
Bushfire management plan

Boulder Creek Wind Farm | Boulder Creek | Queensland
Prepared for Boulder Creek Wind Farm Pty Ltd | 6 August 2025

Bushfire management plan

Final V2

Report 24091 | Boulder Creek Wind Farm Pty Ltd | 6 August 2025

Approved by Robert Janssen

Position Managing principal

Signature



Date 6 August 2025

This report has been prepared in accordance with the brief provided by the client and has relied upon the information collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of the client and no responsibility will be taken for its use by other parties. The client may, at its discretion, use the report to inform regulators and the public.

© Reproduction of this report for educational or other non-commercial purposes is authorised without prior written permission from LEC provided the source is fully acknowledged. Reproduction of this report for resale or other commercial purposes is prohibited without LEC's prior written permission.

Document control

Version	Date	Prepared by	Reviewed by
Draft	24 August 2024	R. Janssen	LEC
Draft V1	3 September 2024	R. Janssen	LEC
Final	16 September 2024	R. Janssen	LEC
Final V1	25 July 2025	R. Janssen	LEC
Final V2	6 August 2025	R. Janssen	LEC

 **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

Table of contents	i
1 Introduction	1
1.1 Approvals context.....	1
1.2 Bushfire management plan review.....	2
1.3 Method	2
1.4 Suitably qualified person	3
2 Description of the Project area and the Project	4
2.1 The Project area.....	4
2.2 The Project.....	4
2.3 Bushfire prone area map	5
3 Bushfire hazard assessment	8
3.1 Severe fire weather	8
3.2 Fire history.....	8
3.3 Field inspection.....	8
3.4 Potential bushfire intensity calculations	8
3.5 Bushfire hazard areas	9
3.6 Radiant heat exposure assessment	9
4 Bushfire hazards associated with the Project area and Project	11
4.1 Fire danger season.....	11
4.2 Fire history.....	11
4.3 Mount Morgan township.....	11
4.4 Vegetation	11
4.5 Bushfire management within the Project area	11
4.6 Bushfire attack and the protection of above ground infrastructure	12
4.7 Workforce	12
4.8 Hazardous chemicals	12
4.9 Access	12
4.10 Rural Fire Brigade resources and capability	13
4.11 Aerial fire-fighting operations	13
4.12 Fire-fighter water supply	13
4.13 Warning and evacuation requirements.....	13

4.14	Buildings and structures	14
5	Fire ignition risks	15
5.1	Land use	15
5.2	Transmission lines	15
5.3	Lightning strike	15
5.4	Mechanical or electrical fire	15
5.5	Construction activities	16
5.6	Operation activities	16
6	Bushfire mitigation plan	17
6.1	Asset protection zones	17
6.2	Surface under certain types of infrastructure	17
6.3	Overhead transmission lines	17
6.4	Cable pits	18
6.5	Cleared vegetation	18
6.6	Access and evacuation	18
6.7	Fire-fighter water supply	20
6.8	Wayfinding	20
6.9	Buildings and structures	20
6.10	Wind monitoring masts	20
6.11	Proposed offset area	21
6.12	Construction phase	26
6.12.1	Project rules and inductions	26
6.12.2	Staging of construction works	26
6.12.3	Fire-fighter water supply	26
6.12.4	Fire extinguishers and protection equipment	26
6.12.5	Communications equipment and communications planning	26
6.12.6	Restrictions during the fire danger season	27
6.12.7	Hot works	27
6.12.8	Safety documentation	27
6.12.9	Training	27
6.12.10	Emergency management plan and evacuation plan	27
6.13	Operation phase	28
6.13.1	Project rules and inductions	28

6.13.2	Information transfer	28
6.13.3	Fire-fighter operations plan.....	28
6.13.4	Communications equipment and communications planning.....	28
6.13.5	Bushfire preparedness activities	28
6.13.6	Safety documentation	29
6.13.7	Training.....	29
6.13.8	Overhead transmission lines	29
6.13.9	Emergency management plan and evacuation plan	29
6.13.10	Electrical safety.....	30
6.13.11	Hazardous materials	30
6.13.12	Braking or pitching wind turbine rotors	30
6.13.13	Lighting fires	30
6.14	Boulder Creek Wind Farm Pty Ltd	30
6.14.1	Liaison with management agencies.....	30
6.14.2	Investigation of fires	31
6.14.3	Public awareness programs.....	31
6.14.4	Local area fire management group	31
6.14.5	Plan available for inspection.....	31
6.14.6	Standards for renewable energy projects	31
7	Closing.....	32

Figures

Figure 2.1	Locality and general layout plan	6
Figure 2.2	Bushfire prone area map	7
Figure 6.1	Bushfire mitigation plan – Area 1	22
Figure 6.2	Bushfire mitigation plan – Area 2	23
Figure 6.3	Bushfire mitigation plan – Switching yard near WTG 41	24
Figure 6.4	Powerlink vegetation management specifications for high voltage OHTLs	25
Figure 6.5	Energy Queensland vegetation management specification for 33 kV OHTLs.....	25

Tables

Table 3.1	Recommended APZs for above ground infrastructure	9
-----------	--	---

Appendix

Appendix 1 Summary of site observations

Appendix 2 Photographs of infrastructure areas

Appendix 3 Potential bushfire intensity calculations

Appendix 4 Radiant heat exposure assessment

Appendix 5 Bushfire overlay code assessment

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.

1 Introduction

This bushfire management plan (**BMP**) has been prepared for the Boulder Creek Wind Farm Project (the **Project**) which is located approximately 40 kilometres (**km**) south-west of Rockhampton, within the local government areas of Banana Shire Council and Rockhampton Regional Council.

The Project involves 18 land parcels which are described as lot 120/LN422, lot 12/LN484, lot 138/PN67, lot 147/PN107, lot 17/PN222, lot 196/PAK40164, lot 1/RP616893, lot 20/LN594, lot 226/RP616893, lot 230/PN16, lot 42/RN244, lot 44/RN245, lot 45/RN245, lot 46/RN245, lot 47/RN243, lot 48/RN243, lot 55/LIV401113 and lot 7/PN54 (the **Project area**).

This BMP documents the bushfire hazard assessment for above ground infrastructure within the Project area and identifies strategies that will mitigate the potential risk of bushfire hazards for the construction and operation phases of the Project. 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 the Project;
- bushfire hazard assessment;
- identification of bushfire hazards associated with the Project area and the Project;
- radiant heat exposure assessment; and
- a plan for mitigating the potential risk of bushfire hazards.

1.1 Approvals context

On 15 October 2021, the State Assessment and Referral Agency (**SARA**) approved a development permit – material change of use for a wind farm (up to 60 wind turbines and ancillary infrastructure) and operation works for the clearing of native vegetation (the **development permit**) – SARA reference 2012-20252 SDA.

Condition 12 of the development permit states:

- a) Prepare a Bushfire Management Plan (BMP) certified by a suitably qualified person and in consultation with the Queensland Fire and Emergency Services addressing construction and operations, and including the following information at a minimum:
 - i. a fire hazard analysis
 - ii. mitigation strategies to achieve the development outcomes in Part E of the State Planning Policy July 2017 – Natural Hazards, Risk and Resilience
 - iii. Details on consultation with all land holders/
 - iv. Confirmation that the details of the consultation in (a)(iii) above has been sent to:
Office of The Assistant Commissioner, South Western Region
Queensland Fire and Emergency Service
Email: QFES.SWREA@qfes.qld.gov.au
19 Steger Road, Charlton QLD 4350. (07) 4592 5201.
- b) Provide the BMP required by part (a) of this condition to:
 - i. Department of State Development, Infrastructure, Local Government and Planning (windfarms@dsdilgp.qld.gov.au)
 - ii. Banana Shire Council (enquiries@banana.qld.gov.au)
 - iii. Rockhampton Regional Council (enquiries@rrc.qld.gov.au)
 - iv. Queensland Fire and Emergency Service QFES.SWREA@qfes.qld.gov.au.

- c) Construct and operate the development in accordance with the BMP.

The Project area is identified as a bushfire hazard area by the Queensland State Planning Policy *Bushfire prone area map* (**Bushfire prone area map**). As a result, condition 12(a) of the development permit is seeking compliance with the example bushfire overlay code (**Bushfire overlay code**) in the *Natural Hazards, Risk and Resilience – Bushfire, State Planning Policy State Interest guidance material* (DSDMIP 2019) (**SPP guidance material – bushfire**) and *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest ‘Natural Hazards, Risk and Resilience – Bushfire’ 2019* (**BRC guide**). The BRC guide was prepared by the former Queensland Fire and Emergency Services, now the Queensland Fire Department (**QFD**) to provide technical guidance for the implementation of the SPP guidance material – bushfire.

Although not referred to in condition 12(a) of the development permit; consideration of guidelines in *Wind Farms and Bushfire Operations* (AFAC 2018) (**Wind farms and bushfire operations**) and *Design Guidelines and Model Requirements – Renewable Energy Facilities V4* (CFA 2023) are also considered relevant to the construction and operation phases of the Project.

This BMP has been prepared to satisfy condition 12(a) of the development permit and demonstrates how compliance with the Bushfire overlay code will be achieved during the construction and operation phases of the Project.

This BMP does not consider fire hazards associated with the battery energy storage system (**BESS**) in stage 2 of the Project, including (amongst other things) electrical hazards, chemical hazards, explosions, potential fire spread due to the proximity of battery enclosures or mechanical damage to battery enclosures. These are matters which will be dealt with via a separate fire safety study.

Records of consultation with Project stakeholders about bushfire management for the construction and operation phase of the Project are documented separately to this BMP.

1.2 Bushfire management plan review

This BMP has been prepared to satisfy compliance with condition 12(a) of the development permit. Upon appointment, the construction contractor and operation 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 the operation contractor to change or deviate from the mitigation measures specified in Chapter 6.

1.3 Method

To meet requirements of the SPP guidance material – bushfire and the BRC guide, the following tasks were undertaken for the preparation of this BMP:

- review of the Bushfire prone area map in the SPP interactive mapping system (DSDILGP 2024), fire scar mapping in Queensland Globe (DR 2024) and the Queensland regional ecosystem map, vegetation hazard class (**VHC**) map and severe fire weather map in the QFD online mapping system (QFD 2024) (**Catalyst**);
- a drive over the Project area and field inspection of above ground infrastructure areas for vegetation characteristics, current land management practices, slope and evidence of previous fires;
- bushfire hazard assessment in general accordance with the method in the BRC guide;
- 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*; and

- identification of mitigation measures required to reduce the potential risk of bushfire hazards to the construction and operation phases of the Project and for compliance with the Bushfire overlay code.

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

1.4 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 is 14,925 hectares (**ha**) and is located approximately 40 km south-west of Rockhampton.

There are numerous local roads which provide access to the Project area from the Burnett Highway and Capricorn Highway. However, the main access from the east is via Mount Morgan and Boulder Creek Road and from the west via Westwood and Flaggy Creek Road.

The Project area is mostly used for farming livestock and dryland cropping. However, large continuous areas of bushland vegetation have been retained and are aligned with the steeper hills and drainage lines.

Most of the properties adjoining the Project area are freehold and also used for farming livestock. In combination with the Project area, they result in a broad landscape of continuous bushfire and grassfire fuel.

A Powerlink Queensland (**Powerlink**) high voltage overhead transmission line (**OHTL**) runs through the eastern part of the Project area in a north-south direction.

2.2 The Project

The location of the Project area and general layout plan for the Project are shown in Figure 2.1. The disturbance footprint within the Project area is 515.51 ha of land.

The Project consist of up to 60 wind turbine generators (**WTGs**) and will deliver approximately 420 megawatts of power to the national grid.

The Project will be constructed in two stages which are identified in Figure 2.1. The overall Project will include:

- WTGs and hardstands;
- substation;
- BESS;
- switching yard;
- medium voltage - 33 kilo volt (**kV**) – OHTLs and underground transmission lines;
- high voltage - 275 kV - OHTLs;
- wind monitoring masts;
- access tracks;
- temporary construction facilities including a construction compound, laydown areas and a concrete batching plant; and
- operations and maintenance facility (**O&M facility**).

Above ground infrastructure associated with the substation, switching yard and BESS are assessed in this BMP as community infrastructure for essential services. The battery storage cabinets component of the BESS is also assessed as hazardous materials in the context of bushfire hazard. Community infrastructure for essential services and hazardous materials in the context of bushfire hazard are further explained in the SPP guidance material - bushfire.

An offset area of approximately 1,207 ha is proposed within the Project area to compensate for the Project's residual impact on matters of national environmental significance.

