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Hazelwood North Solar Farm

Fire & Bushfire Report

ADVERTISED PLAN

Prepared for
Manthos Investments Pty Ltd
c/- Robert Luxmoore Pty Ltd

June 2023
Report No. 22077.03 (1.2)



**Nature
Advisory**

(Formerly Brett Lane & Associates Pty Ltd)
5/61-63 Camberwell Road
Hawthorn East, VIC 3123
PO Box 337, Camberwell VIC 3124
(03) 9815 2111
www.natureadvisory.com.au

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1. Executive summary

Site details	
Municipality:	Latrobe
Subject Site:	Hazelwood North
Site Area:	1,100 hectares
Zoning:	Farming Zone – Schedule 1 (FZ1)
Overlays:	Bushfire Management Overlay (BMO) (intercepts the edge of the site, adjacent to Walshs Road) Development and Design Overlay – Schedule 3 (DDO3) Development and Design Overlay – Schedule 5 (DDO5) Development and Design Overlay – Schedule 6 (DDO6) Development and Design Overlay – Schedule 10 (DDO10) Land Subject to Inundation Overlay (LSIO) State Resource Overlay – Schedule 1 (SR01) Environmental Significance Overlay – Schedule 1 (ES01)
Existing Buildings and Works:	Vegetated block, no existing structures or works
Summary of proposal and recommended bushfire mitigation measures	
Development Plan:	Construction of a solar farm and battery energy storage system
Fire Break:	20 metres for retained grassland vegetation along the eastern borders in accordance with fire break requirements for solar farms including a 10m wide non-vegetated area 30 metres for retained vegetation along the northern borders. 30 metres for retained vegetation in creeks. Refer to Table 2 for full summary.
Water Supply requirements for Solar Farm:	45,000-litre static water supply (x11) for the Solar Farm
Water Supply requirements for Battery Storage:	Reticulated water supply Or a quantity no less than 288,000L or as per the provisions for Open Yard Protection of AS 2419.1-2005 flowing for a period of no less than four hours at 20L/s, whichever is the greater

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Manthos Investments Pty Ltd, on behalf of Robert Luxmoore Pty Ltd, engaged Nature Advisory Pty Ltd to prepare this Bushfire Planning Report for the development of a solar farm on a 1,100-hectare parcel of land in Hazelwood North, zoned Farming Zone – Schedule 1 (FZ1) in the Latrobe Planning Scheme. The land is within a designated Bushfire Prone Area (BPA). The majority of the site is not subject to the Bushfire Management Overlay (BMO), with the exception of a small area adjacent to Walshs Road.

This report demonstrates how the application meets the requirements of Clause 13.02-1S *Bushfire* of the State Planning Provisions, and includes the following components:

- A *bushfire hazard site assessment*, that describes bushfire hazards within 150 metres of the proposed solar farm in accordance with the planning permit application requirements of Clause 44.06-3. The description of the hazards has been prepared in accordance with the *Australian Standards AS 3959:2018, Construction of buildings in bushfire prone areas* (Standards Australia 2018);
- Bushfire planning measures relevant to solar farms have been outlined, in accordance with the *Design Guidelines and Model Requirements – Renewable Energy Facilities* (CFA, 2022); and
- A *bushfire hazard landscape assessment*, including a plan that describes the bushfire hazards in the general locality more than 150 metres from the site.

During the site assessment, classified vegetation in the form of grassland, scrub, woodland and forest was recorded in the study area. Grassland, comprising large paddocks, occupied the majority of the study area. Scrub was situated in creeks in the south of the study area. Woodland and forest bordered the site and were typically associated with planted treed vegetation. The slope was recorded under each of these areas of classified vegetation.

A solar farm and associated infrastructure (as shown in Appendix 1) is proposed for the majority of the property, excluding the areas around creeks and associated tributaries.

A 20 metre wide fire break is required around the perimeter of the site in accordance with the *Design Guidelines for Renewable Energy Facilities* (CFA 2022). Due to the presence of higher threat vegetation (scrub and treed) within creeks and along the northern and western boundary of the site, a fire break of 30 metres is recommended in recognition of the heightened threat this poses. The vegetation within the fire breaks is to be managed to a low-threat state (i.e., grass slashed to a maximum height of 10 centimetres) and will include a 10m wide non-vegetated area (see Section 4.2.4).

This report was prepared by a team from Nature Advisory, comprising Arend Kwak (Botanist), Nhung Thi Hong Nguyen (Senior GIS Analyst), Chris Armstrong (Senior Botanist, Bushfire Expert & Project Manager) and Dr Inga Kulik (Director).

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2. Sources of information and policy context

2.1. Existing information

The reports, planning scheme and the solar farm layout relating to the study area listed below were reviewed.

- *VicPlan* (DELWP 2022a);
- Latrobe Planning Scheme (DTP 2023b);
- Hazelwood North Solar Farm – Preliminary Concept Rev 06 (UrbanFold);
- Planning Permit Applications - Bushfire Management Overlay Technical Guide (DELWP 2017);
- Australian Standard for Building in Bushfire Prone Areas AS3959:2018;
- *Regional Bushfire Planning Assessment* for the Latrobe local government area (DPCD 2012); and
- Design Guidelines and Model Requirements – Renewable Energy Facilities (CFA 2022).

2.2. Definitions

2.2.1. Site and study area

The term 'site' is used herein to refer to the land proposed to support the solar farm at Hazelwood North. The term 'study area' refers to area up to 150 metres from the site (see Figure 1).

2.2.2. Classified vegetation

For the purposes of a Bushfire Hazard site assessment, areas of vegetation within 150m of the study area which were considered to pose a bushfire threat are classified according to the vegetation classes defined in Table 2.3 of AS 3959:2018. These hazards are grouped as either:

- Forest;
- Woodland;
- Shrubland;
- Scrub;
- Mallee/Mulga;
- Rainforest; or
- Grassland.

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Non-vegetated areas and those considered 'low-threat', as defined in Section 2.2.3.2 of AS 3959:2018, are excluded from consideration as potential bushfire hazards.

2.3. Field methodology

The field assessment was conducted on the 14th and 15th September 2022. During this assessment, the site was inspected on foot and the surrounding study area observed from the site and surrounding roads.

Sites in the study area found to contain classified vegetation were mapped. Mapping was undertaken through a combination of aerial photograph interpretation and ground-truthing using a hand-held ArcGIS Collector® (Esri).

2.4. Precautionary approach

Wherever appropriate, a precautionary approach has been adopted in the discussion of implications. That is, where insufficient evidence is available on the predicted behaviour of fire in a wildfire event, it is assumed both that the most severe fire behaviour could take place and that unmanaged immature vegetation could reach mature heights. The implications under legislation and policy are considered accordingly.

3. Bushfire hazard assessment

3.1. Bushfire hazard site assessment

3.1.1. Site description

The site is approximately 1,100 hectares of private land located at Hazelwood North, approximately 3.45 kilometres south-west of the Traralgon town centre and 139.43 kilometres east-south-east of the Melbourne CBD (**Figure 1**). It is bordered by the Princes Highway to the north and west, semi-rural dwellings and Hazelwood Road to the east and semi-rural dwellings and Firmins Lane to the south. The study area consisted of an undulating landscape, that declined towards tributaries associated with Wades Creek and Boyds Creek, which traversed the site in a north-south direction. The land has historically been utilised as a pine plantation, with paddocks also supporting cropping and stock grazing. Surrounding land predominantly supported similar agricultural functions, as well as semi-rural dwellings. The shape of the land is largely irregular. It is approximately 4.37 metres from north to south and 3.48 kilometres from east to west (3.67 kilometres with the inclusion of Walshs Road).

The site is currently zoned Farming Zone – Schedule 1 (FZ1) in the Latrobe planning scheme.

