Land and environment consultants

Bushfire management plan

Miriam Vale Solar Farm | Miriam Vale | Queensland
Prepared for Attexo Group Pty Ltd | 22 May 2024

Land and Environment Consultants Pty Ltd
Suite 5, 66 Bay Terrace
Wynnum Queensland 4178
T: 07 2112 5692
E: info@landeconsultants.com.au

Bushfire management plan

Final V1

Report 24003 | Attexo Group Pty Ltd | 22 May 2024

Approved by Robert Janssen

Position Managing principal

Signature 

Date 22 May 2024

Document control

Version	Date	Prepared by	Reviewed by
Draft	20 February 2024	R. Janssen	LEC
Final	22 February 2024	R. Janssen	LEC
Final V1	22 May 2024	R. Janssen	LEC

Land and environment consultants

T: 07 2112 5692 | E: info@landeconsultants.com.au | http://www.landeconsultants.com.au/

Suite 5, 66 Bay Terrace | Wynnum | Queensland | 4178 | Australia

Table of contents

Contents

Figures

Appendix

Disclaimer

Notwithstanding the precautions adopted in this report, it should always be remembered that bushfires burn under a range of conditions. An element of risk, no matter how small always remains, and although AS 3959-2018 is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any building will withstand bushfire attack on every occasion.

It should be noted that upon lodgement of a development proposal, State Government, council and/or the fire service may recommend additional construction requirements.

Although every care has been taken in the preparation of this report, Land and Environment Consultants Pty Ltd accept no responsibility resulting from the use of the information in this report.

Executive Summary

This bushfire management plan (**BMP**) has been prepared for the Miriam Vale Solar Farm (the **Project**) which is located approximately 3 kilometres west of Miriam Vale, within the local government area of Gladstone Regional Council.

The Project consists of 14 land parcels and has a combined area of 1,084.4 hectares.

A development application will be made for the Project under the Gladstone Regional Council Planning Scheme 2017. The Project area is identified as a bushfire hazard area by the Gladstone Regional Council Planning Scheme 2017 *Bushfire hazard overlay map*. As a result, the development application is subject to compliance with the Gladstone Regional Council Planning Scheme 2017 *Bushfire hazard overlay code* (**Bushfire hazard overlay code**) and where required the example bushfire overlay code in *Natural Hazards, Risk and Resilience – Bushfire, State Planning Policy State Interest guidance material* (DSDMIP 2019) (**SPP guidance material – bushfire**).

The Project involves the development of up to 1 gigawatt peak photovoltaic solar farm including a substation, internal access roads and interconnecting transmission line infrastructure.

The Project will distribute energy to the national grid via a connection between the Project's substation and the existing Powerlink Queensland high voltage overhead transmission line which runs inside the eastern boundary of the Project area.

The bushfire hazard assessment of the Project site confirmed the Project is within a bushfire hazard area.

Bushfire mitigation measures that must be included in the design of the Project and implemented during the construction and operational phases are specified in Chapter 6. These include:

- establishing and maintaining a perimeter fire break and access road;
- establishing and maintaining the solar development area as an asset protection zone;
- design guidelines for the construction of access roads;
- separation between solar panel banks;
- requirements for vegetation clearing and maintenance under overhead transmission lines;
- requirements for the disposal of vegetation waste that is cleared from the solar development area;
- design guidelines for fire-fighter water storage and supply;
- requirements for wayfinding signage;
- requirements for buildings and structures to comply with the relevant governing Queensland laws and national codes and standards that apply to the building industry; and
- administrative controls which are to be implemented during the construction and operational phases.

With the implementation of the above listed bushfire mitigation measures, the development application for the Project is considered to be compliant with the Bushfire hazard overlay code and the SPP guidance material - bushfire.

1 Introduction

This bushfire management plan (**BMP**) has been prepared for the Miriam Vale Solar Farm (the **Project**) which is located approximately 3 kilometres (**km**) west of Miriam Vale, within the local government area of Gladstone Regional Council.

The Project involves 14 land parcels which are described as, lot 130/FD3, lot 88/FD14, lot 132/FD32, lot 5/FD112, lot 251/FD900, and lots 133, 134, 136, 137, 138, 139, 140, 142 and 143/FL40301. These land parcels have a combined area of 1,081.4 hectares (**ha**) and are hereafter referred to as the **Project area**.

A development application will be made for the Project under the Gladstone Regional Council Planning Scheme 2017. The Project area is identified as a bushfire hazard area by the Gladstone Regional Council Planning Scheme 2017 *Bushfire hazard overlay map* (**Bushfire hazard overlay map**). As a result, the development application is subject to compliance with the Gladstone Regional Council Planning Scheme 2017 *Bushfire hazard overlay code* (**Bushfire hazard overlay code**) and where required the example bushfire overlay code in *Natural Hazards, Risk and Resilience – Bushfire, State Planning Policy State Interest guidance material* (DSDMIP 2019) (**SPP guidance material – bushfire**).

This BMP has been prepared in accordance with *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience - Bushfire'* (QFES 2019) (**Bushfire resilient communities**), which was prepared by the Queensland Fire and Emergency Services (**QFES**) to provide technical guidance for the implementation of the SPP guidance material – bushfire.

This BMP documents a bushfire hazard assessment for the Project area, identifies strategies that will mitigate the potential risk of bushfire hazards for the construction and operational phases of the Project and demonstrates how of the development application complies with the Bushfire hazard overlay code. It includes:

- an introduction (this section) and description of methods and information resources used for the preparation of this BMP;
- description of the Project area and Project;
- bushfire hazard assessment;
- identification of bushfire hazards associated with the Project area and Project;
- radiant heat exposure assessment;
- a plan for mitigating the potential risk of bushfire hazards; and
- assessment of compliance with the Bushfire hazard overlay code.

1.1 Bushfire management plan review

This BMP has been prepared for the development application for the Project. Upon approval, the appointed construction contractor and operational contractor may wish to prepare their own version of this BMP to distil the matters which are specific to their contract or to include corporate documentation or procedures. Notwithstanding, this does not permit the construction contractor or operational contractor to change or deviate from the mitigation measures specified in Chapter 6 or associated development approval conditions.

1.2 Method

To meet requirements of the SPP guidance material – bushfire and Bushfire resilient communities, the following tasks were undertaken:

- review of the Bushfire hazard overlay map in Gladstone Regional Council's online mapping system (GRC 2024);
- review of the Queensland regional ecosystem map, vegetation hazard class (**VHC**) map, severe fire weather map and fire history map in the QFES online mapping system (QFES 2024) (**Catalyst**);
- review of fire history mapping in the North Australia and Rangelands Fire Information online mapping system (DISER 2024) (**NAFI**);
- a drive over the Project area and field inspection for vegetation characteristics, current land management practices, slope and evidence of previous fires;
- bushfire hazard assessment in accordance with the method in Bushfire resilient communities;
- radiant heat exposure assessment using the Fire Protection Association of Australia *BAL calculator V4.9* (**BAL calculator**) which models the 'method 2' bushfire attack level assessment procedure in the *Australian Standard* (**AS 3959-2018**) *Construction of buildings in bushfire prone areas* (Standards Australia 2018); and
- identification of mitigation measures required to reduce the potential risk of bushfire hazards to the construction and operational phases of the Project and to demonstrate compliance with the Bushfire hazard overlay code.

Aerial imagery of the Project area was accessed online from Google Earth and the Queensland Globe to assist in validating observations and measurements made during the field inspection.

1.3 Suitably qualified person

This BMP was prepared by Robert Janssen who is a suitably qualified and experienced bushfire management consultant.

Robert is the managing principal at Land and Environment Consultants Pty Ltd (**LEC**) and has over 25 years of experience in bushfire planning and operations. He has prepared bushfire management plans for residential, commercial and industrial property developments, utilities, government facilities and conservation estates.

Robert's formal qualifications as an environmental scientist and consulting experience are coupled with 10 years of experience as a nationally accredited fire-fighter with the national parks and wildlife service in New South Wales and Queensland.

2 Description of the Project area and the Project

This chapter provides a description of the Project area and the Project.

2.1 The Project area

The Project area consists of 14 land parcels, has a combined area of 1,081.4 ha and is 3 km west of Miriam Vale.

From the Bruce Highway, access and egress for the Project area is via Blackman Gap Road and either Cawthrays Road, Burgess Road or Mossman Road.

The Project area is currently used for grazing cattle and mostly consists of grassland with small areas of timber plantation and woody regrowth. Narrow corridors of woodland vegetation have been retained along drainage lines. The topography consists of drainage lines, alluvial plains and low rolling hills.

The Powerlink Queensland (**Powerlink**) high voltage overhead transmission line runs in a north-south direction inside the eastern boundary of the Project area. There are also Ergon 22 kilovolt (**kV**) overhead transmission lines which run through the Project area, but they are unrelated to the Project. The northern, southern, and eastern boundaries of the Project area adjoin farming land used for grazing cattle. These areas of adjoining land have similar topography to the Project area and consist of grassland and scattered areas of woodland vegetation.

The western boundary of the Project area adjoins Bulburin National Park which consists of a mountain range with steep slopes and a large continuous area of woodland vegetation. There is limited vehicle access into this area.

2.2 The Project

The current layout of the Project is shown in the layout plans in Appendix 1.

It involves the development of up to 1 gigawatt peak photovoltaic solar farm including a substation, internal access roads and interconnecting transmission line infrastructure.

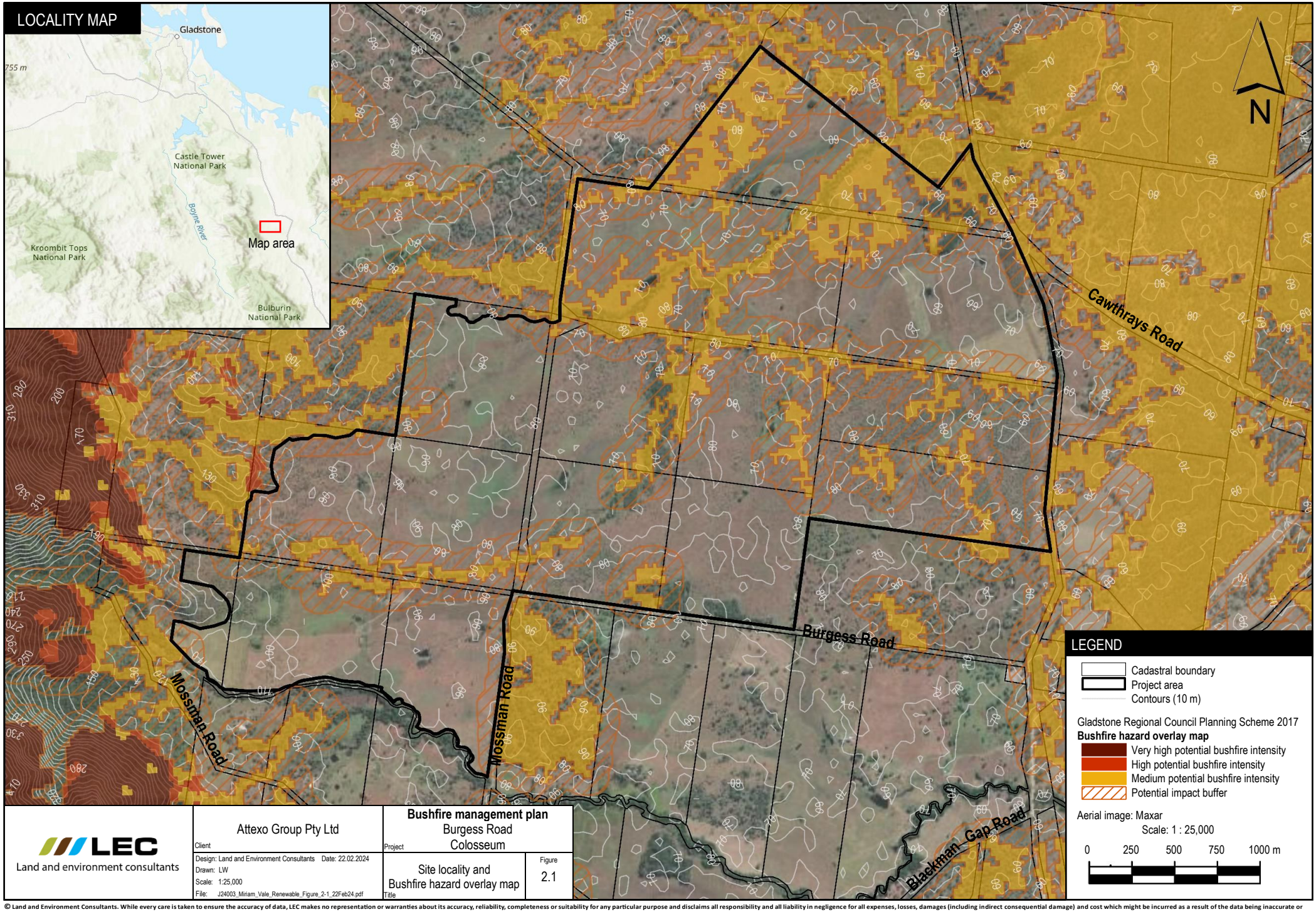
The Project will distribute energy to the national grid via a connection between the Project's substation and the existing Powerlink high voltage overhead transmission line which runs inside the eastern boundary of the Project area.