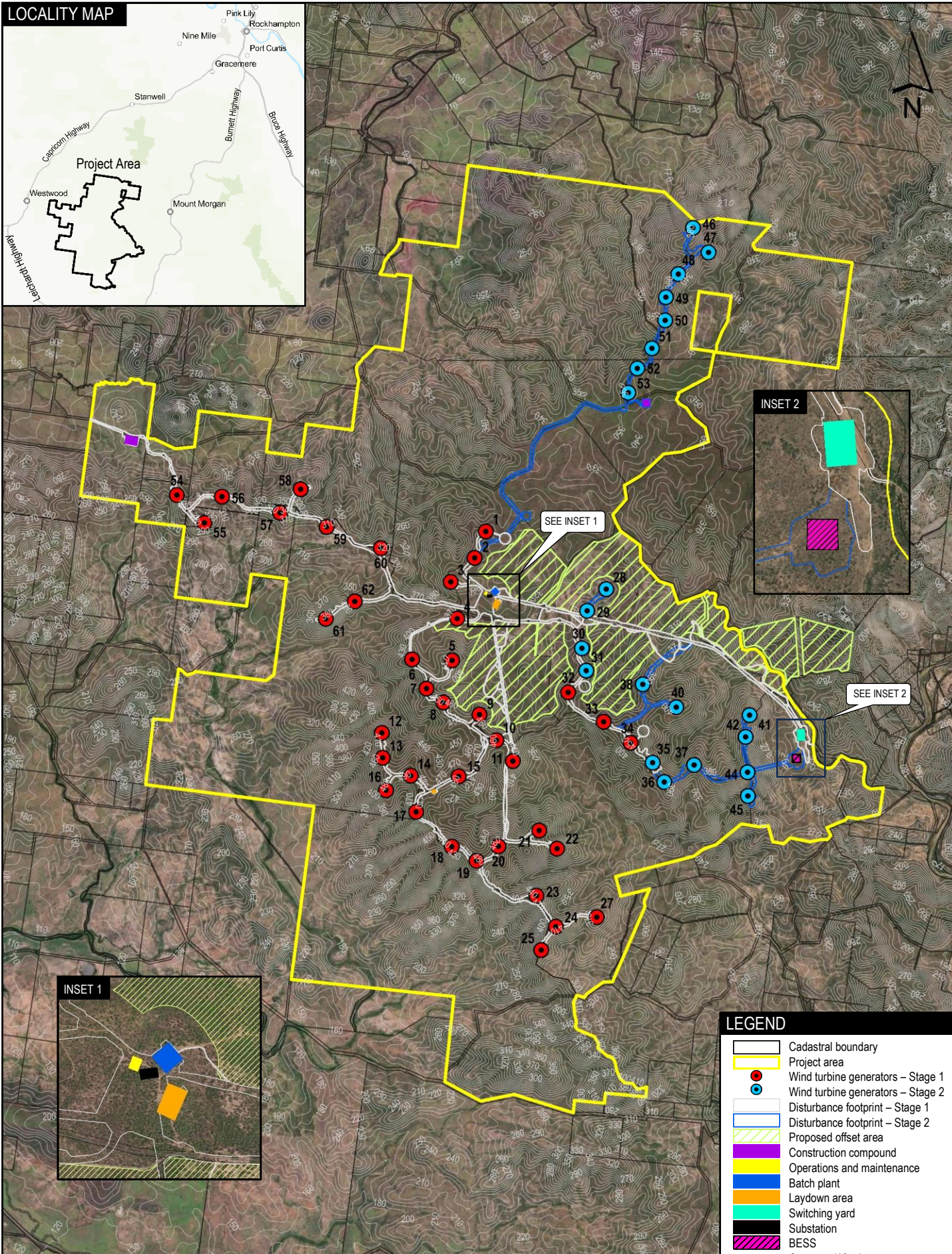
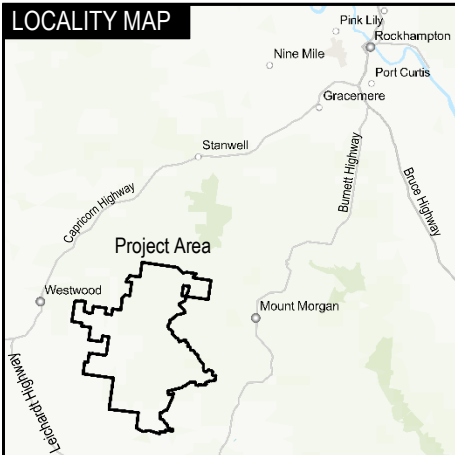
2.3 Bushfire prone area map

The Bushfire prone area map for the Project area is shown in Figure 2.2. It shows that the Project area is affected by medium, high and very high potential bushfire intensity areas and potential impact buffer areas.

The Bushfire prone area map does not identify grassfire prone areas. Grassfire prone areas are identified in this BMP based on the occurrence of VHCs defined as grassfire prone in Figure 14 of the BRC guide.

Please note, in this BMP, the terms 'bushfire prone area' and 'bushfire hazard area' have the same meaning. Both terms mean an area of vegetation that is determined to have a potential bushfire intensity of $\geq 4,000$ kilowatts/metre (**kW/m**) and the land within 100 m of this vegetation.

LOCALITY MAP



LEGEND

- Cadastral boundary
- Project area
- Wind turbine generators – Stage 1
- Wind turbine generators – Stage 2
- Disturbance footprint – Stage 1
- Disturbance footprint – Stage 2
- Proposed offset area
- Construction compound
- Operations and maintenance
- Batch plant
- Laydown area
- Switching yard
- Substation
- BESS
- Contours (10 m)

Aerial image: Esri World Imagery
Scale: 1 : 90,000



LEC
Land and environment consultants

Client:

Aula Energy

Bushfire management plan

Boulder Creek Wind Farm
Westwood

Design: Land and Environment Consultants Date: 23.08.2024

Drawn: LW

Scale: 1:90,000

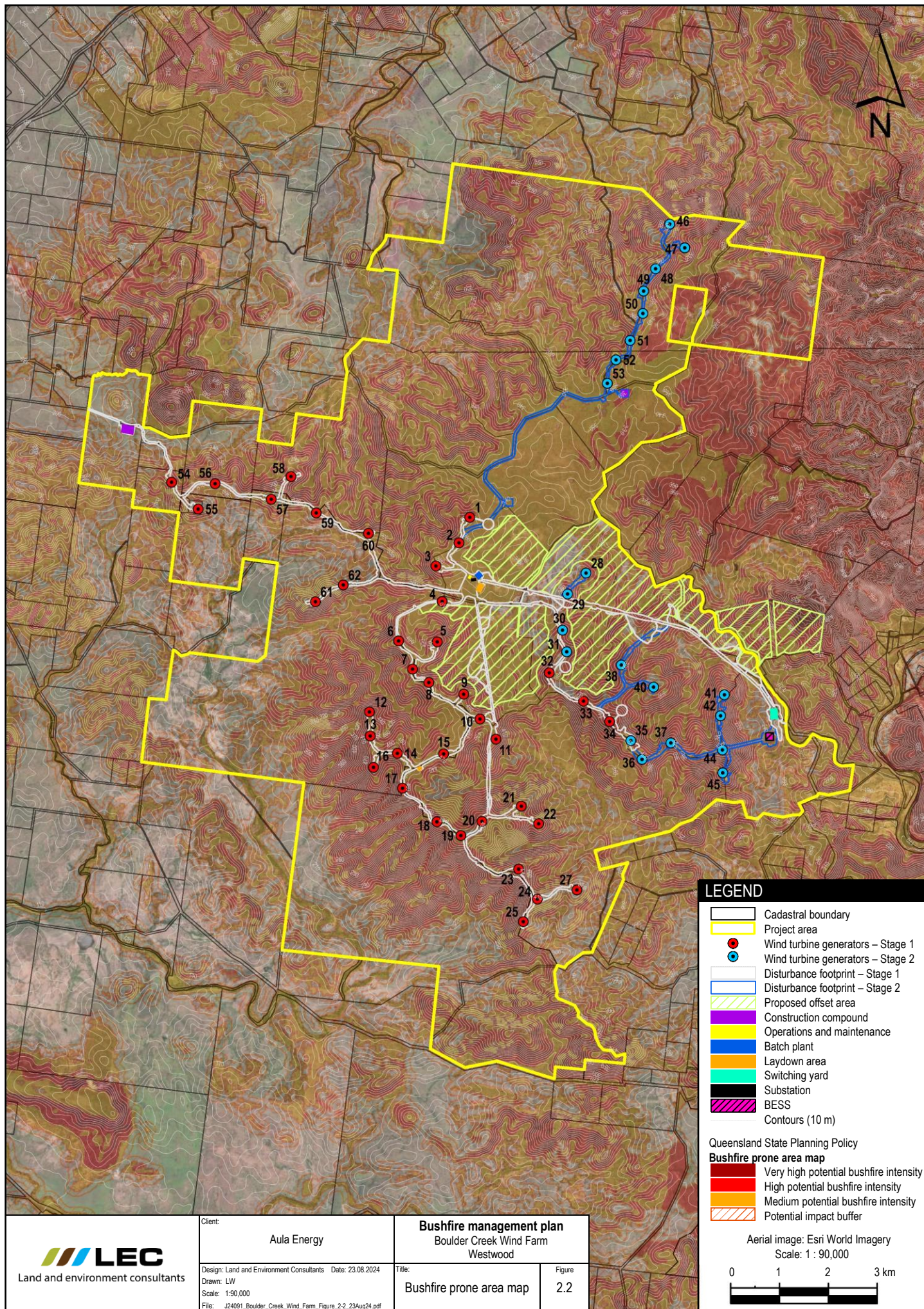
File: J24091_Boulder_Creek_Wind_Farm_Figure_2-1_23Aug24.pdf

Title:

Site locality and
general layout plan

Figure

2.1





LEC
Land and environment consultants

Client:

Aula Energy

Design: Land and Environment Consultants Date: 23.08.2024

Drawn: LW

Scale: 1:90,000

File: J24091_Boulder_Creek_Wind_Farm_Figure_2-2_23Aug24.pdf

Bushfire management plan
Boulder Creek Wind Farm
Westwood

Title:

Bushfire prone area map

Figure

2.2

LEGEND

- Cadastral boundary
- Project area
- Wind turbine generators – Stage 1
- Wind turbine generators – Stage 2
- Disturbance footprint – Stage 1
- Disturbance footprint – Stage 2
- Proposed offset area
- Construction compound
- Operations and maintenance
- Batch plant
- Laydown area
- Switching yard
- Substation
- BESS
- Contours (10 m)

Queensland State Planning Policy

Bushfire prone area map

- Very high potential bushfire intensity
- High potential bushfire intensity
- Medium potential bushfire intensity
- Potential impact buffer

Aerial image: Esri World Imagery

Scale: 1 : 90,000

0 1 2 3 km

3 Bushfire hazard assessment

This chapter provides details about the desktop review, field inspection and bushfire hazard assessment of land adjacent to above ground infrastructure.

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 69. An FFDI value of 69 has been used for the potential bushfire intensity calculations discussed in Section 3.4 and the radiant heat exposure assessment discussed in Section 3.6.

For the radiant heat exposure assessment of grassfire attack, the FFDI value of 69 has been converted to a grassfire danger index (**GFDI**) value of 99, based on the GFDI values in Table B1 of AS 3959-2018.

3.2 Fire history

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

3.3 Field inspection

A field inspection of the Project area was performed by LEC from 3-7 August 2024. Observations were recorded about current land use and management, vegetation characteristics, the slope of land and evidence of previous fires.

A summary of site observations made at the above ground infrastructure areas shown in Figure 2.1 is provided in Appendix 1. The characteristics of vegetation and topography adjacent to the above ground infrastructure areas are shown by the photographs in Appendix 2.

Where above ground infrastructure adjoined two VHCs, the VHC associated with the worst case bushfire attack scenario was used to assess potential bushfire intensity and radiant heat exposure at the above ground infrastructure area.

3.4 Potential bushfire intensity calculations

The potential bushfire intensity of above ground infrastructure areas 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 the BRC guide.

The BRC guide defines bushfire hazard classes as follows:

- very high – potential bushfire intensity > 40,000 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 above ground infrastructure areas shown in Figure 2.1 are presented in Appendix 3.

3.5 Bushfire hazard areas

Results of the potential bushfire intensity calculations in Appendix 3 generally align with the Bushfire prone area map for the Project area and confirm the Project is within a combination of medium, high and very high potential bushfire intensity areas and grassfire prone areas. These results confirm the requirement for compliance with the Bushfire overlay code.

3.6 Radiant heat exposure assessment

The Bushfire overlay code and the BRC guide require above ground infrastructure to be setback from hazardous vegetation by a distance which achieves a radiant heat flux level $\leq 29 \text{ kW/m}^2$ at the above ground infrastructure. The exception is where the above ground infrastructure is associated with community infrastructure for essential services or hazardous materials in the context of bushfire hazard, ie the substation, switching yard and BESS, which must be setback from hazardous vegetation by a distance which achieves a radiant heat flux level $\leq 10 \text{ kW/m}^2$ at the above ground infrastructure. These setbacks are referred to in this BMP as asset protection zones (APZs).

For temporary construction facilities, ie construction compound, laydown areas and concrete batching plant, and wind monitoring masts, this BMP applies an alternative solution to the Bushfire overlay code and the BRC guide and recommends an APZ with a nominal cleared width of 10 m.

The purpose of an APZ is to minimise the impact of bushfire attack on above ground infrastructure and to provide emergency services with access and an operational space for fire-fighting, maintenance works and bushfire fuel hazard reduction activities.

The radiant heat profile of bushfire attack on the location of the WTGs, substation, switching yard, BESS, and O&M facility shown in Figure 2.1 was analysed 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 desktop review and field inspection. Inputs used to assess the radiant heat profile of each bushfire attack scenario and results of the BAL calculator are provided in Appendix 4.

APZs were identified for the WTGs, substation, switching yard, BESS, and O&M facility based on results of the radiant heat exposure assessment and compliance with the radiant heat exposure outcomes of the Bushfire overlay code. The recommended APZs for above ground infrastructure are summarised in Table 3.1.

Table 3.1 Recommended APZs for above ground infrastructure

Recommended width of APZ around above ground infrastructure (m) ^{1,2}							
10	15	20	25	30	35	45	55
Stage one							
WTG 24, WTG 59, Batching plant near WTG 3, Laydown area 1 near WTG 3, laydown area 2 near WTG 15, construction	WTG 21, WTG 27, WTG 57, O&M facility near WTG 3	WTG 1, WTG 2, WTG 4, WTG 5, WTG 6, WTG 7, WTG 8, WTG 9, WTG 10, WTG 11, WTG 15, WTG 16,	WTG 12, WTG 13, WTG 18, WTG 23, WTG 25, WTG 34	WTG 32	WTG 3, WTG 14, WTG 17, WTG 56, WTG 58, WTG 61, WTG 62, Substation near WTG 3	Switching yard near WTG 41 (30 m on the north and west elevations)	WTG 54 ³

Recommended width of APZ around above ground infrastructure (m) ^{1,2}							
10	15	20	25	30	35	45	55
compound near WTG 54		WTG 19, WTG 20, WTG 22, WTG 33, WTG 55, WTG 60					
Stage two							
Construction compound near WTG 53	WTG 48, WTG 49, WTG 52, WTG 53	WTG 29, WTG 31, WTG 35, WTG 38, WTG 45, WTG 47, WTG 50	WTG 36, WTG 37, WTG 40, WTG 46, WTG 51	-	WTG 30, WTG 42	WTG 28, WTG 41, WTG 44, BESS near WTG 41	-
Note	1 The locations of above ground infrastructure are shown in Figure 2.1. 2 APZs may be refined and potentially reduced through detailed design and micro-siting. 3 A 55 m wide APZ is required on the southern and western elevations of WTG 54. The APZ on the northern and eastern elevations of WTG 54 can be reduced to 35 m due to reduced effective slope of potential fire runs on these elevations.						