Photographs of the site and study area are provided in Section 3.2.

3.1.2. Classified vegetation

During the field assessment, four classified vegetation classes were identified as per the classification methods in the Australian Standard AS 3959:2018. Classified vegetation is represented in **Figure 1** and comprised:

- Forest – along the northern, western and southern boundaries of the site.
- Grassland – throughout the majority of the site’s paddocks and occurring along the eastern and southern portions of the study area.
- Scrub – primarily situated within creeks to the south of the site, with an extensive stand also present in the south-eastern corner.
- Woodland – small zones present in the centre and south of the site, with a more extensive zone along the southwestern border of the study area.

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3.2. Vegetation classification zones

The following distinct bushfire hazards were recorded within the study area. Where vegetation has been excluded from further consideration as a bushfire threat, the applicable clause from AS3595 is indicated.

Zone	1	Photo	1
Vegetation Classification or Exclusion Clause			
Class G – Grassland			
Description/Justification for classification			
Unmanaged grassland of exotic pasture species, occupying paddocks and road reserves around the periphery of the site. 0°/upslope.			

Zone	2	Photo	2
Vegetation Classification or Exclusion Clause			
Class A – Forest			
Description/Justification for classification			
A mixture of exotic and treed vegetation, with a prominent midstory and understory. Monterey Pine was commonplace. Associated with a residential dwelling and the Firmins Lane road reserve to the south. 0°/upslope.			

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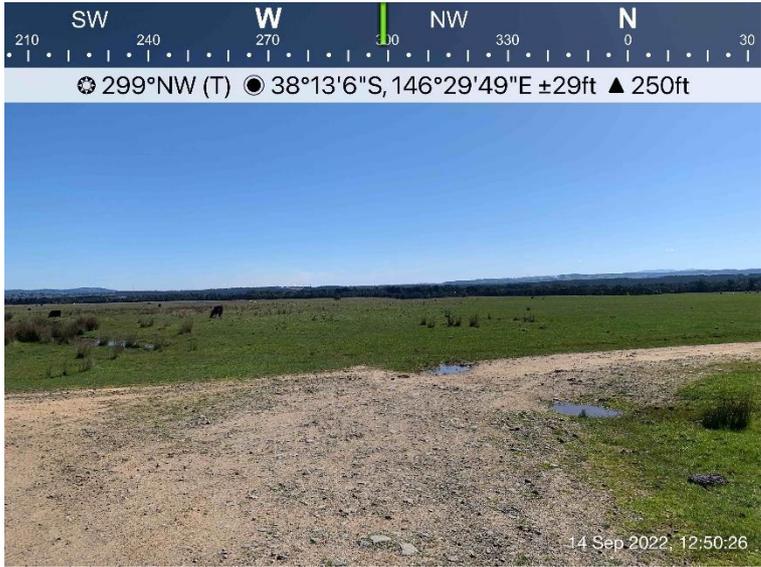
Zone	3	Photo	3
Vegetation Classification or Exclusion Clause			
Class B - Woodland			
Description/Justification for classification			
<p>Assorted eucalypt species, overlying minimal understory values. These were associated with housing lots and road reserves to the southwest of the site. 0°/upslope.</p>			

Zone	4	Photo	4
Vegetation Classification or Exclusion Clause			
Class A – Forest			
Description/Justification for classification			
<p>Remnant native treed vegetation, with a dense midstory and understory. Situated along the north and west of the study area, bordering the Princes Freeway. 0°/upslope.</p>			

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Zone	5	Photo	5
Vegetation Classification or Exclusion Clause			
Class G – Grassland			
Description/Justification for classification			
<p>Unmanaged grassland of exotic pasture species, occupying paddocks throughout the majority of the site. 0-5° downslope.</p>			
		 <p style="text-align: right; font-size: small;">14 Sep 2022, 12:50:26</p>	

Zone	6, 8, 9	Photo	6
Vegetation Classification or Exclusion Clause			
Class G – Grassland			
Description/Justification for classification			
<p>Unmanaged grassland of exotic pasture species, occupying slopes associated with the site's creeks and tributaries. 5-10° downslope.</p>			
		 <p style="text-align: right; font-size: small;">14 Sep 2022, 16:03:59</p>	

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Zone	7, 13	Photo	7
Vegetation Classification or Exclusion Clause			
Class B - Woodland			
Description/Justification for classification			
<p>Treed vegetation with minimal understorey values, occurring in paddocks and associated with a creek to the centre and southeast of the site respectively. 0°/upslope.</p>			

Zone	10, 11, 12	Photo	8
Vegetation Classification or Exclusion Clause			
Class D - Scrub			
Description/Justification for classification			
<p>Dense stands of Swamp Paperbark, situated in creeks and tributaries in the south of the site. 0°/upslope</p>			

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Zone	14	Photo	9
Vegetation Classification or Exclusion Clause			
Class D - Scrub			
Description/Justification for classification			
<p>An extensive stand of Kunzea, situated in the southeastern corner of the site. 0°/upslope.</p>			

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3.4. Fire Breaks

Table 1 summarises the classification of bushfire hazards and the recommended fire break width for each zone.

Table 1: Bushfire hazard assessment and recommended fire breaks

Zone	Vegetation Classification	Effective slope	Fire Break (m)
1	Class G - Grassland	0° /Upslope	20
2	Class A - Forest	0° /Upslope	30
3	Class B - Woodland	0° /Upslope	30
4	Class A - Forest	0° /Upslope	30
5	Class G - Grassland	0-5° downslope	20
6	Class G - Grassland	5-10° downslope	30
7	Class B - Woodland	0° /Upslope	30
8	Class G - Grassland	5-10° downslope	30
9	Class G - Grassland	5-10° downslope	30
10	Class D - Scrub	0° /Upslope	30
11	Class D - Scrub	0° /Upslope	30
12	Class D - Scrub	0° /Upslope	30
13	Class B - Woodland	0° /Upslope	30
14	Class D - Scrub	0° /Upslope	30

If any of the vegetation within the development footprint is not cleared prior to the commencement of construction, interim fire breaks will be required around solar farm infrastructure facing hazards on site. This is needed to protect workers and infrastructure and must be created and maintained in a low-fuel state, until this threat is removed by the development.

A 20 metre wide fire break is required around the perimeter of the site in accordance with the Design Guidelines for Renewable Energy Facilities (CFA 2022). Due to the presence of higher threat vegetation (scrub and treed) within creeks and along the northern and western boundary of the site, a fire break of 30 metres is recommended in recognition of the heightened threat this poses. The vegetation within the fire breaks is to be managed to a low-threat state (i.e., grass slashed to a maximum height of 10 centimetres) and will include a 10m wide non-vegetated area (see Section 4.2.4).