An exclusion zone which was recommended by Energy Queensland has been integrated into the final Project layout design. No Project infrastructure, including the solar array, are within 10 metres (**m**) either side of the centreline of the Ergon 22 kV overhead transmission line that runs down the eastern boundary of the Project area.

Subject to negotiations with Energy Queensland, the Ergon 22 kV overhead transmission line within the southern land parcels of the Project area are to be reticulated underground. The current Project design allows for the development over the proposed underground line.

2.3 Bushfire hazard overlay map

The Bushfire hazard overlay map for the Project area is shown in Figure 2.1. It shows that the Project area is affected by a combination of medium, high and very high potential bushfire intensity areas and potential impact buffer areas. Notwithstanding, a large portion of the Project area is not affected by bushfire hazard and the high and very high potential bushfire intensity areas are restricted to the western boundary and are associated with steep slopes and woodland vegetation within Bulburin National Park.



LEC
Land and environment consultants

Client	Attexo Group Pty Ltd
Project	**Bushfire management plan** Burgess Road Colosseum
Design: Land and Environment Consultants Date: 22.02.2024 Drawn: LW Scale: 1:25,000 File: J24003_Miriam_Vale_Renewable_Figure_2-1_22Feb24.pdf	
Title	Site locality and Bushfire hazard overlay map
Figure	2.1

3 Bushfire hazard assessment

This chapter provides details about the desktop review, field inspection and bushfire hazard assessment.

3.1 Severe fire weather

The severe fire weather map in Catalyst indicates the 5 % annual exceedance probability forest fire danger index (**FFDI**) for the Project area is 53. An FFDI value of 53 has been used for the potential bushfire intensity calculations in Section 3.4 and the radiant heat exposure assessment in Section 3.6.

For the assessment of grassfire attack, the FFDI value of 53 has been converted to a grass fire danger index (**GFDI**) value of 75, based on the GFDI values in Table B1 of AS 3959-2018.

3.2 Fire history

Fire history data in NAFI indicates that the Project area and adjoining land are regularly subject to fire. The fire history data does not identify whether the fires are planned burns or wildfires.

3.3 Field inspection

A drive over the Project area and field inspection was performed by LEC from 8-9 February 2024. Observations were recorded about current land use and management, vegetation characteristics, the slope of land and evidence of previous fires.

The locations of assessment reference points used for the bushfire hazard assessment of the Project area are shown in Figure A2.1 in Appendix 2, which also provides a summary of observations made from the site inspection and notes about the bushfire hazard assessment of assessment reference points.

Photographs of the assessment reference points are provided in Appendix 3.

3.4 Potential bushfire intensity calculations

The potential bushfire intensity of assessment reference points was determined using the Queensland Public Safety Business Agency *Potential Bushfire Intensity Calculator* (version November 2014) which is an Excel spreadsheet calculator that models the bushfire hazard assessment method in Bushfire resilient communities.

Bushfire resilient communities defines bushfire hazard classes as follows:

- very high – potential bushfire intensity > 40,000 kilowatts/(**kW/m**);
- high – potential bushfire intensity 20,000-40,000 kW/m;
- medium – potential bushfire intensity 4,000-20,000 kW/m; and
- non bushfire hazard - potential bushfire intensity <4,000 kW/m.

Results of potential bushfire intensity calculations which determine the bushfire hazard class of the assessment reference points shown in Figure A2.1 in Appendix 2 are presented in Appendix 4.

3.5 Bushfire hazard areas

Results of the potential bushfire intensity calculations in Appendix 4 generally align with the Bushfire hazard overlay map and confirm that the Project area is within a bushfire hazard area. These results confirm the development application for the Project must comply with the Bushfire hazard overlay code.

3.6 Radiant heat exposure assessment

The Bushfire hazard overlay code does not identify a radiant heat exposure outcome to determine setbacks between hazardous vegetation and above ground infrastructure within the Project area. Therefore, this BMP defers to the SPP guidance material – bushfire and Bushfire resilient communities which require above ground infrastructure to be setback from hazardous vegetation by a distance which achieves a radiant heat flux level ≤ 29 kW/m^2 at the above ground infrastructure. These setbacks are hereafter referred to as a perimeter fire break.

The purpose of the perimeter fire break is to minimise the impact of bushfire attack on above ground infrastructure and to provide access and a defendable space for fire-fighters to operate.

The radiant heat profile of bushfire attack on the Project was assessed using the BAL calculator. The analysis of bushfire attack scenarios was based on VHCs observed during the field inspection, VHC mapping in Catalyst and the steepest slopes measured for VHCs during the field inspection. Inputs used in the BAL calculator and results are provided in Appendix 5.

Results of the radiant heat exposure assessment have been used to determine the width of the perimeter fire break which ranges in width from 10-15 m. Specifications for establishing and maintaining the perimeter fire break are provided in Section 6.1.

For temporary infrastructure located within the Project area during the construction phase, ie construction facilities, construction compounds, laydown areas, etc, a fire break with a nominal cleared width of 10 m is proposed around the perimeter of the infrastructure.

4 Bushfire hazards associated with the Project area and the Project

This chapter identifies bushfire hazards associated with the Project area and the Project.

4.1 Fire danger season

The fire danger season at the Project area starts in late winter, peaks during spring and will begin to fall when consistent rainfall occurs during late spring or summer. Typically, the worst fire weather conditions will be experienced during the fire danger season when the wind direction is from the north or west.

An FFDI of 53, ie the 5 % annual exceedance probability FFDI for the Project area, will be associated with hot, dry and windy conditions. If a bushfire or grassfire starts and takes hold under these conditions, it will be difficult to control and fast moving in large areas of bushland or grassland vegetation.

The fire danger rating (**FDR**) system provides advice about the level of bushfire threat on a day. The FDR system has four levels which are summarised below:

- moderate – most fires can be controlled;
- high – fires can be dangerous;
- extreme – fires will spread quickly and be extremely dangerous; and
- catastrophic – if a fire starts to take hold, it could result in the loss of life.

The FDRs will be monitored during both the construction and operational phases of the Project.

4.2 Fire history

As discussed in Section 3.2, fire history data indicates that the Project area and adjoining land regularly burns.

Based on the fire history data it is considered almost certain that the Project area will be exposed to bushfire or grassfire attack in the future.

4.3 Vegetation

The solar development area and substation will be cleared of woody vegetation in preparation for civil works. It will be established as an asset protection zone (**APZ**) and will be maintained for the life of the Project.

The APZ over the solar development area will be maintained free of weeds and woody regrowth and with grass cover that is < 30 centimetres (**cm**) in height during the fire danger season.

The location of the inverter stations and substation will be free of any vegetation. These locations will have a mineral earth, gravel, or similar ground surface.

4.4 Bushfire attack and the protection of above ground infrastructure

A bushfire in the woodland vegetation on steep slopes to the west of the Project area presents the main issue for the protection of above ground infrastructure.

During fire weather conditions which correlate with the 5 % annual exceedance probability FFDI for the Project area, a bushfire in areas of woodland vegetation has potential to generate radiant heat energy up to 13,585 kW/m which in combination with steep slopes will make fire-fighting operations and access difficult. Direct attack may not be possible. Therefore, fire-fighter operations to protect

above ground infrastructure will have a strong reliance on the perimeter fire break and maintenance of vegetation within the APZs.

4.5 Workforce

The Project will not result in the permanent exposure of large numbers of people to bushfire hazard. It is expected that the workforce will peak during the construction phase at 500 personnel over an 18 month construction period and will be reduced to up to 50 (direct and indirect) full time equivalent (**FTE**) roles during the operational phase. The direct operational workforce will consist of approximately 3-5 FTE positions, and up to 5-10 FTE positions during the initial defect liability period of operation (estimated 2 years).

Workers will not be accommodated within the Project area during the construction or operational phases of the Project. It is anticipated that workers will be accommodated in local housing.

4.6 Hazardous chemicals

Storage or handling of hazardous chemicals during the construction and operational phases of the Project will be in accordance with *Managing risks of hazardous chemicals in the workplace – Code of Practice* (SWA 2023), applicable safety data sheets, and otherwise in accordance with the Queensland *Work Health and Safety Act 2011* and its regulations.

4.7 Access

The Project will establish an internal access road network that will link the above ground infrastructure and perimeter fire break to existing roads.

Internal access roads will be designed for emergency vehicle access including (where required) the provision of turnaround areas on dead-end roads. If there are gates across roads, they will be at least 4 m wide.

The main site access location will be via Burgess Road. There will be four vehicle access points into the Project area from Cawthrays Road, Burgess Road and Mossman Road.

4.8 Rural Fire Brigade resources and capability

The local Rural Fire Brigades (**RFBs**) are voluntary primary producer brigades and have limited resources to respond to a fire ignition within the Project area. They are unlikely to have any training or experience operating around electrical infrastructure, ie the inverter stations and substation, and have limited capability to respond to structural fires.

Local RFB personnel may not be familiar with the layout of the Project and out of area RFBs will not be familiar with the location of the Project area, ie access roads, water points, terrain, etc.

4.9 Fire-fighter water supply

There will be dedicated fire-fighter water supply tanks for the construction and operational phases of the Project.

There are numerous dams and creeks within and adjacent to the Project area. However, the standard of vehicle access to these features and the reliability of their water supply is unknown and they should not be relied upon.

4.10 Warning and evacuation requirements

Queensland emergency services use a range of methods to warn the community about bushfire, severe weather and other emergencies that require preparation and action at the property level. The construction workforce and operational workforce will be subject to advice and warnings by Queensland emergency services via radio, online media and local community safety announcements.

A safety and emergency management plan and an evacuation plan will be prepared for the construction phase and operational phase of the Project. These plans will provide details of actions to be undertaken in response to a bushfire emergency. They are separate plans to this BMP.

4.11 Buildings and structures

Offices and worker amenities that are required for the construction phase of the Project will be demountable buildings, ie temporary buildings, that will be in a cleared compound.