Access tracks, retaining walls, embankment batters, fences, walkways and OHTLs do not require APZs. Notwithstanding, OHTLs will be located within a vegetation clearing which is designed to be relevant to electricity transmission and distribution networks in Queensland.

APZs are measured from the infrastructure within the substation, switching yard and BESS, the WTG towers and buildings, structures and storage areas at the O&M facility.

4 Bushfire hazards associated with the Project area and 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 August, peaks in September and will begin to fall when consistent summer rainfall occurs. 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 69, 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 areas of grassland or bushland 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 the construction and operation phases of the Project.

4.2 Fire history

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

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

4.3 Mount Morgan township

Consultation with the Rockhampton QFD during the preparation of the BMP identified that bushfire management is a particular concern for the Mount Morgan township. Activities associated with the construction and operation phases of the Project must be mindful of the Mount Morgan township from a bushfire perspective.

4.4 Vegetation

The disturbance footprint of the Project will be cleared of vegetation in preparation for civil works.

APZs will be established around above ground infrastructure as specified in Table 3.1 and will be maintained for the life of the Project.

APZs will be either hardstand areas which are maintained free of weed and grass cover or grass areas which are maintained at a nominal height of < 30 centimetres (**cm**).

4.5 Bushfire management within the Project area

Pursuant to the Queensland *Fire Services Act 1990* (**FS Act**) Boulder Creek Wind Farm Pty Ltd (**BCWF**) and the construction contractor or operation contractor are the 'Occupiers' of the project disturbance footprint within the Project area, ie the area that is within the scope of the Project's development

permit. They are responsible for bushfire management within the project disturbance footprint, ie implementation of the mitigation measures in Chapter 6 of this BMP.

Pursuant to the FS Act, landowners hosting the Project are the 'Owners' of the balance of the Project area, ie the part of the Project area that is outside of the project disturbance footprint, and are responsible for managing bushfire hazards within the balance of the Project area in general accordance with the guidance provided by the QFD at <https://www.fire.qld.gov.au/prepare/bushfire/prepare-for-bushfire-season>.

Notwithstanding, bushfire management is a landscape issue and there will be benefits for both the Project and landowners if they work collaboratively to manage bushfire hazards within the Project area.

Bushfire management within the proposed offset area will focus on achieving conservation objectives and will be covered by a separate bushfire management plan.

4.6 Bushfire attack and the protection of above ground infrastructure

A bushfire through native vegetation or grasslands on steep slopes where there is limited vehicle access 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 native vegetation could result in a potential fireline intensity of up to 57,155 kW/m. Direct attack of a bushfire with this potential fireline intensity will not be possible. Therefore, there will be a strong reliance on APZs around above ground infrastructure for bushfire protection.

4.7 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 250-300 over a 36 month construction period and will be reduced to approximately 15-20 full time equivalent roles during the operation phase.

Workers will not be accommodated within the Project area during the construction or operation phases of the Project. It is anticipated that workers will be accommodated in local accommodation including Mount Morgan and Westwood, as well as other nearby towns.

4.8 Hazardous chemicals

Storage or handling of hazardous chemicals during the construction and operation 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.

4.9 Access

The Project will establish an access track network that will link the Project infrastructure to existing roads. Access tracks will be designed for heavy articulated vehicles and will meet the design standards for emergency vehicle access in the Bushfire overlay code including (where required) the provision of turnaround areas within 150 m of the end of dead-end access tracks. If there are gates across access tracks, they will be at least 4 m wide.

In addition to the Project's access track network, there are numerous property access tracks which are of varying design and maintenance standards and may require restoration prior to use for bushfire

management operations. Property access tracks are outside the scope of the Project's development permit.

Access to the Project's infrastructure will be from the east via Mount Morgan and Boulder Creek Road and from the west via Westwood and Flaggy Creek Road. During stage one of the Project, most of the Project's infrastructure will be accessed from the west via Flaggy Creek Road with only the switching yard being accessed from the east via Boulder Creek Road.

Alternate emergency access to the Project's infrastructure will be possible from the east via Oakey Creek Road and from the west via Bushley Road and Sandy Creek Road. These alternative emergency access routes involve property access tracks which are outside the scope of the Project's development permit.

4.10 Rural Fire Brigade resources and capability

The local Rural Fire Brigades (**RFBs**) are voluntary primary producer brigades that 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 substation, switching yard or BESS, 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 tracks, water points, terrain, etc.

4.11 Aerial fire-fighting operations

The WTGs and wind monitoring stations pose a navigation risk to pilots performing aerial fire-fighting operations.

Mitigation measures in the aviation impact assessment (AP 2024) will be implemented for the Project.

4.12 Fire-fighter water supply

The construction and operation phases of the Project will have access to water supplies which are suitable for fire-fighting.

There are numerous dams 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.

Please note, the fire-fighter water supply recommended in this BMP is separate to any requirement for hydrants or static fire water storage specified in the *National Construction Code – Building Code of Australia* (ABCB 2022) (**NCC-BCA**) and *Queensland Development Code* (QG 2021) (**QDC**).

4.13 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 operation workforce will be subject to advice and warnings by Queensland emergency services via radio, online media and local community safety announcements.

An emergency management plan and evacuation plan will be prepared for the construction and operation phases 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.

For compliance with condition 13 of the development permit, a safety and emergency management plan (Aula 2024) has been prepared for the construction of stage one of the Project.

4.14 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 within the substation, switching yard, BESS and O&M facility will be designed to meet the fire resistance and safe access and egress requirements of the NCC-BCA and QDC.

Fire detection and first attack fire-fighting equipment in buildings and structures will comply with requirements of the NCC-BCA and QDC.

5 Fire ignition risks

This chapter identifies fire ignition risks associated with the Project area and Project.

5.1 Land use

The boundaries of the Project area mostly adjoin farming land which have large continuous areas of bushfire fuel and grassfire fuel.

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 a potential bushfire hazard to the Project.

5.2 Transmission lines

Fires with a flame height > 1 m adjacent to or under the existing Powerlink high voltage OHTL have 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 Powerlink high voltage OHTL will continue to be maintained in accordance with Powerlink's vegetation management specifications for high voltage OHTLs (Powerlink 2018).

Wind turbines will be connected to the substation by 33 kV OHTLs and underground transmission lines. The risk of a fire ignition caused by the 33 kV OHTLs is minor when compared to the risk profile that exists for Powerlink's high voltage OHTL. Nonetheless, vegetation management under 33 kV OHTLs will be in accordance with *Energy Queensland – Vegetation Management Strategy – Version 2* (EQ 2023).

5.3 Lightning strike

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

The Australasian Fire and Emergency Service Authorities Council Limited suggests that it is possible that WTGs may reduce the risk of bushfires caused by lightning strikes, given that WTGs can attract lightning during thunderstorms. If struck by lightning, a WTG is not expected to start a fire as it has built-in fire protection mechanisms (AFAC 2018).

5.4 Mechanical or electrical fire

There is potential for a fire of electrical or mechanical origin to develop in WTGs, transformer kiosks, substation, switching yard or BESS, and result in bushfire or grassfire within the Project area. However, this situation is unlikely to occur given this infrastructure will have built-in fire protection mechanisms, will be located on cleared land, and will be surrounded by an APZ where vegetation is managed.

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 Operation activities

Similar risks may exist during the operation 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 formed access tracks, meaning vehicle and mobile plant movement off formed access tracks will rarely occur.

6 Bushfire mitigation plan

This chapter identifies bushfire mitigation measures that must be implemented during the construction and operation 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 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 Asset protection zones

The APZs shown in Figures 6.1-6.3 must be established and maintained around above ground buildings and structures.

The width of APZs must comply with the minimum widths specified for above ground infrastructure in Table 3.1.

APZs are not required for access tracks, retaining walls, embankment batters, fences, walkways and OHTLs.

APZs are measured from the development footprint of buildings and structures within the substation, switching yard and BESS, the WTG towers and buildings, structures and storage areas within the O&M facility.

APZs must be cleared of woody understorey vegetation and should be established as a gravel hardstand area or grass area. If a gravel hardstand area is established, it must be maintained free of weeds and grass cover. Where establishing a gravel hardstand area is not practical, a grass area must be established. A grass area must be maintained free of woody vegetation and with grass cover which has a height of ≤ 30 cm.

Tree clearing is not mandatory where the required APZ can be met through existing short grass, and management of understory vegetation, which must be managed and maintained free of woody vegetation and to a height ≤ 30 cm.

APZs must be inspected at regular times intervals during the calendar year and maintained in accordance with the specifications above.

6.2 Surface under certain types of infrastructure

The substation, switching yard, BESS and O&M facility must be located on a mineral earth ground surface which is maintained free of vegetation, ie weeds, woody regrowth and grass.

6.3 Overhead transmission lines

High voltage OHTLs must be located, where practical, within an appropriately designed vegetation management area in accordance with Powerlink's vegetation management specifications for high voltage transmission lines (Powerlink 2018) which is illustrated in Figure 6.4 and summarised as follows:

- The area within up to 30 m of the conductor's centre line (up to 60 m where practical) is to be cleared or selectively cleared of vegetation that could grow to a height > 3.5 m.
- Specimens of *Cycas megacarpa* which are < 3.5 m in height can be retained within this area unless they are located within 6 m of the conductor shadow area.

- The area within 6 m of the conductor shadow area is to be an intensive vegetation management area – one of the 6 m wide areas is to be maintained clear of vegetation and debris for vehicle access and the other is to be maintained with vegetation at a maximum height ≤ 1 m.
- Trees adjacent to the vegetation management area are to be selectively cleared based on the Powerlink's hazardous tree assessment objectives referenced in Figure 6.4.

Lower voltage 33 kV OHTLs which connect WTGs to the substation must be located underground or within a vegetation management area in accordance with Energy Queensland's vegetation management specifications for rural area corridors (EQ 2022) which is illustrated in Figure 6.5 and summarised as follows:

- The area within 6 m of the centreline is to be selectively cleared of vegetation to form a clearance zone.
- Specimens of *Cycas megacarpa* can be retained within the clearance zone where a minimum vertical height clearance of 4 m to the conductor is achieved.
- Vegetation overhanging the conductor is to be removed.
- Trees identified with defects immediately adjacent to the clearance zone are to be removed.
- Where the transmission lines are located within a previously established enlarged clearing width this cleared width will be maintained.

Note: Full compliance with Powerlink's vegetation management specifications for high voltage OHTLs (Powerlink 2018) or Energy Queensland's vegetation management specifications for rural area corridors (EQ 2022) may not be required or practical. For example, where the conductor is suspended across a valley, and it can be demonstrated that there will be an appropriate distance of separation between the conductor and the canopy of vegetation in the valley or where topography restricts the safe use of plant and equipment required to establish and maintain the vegetation management area.

6.4 Cable pits

A 1 m wide area around cable pits must be cleared of vegetation and maintained free of vegetation always.

6.5 Cleared vegetation

Vegetation cleared from the disturbance footprint must not be stockpiled or wind rowed along the edge of the disturbance footprint.

Cleared vegetation can be mulched and used in rehabilitation works or stockpiled in a cleared location within the Project area where it can be beneficially used.

6.6 Access and evacuation

The primary access and evacuation routes for the construction and operation phases of the Project are from the east via Mount Morgan and Boulder Creek Road and from the west via Westwood and Flaggy Creek Road.

During stage one of the Project, most of the Project's infrastructure will be accessed from the west via Flaggy Creek Road with only the switching yard being accessed from the east via Boulder Creek Road.

These access and evacuation routes and the access track network that will be constructed for access to the Project's infrastructure are shown in Figures 6.1-6.2.

Alternate emergency access to the Project's infrastructure from the east via Oakey Creek Road and from the west via Bushley Road and Sandy Creek Road is also shown in Figures 6.1-6.2. Use of alternative emergency access routes must be contingent upon landowner permission and the availability of an escort with local knowledge.

As a minimum requirement, access tracks 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 track 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 track 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 tracks and the inner radius of the intersection being at least 6 m; or
 - a track intersection.

A category 1 fire vehicle in New South Wales correlates with the heavy attack fire vehicle category in Queensland.

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 track, signage must be provided at the access to the track which identifies the distance to the next turnaround area.

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

Access tracks 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, ie prior to the end of August.

6.7 Fire-fighter water supply

At the earliest possible stage of the construction phase, fire-fighter water storage tanks must be installed at the O&M facility and switching yard (outside of the switching yard compound) as indicatively shown in Figures 6.1-6.2. They must be made of metal or concrete, have a nominal minimum capacity of 40,000 litres (l) 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 area must have the load bearing capacity and dimensions suitable for a heavy attack fire-fighter vehicle as specified in Section 6.6.

As stated in Section 4.12, recommendations in this section are separate to any requirements for hydrants and static water storage specified under the NCC-BCA and QDC.

6.8 Wayfinding

Reflective wayfinding signage must be installed at the intersection of access tracks and identify the location of project infrastructure and fire-fighter water supplies.

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 and marked on any site mapping.

Access track marking must clearly indicate dead-end access tracks.

Wayfinding signage must be installed progressively during the construction phase of the Project.

6.9 Buildings and structures

Buildings and structures within the substation, switching yard, BESS and O&M facility must be designed to meet the fire resistance and safe access and egress requirements of the NCC-BCA and QDC.

Fire detection and first attack fire-fighting equipment in buildings and structures must comply with requirements of the NCC-BCA and QDC.