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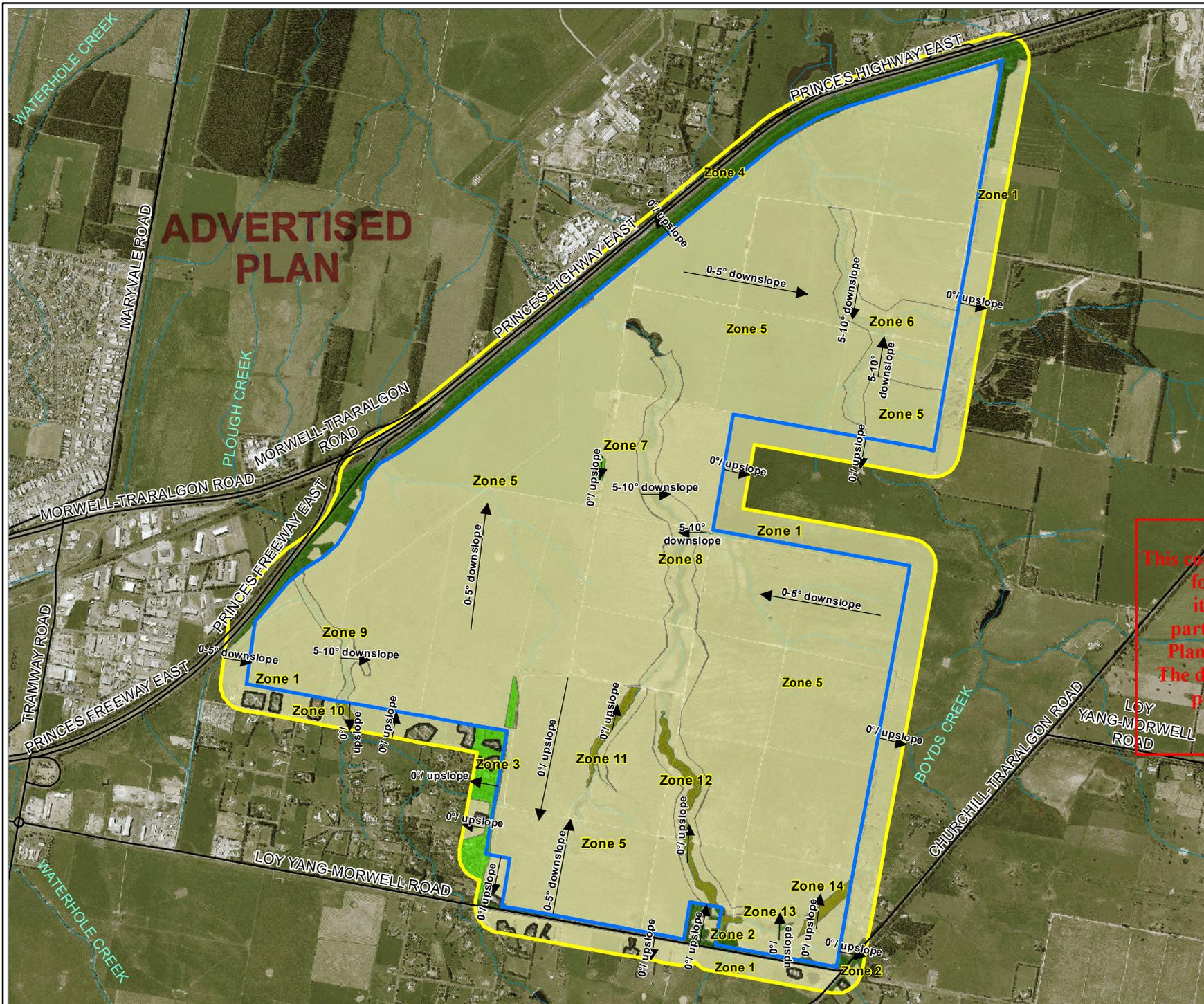


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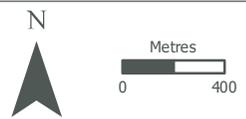
Figure 1: Bushfire Hazard Site Assessment

Project: Hazelwood North Solar Facility
Client: Manthos Investments Pty Ltd
Date: 6/10/2022

- Site
 - Study area (150m buffer of site)
- Classified vegetation**
- Forest
 - Grassland
 - Scrub
 - Woodland
 - Low threat
 - Water course
 - Effective slope under hazard



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3.5. Bushfire hazard landscape assessment

3.5.1. Hazards in the landscape

The surrounding area to the north and west supports extensive residential and commercial developments associated with Traralgon and Morwell respectively. These areas represent minimal fire risk to the site. Areas to the south and east meanwhile support paddocks and semi-rural dwellings, which are unlikely to support extreme bushfire behaviour. It should be noted that large pine plantations also occur within the surrounds, though these are separated from the site by paddocks, roads and townships.

The study area lies within a broader landscape type One as defined in the BMO technical guide (DELWP 2017) and includes the following:

- Minimal vegetation beyond 150 metres of the site, except grassland and low threat vegetation. Though pine plantations also occur in the surrounds, these are separated by roads, paddocks and residential lots.
- Vegetation is unlikely to result in neighbourhood-scale destruction, and extreme bushfire behaviour is not possible.
- Easy access to Traralgon, which provides extensive bushfire shelter.

Additionally, the presence of classified Forest along Princes Highway is not considered to contribute to the landscape risk due to its narrow width and lack of connectivity to more significant hazards in the broader landscape.

The site occurs nearby to an 'Identified Area' of bushfire hazard, listed in the *Regional Bushfire Planning Assessment* for the Latrobe local government area (DPCD 2012):

- Medium sized residential lots interface with a bushfire hazard area, associated with the Jeeralang Traralgon Plantation, less than 1 kilometre to the southeast.

This hazard presents an immediate threat to egress through this area, in the event of a bushfire. However, given that appropriate bushfire shelter in Traralgon and Morwell occurs to the north and west respectively, egress from the site is unlikely to pass through this area. Additionally, these residential lots also buffer the site from bushfire hazards associated with the Jeeralang Traralgon Plantation.

The closest history of a bushfire to the study area since 1970 was from 2016 and occurred immediately south. However, this bushfire was very limited in extent and likely to be associated with grassland. Additionally, several bushfires occurred in 2014 to the west of the study area, with the closest being 3.89 kilometres. These were largely separated from the site by roads, paddocks and residential development. Significant bushfires also occurred between 1990-2016, approximately 5.24 kilometres to the southeast. These bushfires were associated with plantations, the Traralgon South Flora and Fauna Reserve and adjacent tracts of extensive bushland. A series of planned burns were also undertaken at the Jeeralang Traralgon Plantation between 1990 and 2007.

Refer to Figure 2 for a map presenting the landscape assessment. The fire history layer is generated from the 'FIRE_HISTORY' spatial data file available through DataShare.

3.5.2. Likely bushfire scenarios

In Victoria, the most severe weather conditions for bushfire are hot dry winds from the northwest, that after a cool change, change direction to the southwest. The sudden shift in wind direction can cause a rapid change in bushfire direction and behaviour. However, the threat from a bushfire can approach in all directions.

The most severe bushfire scenario at a regional scale would result from fires associated with nearby pine plantations, occurring to the northwest and southwest of the study area. These plantations are extensive and occur in close proximity to large tracts of bushland, which could contribute to landscape-scale

bushfires. However, given the minimal amount of treed vegetation adjacent to and with the site, the intensity of a bushfire is likely to significantly diminish during its approach and transition to a grass fire and low fuel load grazing paddocks. The most likely bushfire scenario would be from grass fires within and adjacent to the site, arising from either ember attack or ignition risks from operational activities. These fires may travel along retained areas of grassland and scrub associated with the creeklines within the site. However, the presence of maintained 20-30 metre wide fuel breaks will limit the potential for fire spreading into the surrounding landscape and resulting in large scale destruction or impacting on human life.

3.6. Egress to built-up areas

The proposed solar farm will provide three vehicular egress routes. All roads are single-carriageway roads, with Firmins Lane being sealed, Groppi Road being partially sealed and Walshs Road being unsealed. These roadways could provide the following egress routes to nearby built-up areas in the event of extreme bushfire behaviour (Figure 2):

- Traralgon – 7.9 kilometres to the north via Walshs Road, Hazelwood Road, Princes Highway and Grey Street;
- Morwell – 8.0 kilometres to the west via Groppi Road, Buckleys Road, Firmins Lane, Monash Way and Morwell-Traralgon Road; and
- Churchill – 11.5 kilometres to the south via Firmins Lane, Hazelwood Road and Tramway Road.

Each of these egress routes would involve travelling on roads that traverse low risk areas such as paddocks, semi-rural and residential areas. Treed vegetation is very sparse along all routes.