Buildings and structures associated with the Project will be designed to meet the fire resistance and safe access and egress requirements of the *National Construction Code–Building Code of Australia* (ABCB 2022) (**NCC-BCA**) and governing Queensland laws, codes and standards that apply to the building industry.

Fire detection and first attack fire-fighting equipment in buildings will comply with requirements in the NCC–BCA and any Queensland specific requirements.

4.12 Separation between solar panel banks

Adequate separation will be provided between solar panel banks to facilitate safe and effective fire-fighting operations that will limit fire spread (CFA 2023).

Long runs of solar panel arrays without breaks due to natural site features or access roads can be a hazard to fire-fighters, prolong fire incidents and increase potential for damage to infrastructure.

5 Fire ignition risks

This chapter identifies fire ignition risks within the Project area.

5.1 Land use

The boundaries of the Project area mostly adjoin farming land and conservation estate which have large continuous areas of woodland and grassland vegetation.

The operation of equipment and machinery or hot works associated with agricultural activities could result in unplanned fires that impact on the Project area, particularly on days with an FDR of high or above. In addition, landowners may light fires to burn waste or for fuel hazard reduction. Therefore, land which is used for agricultural activities is considered to be a potential bushfire hazard to the Project.

The Queensland Parks and Wildlife Service are likely to light fires within the Bulburin National Park for the purpose of fuel hazard reduction or to achieve biodiversity conservation outcomes. Therefore, the Bulburin National Park is also considered a potential bushfire hazard to the Project.

5.2 Overhead transmission lines

Powerlink high voltage overhead transmission lines are susceptible to 'flashover' which can cause a fire ignition in surrounding vegetation. Fires with a flame height greater than 1 m adjacent to or under high voltage overhead transmissions lines have the potential to:

- create electrical arcs (known as flashovers) that can endanger people, animals and objects;
- damage or destroy wires, insulators and supports of the transmission line; and
- interrupt power supply to households, business and industry.

Vegetation under the high voltage overhead transmission lines will be maintained in accordance with Powerlink's vegetation management specifications for high voltage overhead transmission lines (Powerlink 2018).

There are numerous Ergon overhead transmission lines within the Project area. The risk of a fire ignition caused by these overhead transmission lines is minor when compared to the risk profile that exists for Powerlink's high voltage overhead transmission lines. Nonetheless, vegetation under Ergon's overhead transmission lines will be maintained in accordance with *Energy Queensland – Vegetation Management Strategy – Version 2* (EQ 2023).

5.3 Lightning strike

A lightning strike could cause a fire ignition within or adjoining the Project area, particularly during the fire danger season, ie from late winter to early summer, when dry electrical storms most commonly occur.

5.4 Electrical fire

There is potential for a fire of electrical origin to develop at the inverter stations or substation. Notwithstanding, the location of the inverter stations and substation will be free of any vegetation, ie they will have a mineral earth, gravel, or similar ground surface, and will be within the APZ where vegetation will be maintained in a low hazard condition during the fire danger season.

5.5 Construction activities

The use of tracked earthmoving machinery on rocky ground, vehicles driving or parking in long grass, hot works and people smoking has potential to cause a bushfire during the construction phase of the Project.

5.6 Operational activities

Similar risks may exist during the operational phase of the Project that existed during the construction phase, ie vehicles driving or parking in long grass, hot works and people smoking. However, worker numbers will be significantly reduced and access throughout the Project area will be on access roads.

6 Bushfire mitigation plan

This chapter identifies bushfire mitigation measures that must be implemented during the construction and operational phases of the Project.

The bushfire mitigation measures will reduce the risk of bushfire hazards to a tolerable level which in this BMP means compliance with the Bushfire hazard overlay code.

It is the total of the mitigation measures in this chapter that will reduce the risk of bushfire hazards to a tolerable level. Failure to implement all of the mitigation measures in their entirety could result in an increased level of exposure to bushfire hazards.

6.1 Perimeter fire break

A fire break must be established and maintained around the perimeter of the solar development area as shown in Figure 6.1.

The fire break must be cleared of weeds and woody vegetation and have a mineral earth or grass surface. If a grass surface is chosen, it must be maintained at a height ≤ 10 cm during the fire danger season.

An access road must be provided within the perimeter fire break. Specifications for the access road are provided in Section 6.3.

A 10 m wide fire break must be established and maintained around temporary infrastructure located within the Project area during the construction phase, ie construction facilities, construction compounds, laydown areas, etc. An access road is not required within this fire break.

6.2 Asset protection zone

The solar development area shown in Figure 6.1 must be established and maintained as an APZ. It must be cleared of weeds and woody vegetation and have a grass surface. The grass surface must be maintained at a height ≤ 30 cm during the fire danger season.

The location of cable pits, inverter stations and the substation must be established and maintained free of any vegetation, ie they will have a mineral earth, gravel, concrete or similar ground surface. At cable pits and inverter stations, this will include providing a 1 m wide cleared buffer around the infrastructure.

6.3 Access roads

The main site access location will be via Burgess Road. Vehicle access to the Project area is via Cawthrays Road, Burgess Road and Mossman Road. These access routes and the access road network that will be constructed within the solar development area are shown in Figure 6.1 and the layout plans in Appendix 1.

As shown in Figure 6.1, a new gate must be installed in the boundary fence to provide access to the southern end of the perimeter fire break from Mossman Road.

As a minimum requirement, access roads must meet the design specifications for category 1 fire-fighter vehicles by the New South Wales Rural Fire Service (NSW RFS 2016) which are summarised as follows:

- Width – The trafficable surface has a width of 4 m except for short constrictions to 3.5 m for no more than 30 m in length where an obstruction cannot be reasonably avoided or removed. Curves

have a minimum inner radius of 6 m. The minimum distance between inner and outer curves is 6 m.

- Capacity – Trafficable surfaces and crossing structures are capable of carrying vehicles with a vehicle mass of 15 tonnes (**t**) and an axle load of 9 t.
- Grade and crossfall – The maximum grade of a trail is not more than 15°. The crossfall of the road surface is not more than 6°. Drainage structures, feature crossings, or other significant changes in the grade of the trail shall be in accordance with the *Fire Trail Design, Construction and Maintenance Manual* (NSW DISCS 2017).
- Clearance – A minimum vertical clearance of 4 m is provided above the trafficable surface and is maintained clear of obstructions.
- Where the width of the trafficable surface is < 6 m wide, capacity for passing is provided every 250 m comprising:
  - a widened trafficable surface of at least 6 m for a length of at least 20 m; or
  - a 6 m wide and 8 m long area clear of the trafficable surface with a minimum inner curve radius of 6 m and minimum outer radius of 12 m; or
  - a turnaround area is provided (as outlined below).
- Turnarounds – A turning area is provided at the termination of a road and every 500 m and is achieved by:
  - an area clear of the trafficable surface, which is 6 m wide and 8 m deep, with a minimum inner curve radius of 6 m and minimum outer radius of 12 m; or
  - a turning circle of minimum 22 m diameter;
  - a T-junction with each terminating end of the junction being at least 10 m in length from the intersection of the roads and the inner radius of the intersection being at least 6 m; or
  - a road intersection.

Short sections which do not comply with the slope and width criteria outlined above are permissible where topography or environmental constraints do not permit compliance.

Where site constraints prevent turnaround areas being provided every 500 m along an access road, signage must be provided at the access to the road which identifies the distance to the next turnaround area.

Drainage for access roads must be designed and constructed in accordance with the *Fire Trail Design, Construction and Maintenance Manual* (NSW DISCS 2017).

Access roads must be inspected at regular times intervals during the calendar year and maintained in accordance with the specifications above prior to the onset of the annual fire danger season.

Note: It is acknowledged that although the Project is in Queensland, the fire trail design, construction, maintenance and drainage guidelines from New South Wales (**NSW**) are referenced in this BMP. This is because the NSW guidelines are well defined and documented and feedback received from other projects is that they are more practical to implement.

6.4 Separation between solar panel banks

There must be a minimum separation distance of 6 m between solar panel banks. For the purpose of this BMP a bank of solar panels is that which is connected to a single inverter station.

Separation must be provided so that no unbroken area of solar panels is > 25 ha.

6.5 Overhead transmission lines

Vegetation management under any high voltage overhead transmission lines must be in accordance with Powerlink's vegetation management specifications for high voltage transmission lines (Powerlink 2018).

Vegetation management under overhead transmission lines must be in accordance with the *Energy Queensland – Vegetation Management Strategy* (EQ 2023).

6.6 Vegetation waste

Woody vegetation cleared from the solar development area during the construction phase must be removed from the Project area or mulched, in which case the mulch can be used for erosion and sediment control within the solar development area.

6.7 Fire-fighter water supply

Fire-fighter water storage tanks must be installed at the entrances to the solar development area as indicatively shown in Figure 6.1. They must be made of metal or concrete, have a nominal minimum capacity of 40,000 litres and be kept full of water. They must not be used for activities other than bushfire management.

The fire-fighter water storage tanks must be fitted with RFB fire-fighter fittings – we recommend contacting the local RFB to confirm the standard RFB fittings in use at the locality. All above ground fittings, ie connections, valves and pipes, must be made of metal.

The fire-fighter water storage tanks must have a hardstand area within 4 m of the outlet point. The hardstand areas must have the load bearing capacity and dimensions suitable for a vehicle mass of 15 t and an axle load of 9 t.

6.8 Wayfinding

Reflective wayfinding signage must be installed at the intersection of access roads and identify the location of Project infrastructure and fire-fighter water storage tanks.

Wayfinding signage must be based on a naming and marking convention which enhances accessibility for out of area fire-fighters. For example, marking the intersection of access tracks as A-B to indicate that it links landmark A to landmark B; landmarks used for this purpose must be identifiable on site and marked on any site mapping.

Access road marking must clearly indicate no through access roads.

6.9 Buildings

Buildings and structures must comply with the fire resistance and safe access and egress requirements of the NCC-BCA and governing Queensland laws, codes and standards that apply to the building industry.

Fire detection and first attack fire-fighting equipment in buildings must comply with specifications in the NCC–BCA and any Queensland specific requirements.

These matters will be dealt with in detail through the building certification and approvals process.

6.10 Construction phase

6.10.1 Staging of construction works

The fire-fighter water supply and fire break and access roads around the perimeter of the solar development area must be installed at the earliest possible stage of construction.

6.10.2 Fire extinguishers and protection equipment

Fire extinguishers, appropriate to the identified emergency scenario, must be provided at all construction facilities and fitted in construction vehicles and mobile plant.

Fire protection equipment must be provided for any storage of hazardous materials in accordance with *Managing risks of hazardous chemicals in the workplace – Code of Practice* (SWA 2023), applicable safety data sheets, and otherwise in accordance with Queensland *Work Health and Safety Act 2011* and its regulations.

6.10.3 Communications equipment and communications planning

The construction office, vehicles and mobile plant must be fitted with an ultra-high frequency (UHF) radio.

The construction contractor must ensure the following is in place by the time construction commences:

- site personnel are aware of the mitigation measures in this BMP;
- an emergency contact number is available online and is attended to at all times by trained personnel;
- contingency communication systems are in place for the onsite representative of the construction contractor in case of failed telephone communication attempts; and
- a mechanism to provide periodical updates to the local QFES and RFBs and neighbouring landowners as the Project is progressively built.

6.10.4 Restrictions during the fire danger season

QFES restrictions during the fire danger season must be adhered to. These are advertised online at https://www.qfes.qld.gov.au/safety-education/using-fire-outdoors/fire-bans-and-restrictions or can be obtained from the Gladstone area office by calling (07) 4899 2200.

