelio storage system. The power plant consists of 2.475MWp of solar PV and 825kWh of storage. The intention is to utilise ground mounted single axis bifacial power plant. Azelio's long duration electrical energy storage system is used for shifting the electrical energy produced during the day by Solar PV into use at night, allowing to increase the yearly renewable energy penetration.

Figure 2 shows an extract of the Site Plan prepared by Azelio.

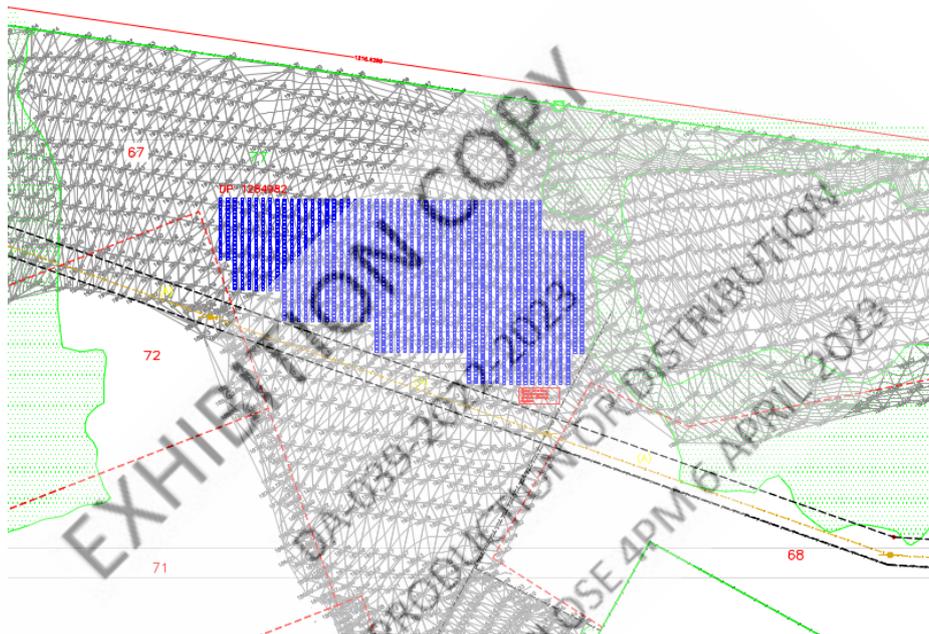


Figure 2: Extract from the Site Plan prepared by Azelio

2 PROPERTY DETAILS

2.1 DESCRIPTION OF PROPERTY

The subject property is described as Lot 67 DP 1288793, No. 23 Drover Place, Narrandera. Narrandera is a town located in the Riverina region of southern New South Wales, Australia. The town lies on the junction of the Newell and Sturt highways, adjacent to the Murrumbidgee River, and it is considered the gateway to the Murrumbidgee Irrigation Area. The location of the site relative to the locality is illustrated in Figure 3 and 4.