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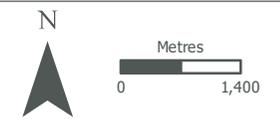
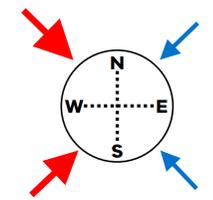
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Figure 2: Bushfire hazard landscape assessment

Project: Hazelwood North Solar Facility
Client: Manthos Investments Pty Ltd
Date: 6/10/2022

- ★ Site
- Egress
- Fire History**
- ▭ Planned Burn
- ▨ Bushfire
- Potential fire run**
- More likely
- Less likely

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4. Fire Risk management

The aim of this section is to provide an analysis of site risks and associated management strategies in accordance with Section 5 of the Design Guidelines and Model Requirements for Renewable Energy Facilities (CFA 2022). This will serve to inform the design of the facility.

4.1. Risk analysis

Table 2: Risks, associated consequences and mitigation measures

Risk	Potential consequences	Mitigation measures
Electrical/Battery fault	<ul style="list-style-type: none"> Localised fires within the immediate site Spread of fire into the surrounding landscape Damage to solar farm infrastructure Risk of injury and death 	<ul style="list-style-type: none"> Regular maintenance of electrical/battery storage infrastructure Report any issues relating to infrastructure faults or unsafe work practices Ensure staff have reviewed the bushfire management plan and received appropriate training. I.e., familiarisation of egress routes and emergency meeting points Maintenance of water supply requirements Maintenance of fire breaks around infrastructure, particularly the battery storage facility. Ensure that the CFA are familiar with the site layout (i.e. vehicle access, water supplies, infrastructure, etc.)
Bushfire/Grassfire in landscape	<ul style="list-style-type: none"> Fire spreading into the site from neighbouring hazards Damage to solar farm infrastructure Risk of injury and death 	<ul style="list-style-type: none"> Ensure staff have reviewed the bushfire management plan and received appropriate training. I.e., familiarisation of egress routes and emergency meeting points Maintenance of the identified fire breaks around the parameter of the site Maintenance of water supply requirements Ensure that the CFA are familiar with the site layout (i.e. vehicle access, water supplies, infrastructure, etc.)

4.2. Risk management strategies

The following risk management strategies are transcribed from Section 6.2. of the Design Guidelines and Model Requirements for Renewable Energy Facilities (CFA 2017), where relevant to the proposal.

4.2.1. Emergency vehicle access

The provision of adequate access for emergency services must be considered, to enable an effective response and management of onsite fires. The CFA identifies the following requirements as the minimum expectations for emergency vehicle access.

- Construction of a four (4) metre perimeter road within the perimeter fire break.
- Roads must be of all-weather construction and capable of accommodating a vehicle of fifteen (15) tonnes.
- 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.
- The average grade should be no more than 1 in 7 (14.4% or 8.1°) with a maximum of no more than 1 in 5 (20% or 11.3°) for no more than fifty (50) metres.
- Dips in the road should have no more than a 1 in 8 (12.5% or 7.1°) entry and exit angle.

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- Roads must incorporate passing bays at least every 600 metres, which must be at least twenty (20) metres long and have a minimum trafficable width of six (6) metres. Where roads are less than 600 metres long, at least one passing bay must be incorporated.
- Road networks must enable responding emergency services to access all areas of the facility, including fire service infrastructure, buildings, and battery energy storage systems and related infrastructure.
- The provision of at least two (2) but preferably more access points to the facility, to ensure safe and efficient access to and egress from areas that may be impacted or involved in fire. The number of access points must be informed through a risk management process.

4.2.2. Firefighting water supply

In the event of a fire, emergency services must have safe and effective access to a sufficient water supply. The location of firefighting access points and the quantity of water must be established through a comprehensive risk management process.

The CFA identifies the following requirements for onsite water supplies:

- Water access points must be clearly identifiable and unobstructed to ensure efficient access.
- Static water storage tank installations must comply with AS 2419.1-2005: Fire hydrant installations – System design, installation and commissioning.
- The static water storage tank(s) must be an above-ground water tank constructed of concrete or steel.
- The static water storage tank(s) must be capable of being completely refilled automatically or manually within 24 hours.
- The static water storage tanks must be located at vehicle access points to the facility and must be positioned at least ten (10) metres from any infrastructure (solar panels, wind turbines, battery energy storage systems, etc.).
- The hard-suction point must be provided, with a 150mm full bore isolation valve (Figure 3) equipped with a Storz connection, sized to comply with the required suction hydraulic performance. Adapters that may be required to match the connection are: 125mm, 100mm, 90mm, 75mm, 65mm Storz tree adapters (Figure 4) with a matching blank end cap to be provided.
- The hard-suction point must be positioned within four (4) metres to a hardstand area and provide a clear access for emergency services personnel.
- An all-weather road access and hardstand must be provided to the hard-suction point. The hardstand must be maintained to a minimum of 15 tonne GVM, eight (8) metres long and six (6) metres wide or to the satisfaction of the CFA.
- The road access and hardstand must be kept clear at all times.
- The hard-suction point must be protected from mechanical damage (eg. bollards) where necessary.
- Where the access road has one entrance, a ten (10) metre radius turning circle must be provided at the tank.
- An external water level indicator must be provided to the tank and be visible from the hardstand area.
- Signage (Figure 5) indicating 'FIRE WATER' and the tank capacity must be fixed to each tank. It should comply with AS 2419.1-2005, Section 5.4.5: Fire hydrant tank signs.
- Signage (Figure 6) must be provided at the front entrance to the facility, indicating the direction to the static water tank. It should be fade resistant, fixed to a rigid post in contrasting lettering, white sign writing on red background, with a circle reflective marker and 'W' in 150mm upper case lettering.



Figure 3: 150mm full-bore isolation valve



Figure 4: 125mm, 100mm, 90mm, 75mm, 65mm Storz tree adapters.



Figure 5: Fire water signage.

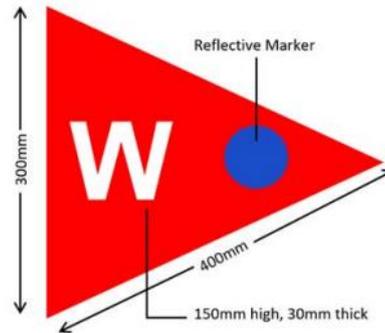


Figure 6: Directional signage.

Model requirements identified by the CFA as being specific to solar energy facilities include:

- The fire protection system for solar energy facilities must incorporate at least one (1) x 45,000L static water tank for every 100ha. For example, a 500ha site requires a minimum of five (5) x 45,000L static water tanks.
- A fire water tank must be located at the primary vehicle access point to the facility, and elsewhere in consultation with CFA.
- Fire water must be provided to cover buildings, control rooms, substations and grid connections, in consultation with CFA.
- Additional fire protection systems or equipment required under any Australian Standards for dangerous goods must be provided as prescribed.

For facilities with battery energy storage systems, the fire protection system must include at a minimum:

- A fire hydrant system that meets the requirements of AS 2419.1-2005: Fire hydrant installations, Section 3.3: Open Yard Protection, and Table 3.3: Number of Fire Hydrants Required to Flow Simultaneously for Protected Open Yards. Except, that fire hydrants must be provided and located so that every part of the battery energy storage system is within reach of a 10m hose stream issuing from a nozzle at the end of a 60m length of hose connected to a fire hydrant outlet.