Vehicles and mobile plant and equipment must not be operated or parked in long grass unless fire management controls are in place.

Smoking must be restricted to prescribed areas.

Mobile water carts must be located adjacent to construction work areas during the fire danger season.

6.10.5 Hot works

Hot works must be managed under a hot works permit system.

Hot works and other high fire risk activities, eg the operation of track machinery on rocky ground, must be monitored for ignitions and only performed if fire management controls are in place.

6.10.6 Safety documentation

Construction activities must be governed by safety documentation, including safe work method statements. Activity specific bushfire risk management controls must be identified through the safety documentation. Where required, the safety documentation must be managed through a permit to work system which must provide an additional layer of control around bushfire risk management.

6.10.7 Training

Bushfire awareness training must be provided to the construction workforce. It must cover the topics of fire line safety, appropriate personal protective equipment and clothing, principles of fire behaviour, types of fuel, hazards and precautions, affects of weather and topography on fires and bushfire danger season and responsibilities during a fire emergency.

6.10.8 Emergency management plan

An emergency management plan must be prepared for the construction phase prior to the construction contractor mobilising to site. As a minimum, it must detail the arrangements for managing emergencies, include site details, procedures, resources and training.

6.11 Operational phase

6.11.1 Information transfer

Prior to commencing the operational phase of the Project, spatial data which identifies the location of fire breaks, access roads, gates and fire-fighter water supply tanks must be provided to the QFES so that it can be uploaded into the QFES online incident management system and is readily available for bushfire emergency planning.

The operational contractor must consult with the QFES to determine the information and data format requirements and the specifics of the data transfer.

6.11.2 Fire-fighter operations plan

Prior to commencing the operational phase of the Project, a fire-fighter operations plan must be prepared for the Project area and provided to the local RFBs. It must be in the format of a poster plan that can be rolled out and used in the field.

The fire-fighter operations plan must identify (as a minimum) the location of infrastructure, fire breaks, access roads, gates, fire-fighter water supply tanks and reference wayfinding signage. It must also include contact and communications information, instructions for operating around electrical infrastructure and operational guidelines for fire control.

6.11.3 Bushfire preparedness activities – non-fire danger period

Non-fire danger period

Preparedness activities that must be undertaken during the non-fire danger period include:

- service plant, vehicles and fire protection systems and equipment;
- conduct site-wide bushfire preparedness inspections of the perimeter fire break, APZ, access roads, fire-fighter water supply, signage and building fire protection systems;
- maintain the perimeter fire break, APZ, access roads, fire-fighter water supply, signage and building fire protection systems in accordance with the relevant sections of this BMP;

- facilitate a bushfire preparedness meeting with the local QFES and RFBs and neighbouring landowners; and
- review emergency management plans.

The operational contractor must invite the local QFES and RFBs and neighbouring landowners to participate in an annual bushfire preparedness meeting. The meeting will be used to familiarise these stakeholders with the location of fire breaks, access roads, gates and fire-fighter water supply tanks and fittings, communication procedures and safety requirements for operating within the solar development area. It will also provide an opportunity to review any bushfire incidents within or adjacent to the Project area and any plans for hazard reduction burns by the neighbouring landowners. It also provides an opportunity to run a bushfire response training drill with the local QFES and RFBs.

Fire danger period

Preparedness activities that must be undertaken during the fire danger period include:

- monitor the QFES FDRs for the Capricornia region four days in advance at https://www.qfes.qld.gov.au/prepare/bushfire/fire-danger-ratings;
- modify site activities based on elevated FDRs, ie high, extreme and catastrophic;
- conduct weekly inspections of the perimeter fire break, APZ, access roads, fire-fighter water supply, signage and building fire protection systems;
- implement travel plans to avoid driving through high and very high potential bushfire intensity areas on days with an extreme or catastrophic FDR.

Modification of site activities must be advised by site-based risk assessment and may include:

- closing the Project on days with an extreme or catastrophic FDR;
- limiting non-essential activities on days with a high or above FDR;
- limiting travel on days with an extreme or catastrophic FDR;
- postponing planned maintenance;
- include bushfire ignition hazards in job safety risk based management process; and
- communicating modified activities and expectations to site personnel and visitors.

6.11.4 Access rules

Access to the Project area must be conditional on site personnel and visitors completing an induction and complying with entry rules, including rules regarding smoking.

Smoking must only be permitted in cleared areas.

6.11.5 Safety documentation

Activities during the operational phase of the Project must be governed by safety documentation as specified for the construction phase in Section 6.10.6.

6.11.6 High voltage overhead transmission line

Fire-fighting operations near the Powerlink high voltage overhead transmission lines must be planned and implemented in accordance with the *National Guidelines on Electrical Safety for Emergency Service Personnel* (ENA DOC 008-2006) and Powerlink's instructions.

6.11.7 Emergency management planning

An emergency management plan must be prepared for the operational phase of the Project in accordance with requirements of the *Australian Standard* (AS 3745-2010) *Planning for emergencies in facilities*.

The emergency management plan must include procedures to be followed in the event of a bushfire warning by the QFES and identify the location of safe assembly/evacuation areas and the access routes to these areas.

In the event of a fire ignition that cannot be safely extinguished with available resources, the following procedure must be followed:

1. Contact the QFES via a 000 call.
2. Notify neighbouring landowners of the fire ignition.
3. Evacuate site personnel and visitors to a safe assembly/evacuation area and account for all site personnel and visitors.
4. Meet the QFES and provide information relevant to the fire emergency.
5. Resume activities when advised by the QFES that it is safe to do so.

6.11.8 Electrical safety

The Project must be operated in compliance with the Queensland *Electrical Safety Act 2002* and its regulations and the electrical safety codes of practice by the Electrical Safety Office of Queensland (ESO 2020a, ESO 2020b and ESO 2021).

Electrical equipment installed to support the operational phase of the Project must be regularly inspected in accordance with the manufacturer's guidance (where this applies) or in accordance with industry best practice.

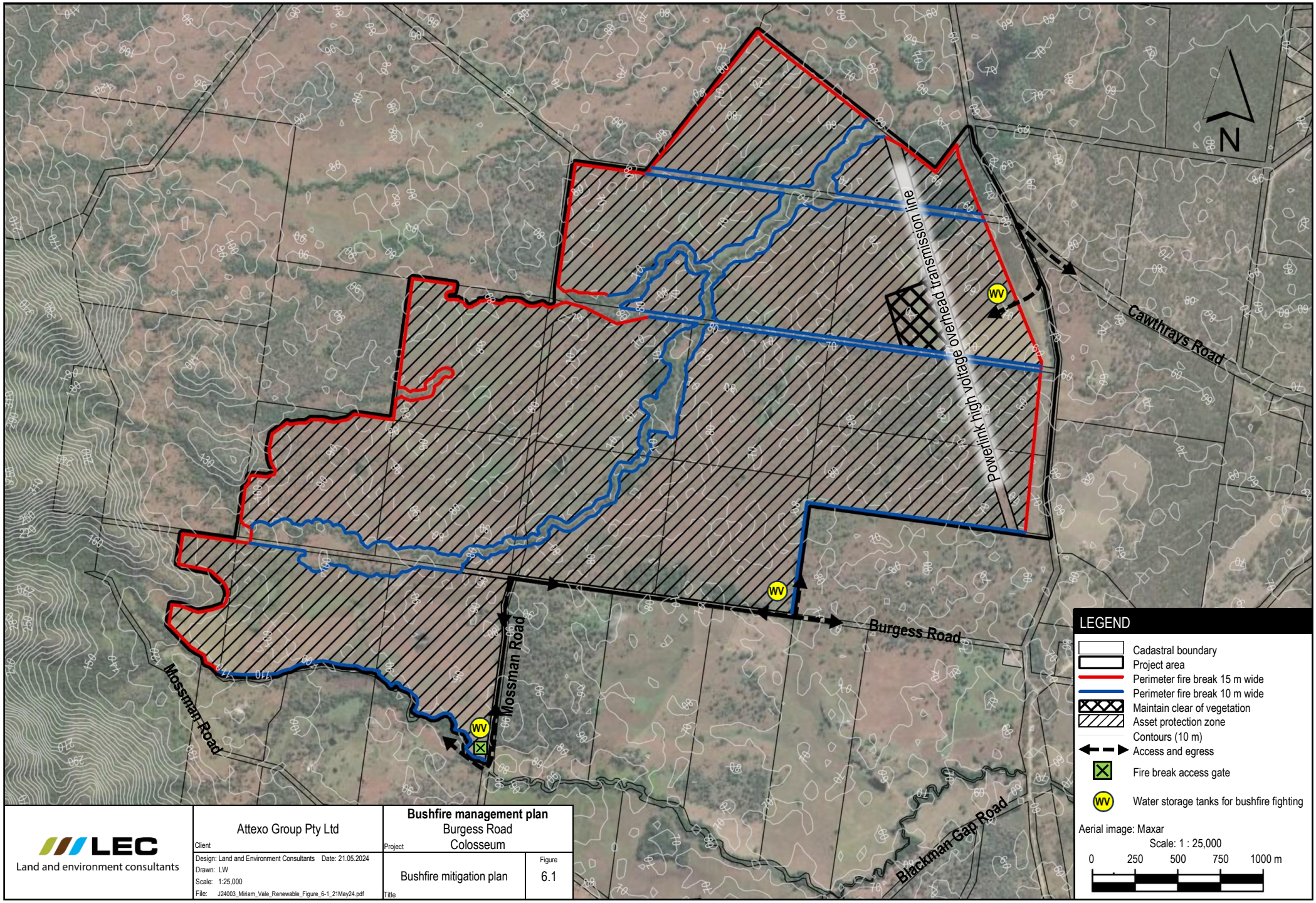
6.11.9 Hazardous materials

Storage or handling of hazardous materials must be in accordance with *Managing risks of hazardous chemicals in the workplace – Code of Practice* (SWA 2023), applicable safety data sheets, and otherwise in accordance with Queensland *Work Health and Safety Act 2011* and its regulations.

6.11.10 Lighting fires

Lighting fires to burn waste is prohibited within the Project area.

Prescribed burns to achieve fuel hazard reduction or conservation outcomes are permitted within the Project area subject to compliance with the Queensland *Fire and Emergency Services Act 1990*.



LEC
Land and environment consultants

Client: Attexo Group Pty Ltd	Project: **Bushfire management plan** Burgess Road Colosseum	
Design: Land and Environment Consultants Date: 21.05.2024 Drawn: LW Scale: 1:25,000 File: J24003_Miriam_Vale_Renewable_Figure_6-1_21May24.pdf	Title: Bushfire mitigation plan	Figure: 6.1

7 Closing

This BMP was prepared by a suitably qualified person and is in general accordance with the SPP guidance material – bushfire and Bushfire resilient communities.

A bushfire hazard assessment determined the Project area is affected by bushfire hazard. Therefore, the development application for the Project must demonstrate compliance with the Bushfire hazard overlay code.

Mitigation measures that must be included in the design of the Project and implemented during the construction and operational phases are specified in Chapter 6. With the implementation of these mitigation measures the development application for the Project is considered to be compliant with the Bushfire hazard overlay code as demonstrated in Appendix 6.