Bushfire Assessment Report

Lot 67 DP 1288793, No. 23 Drover Place, Narrandera

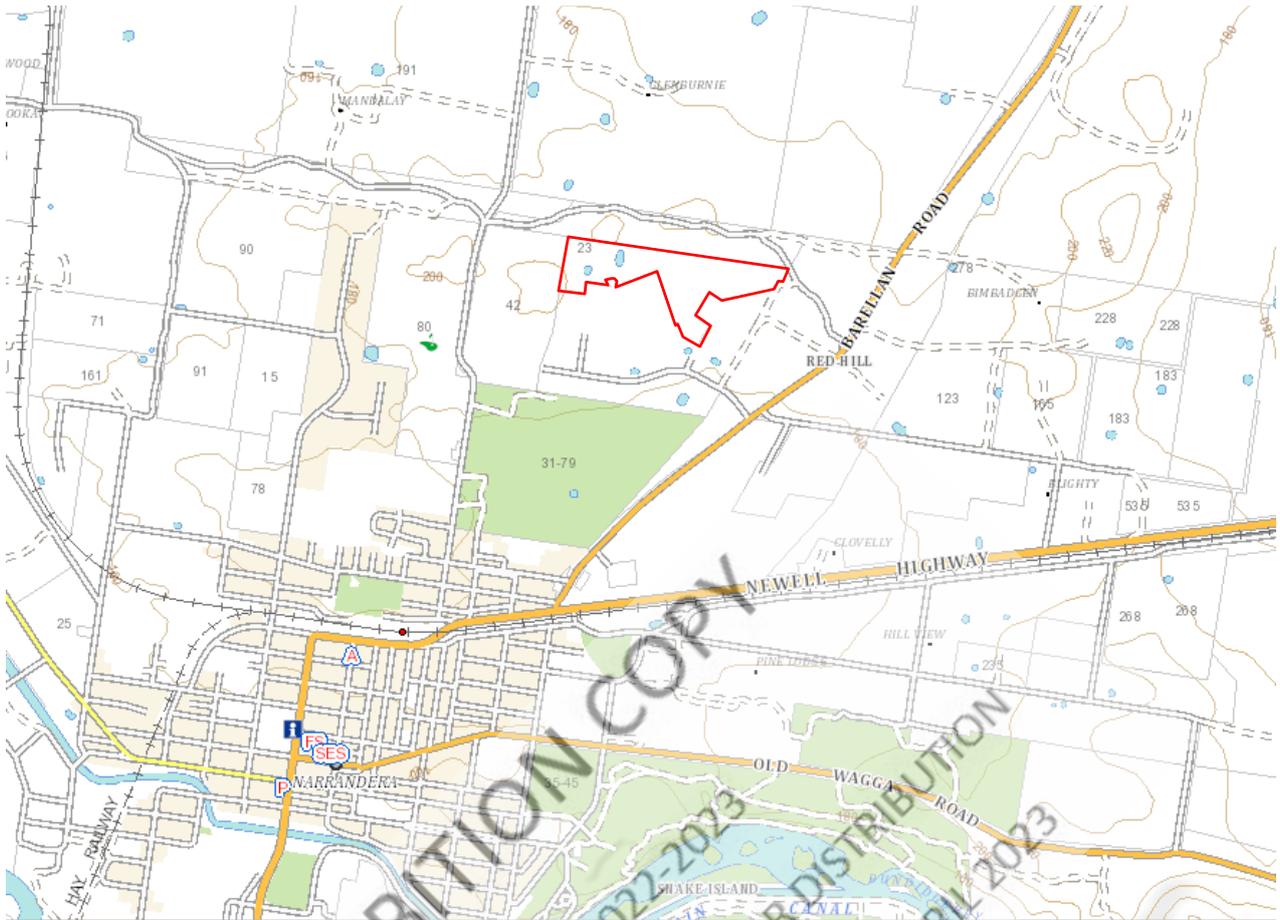


Figure 3: Location map showing the subject site marked in red.

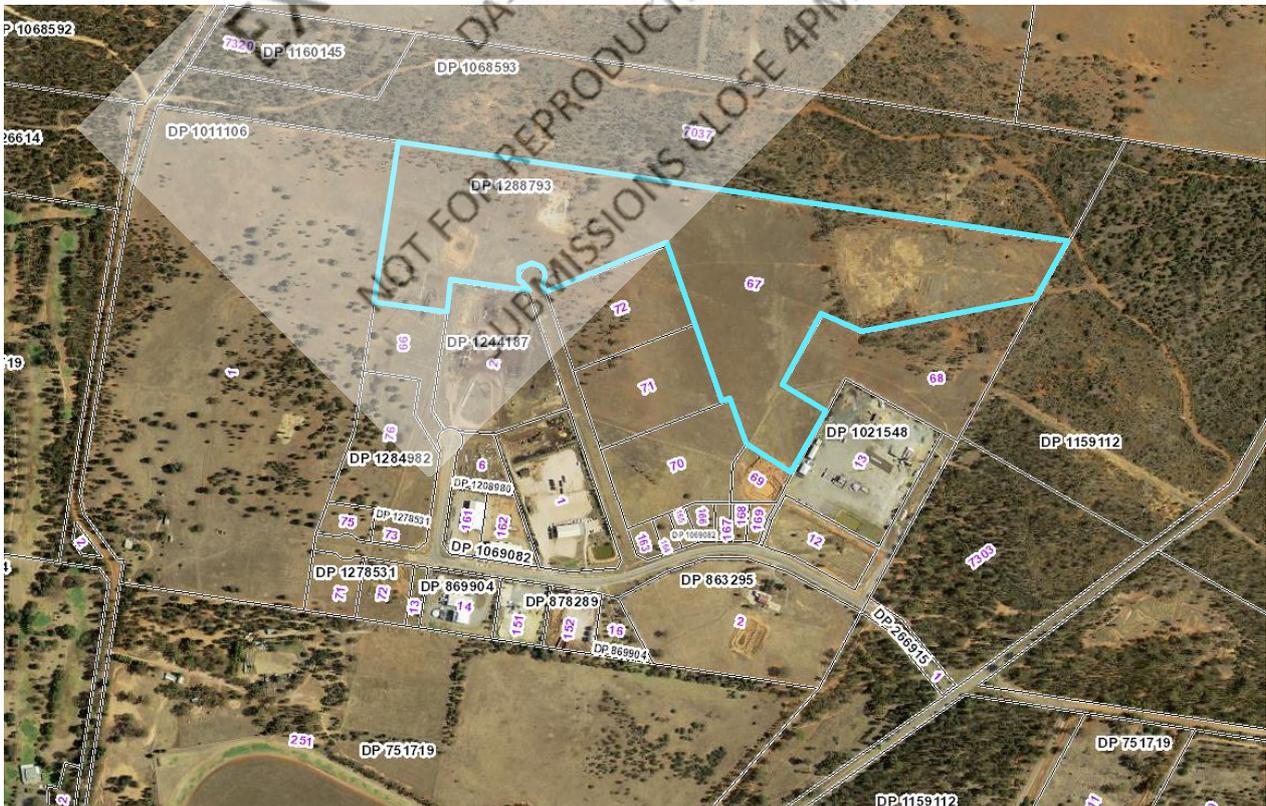


Figure 4: Aerial photo showing the site marked in blue.

The site is an irregular shaped parcel of land having an area of 27ha. The site is located to the north of Narrandera in close proximity to the Newell Highway within Redhill Industrial Estate. Access to the site will be via a proposed public road from Driscoll Rd.

Topographically the site has a steady downslope in a southerly direction. Vegetation posing a threat to the proposed development comes from the woodland to the north and east of the development and grassland located on the subject site and surrounding properties.