If no reticulated water is available, a fire water supply in static storage tanks can be utilised if the following are included:

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- The fire water supply must be of a quantity no less than 288,000L or as per the provisions for Open Yard Protection of AS 2419.1-2005 flowing for a period of no less than four hours at 20L/s, whichever is the greater.
- The quantity of static fire water storage is to be calculated from the number of hydrants required to flow from AS 2419.1-2005, Table 3.3. (E.g., For battery installations with an aggregate area of over 27,000m², 4 hydrant outlets are required to operate at 10L/s for four hours, which equates to a minimum static water supply of 576kL.)
- Fire hydrants must be provided and located so that every part of the battery energy storage system is within reach of a 10m hose stream issuing from a nozzle at the end of a 60m length of hose connected to a fire hydrant outlet.
- The fire water supply must be located at vehicle entrances to the facility, at least 10m from any infrastructure (electrical substations, inverters, battery energy storage systems, buildings).
- The fire water supply must be reasonably adjacent to the battery energy storage system and shall be accessible without undue danger in an emergency (e.g., Fire water tanks are to be located closer to the site entrance than the battery energy storage system).
- The fire water supply must comply with AS 2419.1-2005: Fire hydrant installations - Section 5: Water storage.

4.2.3. Onsite vegetation

Any vegetation existing within or adjacent to the site must be considered for its potential to contribute to fire hazard. Therefore, vegetation must be managed so that it does not create the potential for ignition of infrastructure or retained vegetation.

The fire risk resulting from onsite vegetation may be mitigated via the following measures:

- Vegetation removal (where permitted).
- Separation from nearby infrastructure (e.g., fire breaks), in accordance with prescribed defensible space requirements.
- The provision of thermal barriers at nearby infrastructure.
- Trees must not overhang or touch any elements of the solar farm.
- Regular maintenance of fire breaks.
- Other means in consultation with CFA.

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4.2.4. Fire breaks

Fire breaks must be utilised to provide a barrier to the movement of fire, as well as assisting in emergency vehicle access.

An effective fire break must be non-combustible (e.g. concrete) and free of vegetation and obstructions at all times.

The width of fire breaks must be a minimum of 10m, and at least the distance where radiant heat flux (output) from the vegetation does not create the potential for ignition of on-site infrastructure.

A fire break must be established and maintained around the following solar farm areas:

- The perimeter of the facility, commencing from the boundary of the facility or from the vegetation screening inside the property boundary.
- The perimeter of control rooms, electricity compounds, battery storage systems, substations and all other buildings on site.

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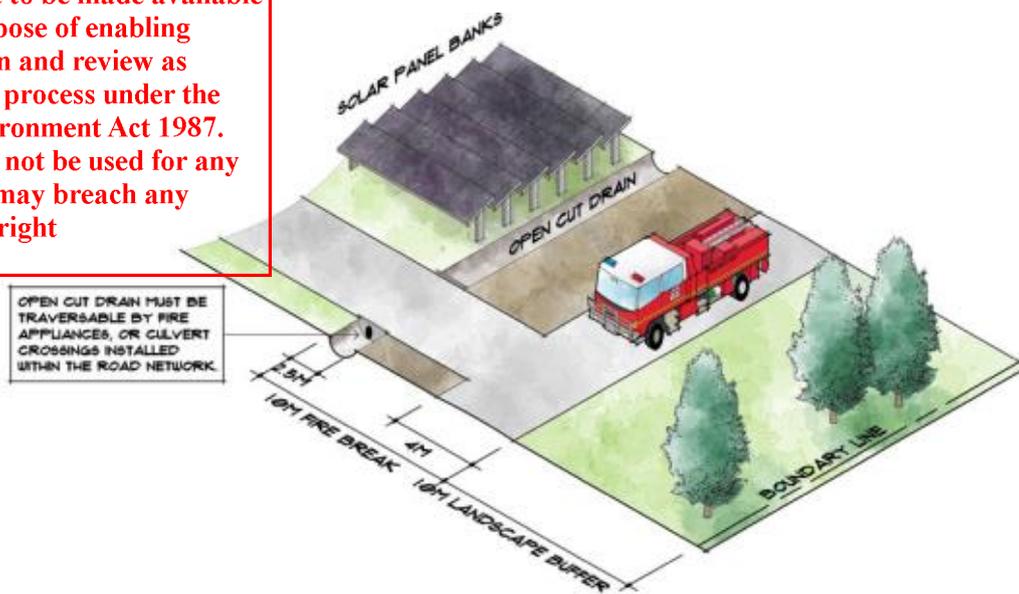


Figure 7: Example fire break requirements for a solar facility (from CFA 2022)

4.2.5. Battery storage systems

At present, an Australian standard has not been established to mitigate risks for large scale battery storage systems. Therefore, the CFA advises that the current version of the *UL 9540: Energy Storage System Requirements* and *FM Global Property Loss Prevention Data Sheet 5-33 (2020) Electrical Energy Storage Systems* should be used in the design and operation of battery energy storage systems.

When siting battery storage systems, the CFA has indicated that the following guidelines must be considered:

- A layout of site infrastructure that:
 - Considers the safety of emergency responders.
 - Minimises the potential for grassfire and/or bushfire to impact the battery energy storage system.
 - Minimises the potential for fires in battery containers/enclosures to impact on-site and offsite infrastructure.
- Located so as to be reasonably adjacent to a site vehicle entrance (suitable for emergency vehicles).
- Located so that the site entrance and any fire water tanks are not aligned to the prevailing wind direction (therefore least likely to be impacted by smoke in the event of fire at the battery energy storage system.)

Furthermore, energy storage systems must be:

- Provided with in-built detection and suppression systems. Where these systems are not provided, measures to effectively detect and/or suppress fires within containers must be detailed within the Risk Management Plan.
- Provided with suitable ember protection to prevent embers from penetrating battery containers/enclosures.
- Provided with suitable access roads for emergency services vehicles, to and within the site, including to battery energy storage system(s) and fire service infrastructure.
- Installed on a non-combustible surface such as concrete.
- Provided with adequate ventilation.
- Provided with impact protection to at least the equivalent of a W guardrail-type barrier, to prevent mechanical damage to battery containers/enclosures.

- Provided with enclosed wiring and buried cabling, except where required to be above-ground for grid connection.
- Provided with spill containment that includes provision for management of fire water runoff.

4.2.6. Dangerous goods storage and handling

The following measures are outlined by the CFA, to ensure compliance with the *Dangerous Goods (Storage and Handling) Regulations (2012)*:

- Signage and labelling compliant with the Dangerous Goods (Storage and Handling) Regulations 2012 and the relevant Australian Standards must be provided at the site entrance, dangerous goods storage locations, and storage tanks where applicable.
- Appropriate material for the clean-up of dangerous goods spills and leaks (including absorbent, neutralisers, tools, disposal containers and personal protective equipment) must be provided and available on-site.
- Training must be provided for site personnel on the hazards, safe use and emergency response for spills, leaks and fire involving dangerous goods.
- All dangerous goods stored on-site must have a current Safety Data Sheet (SDS). Safety Data Sheets must be provided within the facility's Emergency Information Book(s), in the Emergency Information Container(s).
- The requirements of the dangerous goods legislative framework, and all relevant Australian Standards must be complied with for all facilities, including facilities with battery energy storage systems.

4.2.7. Additional siting considerations

The CFA requires that solar panel banks are separated by a minimum of six metres, in order to support effective firefighting responses. Any modifications to separation distances must be in consultation with the CFA.

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4.3. Roles and responsibilities

This section outlines the responsibilities and contact details of staff with roles relating to occupational health and safety (OH&S).