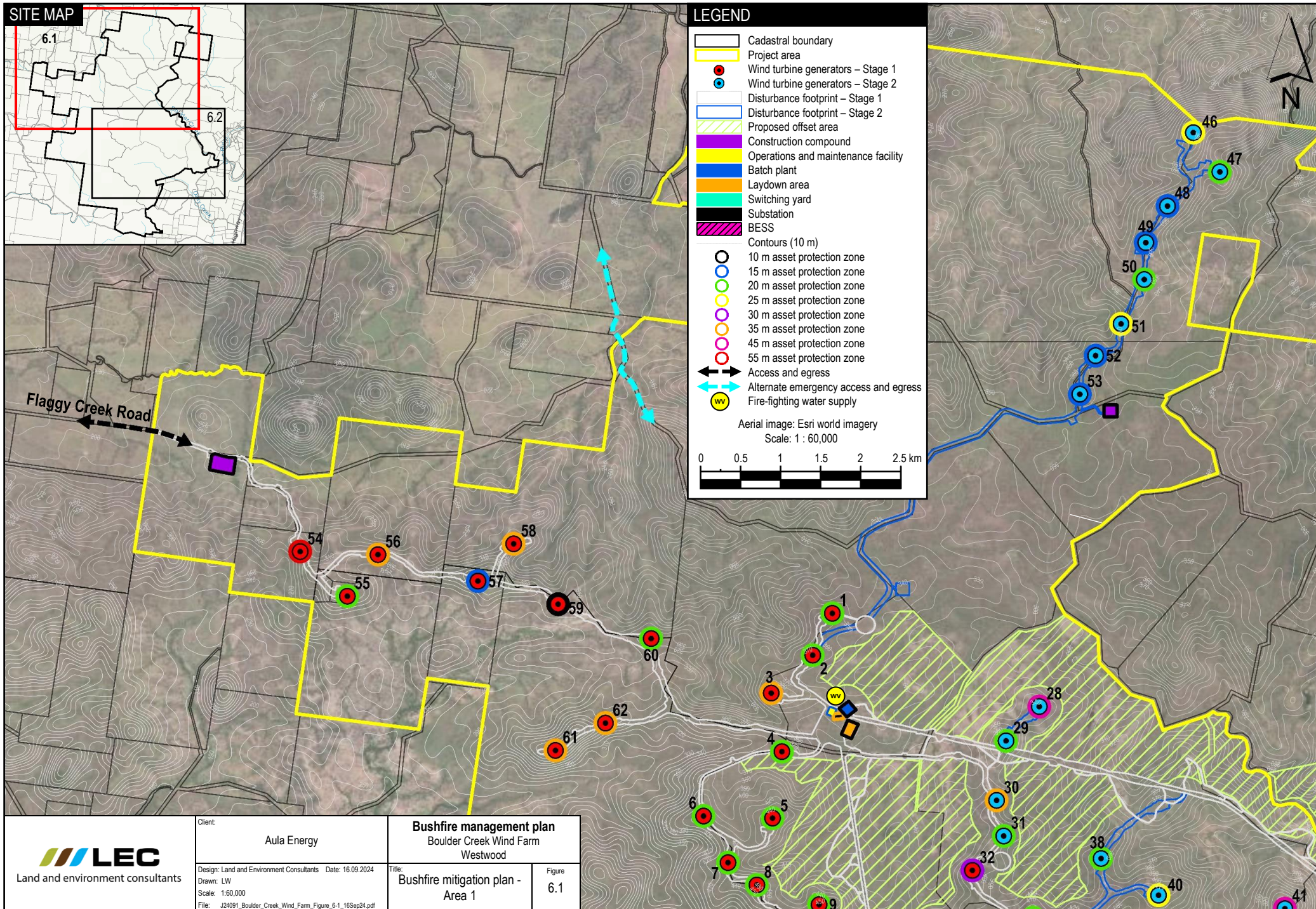
These matters will be dealt with in detail through the building certification and approvals process.

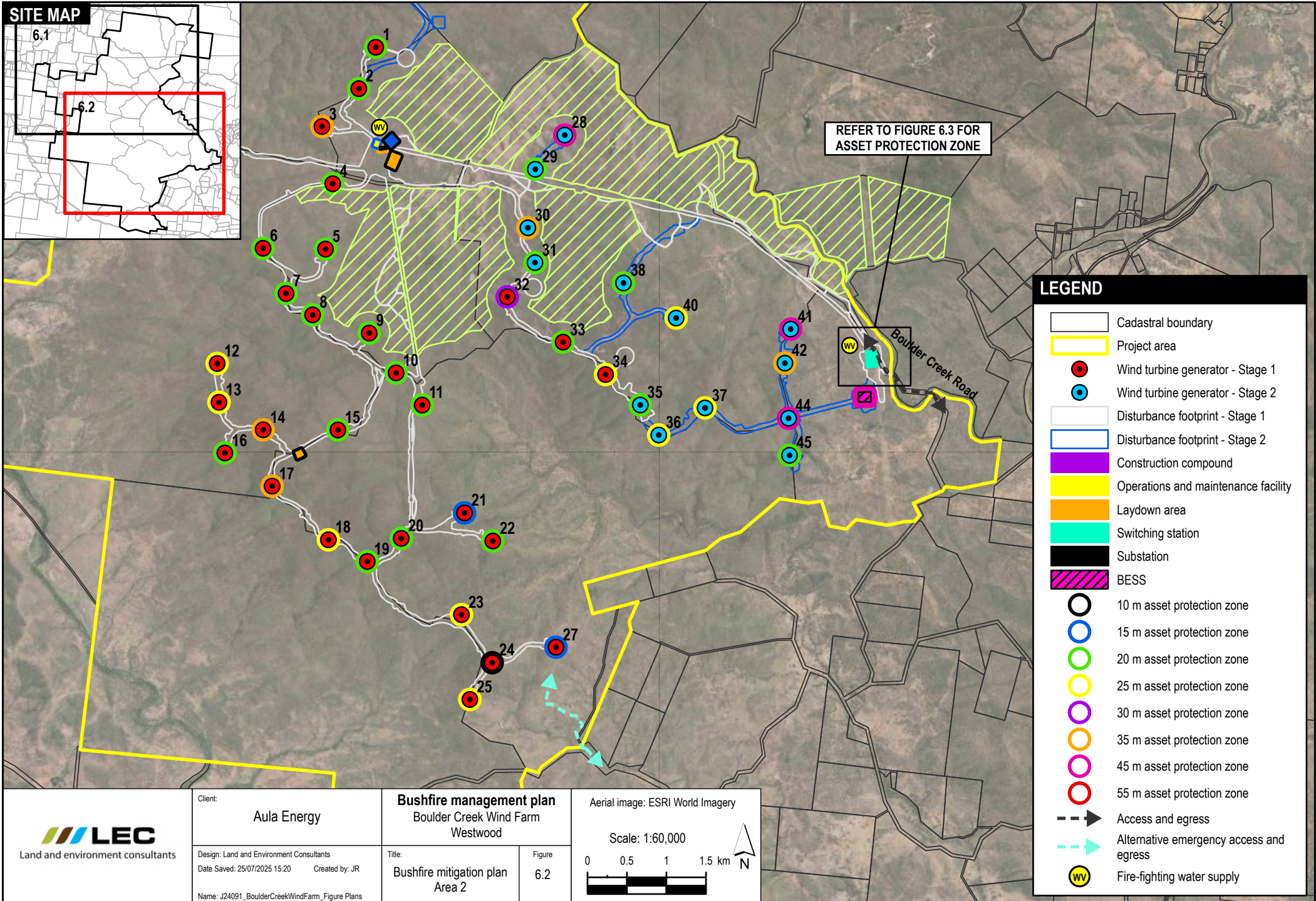
6.10 Wind monitoring masts

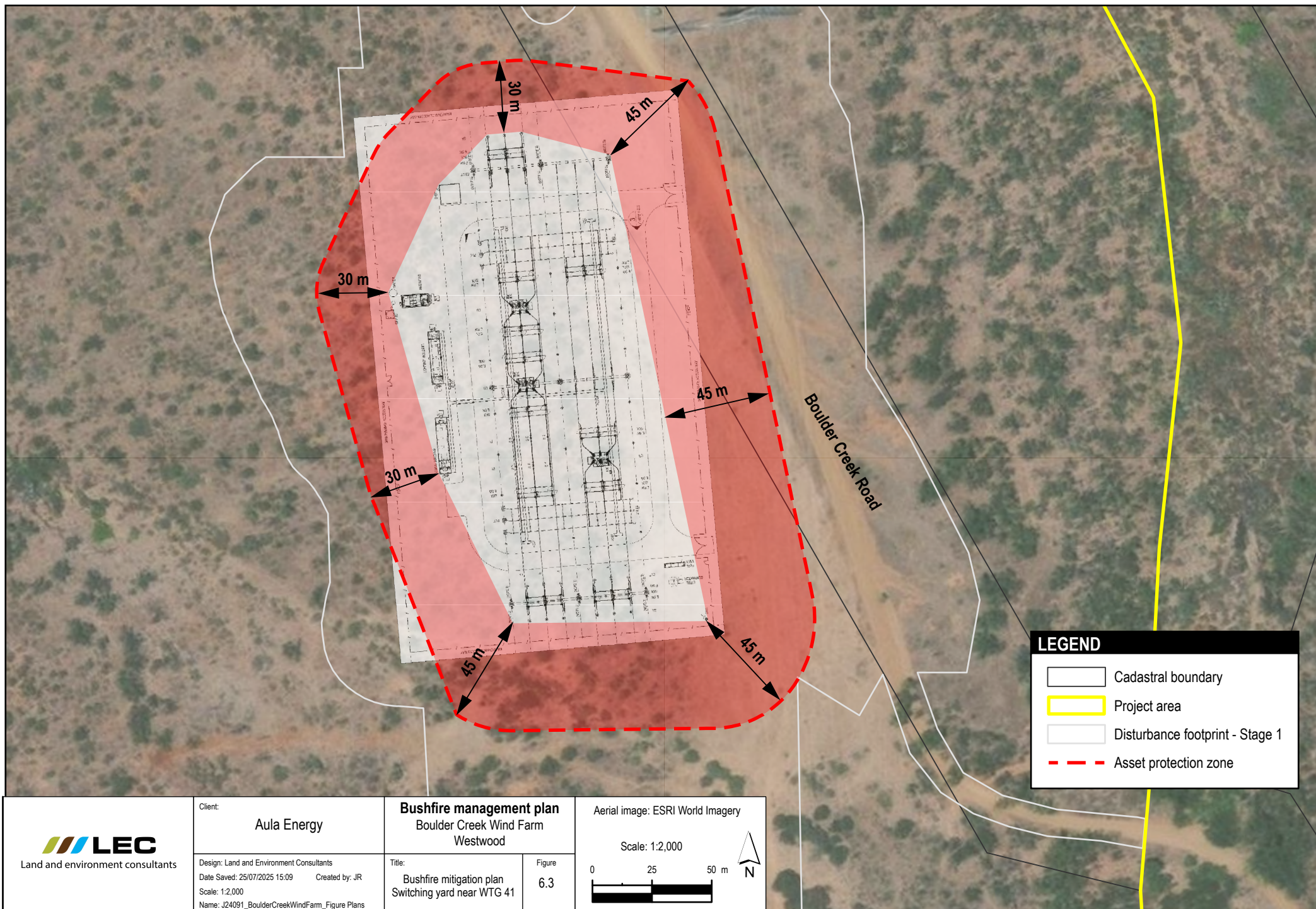
Wind monitoring masts are a potential hazard for aerial fire-fighter operations. Mitigation measures in the aviation impact assessment (AP 2024) must be implemented.

6.11 Proposed offset area

A separate bushfire management plan must be prepared for the proposed offset area.