2.2 CLASS OF VEGETATION

The vegetation types have been classified using the formations and sub-formations provided in Figure A1.2 of the bushfire guideline. Vegetation descriptions are as per Keith D, 2004 in Keith (2004) "Ocean Shores to Desert Dunes" published by DECC (except heathlands which is provided two sub-formations rather than one based largely on vegetation height) the main categories are as follows:

- Forests (wet sclerophyll forests and dry sclerophyll forests);
- Woodlands;
- Forested wetlands;
- Tall heaths;
- Freshwater wetlands;
- Short heaths;
- Alpine complex;
- Semi-arid woodlands;
- Arid shrublands;
- Rainforests; and
- Grasslands.

Fuel loads are based on recent information provided by:

- The University of Wollongong's (UoW) Fuels Modelling Project;
- The University of Melbourne (UoM) which reference the fuel classifications found in Keith (2004); and
- CSIRO Ecosystems Sciences and Bushfire Dynamics and Applications.

Where a mix of vegetation types exist, the type providing the greatest bushfire hazard has been used. Vegetation that is to be cleared as part of the development has not been included in this assessment. It should also be noted that remnant vegetation (a parcel of vegetation < 1 ha or fire run of < 50m) and Riparian vegetation are considered a low hazard and APZ setbacks and building construction standards for these will be the same as required for rainforest vegetation.

The following are not required to be considered a bushfire threat for the purposes of PBP, as detailed below:

- Single areas of vegetation less than 1 hectare in area and greater than 100 metres separation from other areas of Category 1 or 2 vegetation.
- Multiple areas of vegetation less than 0.25 hectares in area and not within 20m of the site, or each other or of other areas of vegetation being classified vegetation.
- Strips of vegetation less than 20 metres in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site or 2 each other, or other areas of vegetation being Category 1, 2 or 3 vegetation.

- Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load, including grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses such as playing areas and fairways, maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens and other non-curing crops, cultivated gardens, arboretums, commercial nurseries, nature strips and windbreaks.

Note: 1. Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bush fire attack (recognizable as short cropped grass for example, to a nominal height of 100 mm). 2. A windbreak is considered a single row of planted trees located on a boundary and used as a screen or to reduce the effect of wind on the leeward side of the trees.

- Existing areas of managed gardens and lawns within curtilage of buildings. Non-vegetated areas, including waterways, roads, footpaths, buildings, and rocky outcrops.

The details of the predominant vegetation in all directions, to a distance of 140m from the proposed development site are provided in **3.2**.

Narrandera Shire Council's bushfire prone land map has not been updated to include Category 3 (Grassland) vegetation and a large portion of the surrounding landscape has been classified as a grassland hazard. Vegetation impacting the proposed development comes from a combination of woodland and grassland. Woodland vegetation surrounding the development has been classified using State Vegetation Type Map (SVTM) Version C1.1.M1, under which the community has been classified as PCT 185 Inland Rocky Hill Woodlands.

2.3 ASSESSMENT OF SLOPE

The slope in all directions over a distance of 100m from the existing property boundary or building footprint has been assessed in terms of the following classes:

- (i) all upslope vegetation (considered 0°)
- (ii) >0 to 5° downslope vegetation
- (iii) >5 to 10° downslope vegetation
- (iv) >10 to 15° downslope vegetation
- (v) >15 to 18° downslope vegetation.

During the assessment of the slope, if it was found that there were a number of different slope classes present over the 100m in any one direction, the slope of the area, which will most significantly influence the fire behavior, has been adopted.

The effective bushfire slopes for the proposed development can be found below. Planning for Bushfire Protection 2019 acknowledges that there may be varying slope and, in this regard, the "gradient within the hazard (vegetation) which will most significantly influence the fire behaviour of the site having regard to the vegetation found" can be used. For this assessment, the effective bushfire slopes are as follows:

- North, East and West – Upslope;
- South – 0 to 5° Downslope.

2.4 SIGNIFICANT ENVIRONMENTAL FEATURES

There are no known significant environmental features surrounding the development site.

2.5 THREATENED SPECIES

There are no known threatened species located on the site.

2.6 ABORIGINAL RELICS

There are no known aboriginal relics located on the subject site.

2.7 ZONING

The site is subject to the provisions of Narrandera Local Environmental Plan 2013, under which it has zoned **IN1 General Industrial**. Figure 5 shows the zoning map of the subject site and surrounding lands.

The objectives of the **IN1** zone are:

- To provide a wide range of industrial and warehouse land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.