References

Australian Building Codes Board (ABCB) 2022, *National Construction Code Series, Building Code of Australia,* Australian Government and States and Territories of Australia, September 2022

Department of Industry, Science, Energy and Resources (DISER) 2024, *North Australia and Rangelands Fire information mapping*, accessed online at https://www.firenorth.org.au/nafi3/, January 2024

Electrical Safety Office (ESO) 2020a, *Electrical safety code of practice 2020 – Working near overhead and underground electric lines*, 2 January 2020

Electrical Safety Office (ESO) 2020b, *Electrical safety code of practice 2020 – Works*, 2 January 2020

Electrical Safety Office (ESO) 2021, *Electrical safety code of practice 2021 – Managing electrical risks in the workplace*, 2021

Energy Networks Association (ENA) 2006, *National Guidelines on Electrical Safety for Emergency Service Personnel,* sixth edition 2006, published by Standards Australia

Energy Queensland (EQ) 2023, *Energy Queensland – Vegetation Management Strategy – Strategy G001 Version 2*, accessed online at https://www.energyq.com.au/__data/assets/pdf_file/0008/706661/Vegetation-Management-Strategy.pdf, 30 January 2024

Gladstone Regional Council (GRC) 2024, *Online mapping system*, accessed online at https://maps.gladstone.qld.gov.au/html/?viewer=planningscheme, January 2024

New South Wales Department of Industry, Soil Conservation Service (NSW DISCS) 2017, *NSW Rural Fire Service – Fire Trail Design, Construction and Maintenance Manual*, developed by the Soil Conservation Service for the NSW Rural Fire Service, 2017

New South Wales Rural Fire Service (NSW RFS) 2016, *NSW RFS Fire Trail Standard 2016*, Version 1.1, Printed June 2019

Powerlink Queensland (Powerlink) 2018, *Site Selection, Easements and Sites – Guideline*, ASM-GDL-A588593, Version 6.0, 27 June 2018

Queensland Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) 2019, *Natural hazards, risk and resilience – Bushfire, State Planning Policy – State Interest Guidance Material*, December 2019

Queensland Fire and Emergency Service (QFES) 2019, *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire'*, October 2019

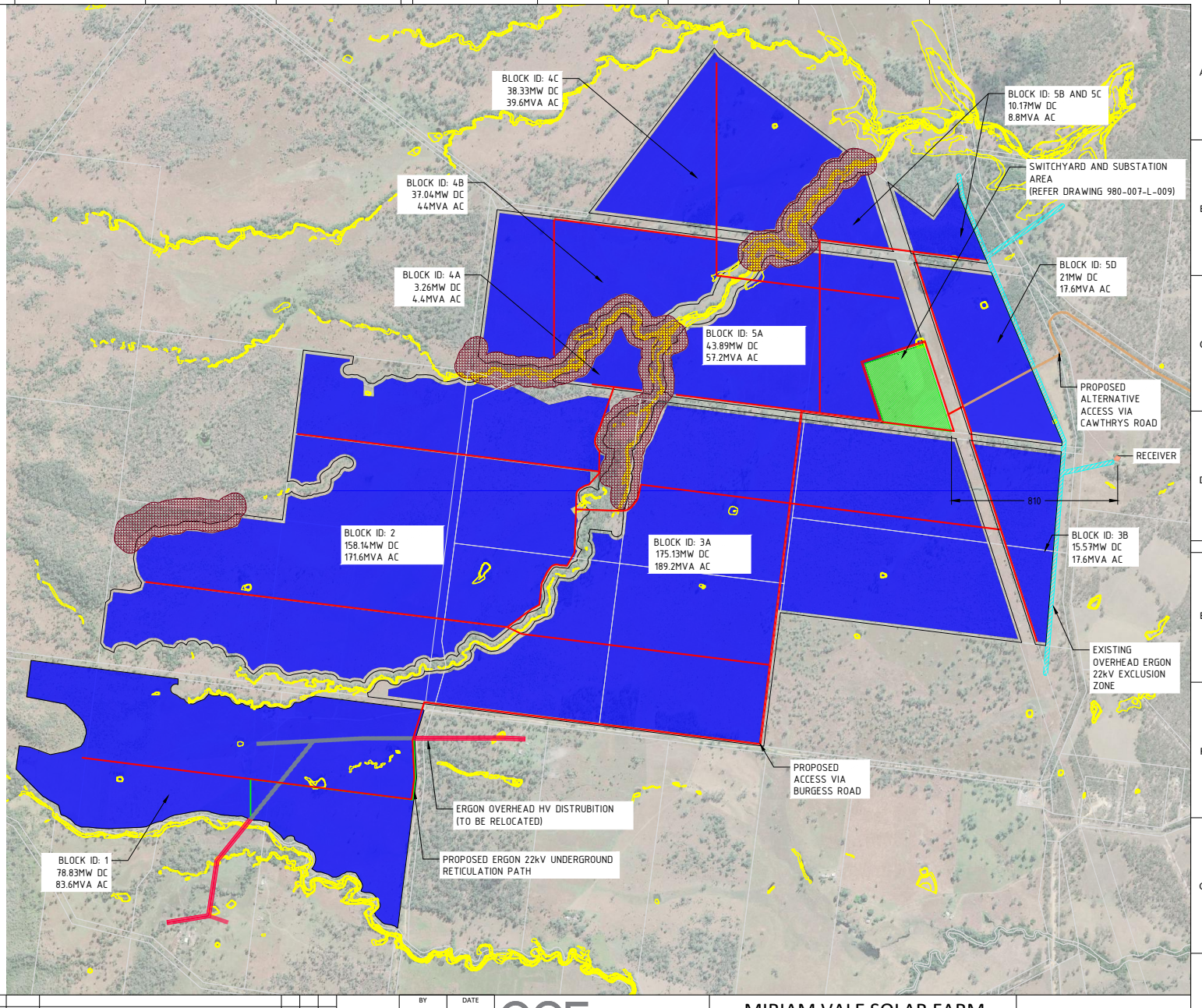
Queensland Fire and Emergency Services (QFES) 2023, *Catalyst - Sustainable development mapping system*, QFES Sustainable Development Unit, accessed online at https://catalyst.qfes.qld.gov.au/sdu/ via user login, January 2024

Safe Work Australia (SWA) 2023, *Managing risks of hazardous chemicals in the workplace – Code of Practice*, 16 June 2023

Standards Australia Limited (Standards Australia) 2018, *Australian Standard 3959-2018 Construction of buildings in bushfire prone areas*, Fourth edition, November 2018

Standards Australia Limited (Standards Australia) 2018, *Australian Standard 3745-2010 Planning for emergencies in facilities*, November 2010

Appendix 1 Layout plans



INVERTER SUMMARY				
BLOCK ID	PCS QUANTITY	RATED AC CAPACITY (MVA AC)	GRID POWER LIMIT (MW AC)	YIELD ESTIMATE (GWH/YEAR)
1	19	83.6	65.82	156.05
2	39	171.6	135.10	339.50
3	47	206.8	162.80	409.10
4	20	88.0	69.29	166.10
5	19	83.6	65.82	158.68
TOTAL	144	633.6	498.83	1229.43

PV ARRAY SUMMARY				
BLOCK ID	PANEL QUANTITY	RACK QUANTITY	DC CAPACITY (MW DC)	PV GROUND COVERAGE (ha)
1	127,140	4,890	78.83	35.72
2	255,060	9,810	158.14	71.19
3	307,580	11,830	190.69	85.84
4	126,828	4,878	78.63	35.39
5	121,056	4,656	75.10	33.79
TOTAL	941,820	36,064	581.35	261.93

LEGEND	
	SOLAR PANEL DEVELOPMENT AREA
	SWITCHYARD AND SUBSTATION AREA
	INTERNAL ACCESS ROAD / 33kV INTERNAL DISTRIBUTION ROUTE
	FLOOD LEVEL (1000mm EXTENT AT 1% AEP)
	SITE ACCESS ROAD
	EXISTING OVERHEAD ERGON 22kV EXCLUSION ZONE
	THREATENED ECOLOGICAL COMMUNITY ZONE WITH 50m EXCLUSION BUFFER
	RECEIVER
	EXISTING OVERHEAD ERGON 22 kV (TO BE RELOCATED)

NOTES:

1. REFER TO DRAWINGS 980-007-L-002 TO 980-007-L-006 FOR PROPOSED INVERTER STATIONS AND HV CONNECTION ASSET LOCATIONS.
2. SUBJECT TO DETAILED FLOOD STUDY.
3. PROPOSED NEW ACCESS ROADS, LAYDOWN AREAS AND FLOOD EXCLUSION ZONES SUBJECT TO DETAILED DESIGN.
4. PV PANEL MAKE/MODEL: LONGI SOLAR LR5-72HBD-620M.
5. PCS MAKE/MODEL: SMA 4.4MVA MVPS 4400-S2 CENTRAL INVERTER PACKAGE.
6. YIELD ESTIMATES ARE BASED ON SYNTHETIC METEOROLOGICAL DATA. SUBJECT TO DETAILED YIELD GENERATION REPORTS.

PRELIMINARY
NOT FOR CONSTRUCTION

DRAWING No	REFERENCE DRAWINGS	No.	BY	DATE	REVISION DETAILS	DES	CHK	Client
		F	MLM	17.05.24	UPDATED ROAD AND INVERTER LAYOUT			
		E	MIS	18.03.24	UPDATED GRID POWER LIMIT AND YIELD ESTIMATE	AYS	MWD	
		D	MIS	20.02.24	UPDATED PV DEVELOPMENT AREA AND SUMMARY TABLES	AYS	MWD	
		C	MIS	06.02.24	UPDATED OVERALL SITE LAYOUT	AYS	MWD	
		B	AYS	25.01.24	UPDATED SOLAR FARM CAPACITY	AYS	MWD	
		A	MIS	05.12.23	PRELIMINARY SITE LAYOUT	AYS	MWD	