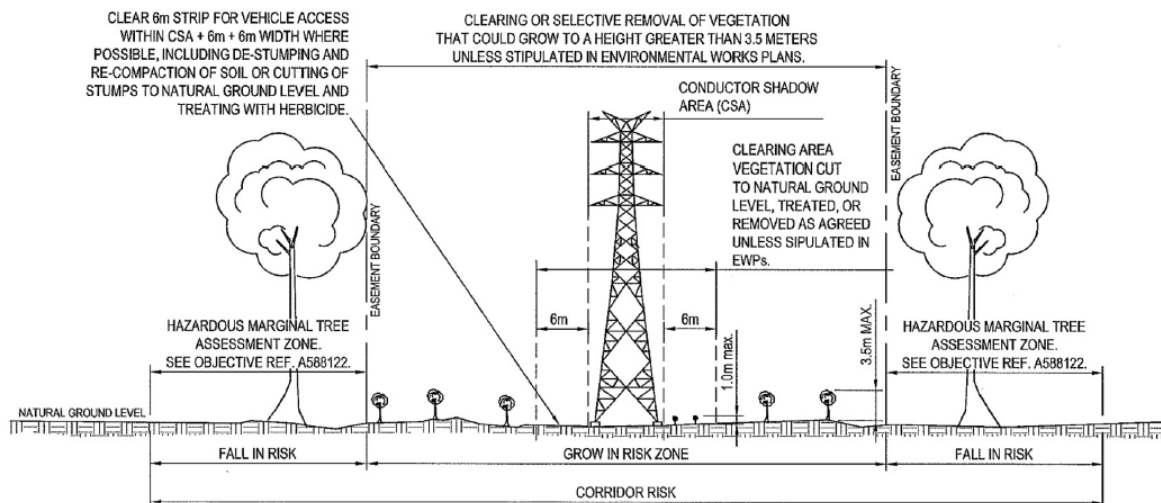


Figure 6.4 Powerlink vegetation management specifications for high voltage OHTLs

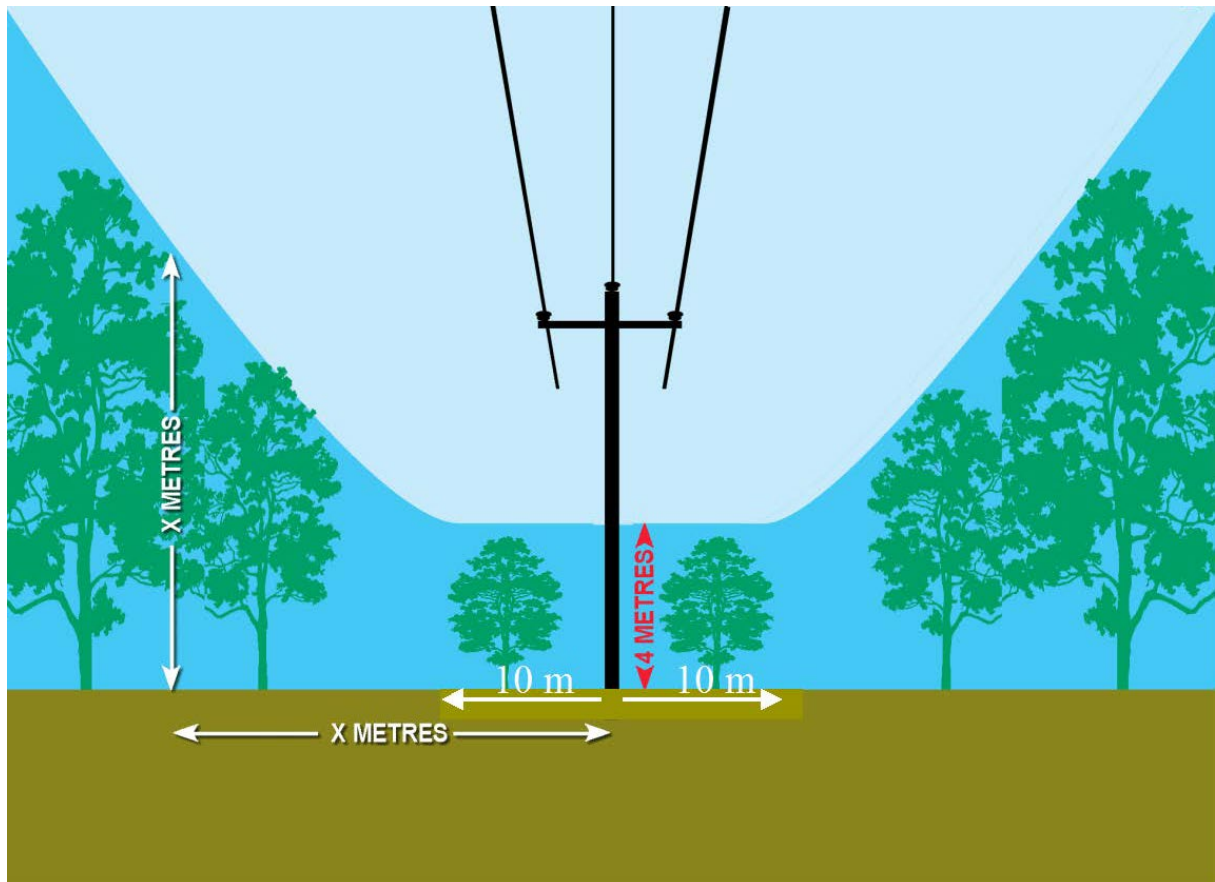


Figure 6.5 Energy Queensland vegetation management specification for 33 kV OHTLs

6.12 Construction phase

The mitigation measures in this section are relevant to the construction phase and are the responsibility of construction contractor.

6.12.1 Project rules and inductions

Access to the Project area must be conditional based on the requirement for site personnel and visitors to complete an induction and comply with entry rules, including rules regarding smoking.

Smoking must only be permitted in cleared areas.

6.12.2 Staging of construction works

The fire-fighter water supply, APZs and access tracks must be installed at the earliest possible stage of construction.

6.12.3 Fire-fighter water supply

A temporary fire-fighter water storage tank, with a nominal minimum capacity of 40,000 l, must be installed at the construction compound and remain in place until the fire-fighter water storage tank at the O&M facility is tested and commissioned.

A separate temporary fire-fighter water storage tank, with a nominal minimum capacity of 40,000 l, must be installed at the switching yard and remain in place until the fire-fighter water storage tank at the switching yard is tested and commissioned.

Specifications for RFB fire-fighter fittings and vehicles access to the water supply outlet are provided in Section 6.7.

Water carts/water tankers must be on-site and available at all times during the construction phase.

6.12.4 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.

6.12.5 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 annual updates to the local QFD and RFBs and neighbouring landowners as the Project is progressively built (timing should be prior to the commencement of the annual fire danger season).

6.12.6 Restrictions during the fire danger season

QFD restrictions during the fire danger season must be adhered to. These are advertised online at <https://www.fire.qld.gov.au/safety-education/using-fire-outdoors/fire-bans-and-restrictions> or can be obtained from the Rockhampton area office by calling (07) 4932 8129.

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

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

6.12.7 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.

6.12.8 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.

6.12.9 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.

6.12.10 Emergency management plan and evacuation plan

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

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

1. Contact the QFD 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 QFD and provide information relevant to the fire emergency.
5. Resume activities when advised by the QFD that it is safe to do so.

6.13 Operation phase

The mitigation measures in this section are relevant to the operation phase and are the responsibility of operation contractor.

6.13.1 Project rules and inductions

Access to the Project area must be conditional based on the requirement for site personnel and visitors to complete an induction and comply with entry rules, including rules regarding smoking.

Smoking must only be permitted in cleared areas.

6.13.2 Information transfer

Prior to commencing the operation phase of the Project, spatial data which identifies the location of infrastructure, access tracks, gates and fire-fighter water supply facilities must be provided to the QFD so that it can be uploaded into the QFD online incident management system and be readily available for bushfire emergency planning.

The operation contractor must consult with the QFD to determine the information and data format requirements and specifics about the data transfer.

6.13.3 Fire-fighter operations plan

Prior to commencing the operation 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, access tracks, gates, fire-fighter water supply facilities and reference wayfinding signage. It must also include contact and communications information, instructions for operating around electrical infrastructure and operational guidelines for fire control.

6.13.4 Communications equipment and communications planning

The O&M facility, vehicles and mobile plant must be fitted with a UHF radio.

The operation contractor must ensure the specifications for communications planning in 6.12.5 are in place by the time the operation of the Project commences.

6.13.5 Bushfire preparedness activities

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 quarterly site-wide bushfire preparedness inspections of the APZs, access tracks, fire-fighter water supply, signage and building fire protection systems;
- maintain the APZs, access tracks, fire-fighter water supply, signage and building fire protection systems in accordance with the relevant sections of this BMP;
- facilitate an annual bushfire preparedness meeting with the local QFD, RFBs and neighbouring landowners; and
- review emergency management plans annually.

In addition to the schedule above, the access track network should be inspected and repaired after above average rainfall events.

The operation contractor must invite the local QFD, 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 access tracks, gates and fire-fighter water supply facilities and fittings, communication procedures and safety requirements for operating within the Project area. It provides 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 QFD and RFBs.

Fire danger period

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

- monitor the QFD FDRs for the Capricornia region four days in advance at <https://www.fire.qld.gov.au/prepare/bushfire/fire-danger-ratings>;
- modify site activities based on elevated FDRs, ie high, extreme and catastrophic;
- conduct weekly inspections of APZs, access tracks, fire-fighter water supply facilities, 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 activities must be advised by a 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.

6.13.6 Safety documentation

Activities during the operation phase of the Project must be governed by safety documentation as specified for the construction phase in Section 6.12.8.

6.13.7 Training

The onsite operation workforce must be trained to Queensland fire-fighter minimum skills or equivalent certificate II in public safety (fire-fighter operation).

6.13.8 Overhead transmission lines

Fire-fighter operations near OHTLs must be planned and implemented in accordance with the *National Guidelines on Electrical Safety for Emergency Service Personnel* (ENA DOC 008-2006).

6.13.9 Emergency management plan and evacuation plan

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

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

The procedure outlined in Section 6.12.10 must be followed in the event of a fire ignition that cannot be safely extinguished with available resources.

6.13.10 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 operation 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.

6.13.11 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.

6.13.12 Braking or pitching wind turbine rotors

Wind turbine rotors must be braked or pitched to minimise movement if advised by the QFD that aerial fire-fighting operations are to be undertaken within the properties hosting the Project.

Protocols for the operation phase of the Project must be explicit about what party has the authority to brake or pitch wind turbine rotors during a bushfire emergency.

6.13.13 Lighting fires

Lighting fires to burn waste is prohibited within the disturbance footprint of the Project.

Prescribed burns are permitted within the Project area subject to compliance with the Queensland *Fire and Emergency Services Act 1990*.

6.14 Boulder Creek Wind Farm Pty Ltd

The mitigation measures in this section are relevant to both the construction and operation phase of the project and are the responsibility of BCWF.

6.14.1 Liaison with management agencies

BCWF must maintain communication with the Rockhampton Regional Council and Banana Shire Council local disaster management group(s) about the expected commencement, duration and severity of the annual fire danger season and bushfire mitigation strategies for the Project. This recommendation may include maintaining a representative position on the local disaster management group(s).

BCWF must maintain communication with emergency response agencies, ie the Queensland Police Service, Queensland Ambulance Service, State Emergency Service, QFD, Rural Fire Service Queensland (RFSQ) and local RFBs about bushfire season preparedness activities, bushfire ignition detection, bushfire emergency response and incident command and control.

Liaison with management agencies outlined in this section must be coordinated with construction phase communication specified in Section 6.12.5 and operation phase communication specified in Sections 6.13.2, 6.13.5 and 6.13.9.

6.14.2 Investigation of fires

BCWF must provide access to the project disturbance footprint, records and personnel to assist relevant authorities with the investigation of fires originating from within the project disturbance footprint.

6.14.3 Public awareness programs

BCWF must seek to raise community awareness about the Project's commitment to bushfire planning, preparedness and response.

This mitigation measure includes seeking to have a presence at the local area fire management group (**FMG**) at Mount Morgan.

6.14.4 Local area fire management group

BCWF must investigate the opportunity to establish a project-specific local area FMG which can focus on strategies that are specific to bushfire (and fire) hazards and risks associated with a renewable energy project.

6.14.5 Plan available for inspection

BCWF must make available on the BCWF website and to local stakeholders the latest approved version of this BMP.

6.14.6 Standards for renewable energy projects

With respect to bushfire and fire management, BCWF must seek to adopt any new industry standards for renewable energy projects by the QFD, RFSQ and the Australasian Fire and Emergency Service Authorities Council Limited.

7 Closing

This BMP has been prepared for compliance with condition 12(a) of the development permit as it relates to the Project. It has been prepared by a suitably qualified person and is in general accordance with the requirements of the SPP guidance material -bushfire and the BRC guide.

The bushfire hazard assessment confirmed the Project area is a bushfire hazard area, and the construction and operation phases of the Project are subject to compliance with the Bushfire overlay code. An assessment of compliance with the Bushfire overlay code is provided in Appendix 5.

Mitigation measures that must be implemented during the construction and operation phases of the Project are specified in Chapter 6.

Upon appointment, the construction contractor and the operation 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. This does not permit the construction contractor or operation contractor to change or deviate from the mitigation measures specified in Chapter 6.

There is an opportunity for refining the APZs specified in Chapter 6 through detailed design and micro-siting of the Project's infrastructure.

Compliance with condition 12(a) of the development permit requires the BMP to be prepared in consultation with the QFD. The Bushfire Resilient Communities unit (**BRC**) of the Rural Fire Service Queensland (**RFSQ**) and the Rockhampton Area Office of the QFD have been engaged during the preparation of this BMP. A record of this consultation will be provided separate to the BMP.

Compliance with condition 12(b) requires the final version of the BMP to be submitted to

- Department of State Development, Infrastructure, Local Government and Planning (windfarms@dsdilgp.qld.gov.au)
- Banana Shire Council (enquiries@banana.qld.gov.au)
- Rockhampton Regional Council (enquiries@rrc.qld.gov.au)
- Queensland Fire and Emergency Service (now the QFES.SWREA@qfes.qld.gov.au).

During consultation, the BRC-RFSQ advised the BMP should also be submitted to the RFSQ Central Region and the Rockhampton Regional Council and Banana Shire Council local disaster management group(s). The RFSQ Central Region contact is:

The Office of the Deputy Chief Officer – Central Region
Rural Fire Service Queensland
Regional Headquarters
98 Lennox Street
Maryborough Queensland 4650
CR.DCO.RFSQ@fire.qld.gov.au

Compliance with condition 12(c) requires that the Project to be constructed and operated in accordance with the final version of the BMP.