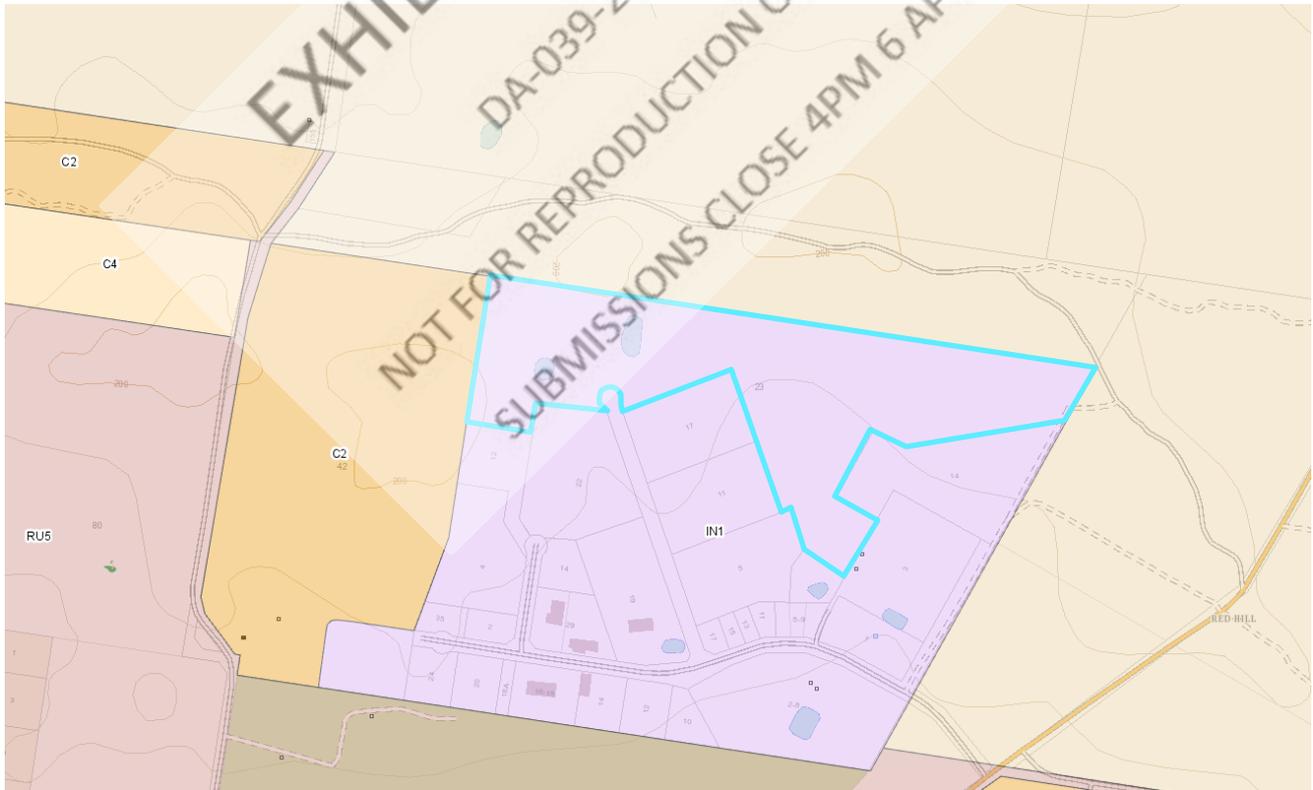


Figure 5: Narrandera LEP 2013 Zoning Map, subject site highlighted in blue.

3 PROPERTIES ADEQUACY FOR BUSHFIRE PROTECTION

3.1 ASSESSMENT METHODOLOGY

A site inspection was conducted to determine the direction and scale of any potential bush fire event based on an analysis of slope, aspect, vegetation type and density, current fuel loading and evidence of past fire history.

The information contained in the appendices of the PBP 2019 has been used to categorise vegetation type and slope class in the locality, as discussed in Sections 2.2 and 2.3 of this report. Section A1.6 of the PBP 2019 was used to determine the appropriate fire area and corresponding FDI rating. Following on from this the development specific provisions of Section 8.3.5 'Wind and Solar Farms' PBP 2019.

3.2 SPECIFICATIONS FOR ASSET PROTECTION ZONE

The aim of APZs is to ensure that there is a progressive reduction in flammable material towards any building. In relation to APZs for Infill Development the performance criteria are to provide a defensible space onsite and to provide and maintain asset protection zones for the life of the development as to prevent the spread of a fire towards the building. The intent of the measures is to provide sufficient space and maintain reduced fuel loads, so as to ensure radiant heat levels at buildings are below critical limits and to prevent direct flame contact with the building. The performance criteria and acceptable solutions for asset protection zones for infill development in particular Solar Farms in accordance with PBP 2019 are provided in Table 1.

Table 1: Provides the performance criteria and acceptable solutions for APZ for Solar Farms in accordance with Section 8.3.5 of PBP 2019.

Performance Criteria	Acceptable Solutions	Compliance
The intent may be achieved where:		
Wind and solar farms require special consideration and should be provided with adequate clearances to combustible vegetation.	A minimum 10 APZ shall be provided surrounding all structures and Infrastructure.	The proposal complies with the APZ requirements of Appendix 1 of PBP 2019. The recommended APZs may require some clearing/management to be undertaken on the site.
APZs are managed and maintained to prevent the spread of a fire towards the building.	APZs are managed in accordance with the requirements of Appendix 4 of PBP.	The APZs on the subject site should have no problem being maintained in accordance with the requirements of Standards for Asset Protection Zones (RFS, 2005).
The APZ is provided in perpetuity. APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimized.	APZs are wholly within the boundaries of the development site. The APZ is located on lands with a slope less than 18 degrees.	The subject site does not have slopes greater than 18 degrees and the APZs are contained within the property boundaries.