	BY	DATE
CLIENT		
DESIGN CHECKED	MWD	05.12.23
DESIGNED	AYS	05.12.23
DRAWN	HM	05.12.23

QGE Pty Ltd
ABN 57 144 928 030
www.qge.com.au

privateenergy PARTNERS

MIRIAM VALE SOLAR FARM

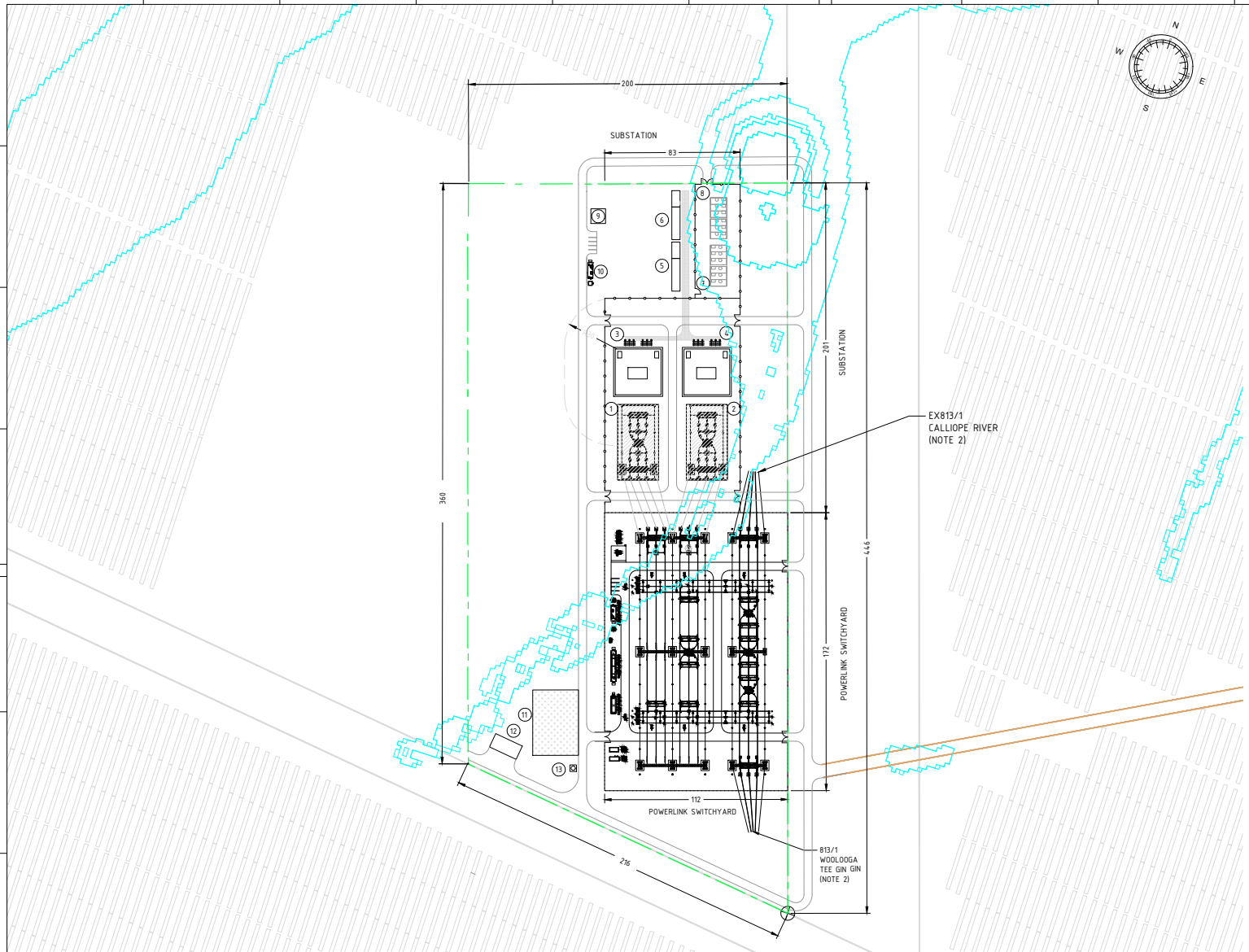
BURGESS ROAD, COLOSSEUM QLD 4677
OVERALL SITE LAYOUT

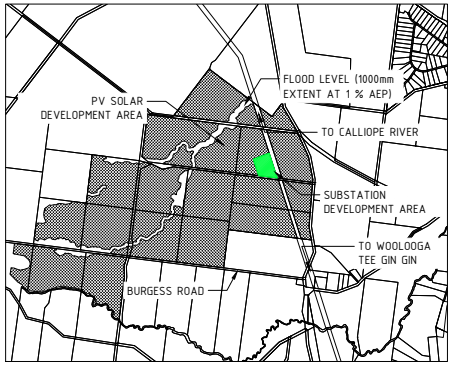
980-007-L-001

SCALE 1:6000 | SIZE A1

DRAWING TO DRAFTING STANDARD AS1100.101

REV F





LOCALITY MAP (SHOWN ORIENTED NORTH)

EQUIPMENT	DESCRIPTION
1	SUBSTATION 1 – 275kV SWITCHGEAR
2	SUBSTATION 2 – 275kV SWITCHGEAR
3	SUBSTATION 1 – TRANSFORMER BUND (30m x 30m)
4	SUBSTATION 2 – TRANSFORMER BUND (30m x 30m)
5	SUBSTATION 1 – 33kV SWITCHROOM AND COMMUNICATIONS
6	SUBSTATION 2 – 33kV SWITCHROOM AND COMMUNICATIONS
7	SUBSTATION 1 – FILTER EQUIPMENT
8	SUBSTATION 2 – FILTER EQUIPMENT
9	ONSITE WORKSHOP/STORAGE SHED (9m x 9m x 4.5m)
10	ABLUTIONS AND SITE OFFICE
11	LAYDOWN AREA (40m X 28m)
12	MAINTENANCE AND STORAGE SHED (9m x 18m x 4.5m)
13	WATER TANK (10000L CAPACITY)

EQUIPMENT RATINGS (NOTE 8)				
EQUIPMENT	MAKE/MODEL	NAMEPLATE RATING	QTY	TOTAL
SUBSTATION 1	TBC	350 MVA (275/33/33 kV)	1	350 (MVA)
SUBSTATION 2	TBC	350 MVA (275/33/33 kV)	1	350 (MVA)

LEGEND	
	FLOOD LEVEL (100mm EXTENT AT 0.5% AEP)
	SUBSTATION DEVELOPMENT AREA
	EXISTING ACCESS – CAWTHRAYS ROAD

NOTES:
1. CONCEPT DESIGN ONLY. SUBJECT TO CHANGE.
2. REFER TO POWERLINK DRAWING A0-H-154691-002 FOR POWERLINK SUBSTATION DETAILS.
3. REFER TO 980-007-L-001 FOR THE OVERALL SITE LAYOUT.
4. REFER TO 980-007-E-001 FOR THE ELECTRICAL SLD.
5. SUBSTATION DEVELOPMENT AREA = 8.5ha
6. SUBSTATION DEVELOPMENT AREA TO REQUIRE EARTHWORKS TO MAINTAIN CLEARANCE FROM IDENTIFIED FLOOD LEVELS.
7. EQUIPMENT RATINGS SUBJECT TO DETAILED DESIGN VERIFICATION.

PRELIMINARY
NOT FOR CONSTRUCTION

DRAWING No	REFERENCE DRAWINGS	No.	BY	DATE	REVISION DETAILS	DES	CHK	Client
		E	MIS	16.04.24	UPDATED TRANSFORMER RATINGS	AYS	MWD	
		D	MIS	15.04.24	UPDATED QTY	AYS	MWD	
		C	MIS	09.04.24	UPDATED LAYOUT	AYS	MWD	
		B	MIS	21.02.24	UPDATED DETAILS	AYS	MWD	
		A	HM	06.02.24	PRELIMINARY ISSUE ONLY	AYS	BVM	

	BY	DATE
CLIENT		
DESIGN CHECKED	BVM	06.02.24
DESIGNED	AYS	06.02.24
DRAWN	HM	06.02.24

QGE Pty Ltd
ABN 57 144 928 030
www.qge.com.au

privateenergy PARTNERS

MIRIAM VALE SOLAR FARM

BURGESS ROAD, COLOSSEUM QLD 4677
COUNCIL DA
SUBSTATION LAYOUT

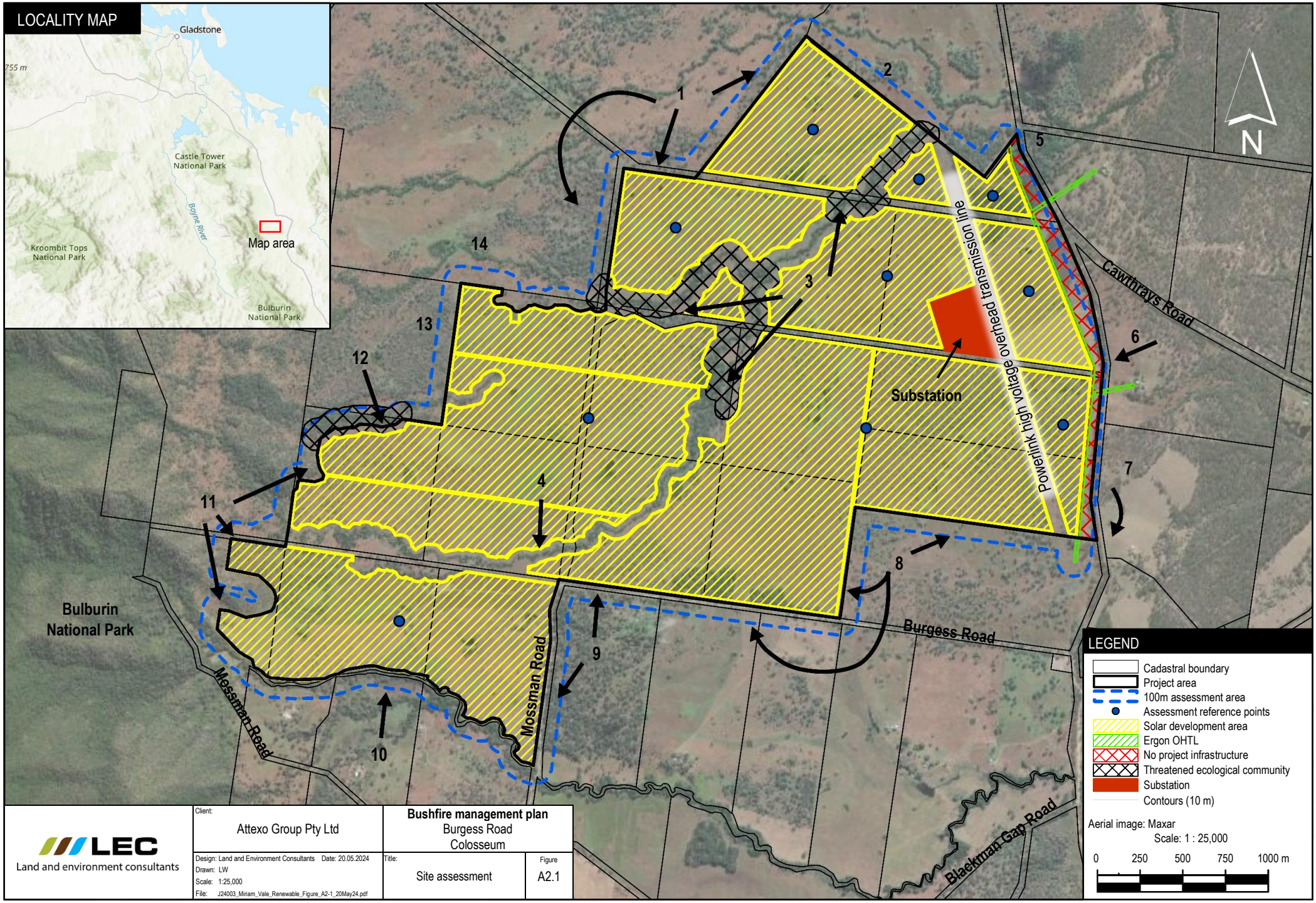
980-007-L-009

SCALE 1:1250 | SIZE A1

DRAWING TO DRAFTING STANDARD AS1100.101

REV E

Appendix 2 Summary of site observations



LEC
Land and environment consultants

Client: Attexo Group Pty Ltd

Bushfire management plan
Burgess Road
Colosseum

Design: Land and Environment Consultants Date: 20.05.2024
Drawn: LW
Scale: 1:25,000
File: J24003_Miriam_Vale_Renewable_Figure_A2-1_20May24.pdf

Title: Site assessment

Figure A2.1

Summary of site observations at assessment reference points

Assessment reference points	Catalyst vegetation hazard class (VHC)	Ground truthed VHC	Notes
1	VHC 40.4 *Continuous low grass or tree cover* (**VHC 40.4**)	VHC 9.2 *Moist to dry eucalypt woodland on coastal lowlands and ranges* (**VHC 9.2**)	Woodland regrowth on 2° slope.
2	VHC 40.4	VHC 40.4	Grassland on 2° slope.
3	VHC 16.2 *Eucalyptus dominated woodland on drainage lines and alluvial plains* (**VHC 16.2**)	VHC 16.2	Woodland on narrow drainage lines within the site – slope is associated with the short banks of the drainage lines. Vegetation along the drainage lines will be retained in the post development landscape.
4	VHC 9.2	-	Woodland on narrow drainage lines within the site – slope is associated with the short banks of the drainage lines. Vegetation along the drainage lines will be retained in the post development landscape.
5	VHC 9.2	VHC 9.2	Woodland on 1-3° slope.
6	VHC 40.4	VHC 40.4	Grassland on 1-3°slope, with a narrow corridor of VHC 9.2 aligned with the adjoining road reserve.
7	VHC 9.2	VHC 9.2	Woodland on 2° slope.
8	VHC 40.4	VHC 40.4	Grassland on 1-3° slope.
9	VHC 9.2	VHC 9.2	Woodland and woodland regrowth on 0-2° slope.
10	VHC 4.1 *Notophyll and notophyll palm or vine forest* (**VHC 4.1**)	VHC 9.2	Woodland on a narrow drainage line – slope is associated with the short banks of the drainage line. Notophyll palm or vine forest structure is not present.
11	VHC 13.2 *Dry to moist eucalypt woodlands on undulating metamorphics and granite* (**VHC 13.2**)	VHC 13.2	Woodland and woodland regrowth on 3-10° slope.
12	VHC 16.2	VHC 16.2	Woodland on a wide drainage line with 0-4° slope.
13	VHC 9.2	VHC 9.2	Woodland regrowth on 1-3° slope.
14	VHC 40.4	VHC 40.4	Grassland on 1° slope.
*	VHC 9.2, VHC 16.2 and VHC 40.4	VHC 9.2, VHC 16.2 and VHC 40.4	Woody vegetation, ie trees and shrubs, will be cleared from these areas for the Project's infrastructure. The area will be maintained as grassland in the post development landscape with grass height < 30 centimetres during the fire danger season.