Table 3: OH&S staff information

Responsible staff	Responsibilities	
	Preparedness	In event of a bushfire emergency
Operations Manager	<p>Ensure vegetation management actions are undertaken prior to the fire danger period, and maintained throughout.</p> <p>Fire equipment checks.</p> <p>Conduct annual onsite training sessions for staff prior to the fire danger period declaration in early December. Induct new staff members on the content of this Plan</p> <p>Ensure emergency signage is appropriately installed.</p>	<p>Determine appropriate response to any identified fire threats</p> <p>Inform all staff and visitors if evacuation or shelter-in-place is required.</p> <p>Instigate evacuation or shelter-in-place responses if required.</p>
First Aid Officer	<p>Assist Operations Manager as instructed.</p> <p>Undertake Level 2 First aid course and complete appropriate refresher courses as required.</p> <p>Ensure first aid kits on site are fully stocked and maintained appropriately</p>	<p>Take a portable first aid kit when leaving the building during an evacuation or shelter-in-place (only if it's easily accessible).</p> <p>Provide first aid assistance to staff and visitors to the best of their training.</p>

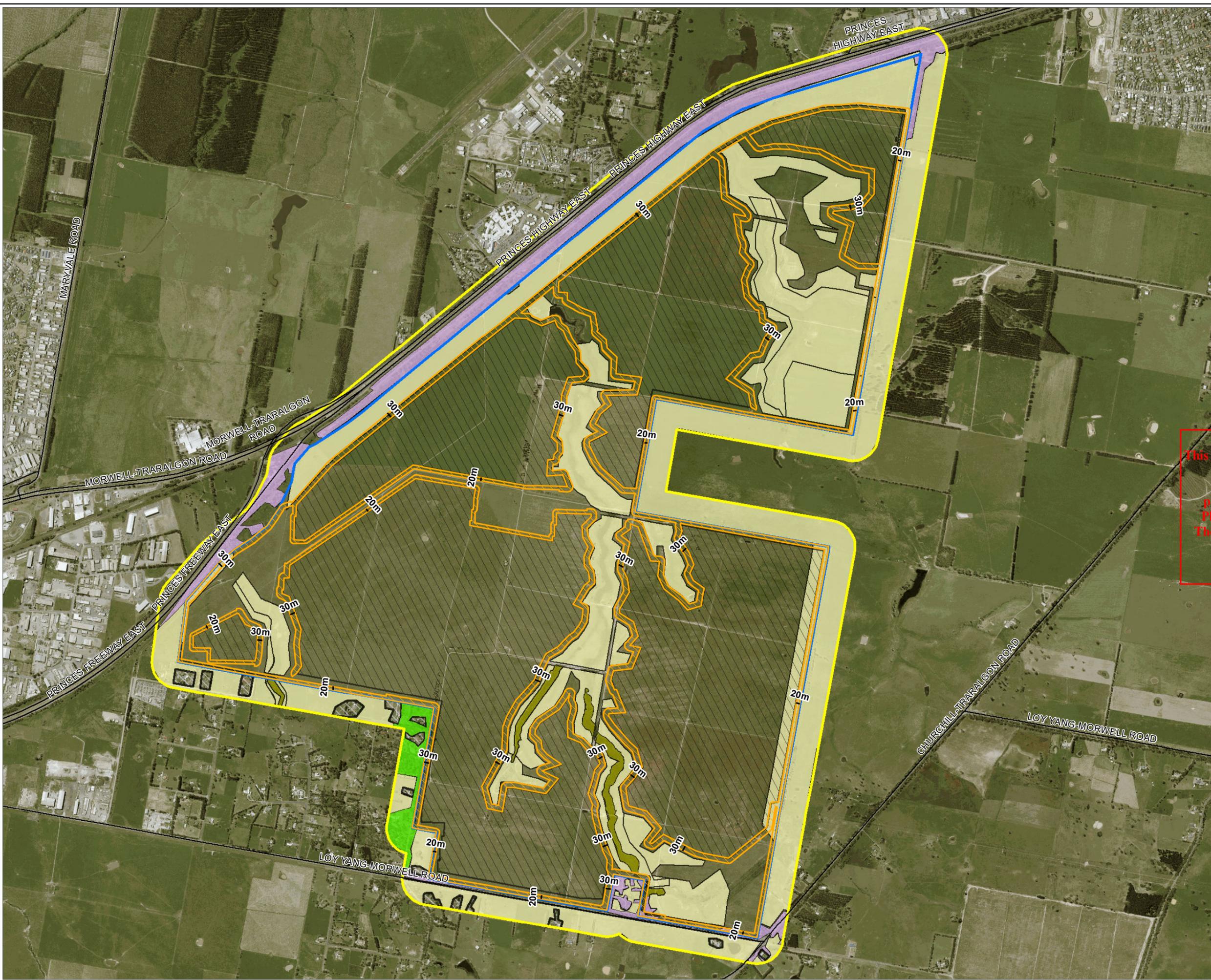
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Figure 3: Bushfire Protection Measures

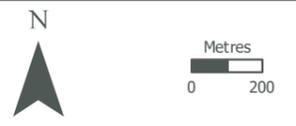
Project: Hazelwood North Solar Facility
Client: Manthos Investments Pty Ltd
Date: 10/07/2023

- ▭ Site
- ▭ Study area (150m buffer of site)
- Development footprint (solar panel infrastructure)
- Bushfire buffers
- Classified vegetation**
- Forest
- Grassland
- Scrub
- Woodland
- Low threat



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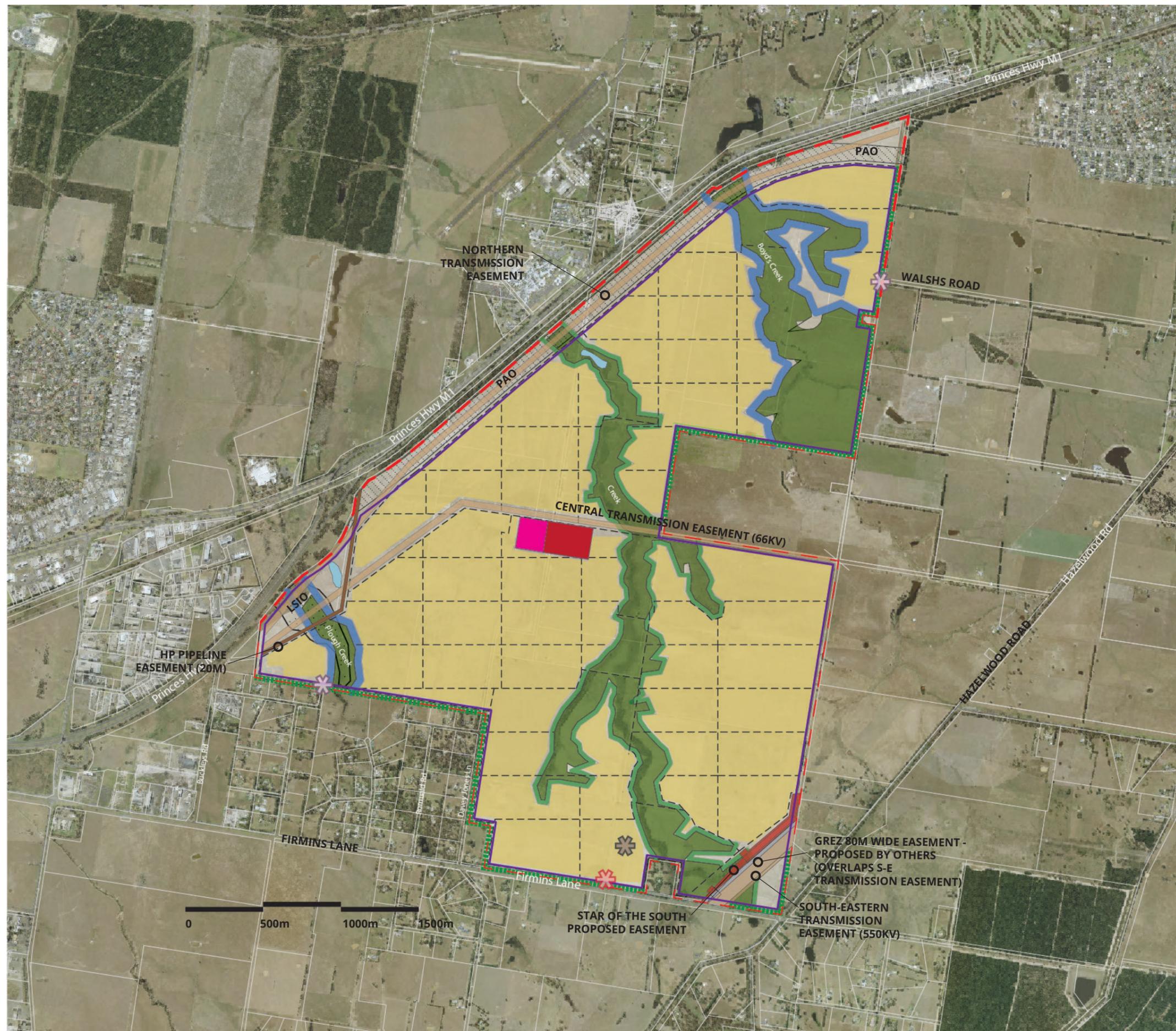
PO Box 337, Camberwell, VIC 3124, Australia
 www.natureadvisory.com.au
 03 9815 2111 - info@natureadvisory.com.au