- From the start of building works, and in perpetuity to ensure ongoing protection from the impacts of bush fires the property around all structures and infrastructure to a minimum distance of 10m shall be established and maintained as an Inner Protection Area (IPA). When establishing and maintaining an IPA the following requirements apply in accordance with the requirements of Appendix 4 of Planning for Bushfire Protection 2019;
 - Tree canopy cover should be less than 15% at maturity;
 - Trees at maturity should not touch or overhang the building;
 - Lower limbs should be removed up to a height of 2m above the ground;
 - Tree canopies should be separated by 2 to 5m;
 - Preference should be given to smooth barked and evergreen trees;
 - Create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;
 - Shrubs should not be located under trees;
 - Shrubs should not form more than 10% ground cover;
 - Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation;
 - Grass should be kept mown (as a guide grass should be kept to no more than 100mm in height);
 - Leaves and vegetation debris should be removed.

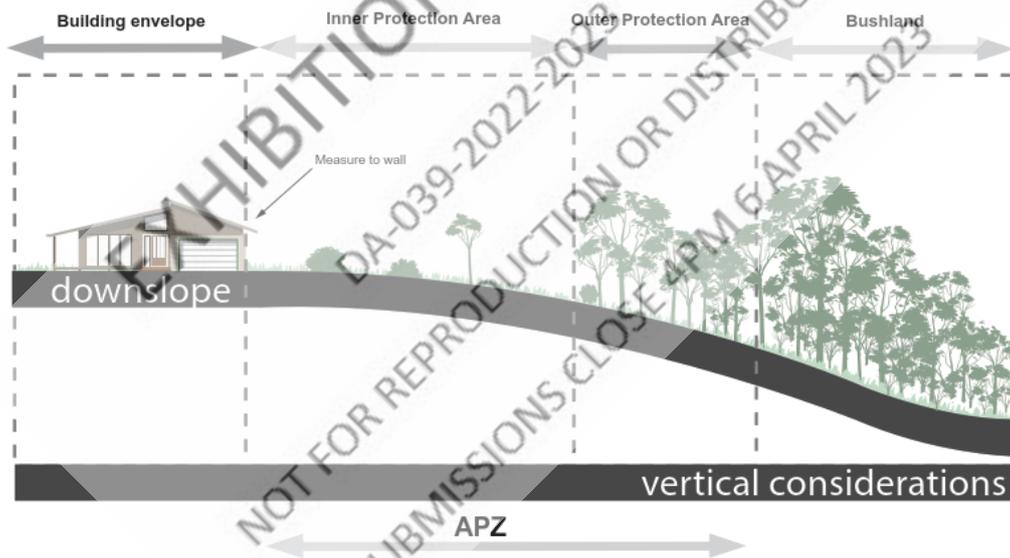


Figure 6: Diagrammatic representation of an Asset Protection Zone.

3.3 CONSTRUCTION STANDARDS

Essential equipment shall be designed and housed in such a way as to minimise the impact of bush fires on the capabilities of the infrastructure during bush fire emergencies. It should also be designed and maintained so that it will not serve as a bush fire risk to surrounding bush.

In order to minimise the susceptibility of infrastructure to bush fire and to prevent the likely spread of fire to and from the site, essential equipment should be housed and design in a manner to prevent likely ignition. This can be achieved through the use of fire-resistant materials and shielding vulnerable elements.

3.4 SITING AND ADEQUACY OF WATER ELECTRICITY AND GAS SUPPLIES

The performance criteria and acceptable solutions for water, electricity, and gas for Infill Development in accordance with PBP 2019 are provided in Table 2. The intent of the measures are to provide adequate water services for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.

Table 2: Provides the performance criteria and acceptable solutions for water, electricity, and gas for Infill development in accordance with PBP 2019.

Performance Criteria	Acceptable Solutions	Compliance										
<p><u>Reticulated water supply areas</u></p> <p>An adequate water supply is provided for firefighting purposes.</p> <p>Water supplies are located at regular intervals.</p> <p>The water supply is accessible and reliable for firefighting operations.</p> <p>Flows and pressure are appropriate.</p> <p>The integrity of the water supply is maintained.</p>	<ul style="list-style-type: none"> Reticulated water is to be provided to the development where available. A static water supply is provided where no reticulated water is available. Fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005. Hydrants are not located within any road carriageway. Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads. Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005. All above ground water service pipes external to the building are metal, including and up to any taps. 	<p>To satisfy the provisions for water and provide water for fire suppression a reticulated system could be provided within close proximity to the proposed development. If this approach is taken fire hydrant spacing, design and sizing shall comply with the relevant clauses of AS 2419.1:2005.</p>										
<p><u>Non-reticulated water supply area.</u></p> <p>a water supply reserve dedicated to firefighting purposes is installed and maintained. The supply of water can be an amalgam of</p> <p>minimum quantities for each lot in the development and be reticulated within dedicated firefighting lines.</p>	<ul style="list-style-type: none"> the minimum dedicated water supply required for firefighting purposes for each occupied building is provided in accordance with the following requirements for the different development types: <table border="1"> <thead> <tr> <th>DEVELOPMENT TYPE</th> <th>WATER REQUIREMENTS</th> </tr> </thead> <tbody> <tr> <td>Residential lots (<1,000m²)</td> <td>5,000L/lot</td> </tr> <tr> <td>Rural-residential lots (1,000-10,000m²)</td> <td>10,000L/lot</td> </tr> <tr> <td>Large rural/lifestyle lots (>10,000m²)</td> <td>20,000L/lot</td> </tr> <tr> <td>Multi-dwelling housing (including dual occupancies)</td> <td>5,000L/dwelling</td> </tr> </tbody> </table> <ul style="list-style-type: none"> a connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure. A 65mm Storz outlet with a ball valve is provided. ball valve and pipes are adequate for water flow and are metal. supply pipes from tank to ball valve have the same bore size to ensure flow volume. underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank. a hardened ground surface for truck access is supplied within 4m of the access hole. above ground tanks are manufactured of concrete or metal. 	DEVELOPMENT TYPE	WATER REQUIREMENTS	Residential lots (<1,000m ²)	5,000L/lot	Rural-residential lots (1,000-10,000m ²)	10,000L/lot	Large rural/lifestyle lots (>10,000m ²)	20,000L/lot	Multi-dwelling housing (including dual occupancies)	5,000L/dwelling	<p>To comply with the water requirements, it may be necessary to provide a static water supply that is located near the proposed development.</p> <p>The tank should be appropriately sized to meet the necessary water demands and must be maintained according to the acceptable solutions specified in PBP 2019.</p> <p>Provision of taps and at least two hoses (with minimum diameter of 18 mm) such that all parts of built assets within the development can be reached. (Where hose distances exceed 30 metres, professional advice on system design may be required.)</p>
DEVELOPMENT TYPE	WATER REQUIREMENTS											
Residential lots (<1,000m ²)	5,000L/lot											
Rural-residential lots (1,000-10,000m ²)	10,000L/lot											
Large rural/lifestyle lots (>10,000m ²)	20,000L/lot											
Multi-dwelling housing (including dual occupancies)	5,000L/dwelling											