Appendix 3 Photographs of assessment reference points

Photograph 1 Example of VHC 9.2 regrowth at assessment reference point 1

Photograph 2 Example of VHC 40.4 at assessment reference point 2

Left blank intentionally

Photograph 3 Example of VHC 16.2 at assessment reference point 3

Photograph 4 - No photograph of assessment reference point 4

Photograph 5 Example of VHC 9.2 at assessment reference point 5

Photograph 6 Example of VHC 40.4 at assessment reference point 6

Photograph 7 Example of VHC 9.2 at assessment reference point 7

Photograph 8 Example of VHC 40.4 at assessment reference point 8

Photograph 9 Example of VHC 9.2 at assessment reference point 9

Photograph 10 Example of VHC 9.2 at assessment reference point 10

Photograph 11 Example of VHC 13.2 regrowth at assessment reference point 11

Photograph 12 Example of VHC 16.2 at assessment reference point 12

Photograph 13 Example of VHC 9.2 regrowth at assessment reference point 13

Photograph 14 Example of VHC 40.4 at assessment reference point 14

Appendix 4 Potential bushfire intensity calculations

Potential bushfire intensity calculations

Assessment reference points	Vegetation hazard class (VHC)	Potential fuel load (t/ha)[1]	Slope (°)[2]	Potential bushfire intensity (kW/m)[3]	Bushfire hazard class
1	VCH 9.2 *Moist to dry eucalypt woodland on coastal lowlands and ranges* (**VHC 9.2**)	17.2	2	11,160	Medium
2	VHC 40.4 *Continuous low grass or tree cover* (**VHC 40.4**)	5	2	943	Non-bushfire hazard class[5]
3	VHC 16.2 *Eucalyptus dominated woodland on drainage lines and alluvial plains* (**VHC 16.2**)	11.6	0	4,346	Medium
4	VHC 9.2[4]	17.2	0	9,721	Medium
5	VHC 9.2	17.2	3	11,957	Medium
6	VHC 40.4	5	3	1,010	Non-bushfire hazard class[5]
7	VHC 9.2	17.2	2	11,160	Medium
8	VHC 40.4	5	3	1,010	Non-bushfire hazard class[5]
9	VHC 9.2	17.2	2	11,160	Medium
10	VHC 9.2	17.2	0	9,721	Medium
11	VHC 13.2 *Dry to moist eucalypt woodlands on undulating metamorphics and granite* (**VHC 13.2**)	14.4	10	13,585	Medium
12	VHC 16.2	11.6	4	5,727	Medium
13	VHC 9.2	17.2	3	11,957	Medium
14	VHC 40.4	5	1	880	Non-bushfire hazard class[5]
*	VHC 41.4[6]	3	0	296	Non-bushfire hazard class

Notes
1 Fuel load taken from *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire'2019*.
2 Slope defaults to 0° for VHC 41.4 which has discontinuous bushfire fuel.
3 Potential bushfire intensity calculation based on a forest fire danger index value of 53 from the severe fire weather map in the Queensland Fire and Emergency Services online mapping system (accessed online via user login January 2024).
4 VHC is based on the VHC map in the Queensland Fire and Emergency Services online mapping system (accessed online via user login January 2024).
5 VHC 40.4 is defined as grassfire prone in Bushfire resilient communities.
6 Assumes a maintained grassland in the post development landscape with grass height < 30 centimetres during the fire danger season.

Appendix 5 Radiant heat exposure assessment

Bushfire attack from assessment reference points 1, 5, 7, 9 and 13

- Forest fire danger index - 53
- Vegetation - VHC 9.2 *Moist to dry eucalypt woodland on coastal lowlands and ranges* (**VHC 9.2**)
- Understorey fuel load – 14.9 t/ha
- Total fuel load – 17.2 t/ha
- Effective slope – 3° slope
- Site slope – 3° slope
- Flame width – 100 m

Note Inputs are in accordance with Section 7.3 of *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire' 2019* (**Bushfire resilient communities**).

Calculated February 18, 2024, 1:02 pm (MDc v.4.9)

J24003

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	53	Rate of spread	1.16 km/h
Vegetation classification	Woodland	Flame length	9.640000000000001 m
Understorey fuel load	14.9 t/ha	Flame angle	55 °, 66 °, 75 °, 80 °, 82 ° & 87 °
Total fuel load	17.2 t/ha	Elevation of receiver	3.53 m, 3.83 m, 3.81 m, 3.53 m, 3.3 m & 0.96 m
Vegetation height	n/a	Fire intensity	10,358 kW/m
Effective slope	3 °	Transmissivity	0.882, 0.868, 0.847, 0.824, 0.8110000000000001 & 0.741
Site slope	3 °	Viewfactor	0.5948, 0.4364, 0.294, 0.1994, 0.162 & 0.0443
Flame width	100 m	Minimum distance to < 40 kW/m²	7.8 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	10.7 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	15.9 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	23.2 m
		Minimum distance to < 10 kW/m²	28 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Bushfire attack from assessment reference points 4 and 10

- Forest fire danger index - 53
- Vegetation - VHC 9.2
- Understorey fuel load – 14.9 t/ha
- Total fuel load – 17.2 t/ha
- Effective slope – 0° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs are in accordance with Section 7.3 of Bushfire Resilient Communities.

FLAMESOL
FPA AUSTRALIA

Calculated February 18, 2024, 1:04 pm (MDc v.4.9)

J24003

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	53	Rate of spread	0.9399999999999999 km/h
Vegetation classification	Woodland	Flame length	8.220000000000001 m
Understorey fuel load	14.9 t/ha	Flame angle	54 °, 64 °, 73 °, 78 °, 79 ° & 85 °
Total fuel load	17.2 t/ha	Elevation of receiver	3.32 m, 3.69 m, 3.93 m, 4.02 m, 4.03 m & 4.09 m
Vegetation height	n/a	Fire intensity	8,421 kW/m
Effective slope	0 °	Transmissivity	0.885, 0.873, 0.853, 0.832, 0.82 & 0.748
Site slope	0 °	Viewfactor	0.5871, 0.4367, 0.2916, 0.1971, 0.1603 & 0.0438
Flame width	100 m	Minimum distance to < 40 kW/m²	6.9 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	9.300000000000001 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	13.9 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	20.4 m
		Minimum distance to < 10 kW/m²	24.7 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Bushfire attack from assessment reference point 11

- Forest fire danger index - 53
- Vegetation - VHC 13.2 *Dry to moist eucalypt woodlands on undulating metamorphics and granite*
- Understorey fuel load – 12.8 t/ha
- Total fuel load – 14.4 t/ha
- Effective slope – 10° slope
- Site slope – 10° slope
- Flame width – 100 m

Note Inputs are in accordance with Section 7.3 of Bushfire Resilient Communities.

FLAMESOL
FPA AUSTRALIA

Calculated February 18, 2024, 1:05 pm (MDc v.4.9)

J24003

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	53	Rate of spread	1.62 km/h
Vegetation classification	Woodland	Flame length	12.27 m
Understorey fuel load	12.8 t/ha	Flame angle	60 °, 72 °, 81 °, 86 °, 88 ° & 93 °
Total fuel load	14.4 t/ha	Elevation of receiver	3.64 m, 3.54 m, 2.64 m, 1.16 m, 0.19 m & 0 m
Vegetation height	n/a	Fire intensity	12,075 kW/m
Effective slope	10 °	Transmissivity	0.877, 0.859, 0.835, 0.8100000000000001, 0.797 & 0.733
Site slope	10 °	Viewfactor	0.5955, 0.4419, 0.2986, 0.2022, 0.1643 & 0.0447
Flame width	100 m	Minimum distance to < 40 kW/m²	9.4 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	12.9 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	19.4 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	28.1 m
		Minimum distance to < 10 kW/m²	33.7 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Bushfire attack from assessment reference point 3

- Forest fire danger index - 53
- Vegetation - VHC 16.2 *Eucalyptus dominated woodland on drainage lines and alluvial plains* (**VHC 16.2**)
- Understorey fuel load – 11.1 t/ha
- Total fuel load – 11.6 t/ha
- Effective slope –0° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs are in accordance with Section 7.3 of Bushfire Resilient Communities.

FLAMESOL
FPA AUSTRALIA

Calculated February 18, 2024, 1:06 pm (MDc v.4.9)

J24003

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	53	Rate of spread	0.7 km/h
Vegetation classification	Woodland	Flame length	5.98 m
Understorey fuel load	11.1 t/ha	Flame angle	54 °, 65 °, 73 °, 78 °, 80 ° & 86 °
Total fuel load	11.6 t/ha	Elevation of receiver	2.41 m, 2.71 m, 2.85 m, 2.92 m, 2.94 m & 2.98 m
Vegetation height	n/a	Fire intensity	4,231 kW/m
Effective slope	0 °	Transmissivity	0.89, 0.88, 0.865, 0.847, 0.836 & 0.761
Site slope	0 °	Viewfactor	0.5862000000000001, 0.4268, 0.2866, 0.1934, 0.157 & 0.043
Flame width	100 m	Minimum distance to < 40 kW/m²	5 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	6.9 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	10.3 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	15.2 m
		Minimum distance to < 10 kW/m²	18.6 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Bushfire attack from assessment reference point 12

- Forest fire danger index - 53
- Vegetation - VHC 16.2
- Understorey fuel load – 11.1 t/ha
- Total fuel load – 11.6 t/ha
- Effective slope –4° slope
- Site slope – 4° slope
- Flame width – 100 m

Note Inputs are in accordance with Section 7.3 of Bushfire Resilient Communities.