References

- Aula Energy (Aula) 2024, *Safety and Emergency Management Plan – Boulder Creek Wind Farm*, 19 August 2024.
- Australian Building Codes Board (ABCB) 2022, *National Construction Code Series, Building Code of Australia*, Australian Government and States and Territories of Australia, adopted 1 May 2023
- Australasian Fire and Emergency Service Authorities Council Limited (AFAC) 2018, *Wind Farms and Bushfire Operations – Guideline*, Version 3.0, Doctrine identification 2053, 25 October 2018
- Aviation Projects (AP) 2024, *Boulder Creek Wind Farm - Lighting Risk Assessment*, February 2024
- Country Fire Authority (CFA) 2023, *Design Guidelines and Model Requirements – Renewable Energy Facilities*, Version 4, August 2023
- 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*, published by Standards Australia, sixth edition 2006
- Energy Queensland (EQ) 2022, *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 March 2023
- 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-GDLA588593, Version 6.0, 27 June 2018
- Queensland Department of Resources (DR) 2024, *Queensland Globe*, accessed online at <https://qldglobe.information.qld.gov.au/>, July 2024
- Queensland Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) 2024, *State Planning Policy Interactive Mapping System*, accessed online at <https://spp.dsdip.esriaustraliaonline.com.au/geoviewer/map/planmaking>, July 2024
- 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, July 2024

Queensland Government (QG) 2021, *Queensland Development Code*, accessed online at <https://www.business.qld.gov.au/industries/building-property-development/building-construction/laws-codes-standards/queensland-development-code>, last updated March 2021

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*, Amd 2: June 2018

Appendix 1 Summary of site observations

Summary of site observations at infrastructure areas

Infrastructure	Catalyst vegetation hazard class (VHC)	Ground-truthed VHC	Notes
Stage one			
<i>Wind turbine generator (WTG)</i>			
1	VHC 13.2 <i>Dry to moist eucalypt woodlands on undulating metamorphics and granite (VHC 13.2)</i>	VHC 13.2	Continuous woodland on 8° slope
2	VHC 13.2	VHC 13.2	Continuous woodland on 6° slope
3	VHC 13.2	VHC 13.2	Continuous woodland on 18° slope
4	VHC 40.4 <i>Continuous low grass or tree cover (VHC 40.4)</i>	VHC 13.2	Continuous woodland regrowth on 6° slope
5	VHC 13.2	VHC 13.2	Continuous woodland on 8° slope
6	VHC 13.2	VHC 13.2	Continuous woodland on 8° slope
7	VHC 13.2	VHC 13.2	Continuous woodland on 8° slope
8	VHC 13.2	VHC 13.2	Continuous woodland on 8° slope
9	VHC 13.2	VHC 13.2	Continuous woodland on 8° slope
10	VHC 13.2	VHC 13.2	Continuous woodland on 7° slope
11	VHC 13.2	VHC 13.2	Continuous woodland on 8° slope
12	VHC 13.2	VHC 13.2	Continuous woodland on 15° slope
13	VHC 13.2	VHC 13.2	Continuous woodland on 13° slope
14	VHC 13.2	VHC 13.2	Continuous woodland on 16° slope
15	VHC 13.2	VHC 13.2	Continuous woodland on 8° slope
16	VHC 13.2	VHC 13.2	Continuous woodland on 10° slope
17	VHC 13.2	VHC 13.2	Continuous woodland on 16° slope
18	VHC 13.2	VHC 13.2	Continuous woodland on 11° slope
19	VHC 7.1 <i>Semi-evergreen to deciduous microphyll vine forest (VHC 7.1)</i>	VHC 13.2	Continuous woodland on 8° slope
20	VHC 13.2	VHC 13.2	Continuous woodland on 9° slope
21	VHC 13.2	VHC 13.2	Continuous woodland on 4° slope
22	VHC 13.2	VHC 13.2	Continuous woodland on 9° slope

Infrastructure	Catalyst vegetation hazard class (VHC)	Ground-truthed VHC	Notes
23	VHC 13.2 and VHC 40.4	VHC 13.2	Continuous woodland on 14° slope
24	VHC 40.4	VHC 40.4	Continuous grassland on 4° slope
25	VHC 13.2 and VHC 40.4	VHC 13.2	Continuous woodland on 11° slope
27	VHC 40.4	VHC 40.4	Continuous grassland on 6° slope
32	VHC 12.2 <i>Dry eucalypt woodlands on sandstone and shallow soils (VHC 12.2)</i>	VHC 12.2	Continuous woodland on 13° slope
33	VHC 12.2 and VHC 40.4	VHC 12.2	Continuous woodland on 10° slope
34	VHC 12.2	VHC 13.2	Continuous woodland on 12° slope
54	VHC 13.2	VHC 13.2	Continuous woodland on 27° slope
55	VHC 13.2	VHC 13.2	Continuous woodland regrowth on 9° slope
56	VHC 13.2	VHC 13.2	Continuous woodland regrowth on 16° slope
57	VHC 17.2 <i>Dry woodlands dominated by poplar box, silver leaved ironbark or White's ironbark on sand or depositional plains (VHC 17.2)</i>	VHC 17.2	Continuous woodland on 6° slope
58	VHC 13.2	VHC 13.2	Continuous woodland on 16° slope
59	VHC 40.4	VHC 40.4	Continuous grassland on 4° slope
60	VHC 17.2	VHC 13.2	Continuous woodland on 7° slope
61	VHC 40.4	VHC 13.2	Continuous woodland regrowth on 18° slope
62	VHC 40.4	VHC 13.2	Continuous woodland regrowth on 18° slope
Infrastructure			
Substation near WTG 3	VHC 13.2	VHC 13.2	Continuous woodland on 4° slope
Batching plant near WTG 3	VHC 13.2	VHC 13.2	Continuous woodland on 4° slope
Laydown area 1 near WTG 3	VHC 13.2	VHC 13.2	Continuous woodland on 4° slope
Operations and maintenance facility near WTG 3	VHC 13.2	VHC 13.2	Continuous woodland on 4° slope
Laydown area 2 near WTG 15	VHC 13.2	VHC 13.2	Continuous woodland on 4° slope

Infrastructure	Catalyst vegetation hazard class (VHC)	Ground-truthed VHC	Notes
Switching yard near WTG 41	VHC 13.2 and VHC 40.4	VHC 13.2	Continuous woodland regrowth on 10° slope
Construction compound near WTG 54	VHC 40.4	VHC 40.4	Continuous grassland on 3° slope
Stage two			
WTGs			
28	VHC 13.2	VHC 13.2	Continuous woodland on 23° slope
29	VHC 13.2	VHC 13.2	Continuous woodland on 10° slope
30	VHC 12.2 and VHC 40.4	VHC 12.2	Continuous woodland on 16° slope
31	VHC 40.4	VHC 12.2	Continuous woodland on 7° slope
35	VHC 13.2	VHC 13.2	Continuous woodland on 10° slope
36	VHC 13.2	VHC 13.2	Continuous woodland on 12° slope
37	VHC 13.2	VHC 13.2	Continuous woodland on 11° slope
38	VHC 12.2	VHC 12.2	Continuous woodland on 8° slope
40	VHC 40.4	VHC 13.2	Continuous woodland on 15° slope
41	VHC 13.2	VHC 13.2	Continuous woodland on 22° slope
42	VHC 13.2	VHC 13.2	Continuous woodland on 16° slope
44	VHC 13.2	VHC 13.2	Continuous woodland on 22° slope
45	VHC 13.2	VHC 13.2	Continuous woodland on 10° slope
46	VHC 13.2	VHC 13.2	Continuous woodland on 15° slope
47	VHC 13.2	VHC 13.2	Continuous woodland on 8° slope
48	VHC 40.4	VHC 13.2	Continuous woodland on 2° slope
49	VHC 13.2	VHC 13.2	Continuous woodland on 4° slope
50	VHC 13.2	VHC 13.2	Continuous woodland on 6° slope
51	VHC 13.2	VHC 13.2	Continuous woodland on 12° slope
52	VHC 13.2	VHC 12.2	Continuous woodland on 4° slope

Infrastructure	Catalyst vegetation hazard class (VHC)	Ground-truthed VHC	Notes
53	VHC 12.2	VHC 12.2	Continuous woodland on 2° slope
Infrastructure			
Battery Energy Storage System near WTG 41	VHC 13.2 and VHC 40.4	VHC 13.2	Continuous woodland regrowth on 10° slope
Construction compound near WTG 53	VHC 12.2	VHC 12.2	Continuous woodland on 8° slope

Appendix 2 Photographs of infrastructure areas

Stage one infrastructure



Photograph 1 VHC 13.2 *Dry to moist eucalypt woodlands on undulating metamorphics and granite (VHC 13.2) at WTG 1*



Photograph 2 VHC 13.2 at WTG 2



Photograph 3 VHC 13.2 at WTG 3



Photograph 4 VHC 13.2 at WTG 4



Photograph 5 VHC 13.2 at WTG 5



Photograph 6 VHC 13.2 at WTG 6



Photograph 7 VHC 13.2 at WTG 7



Photograph 8 VHC 13.2 at WTG 8



Photograph 9 VHC 13.2 at WTG 9



Photograph 10 VHC 13.2 at WTG 10



Photograph 11 VHC 13.2 at WTG 11



Photograph 12 VHC 13.2 at WTG 12



Photograph 13 VHC 13.2 at WTG 13



Photograph 14 VHC 13.2 at WTG 14



Photograph 15 VHC 13.2 at WTG 15



Photograph 16 VHC 13.2 at WTG 16



Photograph 17 VHC 13.2 at WTG 17



Photograph 18 VHC 13.2 at WTG 18



Photograph 19 VHC 13.2 at WTG 19



Photograph 20 VHC 13.2 at WTG 20



Photograph 21 VHC 13.2 at WTG 21



Photograph 22 VHC 13.2at WTG 22



Photograph 23 VHC 13.2 at WTG 23



Photograph 24 VHC 40.4 *Continuous low grass or tree cover* (VHC 40.4) at WTG 24



Photograph 25 VHC 13.2 at WTG 25



Photograph 26 VHC 40.4 at WTG 27



Photograph 27 VHC 12.2 *Dry eucalypt woodlands on sandstone and shallow soils* (VHC 12.2) at WTG 32



Photograph 28 VHC 12.2 at WTG 33



Photograph 29 VHC 13.2 at WTG 34



Photograph 30 VHC 13.2 at WTG 54



Photograph 31 VHC 13.2 at WTG 55



Photograph 32 VHC 13.2 at WTG 56



Photograph 33 VHC 17.2 Dry woodlands dominated by poplar box, silver leaved ironbark or White's ironbark on sand or depositional plains at WTG 57



Photograph 34 VHC 13.2 at WTG 58



Photograph 35 VHC 40.4 at WTG 59



Photograph 36 VHC 13.2 at WTG 60



Photograph 37 VHC 13.2 at WTG 61



Photograph 38 VHC 13.2 at WTG 62



Photograph 39 VHC 13.2 at Substation near WTG 3



Photograph 40 VHC 13.2 at Batching plant, laydown area 1 and operations and maintenance facility near WTG 3



Photograph 41 VHC 13.2 at Switching yard near WTG 41

Stage two infrastructure



Photograph 42 VHC 13.2 at WTG 28



Photograph 43 VHC 13.2 at WTG 29



Photograph 44 VHC 12.2 at WTG 30



Photograph 45 VHC 12.2 at WTG 31



Photograph 46 VHC 13.2 at WTG 35



Photograph 47 VHC 13.2 at WTG 36



Photograph 48 VHC 13.2 at WTG 37



Photograph 49 VHC 12.2 at WTG 38



Photograph 50 VHC 13.2 at WTG 40



Photograph 51 VHC 13.2 at WTG 41



Photograph 52 VHC 13.2 at WTG 42



Photograph 53 VHC 13.2 at WTG 44



Photograph 54 VHC 13.2 at WTG 45



Photograph 55 VHC 13.2 at WTG 46



Photograph 56 VHC 13.2 at WTG 47



Photograph 57 VHC 13.2 at WTG 48



Photograph 58 VHC 13.2 at WTG 49



Photograph 59 VHC 13.2 at WTG 50



Photograph 60 VHC 13.2 at WTG 51



Photograph 61 VHC 12.2 at WTG 52



Photograph 62 VHC 12.2 at WTG 53



Photograph 63 VHC 13.2 at battery energy storage system near WTG 41

Appendix 3 Potential bushfire intensity calculations

Potential bushfire intensity calculations

Infrastructure	Vegetation hazard class (VHC)	Potential fuel load (tonnes/hectare) ¹	Slope (°)	Potential bushfire intensity (kW/m) ²	Bushfire hazard class	Radiant heat flux model
Stage one						
Wind turbine generators (WTGs)						
1	VHC 13.2 <i>Dry to moist eucalypt woodlands on undulating metamorphics and granite (VHC 13.2)</i>	14.4	8	15,406	Medium	F
2	VHC 13.2	14.4	6	13,420	Medium	F
3	VHC 13.2	14.4	18	30,716	High	H
4	VHC 13.2	14.4	6	13,420	Medium	F
5	VHC 13.2	14.4	8	15,406	Medium	F
6	VHC 13.2	14.4	8	15,406	Medium	F
7	VHC 13.2	14.4	8	15,406	Medium	F
8	VHC 13.2	14.4	8	15,406	Medium	F
9	VHC 13.2	14.4	8	15,406	Medium	F
10	VHC 13.2	14.4	7	14,379	Medium	F
11	VHC 13.2	14.4	8	15,406	Medium	F
12	VHC 13.2	14.4	15	24,972	High	G
13	VHC 13.2	14.4	13	21,753	High	G
14	VHC 13.2	14.4	16	26,756	High	H
15	VHC 13.2	14.4	8	15,406	Medium	F
16	VHC 13.2	14.4	10	17,686	Medium	F
17	VHC 13.2	14.4	16	26,756	High	H
18	VHC 13.2	14.4	11	18,949	Medium	G
19	VHC 13.2	14.4	8	15,406	Medium	F
20	VHC 13.2	14.4	9	16,507	Medium	F
21	VHC 13.2	14.4	4	11,690	Medium	E
22	VHC 13.2	14.4	9	16,507	Medium	F
23	VHC 13.2	14.4	14	23,307	High	G
24	VHC 40.4 <i>Continuous low grass or tree cover (VHC 40.4)</i>	5	4	1,409	Non-bushfire prone hazard class ³	L
25	VHC 13.2	14.4	11	18,949	Medium	G
27	VHC 40.4	5	6	1,618	Non-bushfire prone hazard class ³	M

Potential bushfire intensity calculations

Infrastructure	Vegetation hazard class (VHC)	Potential fuel load (tonnes/hectare) ¹	Slope (°)	Potential bushfire intensity (kW/m) ²	Bushfire hazard class	Radiant heat flux model
32	VHC 12.2 <i>Dry eucalypt woodlands on sandstone and shallow soils (VHC 12.2)</i>	17.4	13	31,398	High	C
33	VHC 12.2	17.4	10	25,527	High	B
34	VHC 13.2	14.4	12	20,303	High	G
54	VHC 13.2	14.4	27	57,155	Very high	J
55	VHC 13.2	14.4	9	16,507	Medium	F
56	VHC 13.2	14.4	16	26,756	High	H
57	VHC 17.2 <i>Dry woodlands dominated by poplar box, silver leaved ironbark or White's ironbark on sand or depositional plains (VHC 17.2)</i>	9.6	6	5,965	Medium	K
58	VHC 13.2	14.4	16	26,756	High	H
59	VHC 40.4	5	4	1,409	Non-bushfire prone hazard class ³	L
60	VHC 13.2	14.4	7	14,379	Medium	F
61	VHC 13.2	14.4	18	30,716	High	H
62	VHC 13.2	14.4	18	30,716	High	H
Infrastructure						
Substation near WTG 3	VHC 13.2	14.4	4	11,690	Medium	E
Batching plant near WTG 3	VHC 13.2	14.4	4	11,690	Medium	N/A
Laydown area 1 near WTG 3	VHC 13.2	14.4	4	11,690	Medium	N/A
operations and maintenance facility near WTG 3	VHC 13.2	14.4	4	11,690	Medium	E
Laydown area 2 near WTG 15	VHC 13.2	14.4	4	11,690	Medium	N/A
Switching yard near WTG 41	VHC 13.2	14.4	10	17,686	Medium	F and N