Bushfire Assessment Report

Lot 67 DP 1288793, No. 23 Drover Place, Narrandera

	<ul style="list-style-type: none"> • raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F AS 3959). • unobstructed access is provided at all times. • tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters. • underground tanks are clearly marked. • All exposed water pipes external to the building are metal, including any fittings. • where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump and are shielded against bush fire attack; Any hose and reel for firefighting connected to the pump shall be 19mm internal diameter. 	<p>Clear signage and access is to be provided to the pump and fire hose location.</p>
<p><u>Electricity Services</u></p> <ul style="list-style-type: none"> • Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings. 	<ul style="list-style-type: none"> • where practicable, electrical transmission lines are underground. • where overhead electrical transmission lines are proposed: <ul style="list-style-type: none"> - lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; and - no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines. 	<p>The area is serviced by existing aboveground electrical transmission lines. The augmentation of that service should have no problem satisfying the acceptable solution for electricity.</p>
<p><u>Gas services</u></p> <p>Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings</p>	<ul style="list-style-type: none"> • reticulated or bottled gas is installed and maintained in accordance with AS 1596:2014 and the requirements of relevant authorities. Metal piping is to be used. • all fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side. • Connections to and from gas cylinders are metal. • polymer-sheathed flexible gas supply lines are not used. above-ground gas service pipes are metal, including and up to any outlets. 	<p>Reticulated piped gas is not available to the subject site.</p> <p>Any future gas bottles shall be installed and maintained in accordance with AS 1596. Gas cylinders are to be positioned in accordance with the acceptable solution outlined in this table.</p> <p>There is no reason why the installation of gas cylinders for future buildings associated with the proposal cannot comply with the acceptable solutions outlined in this table.</p>

3.5 ADEQUACY OF ACCESS AND EGRESS FROM SITE FOR EMERGENCY RESPONSES

In relation to access requirements for infill development the performance criteria are for safe, operational access to be provided (and maintained) for emergency services personnel in suppressing a bushfire while residents are seeking to relocate, in advance of a bushfire. The acceptable solution for access is to satisfy the intent and performance criteria for property access roads as detailed in Table 7.4a of PBP 2019. In relation to the access and egress to the site for Solar Farms it is important access is provided to all infrastructure to allow for fire suppression for fire fighters. An assessment of the proposed development against these requirements is provided in Table 3.

Table 3 Provides the performance criteria and acceptable solutions for Property Access Roads in accordance with PBP 2019.

Performance Criteria	Acceptable Solutions	Compliance
<ul style="list-style-type: none"> Firefighting vehicles are provided with safe, all-weather access to structures 	<ul style="list-style-type: none"> Property access roads are two-wheel drive, all weather roads; 	At a minimum, all weather access shall be provided to the proposed solar farm.
<ul style="list-style-type: none"> The capacity of access roads is adequate for firefighting vehicles 	<ul style="list-style-type: none"> The capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/causeways are to clearly indicate load rating. 	Access shall be design with capacity to support a fully loaded fire fighting vehicle.
<ul style="list-style-type: none"> There is appropriate access to water supply 	<ul style="list-style-type: none"> Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005 - Fire hydrant installations System design, installation and commissioning; and There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available. 	Suitable access to a static water supply or fire hydrant shall be provided.
<ul style="list-style-type: none"> Firefighting vehicles can access the dwelling and exit the property safely. 	<ul style="list-style-type: none"> At least one alternative property access road is provided for individual dwellings or groups of dwellings that are located more than 200 metres from a public through road; There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. In circumstances where this cannot occur, the following requirements apply: <ul style="list-style-type: none"> - Minimum 4m carriageway width; - In forest, woodland and heath situations, rural property roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m, at the passing bay; 	Suitable access should be provided to the site to allow for fire fighter access to the solar farm and to allow for the suppression of solar farm infrastructure and any fire traveling towards the assets. Access to the site shall comply the provisions of Property Access Roads.