FLAMESOL
FPA AUSTRALIA

Calculated February 18, 2024, 1:07 pm (MDc v.4.9)

J24003

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	53	Rate of spread	0.93 km/h
Vegetation classification	Woodland	Flame length	7.43 m
Understorey fuel load	11.1 t/ha	Flame angle	56 °, 68 °, 76 °, 82 °, 84 ° & 89 °
Total fuel load	11.6 t/ha	Elevation of receiver	2.65 m, 2.86 m, 2.73 m, 2.38 m, 2.12 m & 0 m
Vegetation height	n/a	Fire intensity	5,575 kW/m
Effective slope	4 °	Transmissivity	0.887, 0.875, 0.858, 0.837, 0.824 & 0.752
Site slope	4 °	Viewfactor	0.5899, 0.4309, 0.2908, 0.1953, 0.1589 & 0.0436
Flame width	100 m	Minimum distance to < 40 kW/m²	6 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	8.300000000000001 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	12.4 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	18.4 m
		Minimum distance to < 10 kW/m²	22.5 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Grassfire attack from assessment reference points 2, 6, 8, and 14

- Forest fire danger index – 53
- Grass fire danger index conversion - 75
- Vegetation - VHC 40.4 *Continuous low grass or tree cover*
- Understorey fuel load – 4.5 t/ha
- Total fuel load – 5 t/ha
- Effective slope – 3° slope
- Site slope – 3° slope
- Flame width – 100 m

Note Inputs are in accordance with Section 7.3 of Bushfire Resilient Communities.

FLAMESOL
FPA AUSTRALIA

Calculated February 18, 2024, 1:08 pm (MDc v.4.9)

J24003

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Grassland Fire Danger Index	75	Rate of spread	11.99 km/h
Vegetation classification	Grassland	Flame length	6.63 m
Understorey fuel load	4.5 t/ha	Flame angle	56 °, 67 °, 76 °, 81 °, 83 ° & 88 °
Total fuel load	5 t/ha	Elevation of receiver	2.46 m, 2.66 m, 2.62 m, 2.4 m, 2.22 m & 0.25 m
Vegetation height	n/a	Fire intensity	30,980 kW/m
Effective slope	3 °	Transmissivity	0.888, 0.878, 0.862, 0.842, 0.831 & 0.757
Site slope	3 °	Viewfactor	0.5883, 0.4332, 0.2885, 0.1943, 0.1577 & 0.0434
Flame width	100 m	Minimum distance to < 40 kW/m²	5.4 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	7.4 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	11.2 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	16.6 m
		Minimum distance to < 10 kW/m²	20.4 m

Rate of Spread - Noble et al. 1980

Flame length - Purton, 1982

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Appendix 6 Bushfire hazard overlay code assessment

8.2.4 Bushfire hazard

8.2.4.1 Application

This code applies to development where the code is identified as applicable in the table of assessment for the bushfire hazard overlay code. When using this code, reference should be made to section 5.3.2 and where applicable, section 5.3.3 located in Part 5.

8.2.4.2 Purpose

1. The purpose of the bushfire hazard overlay code is to ensure that:

   Note—Relationship with the building assessment provisions. For the building assessment provisions, the bushfire prone area defined by this planning scheme under map is also designated to be the bushfire prone area for the BCA or QDC pursuant to section 12 of the Building Regulation 2006.

   a. The risks to life, property, community, economic activity and the environment during uncontrolled bushfire events are minimised.
   b. Development does not increase the potential for bushfire damage or risk on–site or to other property.
2. The purpose of the code will be achieved through the following overall outcomes:
   a. Development is compatible with the nature of the bushfire hazard except where there is an overriding need for the development in the public interest and no other site is suitable and reasonably available for the proposal.
   b. Development siting, layout, design and access minimises the risks to personal safety, and damage to property, infrastructure and other assets.
   c. Development directly, indirectly and cumulatively avoids an unacceptable increase in severity of bushfires and does not increase the potential for damage on the site or to other properties.
   d. The potential for the release of hazardous material as a result of a bushfire event is avoided.
   e. Evacuation and disaster management response including firefighting and access for emergency services during bushfire events is facilitated.
   f. Community infrastructure is located and designed to function effectively at all times.

8.2.4.3 Assessment benchmarks

Table 8.2.4.3.1—Accepted development subject to requirements and assessable development

Performance outcomes	Acceptable outcomes	Comments
Site suitability		
PO1 Development maintains the safety of people and property by not exposing them to an unacceptable risk from bushfire. Note—A site specific bushfire hazard assessment may demonstrate that the site is not within a bushfire hazard area or has a low degree of bushfire risk.	No acceptable outcome is nominated.	**Complies with PO1** A bushfire management plan (**BMP**) has been prepared for the Miriam Vale Solar Farm (the P**roject**) and demonstrates how the development application for the Project will comply with this Bushfire hazard overlay code. The bushfire hazard assessment and radiant heat exposure assessment in the BMP has been undertaken in accordance with *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire' 2019* (**Bushfire resilient communities**), which was prepared by the Queensland Fire and Emergency Services to provide technical guidance for the implementation of *Natural Hazards, Risk and Resilience – Bushfire,*

Performance outcomes	Acceptable outcomes	Comments
		State Planning Policy State Interest guidance material 2019 (**SPP guidance material – bushfire**).
PO2 Development does not result in a higher concentration of people living, working or congregating in a high or very high bushfire hazard area unless it can be demonstrated: a. there is an overriding community need in the public interest, and b. no other site is suitable and reasonably available. Note—A 'medium, high or very high bushfire risk hazard area' means land mapped on the bushfire overlay map as having medium, high or very high potential bushfire risk.	**AO2** The following uses are not located on land within a confirmed medium, high or very high bushfire hazard area: a. child care facility b. community care centre c. educational establishment d. hostel e. hospital f. multiple dwelling g. non–resident workforce accommodation h. residential care facility i. retirement facility j. shopping centre k. short–term accommodation l. tourist attraction m. tourist park.	**Complies with AO2** The Project does not involve the land uses identified in AO2a-m.

Performance outcomes	Acceptable outcomes	Comments
Water supply		
PO3 Development in areas with a reticulated water supply has adequate flow and pressure for fire–fighting purposes at all times.	**AO3** The water supply network has a minimum sustained pressure and flow of at least 10L per second at 200kPa.	**PO3 and AO3 are not applicable** The Project is not in a reticulated water supply area.
PO4 Development in areas without a reticulated water supply has an appropriate dedicated water supply for fire–fighting purposes that are safely located and freely accessible for fire–fighting purposes at all times.	**AO4.1** Development involving a gross floor area greater than 50m2 where a reticulated water supply is not available is: a. provided with an easily accessible fire resistant on–site water storage of not less than 5,000L (e.g. concrete tank with fire brigade fittings, in–ground swimming pool, dam fed by a permanent water source) that is within 100m of each class 1, 2, 3, or 4 building, and b. has a hard standing area allowing a heavy rigid fire appliance safe	**Complies with PO4** The BMP identifies the Project will have three water storage tanks for the purpose of bushfire fighting. Section 6.7 of the BMP provides specifications for the water storage tanks (which are based on AO4.1) and their proposed location is identified in Figure 6.1 of the BMP.

Performance outcomes	Acceptable outcomes	Comments
	access to within 6m of the storage facility. Note—Plastic water tanks are not considered to be fire resistant unless they are submerged.	
	AO4.2 The location of water supplies is readily identifiable from the street frontage with clear signage directing firefighters to its access point.	**Complies with AO4.2** Section 6.8 of the BMP requires the water storage tanks to be identified with reflective wayfinding signage.
Roads, fire access trails and firebreaks		
PO5 Roads and fire access trails are designed and constructed to: a. enable efficient access to buildings and structures for fire–fighting purposes for emergency services, and	**AO5.1** Roads and fire access trails are designed and constructed to: a. separate the development from the hazardous vegetation b. have a maximum gradient of 12.5% c. a minimum cleared width of 6m and a minimum formed width of 4m	**Complies with P05** Specifications for access roads are provided in Section 6.3 of the BMP. The specifications are based on compliance with the minimum requirements for a category 1 fire-fighter vehicle by the New South Wales (**NSW**) Rural Fire Service. This specification has been used in lieu of specifications in the various Queensland guidelines because the

Performance outcomes	Acceptable outcomes	Comments
b. swift evacuation in emergency situations.	d. have adequate drainage and erosion control devices e. provides passing and turning areas for fire–fighting appliances at intervals of not less than 200m f. have a vehicular access at each end to roads or a bushfire trail g. not involve any cul–de–sac h. have gates locked with a system authorised by QFES, and i. have suitable arrangements in place to ensure maintenance in perpetuity.	NSW guidelines are well defined and documented and feedback received from other projects is that they are more practical to implement.
	AO5.2 Development has direct access to an evacuation route with a potential fire intensity exposure no greater than 2kw/m2. Note—The distance from hazardous vegetation to achieve 2kw/m2 is generally: • 58m in a very high bushfire hazard areas	**Complies with AO5.2** The access and egress for the Project is via existing public roads, ie Cawthrays Road and Burgess Road.

Performance outcomes	Acceptable outcomes	Comments
	• 52m in a high bushfire hazard area, and • 44 m in a medium bushfire hazard area.	
	AO5.3 Development incorporates an area of managed vegetation that separates lot boundaries from hazardous vegetation by a distance of: a. 20m to a high or very high bushfire risk area, or b. 10 to a medium risk bushfire area and includes a fire access trail.	**Alternative solution to AO5.3 proposed** Radiant heat exposure modelling has been used to advise the width of the perimeter fire break. It has been designed to separate the solar development area from hazardous vegetation by a distance which achieves a radiant heat flux level ≤ 29 kilowatts/square metre. An access road will be located in the perimeter fire break. The alternative solution complies with the SPP guidance material – bushfire and Bushfire resilient communities.
PO6	No acceptable outcome is nominated.	**Complies with PO6**

Performance outcomes	Acceptable outcomes	Comments
Development provides for adequate fire breaks that minimise bushfire hazard by: a. separating hazardous vegetation from development areas, and b. facilitating access for firefighting and emergency vehicles.		Section 6.1 of the BMP requires a perimeter fire break to be established around the solar development area. An access road will be located in the perimeter fire break.
Hazardous materials		
PO7 The potential for the release of hazardous materials as a result of a bushfire event is avoided. Note—The term 'hazardous material' is defined in the Glossary of the relevant State Planning Policy.	**AO7** Development involving the production or storage of hazardous materials in bulk: a. is not located within a high or very high bushfire hazard area, or b. complies with a site specific bushfire management plan	**Complies with PO7** The Project does not involve hazardous chemicals that are present at the levels or in the quantities that would constitute the use being a hazardous chemical facility. The BMP requires the storage or handling of hazardous materials to be in accordance with *Managing risks of hazardous chemicals in the workplace – Code of Practice 2023*, applicable safety data sheets, and otherwise in accordance with Queensland *Work Health and Safety Act 2011* and its regulations.

Performance outcomes	Acceptable outcomes	Comments
Reconfiguration of a lot		
PO8 Additional lots avoid the risk of bushfire hazard to personal and property safety and increased risk of damage to assets. Note—A site specific bushfire hazard assessment may demonstrate that the site is not within a bushfire hazard area or has a low degree of bushfire risk. Any site specific bushfire assessment should be carried out in accordance with the method set out in Appendix 3 of *State Planning Policy 1/03 Guideline Mitigating the adverse impacts of Flood, Bushfire and Landslide*.	**AO8** New residential lots (including rear lots) do not occur in a bushfire hazard area.	**PO8 is not applicable** The Project does not involve the reconfiguration of a lot.
Community infrastructure		
PO9 Development for community infrastructure is located, designed and sited to: a. protect the safety of people during a bushfire	No acceptable outcome is nominated	**PO8 is not applicable** The Project does not involve community infrastructure for essential services. Notwithstanding, the Project substation and connection to high voltage overhead transmission lines will be located within an

Performance outcomes	Acceptable outcomes	Comments
b. not increase the exposure of people to the risk from a bushfire event, and c. function effectively during and immediately after bushfire events.		asset protection zone and will be > 100 m to any large continuous areas of bushfire fuel.