5. References

- CFA 2022, *Design Guidelines and Model Requirements – Renewable Energy Facilities*, State of Victoria, Country Fire Authority, Burwood East.
- DELWP 2022a, *VicPlan*, Department of Environment, Land, Water and Planning, East Melbourne, <<https://mapshare.vic.gov.au/vicplan/>>.
- DELWP 2023b, *Victoria Planning Provisions*, Department of Land, Planning and Transport, Melbourne, <<https://planning-schemes.app.planning.vic.gov.au/Victoria%20Planning%20Provisions/ordinance/>>
- DPCD 2012, *Regional Bushfire Planning Assessment – Latrobe Region*, Department of Planning and Community Development, Melbourne.
- Standards Australia 2018, *Australian Standards AS 3959:2018, Construction of buildings in bushfire-prone areas*, Standards Australia, Sydney.

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LEGEND

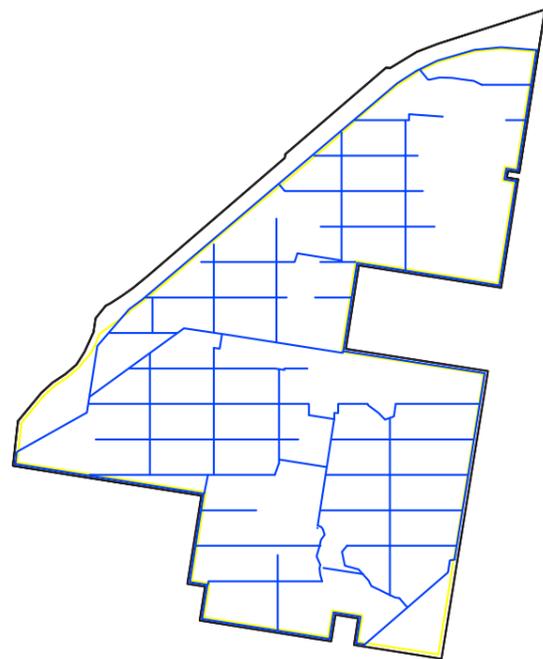
- PROPERTY BOUNDARY
- 30M PERIMETER BUFFER (DOUBLES AS FIREBREAK & INCLUDES PERIMETER ROAD)
- SOLAR FARM
- SUBSTATION
- BATTERY STORAGE
- VEHICULAR ACCESS NETWORK
- LAND SUBJECT TO INUNDATION (LSIO) OVERLAY
- EXTENT OF CREEK TO APPROX. TOP OF SLOPE
- 30M CREEK BUFFER FROM APPROX. TOP OF SLOPE
- 50M CREEK BUFFER FROM APPROX. TOP OF SLOPE
- PUBLIC ACQUISITION OVERLAY (PAO) - ROAD
- ✱ PRIMARY ACCESS POINT
- ✱ EMERGENCY ACCESS POINT
- WATER STORAGE (REQUIRES COORDINATION WITH FIREBREAK)
- PROPOSED PERIMETER PLANTING
- ✱ TEMPORARY CONSTRUCTION COMPOUND (+/- 2HA)

*All areas are indicative and subject to change.

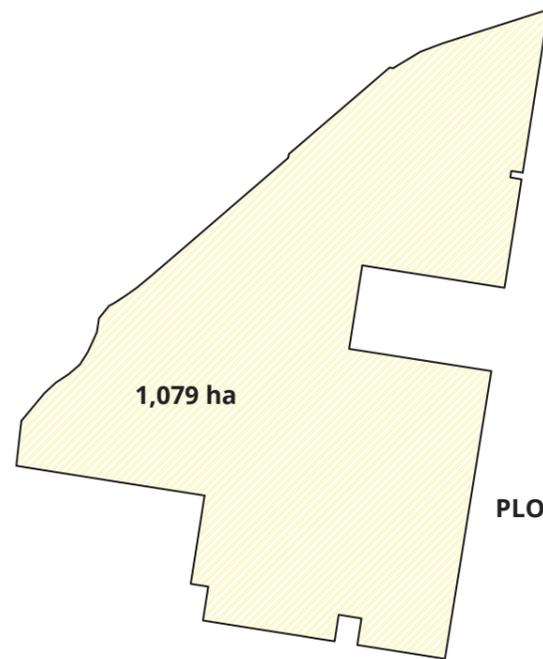
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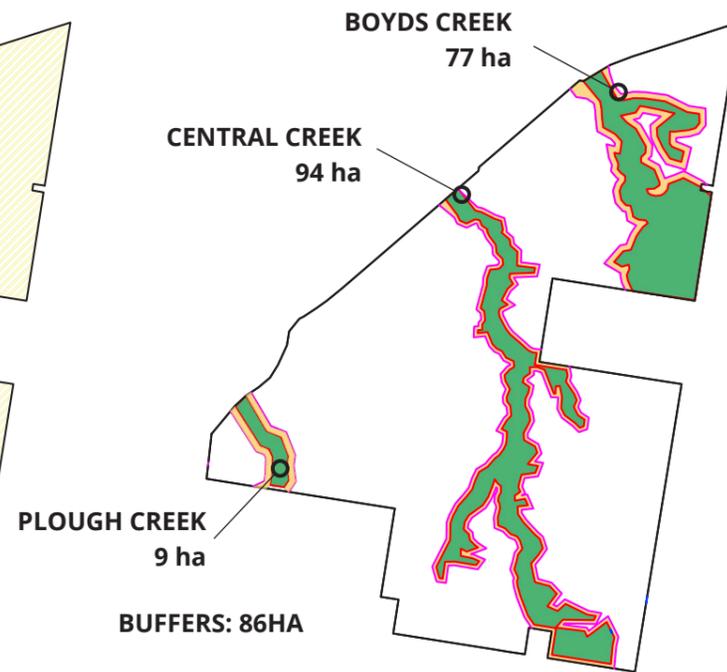
DEVELOPABLE AREAS