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Performance Criteria	Acceptable Solutions	Compliance
	<ul style="list-style-type: none">- A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;- Property access must provide a suitable turning area in accordance with Appendix 3;- Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress;- The minimum distance between inner and outer curves is 6m;- The crossfall is not more than 10 degrees;- Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and a development comprising more than three dwellings has formalised access by dedication of a road and not by right of way.• Note: <i>Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.</i>	

3.6 ADEQUACY OF BUSHFIRE MAINTENANCE PLANS FOR EMERGENCY

The MIA Rural Fire District Fire Control Centre (200 Wakaden Street, Griffith 2680) currently administers bushfire maintenance plans and fire emergency procedures in this particular area. In addition, the Narrandera NSW RFS brigade station is located at No. 23 Twynam St, Narrandera.

Legislation requires occupants of land to immediately extinguish fires or notify fire-fighting authorities, on becoming aware of fire during fire danger period. The most appropriate course of action is to telephone "000" and report the fire.

- A Bush Fire Management Plan (BFMP) shall be prepared in consultation with NSW RFS District Fire Control Centre. The BFMP shall include:
 - 24/7 contact details including alternative telephone contact;
 - Site infrastructure plan;
 - Fire fighting water supply plan;
 - Site access and internal road plan;
 - Construction of asset protection zones and their continued maintenance;
 - Location of hazards (Physical, Chemical and Electrical) that will impact on fire fighting operations and procedures to manage identified hazards during fire fighting operations;
 - Such additional matters as required by the NSW RFS District Office (Plan review and update).

3.7 PBP 2019 SPECIFIC OBJECTIVE ASSESSMENT

All development on Bushfire Prone Land must satisfy the aims and objectives of PBP 2019. Table 4 demonstrates who the proposal complies with the specific objectives of PBP 2019.

Table 4: Compliance with the specific objectives of PBP 2019.

PBP 2019 Specific Objective	Assessment / Comment
Afford occupants of any building adequate protection from exposure to a bushfire.	Where the recommendations stated by this report are reasonably and adequately incorporated (where practicable), occupants remaining within the subject development site during a significant bushfire event would be afforded the benefit bushfire protection 'measures in combination'. In this respect, fire fighters or occupants remaining within the subject development site or else defending an asset or building during a passing bushfire event should reasonably be better afforded an acceptable level of protection.
Provide for a defensible space to be located around buildings.	Where the recommendation relating to APZ management as stated by this report is reasonably and adequately incorporated, future building structures would be afforded a reasonable area of defensible space (complying APZ) within the subject development site.
Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition.	Where the recommendations relating to APZ area stated by this report are reasonably and adequately incorporated infrastructure would reasonably be able to avoid direct flame contact and material ignition.
Ensure that safe operational access and egress for emergency service personnel and residents is available.	Where the recommendation relating to internal roadway installation and maintenance as stated by this report is reasonably and adequately incorporated, both emergency services personnel and occupants should be afforded safe access / egress within the subject development site for firefighting or evacuation purposes.
Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in the asset protection zone (APZ).	Where the recommendations relating to construction standards and APZ area stated by this report are reasonably and adequately incorporated, it would be reasonable to assume that regular maintenance works within the subject development would ensure ongoing management and maintenance of bush fire protection measures. Should the standard or upkeep of APZ areas, vegetation maintenance or vehicle access (required for bushfire safety compliance) become compromised during the life of the subject development site, it would also be reasonable to assume such matters would be addressed by the Council or local Fire Authorities through their hazard mitigation policies and notifications.
Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bushfire fighting").	Similarly, where the installation or connection to electrical and gas services incorporates the recommendations as stated by this report, both emergency services personnel or occupants assisting in bush firefighting should safely be able to manage potential electrical and gas hazards associated during a bushfire event.

4 CONCLUSION AND RECOMMENDATIONS

This Bushfire Assessment Report has been prepared for MPG Built Pty Ltd to accompany a development application for the construction of a solar farm over Lot 67 DP1288793, No. 23 Drover Place, Narrandera.

The proposal relates to the construction of a sustainable solar farm and will consist of a solar power plant and Azelio storage system. The power plant consists of 2.475MWp of solar PV and 825kWh of storage.

Topographically the site has a steady downslope in a southerly direction. Vegetation posing a threat to the proposed development comes from the woodland to the north and east of the development and grassland located on the subject site and surrounding properties.

The following combination of mitigation measures are recommended to provide an appropriate level of safety for the solar farm, a level consistent with that required by PBP 2019:

Asset Protection Zones

1. From the start of building works, and in perpetuity to ensure ongoing protection from the impacts of bush fires the property around all structures and infrastructure to a minimum distance of 10m shall be established and maintained as an Inner Protection Area (IPA). When establishing and maintaining an IPA the following requirements apply in accordance with the requirements of Appendix 4 of Planning for Bushfire Protection 2019;
 - I. Tree canopy cover should be less than 15% at maturity;
 - II. Trees at maturity should not touch or overhang the building;
 - III. Lower limbs should be removed up to a height of 2m above the ground;
 - IV. Tree canopies should be separated by 2 to 5m;
 - V. Preference should be given to smooth barked and evergreen trees;
 - VI. Create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;
 - VII. Shrubs should not be located under trees;
 - VIII. Shrubs should not form more than 10% ground cover;
 - IX. Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation;
 - X. Grass should be kept mown (as a guide grass should be kept to no more than 100mm in height);
 - XI. Leaves and vegetation debris should be removed.