Potential bushfire intensity calculations

Infrastructure	Vegetation hazard class (VHC)	Potential fuel load (tonnes/hectare) ¹	Slope (°)	Potential bushfire intensity (kW/m) ²	Bushfire hazard class	Radiant heat flux model
Construction compound near WTG 54	VHC 40.4	5	3	1,315	Non-bushfire prone hazard class ³	N/A
Stage two						
WTGs						
28	VHC 13.2	14.4	23	43,370	Very high	I
29	VHC 13.2	14.4	10	17,686	Medium	F
30	VHC 12.2	17.4	16	38,618	High	D
31	VHC 12.2	17.4	7	20,754	High	B
35	VHC 13.2	14.4	10	17,686	Medium	F
36	VHC 13.2	14.4	12	20,303	High	G
37	VHC 13.2	14.4	11	18,949	Medium	G
38	VHC 12.2	17.4	8	22,236	High	B
40	VHC 13.2	14.4	15	24,972	High	G
41	VHC 13.2	14.4	22	40,479	Very high	I
42	VHC 13.2	14.4	16	26,756	High	H
44	VHC 13.2	14.4	22	40,479	Very high	I
45	VHC 13.2	14.4	10	17,686	Medium	F
46	VHC 13.2	14.4	15	24,972	High	G
47	VHC 13.2	14.4	8	15,406	Medium	F
48	VHC 13.2	14.4	2	10,184	Medium	E
49	VHC 13.2	14.4	4	11,690	Medium	E
50	VHC 13.2	14.4	6	13,420	Medium	F
51	VHC 13.2	14.4	12	20,303	High	G
52	VHC 12.2	17.4	4	11,690	Medium	A
53	VHC 12.2	17.4	2	14,698	Medium	A
Infrastructure						
Battery energy storage system near WTG 41	VHC 13.2	14.4	10	17,686	Medium	F
Construction compound near WTG 53	VHC 12.2	17.4	8	22,236	High	N/A

- 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 (BRC guide)*.
 - 2 Potential bushfire intensity calculation based on a forest fire danger index value of 69 from the severe fire weather map in the Queensland Fire Department online mapping system (accessed online via user login March 2024).
 - 3 VHC 40.4 is defined as grassfire prone in the BRC guide.

Appendix 4 Radiant heat exposure assessment

Radiant heat flux model A

- Forest fire danger index - 69
 - Vegetation – VHC 12.2 Dry eucalypt woodlands on sandstone and shallow soils (VHC 12.2)
 - Understorey fuel load – 14.6 tonnes/hectare (t/ha)
 - Total fuel load – 17.4 t/ha
 - Effective slope – 5° slope
 - Site slope – 0° slope
 - Flame width – 100 metres (m)
- Note Inputs used for the radiant heat exposure assessment 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 August 20, 2024, 5:18 pm (MDC v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	1.7 km/h
Vegetation classification	Woodland	Flame length	13.18 m
Understorey fuel load	14.6 t/ha	Flame angle	53 °, 63 °, 71 °, 76 °, 77 ° & 83 °
Total fuel load	17.4 t/ha	Elevation of receiver	5.26 m, 5.87 m, 6.23 m, 6.39 m, 6.42 m & 6.54 m
Vegetation height	n/a	Fire intensity	15,345 kW/m
Effective slope	5 °	Transmissivity	0.875, 0.857, 0.832, 0.8070000000000001, 0.794 & 0.73
Site slope	0 °	Viewfactor	0.5983000000000001, 0.4427, 0.2998, 0.2033, 0.1651 & 0.0449
Flame width	100 m	Minimum distance to < 40 kW/m²	10.9 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	14.7 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	21.5 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	30.5 m
		Minimum distance to < 10 kW/m²	36.3 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

Radiant heat flux model B

- Forest fire danger index - 69
- Vegetation – VHC 12.2
- Understorey fuel load – 14.6 t/ha
- Total fuel load – 17.4 t/ha
- Effective slope – 10° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated August 20, 2024, 5:19 pm (MDc v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	2.41 km/h
Vegetation classification	Woodland	Flame length	17.75 m
Understorey fuel load	14.6 t/ha	Flame angle	52 °, 62 °, 69 °, 74 °, 75 ° & 81 °
Total fuel load	17.4 t/ha	Elevation of receiver	6.99 m, 7.83 m, 8.279999999999999 m, 8.529999999999999 m, 8.57 m & 8.76 m
Vegetation height	n/a	Fire intensity	21,667 kW/m
Effective slope	10 °	Transmissivity	0.867, 0.845, 0.8169999999999999, 0.791, 0.778 & 0.72
Site slope	0 °	Viewfactor	0.606, 0.4496, 0.3047, 0.2071, 0.1683 & 0.0455
Flame width	100 m	Minimum distance to < 40 kW/m²	14.5 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	19.5 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	27.9 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	38.6 m
		Minimum distance to < 10 kW/m²	45.3 m

Rate of Spread - Mearthur, 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

Radiant heat flux model C

- Forest fire danger index - 69
- Vegetation – VHC 12.2
- Understorey fuel load – 14.6 t/ha
- Total fuel load – 17.4 t/ha
- Effective slope – 15° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated August 20, 2024, 5:22 pm (MDC v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	3.4 km/h
Vegetation classification	Woodland	Flame length	24.2 m
Understorey fuel load	14.6 t/ha	Flame angle	51 °, 60 °, 67 °, 71 °, 72 ° & 80 °
Total fuel load	17.4 t/ha	Elevation of receiver	9.4 m, 10.48 m, 11.14 m, 11.44 m, 11.51 m & 11.92 m
Vegetation height	n/a	Fire intensity	30,594 kW/m
Effective slope	15 °	Transmissivity	0.856, 0.831, 0.801, 0.776, 0.764 & 0.709
Site slope	0 °	Viewfactor	0.6132, 0.4573, 0.3111, 0.2114, 0.1719 & 0.0463
Flame width	100 m	Minimum distance to < 40 kW/m²	19.6 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	25.8 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	36 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	48.5 m
		Minimum distance to < 10 kW/m²	56.1 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

Radiant heat flux model D

- Forest fire danger index - 69
- Vegetation – VHC 12.2
- Understorey fuel load – 14.6 t/ha
- Total fuel load – 17.4 t/ha
- Effective slope – 20° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated August 20, 2024, 5:23 pm (MDc v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	4.8 km/h
Vegetation classification	Woodland	Flame length	33.32 m
Understorey fuel load	14.6 t/ha	Flame angle	49 °, 57 °, 63 °, 67 °, 69 ° & 78 °
Total fuel load	17.4 t/ha	Elevation of receiver	12.57 m, 13.97 m, 14.84 m, 15.33 m, 15.55 m & 16.29 m
Vegetation height	n/a	Fire intensity	43,198 kW/m
Effective slope	20 °	Transmissivity	0.845, 0.8169999999999999, 0.786, 0.762, 0.751 & 0.695
Site slope	0 °	Viewfactor	0.6217, 0.4653, 0.317, 0.2154, 0.1748 & 0.0472
Flame width	100 m	Minimum distance to < 40 kW/m²	26.4 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	34.1 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	46.2 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	60.5 m
		Minimum distance to < 10 kW/m²	69.2 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

Radiant heat flux model E

- Forest fire danger index - 69
- Vegetation – VHC 13.2 Dry to moist eucalypt woodlands on undulating metamorphics and granite (VHC 13.2)
- Understorey fuel load – 12.8 t/ha
- Total fuel load – 14.4 t/ha
- Effective slope – 5° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated August 20, 2024, 5:24 pm (MDc v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	1.49 km/h
Vegetation classification	Woodland	Flame length	11.45 m
Understorey fuel load	12.8 t/ha	Flame angle	53 °, 64 °, 72 °, 76 °, 78 ° & 83 °
Total fuel load	14.4 t/ha	Elevation of receiver	4.57 m, 5.14 m, 5.44 m, 5.55 m, 5.6 m & 5.68 m
Vegetation height	n/a	Fire intensity	11,133 kW/m
Effective slope	5 °	Transmissivity	0.878, 0.862, 0.839, 0.8149999999999999, 0.801 & 0.735
Site slope	0 °	Viewfactor	0.596, 0.4387, 0.2966, 0.201, 0.1636 & 0.0446
Flame width	100 m	Minimum distance to < 40 kW/m²	9.5 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 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	27.2 m
		Minimum distance to < 10 kW/m²	32.5 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

Radiant heat flux model F

- Forest fire danger index - 69
- Vegetation – VHC 13.2
- Understorey fuel load – 12.8 t/ha
- Total fuel load – 14.4 t/ha
- Effective slope – 10° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated August 20, 2024, 5:25 pm (MDc v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	2.11 km/h
Vegetation classification	Woodland	Flame length	15.46 m
Understorey fuel load	12.8 t/ha	Flame angle	53 °, 63 °, 70 °, 75 °, 76 ° & 82 °
Total fuel load	14.4 t/ha	Elevation of receiver	6.17 m, 6.88 m, 7.26 m, 7.46 m, 7.5 m & 7.65 m
Vegetation height	n/a	Fire intensity	15,720 kW/m
Effective slope	10 °	Transmissivity	0.87, 0.85, 0.824, 0.798, 0.785 & 0.725
Site slope	0 °	Viewfactor	0.6026, 0.4454, 0.3018, 0.2051, 0.1671 & 0.0453
Flame width	100 m	Minimum distance to < 40 kW/m²	12.7 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	17.1 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	24.8 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	34.7 m
		Minimum distance to < 10 kW/m²	40.9 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

Radiant heat flux model G

- Forest fire danger index - 69
- Vegetation – VHC 13.2
- Understorey fuel load – 12.8 t/ha
- Total fuel load – 14.4 t/ha
- Effective slope – 15° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated August 20, 2024, 5:26 pm (MDC v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	2.98 km/h
Vegetation classification	Woodland	Flame length	21.12 m
Understorey fuel load	12.8 t/ha	Flame angle	52 °, 61 °, 68 °, 72 °, 74 ° & 81 °
Total fuel load	14.4 t/ha	Elevation of receiver	8.32 m, 9.23 m, 9.789999999999999 m, 10.04 m, 10.15 m & 10.43 m
Vegetation height	n/a	Fire intensity	22,197 kW/m
Effective slope	15 °	Transmissivity	0.861, 0.838, 0.8090000000000001, 0.783, 0.77 & 0.714
Site slope	0 °	Viewfactor	0.6073, 0.4546, 0.3088, 0.2098, 0.1706 & 0.046
Flame width	100 m	Minimum distance to < 40 kW/m²	17.2 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	22.8 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	32.2 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	43.9 m
		Minimum distance to < 10 kW/m²	51.1 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

Radiant heat flux model H

- Forest fire danger index - 69
- Vegetation – VHC 13.2
- Understorey fuel load – 12.8 t/ha
- Total fuel load – 14.4 t/ha
- Effective slope – 20° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated August 20, 2024, 5:27 pm (MDC v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	4.21 km/h
Vegetation classification	Woodland	Flame length	29.11 m
Understorey fuel load	12.8 t/ha	Flame angle	50 °, 58 °, 65 °, 69 °, 70 ° & 79 °
Total fuel load	14.4 t/ha	Elevation of receiver	11.15 m, 12.34 m, 13.19 m, 13.58 m, 13.67 m & 14.28 m
Vegetation height	n/a	Fire intensity	31,342 kW/m
Effective slope	20 °	Transmissivity	0.85, 0.823, 0.792, 0.767, 0.756 & 0.701
Site slope	0 °	Viewfactor	0.6179, 0.4628, 0.315, 0.2137, 0.1736 & 0.0468
Flame width	100 m	Minimum distance to < 40 kW/m²	23.3 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	30.3 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	41.6 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	55.2 m
		Minimum distance to < 10 kW/m²	63.4 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

Radiant heat flux model I

- Forest fire danger index - 69
- Vegetation – VHC 13.2
- Understorey fuel load – 12.8 t/ha
- Total fuel load – 14.4 t/ha
- Effective slope – 25° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated August 20, 2024, 5:28 pm (MDC v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	5.94 km/h
Vegetation classification	Woodland	Flame length	40.39 m
Understorey fuel load	12.8 t/ha	Flame angle	47 °, 55 °, 61 °, 65 °, 67 ° & 77 °
Total fuel load	14.4 t/ha	Elevation of receiver	14.77 m, 16.54 m, 17.66 m, 18.3 m, 18.59 m & 19.67 m
Vegetation height	n/a	Fire intensity	44,255 kW/m
Effective slope	25 °	Transmissivity	0.837, 0.8080000000000001, 0.778, 0.754, 0.744 & 0.6860000000000001
Site slope	0 °	Viewfactor	0.6268, 0.4703, 0.3206, 0.2174, 0.1763 & 0.0478
Flame width	100 m	Minimum distance to < 40 kW/m²	31.5 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	40.1 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	53.3 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	68.8 m
		Minimum distance to < 10 kW/m²	78.09999999999999 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

Radiant heat flux model J

- Forest fire danger index - 69
- Vegetation – VHC 13.2
- Understorey fuel load – 12.8 t/ha
- Total fuel load – 14.4 t/ha
- Effective slope – 30° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated August 20, 2024, 5:30 pm (MDc v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	8.390000000000001 km/h
Vegetation classification	Woodland	Flame length	56.32 m
Understorey fuel load	12.8 t/ha	Flame angle	44 °, 50 °, 56 °, 60 °, 62 ° & 74 °
Total fuel load	14.4 t/ha	Elevation of receiver	19.56 m, 21.57 m, 23.34 m, 24.38 m, 24.86 m & 27.06 m
Vegetation height	n/a	Fire intensity	62,488 kW/m
Effective slope	30 °	Transmissivity	0.824, 0.794, 0.765, 0.743, 0.734 & 0.672
Site slope	0 °	Viewfactor	0.6371, 0.4784, 0.3262, 0.2208, 0.1788 & 0.0489
Flame width	100 m	Minimum distance to < 40 kW/m²	42.4 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	52.6 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	67.7 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	85.2 m
		Minimum distance to < 10 kW/m²	95.90000000000001 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