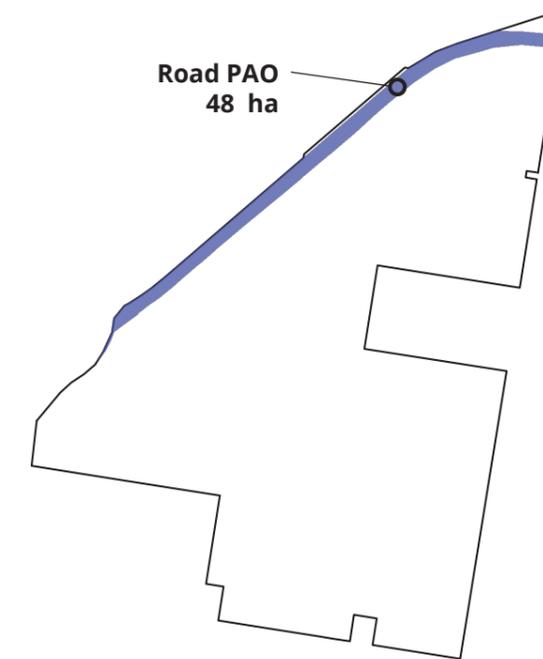
ACCESS TRACKS PLAN



TOTAL SITE AREA



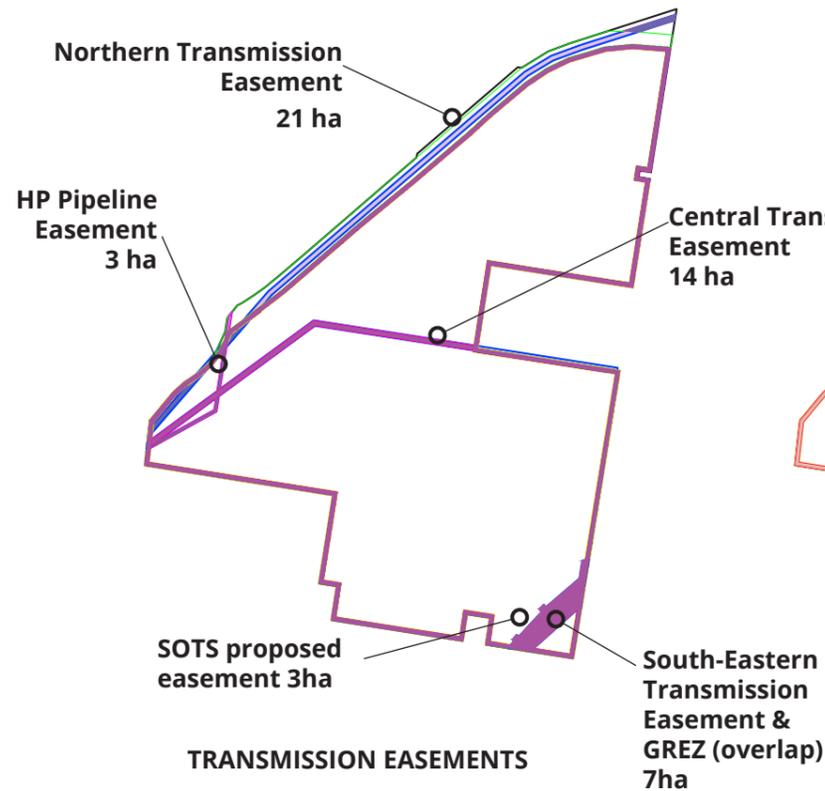
CREEK CORRIDORS



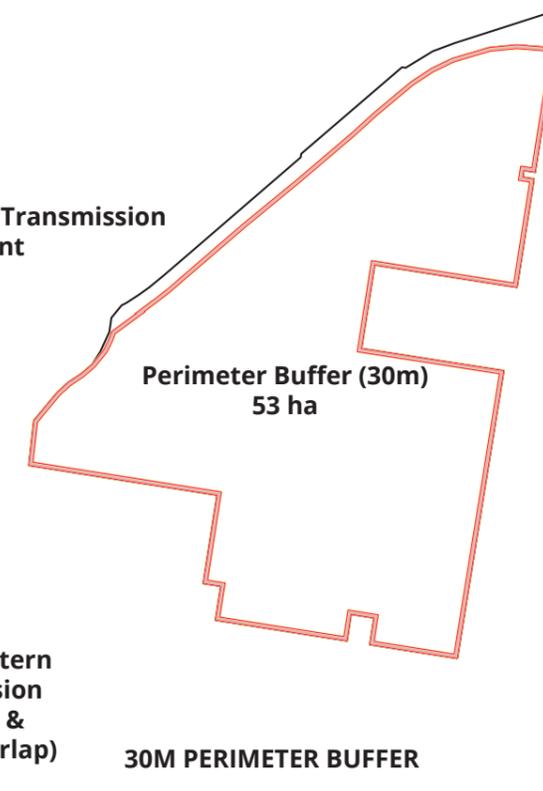
PUBLIC ACQUISITION OVERLAY

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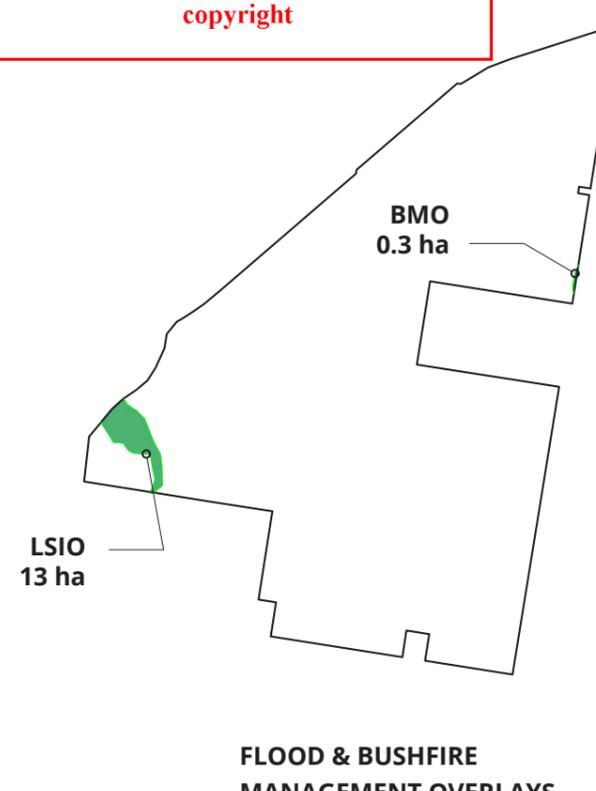
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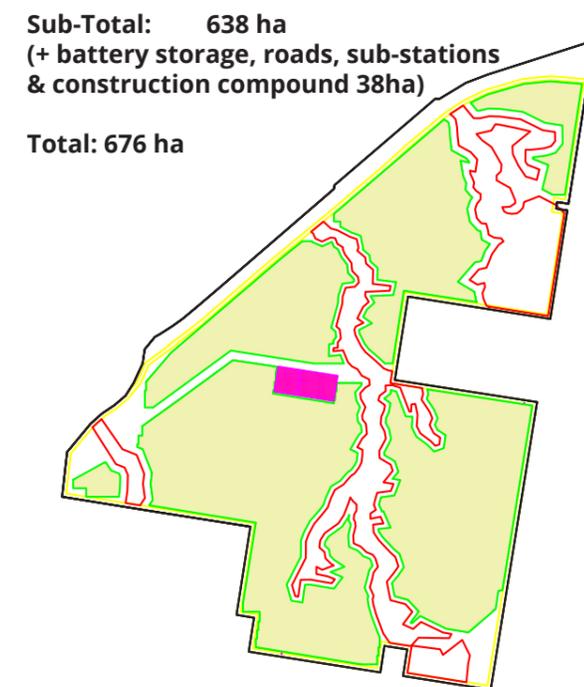
TRANSMISSION EASEMENTS



30M PERIMETER BUFFER



FLOOD & BUSHFIRE MANAGEMENT OVERLAYS



TOTAL DEVELOPABLE AREA (FOR SOLAR PANELS)

*All areas are indicative and subject to change.