Construction Standards

2. In order to minimise the susceptibility of infrastructure to bush fire and to prevent the likely spread of fire to and from the site, essential equipment should be housed and design in a manner to prevent likely ignition. This can be achieved through the use of fire-resistant materials and shielding vulnerable elements.

Services

3. Either of the following conditions can be used to achieve the provisions for water.

The tank should be appropriately sized to meet the necessary water demand. The dedicated water supply shall be supported by the following:

- i. A connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure. A 65mm Storz outlet with a ball valve is provided.
- ii. Ball valve and pipes are adequate for water flow and are metal.
- iii. Supply pipes from tank to ball valve have the same bore size to ensure flow volume.
- iv. Underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank.
- v. A hardened ground surface for truck access is supplied within 4m of the access hole.
- vi. Above ground tanks are manufactured of concrete or metal.
- vii. Raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F AS 3959).
- viii. Unobstructed access is provided at all times.
- ix. Tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters.
- x. Underground tanks are clearly marked.
- xi. All exposed water pipes external to the building are metal, including any fittings.
- xii. Where pumps are provided, they are a minimum 5hp or 3kw petrol or diesel-powered pump and are shielded against bush fire attack; Any hose and reel for firefighting connected to the pump shall be 19mm internal diameter.

EITHER/OR

A new hydrant shall be installed as per Australian Standard AS 2419.1–2005 'Fire Hydrant Installations System Design, Installation and Commissioning'. Suitable signposting shall be provided to ensure the hydrant is highly visible.

- I. Fire hydrant spacing, sizing and pressures shall comply with Australian Standard AS 2419.1– 2005 'Fire Hydrant Installations System Design, Installation and Commissioning'.
 - II. Fire hydrants shall not be located within any road carriageway.
 - III. Suitable access for a Category 1 fire appliance shall be provided.
4. Where overhead electrical transmission lines are proposed the following requirements apply:
- i. Lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and
 - ii. No part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.
5. Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used;
- iii. All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side;
 - iv. Connections to and from gas cylinders are metal;
 - v. Polymer-sheathed flexible gas supply lines are not used; and
 - vi. Above-ground gas service pipes are metal, including and up to any outlets.

Access

6. Suitable access should be provided to the site to allow for fire fighter access to the solar farm and to allow for the suppression of solar farm infrastructure and any fire traveling towards the assets. Access to the site shall comply the provisions of Property Access Roads. Property access roads must comply with the following requirements of Planning for Bush Fire Protection 2019:
 - I. Property access roads are two-wheel drive, all weather roads;
 - II. The capacity of road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes), bridges and causeways are to clearly indicate load rating.
 - III. If Hydrants are provided, they shall meet the relevant clauses of AS 2419.1:2005;
 - IV. Where a static water supply is provided, there shall be suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available;
 - V. Minimum 4m carriageway width;
 - VI. In forest, woodland and heath situations, rural property roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m, at the passing bay;
 - VII. A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;
 - VIII. Property access must provide a suitable turning area in accordance with Appendix 3;
 - IX. Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress;
 - X. The minimum distance between inner and outer curves is 6m;
 - XI. The crossfall is not more than 10 degrees; and
 - XII. Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads.

Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.

If the proposed development is undertaken in accordance with the recommendations outlined in this report it will comply with performance requirements provided in *Planning for Bushfire Protection* (2019) and will provide adequate provision for firefighting strategies. Compliance with the overall performance requirements of Clause 45 of the Rural Fires Regulation 2022 is provided in Table 5.

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Table 5: Compliance with the performance requirements of Clause 45 of the Rural Fires Regulation 2022.

Bushfire Protection Measure	Compliance
Asset Protection Zone	Yes - Refer to Sections 3.2.
The siting and adequacy of water supplies for fire fighting	YES - Refer to Sections 3.4.
Capacity of public roads to handle increased volumes of traffic in the event of a bushfire emergency	YES – Refer Section 3.5.
Whether or not public roads in the vicinity that link with the fire trail network have two-way access	Not applicable.
Adequacy of emergency response access and egress	YES - Refer to Section 3.5. No changes proposed to the existing access road.
Adequacy of bushfire maintenance plans and fire emergency procedures	YES - Refer to Sections 3.6.
Building construction standards	YES - Refer to Sections 3.3
Adequacy of sprinkler systems and other fire protection measures to be incorporated into the development	No sprinkler systems proposed.

This Bushfire Assessment Report should remain current for a period of twelve months (Feb 2024), at which time it should be subject to review to take into account changing land use and vegetation patterns. Any major bushfire event that affects the subject site should also trigger a review in order to determine the effectiveness of protection measures and annual hazard reduction activities.

The findings contained within this report are the result of discrete/specific methodologies used in accordance with recognised practices. To the best of our knowledge they represent a reasonable interpretation of the general conditions of the site. However, having stated this, it is important to note that although designing a solar farm to have an improved level of fire resistance will increase the likelihood of survival in a bushfire, their survival and that of the occupants cannot be guaranteed and therefore the decision whether to stay or go should be based on an understanding that the adoption of solutions outlined in this report will not guarantee safety.

EXHIBITION COPY

SET

consultants

ATTACHMENT 1

SITE PLAN

DA-039-2022-2023
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SUBMISSIONS CLOSE 4PM 6 APRIL 2023