Radiant heat flux model K

- Forest fire danger index - 69
- Vegetation – VHC 17.2 Dry woodlands dominated by poplar box, silver leaved ironbark or White’s ironbark on sand or depositional plains
- Understorey fuel load – 9 t/ha
- Total fuel load – 9.6 t/ha
- Effective slope – 10° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated August 20, 2024, 5:32 pm (MDC v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	1.48 km/h
Vegetation classification	Woodland	Flame length	10.8 m
Understorey fuel load	9 t/ha	Flame angle	53 °, 64 °, 72 °, 77 °, 78 ° & 84 °
Total fuel load	9.6 t/ha	Elevation of receiver	4.31 m, 4.85 m, 5.14 m, 5.26 m, 5.28 m & 5.37 m
Vegetation height	n/a	Fire intensity	7,369 kW/m
Effective slope	10 °	Transmissivity	0.879, 0.864, 0.842, 0.8179999999999999, 0.805 & 0.737
Site slope	0 °	Viewfactor	0.5933, 0.4378, 0.2961, 0.2003, 0.1632 & 0.0444
Flame width	100 m	Minimum distance to < 40 kW/m²	9 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	12.2 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	17.9 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	25.9 m
		Minimum distance to < 10 kW/m²	31 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

Radiant heat flux model L

- Forest fire danger index – 69
- Grassfire danger index – 99 (conversion)
- Vegetation – VHC 40.4 Continuous low grass or tree cover (VHC 40.4)
- Understorey fuel load – 4.5 t/ha
- Total fuel load – 5 t/ha
- Effective slope – 5° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated August 20, 2024, 5:33 pm (MDC v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Grassland Fire Danger Index	99	Rate of spread	18.17 km/h
Vegetation classification	Grassland	Flame length	8.16 m
Understorey fuel load	4.5 t/ha	Flame angle	54 °, 64 °, 73 °, 78 °, 80 ° & 85 °
Total fuel load	5 t/ha	Elevation of receiver	3.3 m, 3.67 m, 3.9 m, 3.99 m, 4.02 m & 4.06 m
Vegetation height	n/a	Fire intensity	46,945 kW/m
Effective slope	5 °	Transmissivity	0.885, 0.872, 0.854, 0.832, 0.82 & 0.748
Site slope	0 °	Viewfactor	0.5915, 0.4337, 0.2918, 0.1968, 0.1599 & 0.0438
Flame width	100 m	Minimum distance to < 40 kW/m²	6.8 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	13.8 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	20.3 m
		Minimum distance to < 10 kW/m²	24.6 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

Radiant heat flux model M

- Forest fire danger index – 69
- Grassfire danger index – 99 (conversion)
- Vegetation – VHC 40.4
- Understorey fuel load – 4.5 t/ha
- Total fuel load – 5 t/ha
- Effective slope – 10° slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated August 20, 2024, 5:35 pm (MDC v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Grassland Fire Danger Index	99	Rate of spread	25.65 km/h
Vegetation classification	Grassland	Flame length	9.699999999999999 m
Understorey fuel load	4.5 t/ha	Flame angle	54 °, 64 °, 72 °, 77 °, 79 ° & 84 °
Total fuel load	5 t/ha	Elevation of receiver	3.92 m, 4.36 m, 4.61 m, 4.72 m, 4.76 m & 4.82 m
Vegetation height	n/a	Fire intensity	66,286 kW/m
Effective slope	10 °	Transmissivity	0.881, 0.867, 0.847, 0.823, 0.8100000000000001 & 0.741
Site slope	0 °	Viewfactor	0.5913, 0.436, 0.2945, 0.199, 0.1619 & 0.0443
Flame width	100 m	Minimum distance to < 40 kW/m²	8.1 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	11 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	16.2 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	23.6 m
		Minimum distance to < 10 kW/m²	28.4 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

Radiant heat flux model N

- Forest fire danger index - 69
- Vegetation – VHC 13.2
- Understorey fuel load – 12.8 t/ha
- Total fuel load – 14.4 t/ha
- Effective slope – 0° slope (upslope earthworks embankment)
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated July 12, 2025, 12:43 pm (MDC v.4.9)

J24091

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	1.05 km/h
Vegetation Classification	Woodland	Flame length	8.609999999999999 m
Understorey fuel load	12.8 t/ha	Flame angle	54 °, 64 °, 72 °, 78 °, 79 ° & 84 °
Total fuel load	14.4 t/ha	Elevation of receiver	3.48 m, 3.87 m, 4.09 m, 4.21 m, 4.22 m & 4.28 m
Vegetation height	n/a	Fire intensity	7,885 kW/m
Effective slope	0 °	Transmissivity	0.884, 0.871, 0.852, 0.829, 0.8169999999999999 & 0.746
Site slope	0 °	Viewfactor	0.5899, 0.4343, 0.2928, 0.1973, 0.1608 & 0.044
Flame width	100 m	Minimum distance to < 40 kW/m²	7.2 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	9.800000000000001 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	14.5 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	21.3 m
		Minimum distance to < 10 kW/m²	25.7 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

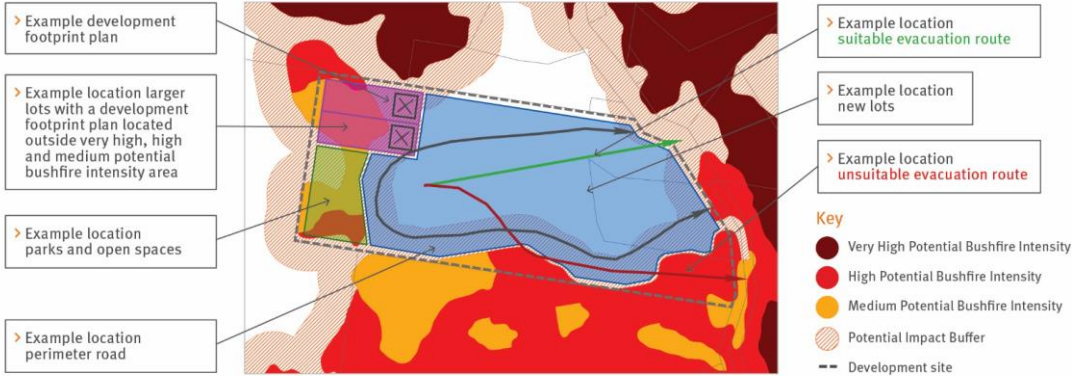
Flame angle - Douglas & Tan, 2005

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

Appendix 5 Bushfire overlay code assessment

Performance outcomes	Acceptable outcomes	Compliance assessment
Section A		
Reconfiguring a lot (RaL) – where creating lots of more than 2,000 square metres		
PO1 The subdivision layout: (a) enables future buildings to be located away from slopes and land forms that expose people or property to an intolerable risk to life or property; and (b) facilitates emergency access and operational space for firefighters in a reduced fuel area between future buildings and structures and hazardous vegetation, that reduce risk to an acceptable or tolerable level. Note – An applicant may seek to undertake a site-level verification of the location and nature of hazardous vegetation and resulting potential bushfire intensity levels, for example where changes in foliage have occurred (e.g. as a consequence of adjoining permanent urban development) or where an applicant seeks to verify the regional ecosystem map inputs. This verification should form part of a bushfire hazard assessment in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document. The outcomes of this assessment can demonstrate how an alternate solution to the acceptable outcome can deliver an acceptable or tolerable level of risk.	AO1.1 A development footprint plan is identified for each lot that avoids ridgelines, saddles and crests where slopes exceed 15 per cent.	Not applicable
	AO1.2 A development footprint plan is identified for each lot that is separated from the closest edge to the adjacent mapped medium, high or very high potential bushfire intensity area by: (a) a distance that is no closer than the distances specified in Table 5 at all development footprint plan boundaries; or (b) a distance that achieves a radiant heat flux level of 29 kW/m² or less at all development footprint plan boundaries. Note – This separation area is often termed an asset protection zone. Note – The radiant heat flux levels can be established by undertaking a bushfire hazard assessment in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document.	Not applicable
PO2 The subdivision layout enables: (a) future buildings to be located as close as possible to property entrances to facilitate safe evacuation during a bushfire event; and (b) future site access to be located and designed to allow safe evacuation of the site by occupants and maintain access by emergency services under critical event conditions.	AO2 A development footprint plan is identified for each lot that: (a) is located within 60 metres of the street frontage; and (b) sited to enable a route between the development footprint plan and the street frontage with a gradient that does not exceed of 12.5 per cent.	Not applicable
Section B		
Reconfiguring a lot (RaL) – where creating lots of 2,000 square metres or less		
PO3 The subdivision layout: (a) avoids creating lots on slopes and land forms that expose people or property to an intolerable risk to life or property; and (b) facilitates emergency access and operational space for firefighters in a reduced fuel area between future	AO3.1 The subdivision layout results in lots that are sited so that they are separated from the closest edge to the adjacent mapped medium, high or very high potential bushfire intensity area by: (a) a distance that is no closer than the distances specified in Table 5 at all lot boundaries; or :	Not applicable

Performance outcomes	Acceptable outcomes	Compliance assessment
buildings and structures and hazardous vegetation, that reduce risk to an acceptable or tolerable level. Note – An applicant may seek to undertake a site-level verification of the location and nature of hazardous vegetation and resulting potential bushfire intensity levels, for example where changes in foliage have occurred (e.g. as a consequence of adjoining permanent urban development) or where an applicant seeks to verify the regional ecosystem map inputs. This verification should form part of a bushfire hazard assessment, in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document. The outcomes of this assessment can demonstrate how an alternate solution to the acceptable outcome can deliver an acceptable or tolerable level of risk.	(b) a distance that achieves a radiant heat flux level of 29 kW/m² or less: (i) at the building envelope, if identified at RaL stage; or (ii) where a building envelope is not identified, at all lot boundaries. Note – This separation area is often termed an asset protection zone. Note – The radiant heat flux levels can be established by undertaking a bushfire hazard assessment in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document. Note – For staged developments, temporary separation areas may be absorbed as part of subsequent stages. Note - Existing cleared areas external to the site may only be used in calculating necessary separation where tenure ensures that the land will remain cleared of hazardous vegetation (for example the land is a road, watercourse or highly managed park in public ownership).	
	A03.2 The subdivision layout does not create lots that are within bushfire prone areas and on ridgelines, saddles and crests where slopes exceed 15 per cent (roads and parks may be located in these areas).	Not applicable
Section C		
Reconfiguring a lot (RaL) – where creating more than 20 lots		
PO4 The subdivision layout is designed to minimise the length of the development perimeter and number of lots exposed to hazardous vegetation. Note – For example, avoid finger-like subdivision patterns or substantive vegetated corridors between lots.	A04 No acceptable outcome is prescribed	Not applicable
PO5 The subdivision layout provides for adequate access and egress and safe evacuation routes, to achieve an acceptable or tolerable risk to people.	A05.1 The subdivision layout: (a) avoids the creation of bottle-neck points in the movement network within the development (for example, avoids hourglass patterns); and (b) ensures the road network has sufficient capacity for	Not applicable

Performance outcomes	Acceptable outcomes	Compliance assessment
	the evacuating population.	
	A05.2 The subdivision layout ensures evacuation routes: (a) direct occupants away from rather than towards or through areas with a greater potential bushfire intensity; and (b) minimise the length of route through bushfire prone areas. Refer Figure 5.	Not applicable
 Figure 5 – Subdivision layout and evacuation routes		
PO6 The subdivision layout provides adequate buffers between hazardous vegetation and development. Note – An applicant may seek to undertake a site-level verification of the location and nature of hazardous vegetation and resulting potential bushfire intensity levels, for example where changes in foliage have occurred (e.g. as a consequence of adjoining permanent urban development) or where an applicant seeks to verify the regional ecosystem map inputs. This verification should form part of a bushfire hazard assessment, in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document. The outcomes of this assessment can demonstrate how an alternate solution to the acceptable outcome can deliver an acceptable or tolerable level of risk.	A06.1 The subdivision layout results in an asset protection zone being located to create a separation area from adjacent mapped medium, high or very high potential bushfire intensity areas.	Not applicable
	A06.2 The asset protection zone is comprised of: (a) parks and open spaces; and/or (b) lots greater than 2000 square metres; and/or (c) public roads (termed perimeter roads). Note – Parks and open space may be located within the mapped medium, high and very high potential bushfire intensity areas to create a separation between the development and the balance of the bushfire prone area. Note – Portions of lots greater than 2000 square metres may be located within the mapped medium, high and very high potential bushfire intensity areas. Refer Figure 5.	Not applicable
	A06.3 Where the asset protection zone	Not applicable

Performance outcomes	Acceptable outcomes	Compliance assessment
	includes lots greater than 2000 square metres a development footprint plan is identified for each lot that is located in accordance with AO1.2.	
PO7 Parks or open space provided as part of the asset protection zone do not create additional bushfire prone areas. Note –The undertaking of a bushfire hazard assessment, in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this performance outcome.	AO7 Where the asset protection zone includes parks or open spaces, they: (a) comprise only low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, cultivated gardens and nature strips; or (b) are designed to ensure a potential available fuel load is maintained at less than eight tonnes/hectare in aggregate and with a fuel structure that remains discontinuous. Note – Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack, for example short-cropped grass to a nominal height of 10 centimetres.	Not applicable
PO8 Perimeter roads are accessible for fire-fighting vehicles, to facilitate emergency access and operational space for fire- fighting, maintenance works and hazard reduction activities.	AO8.1 Where the asset protection zone includes a perimeter road it: (a) has a two-lane sealed carriageway clear of hazardous vegetation; and (b) is connected to the wider public road network at both ends and at intervals of no more than 200 metres; and (c) does not include design elements that may impede access for fire-fighting and maintenance for fire- fighting purposes (for example traffic calming involving chicanes).	Not applicable
	AO8.2 Where the subdivision contains a reticulated water supply, the road network and fire hydrants are designed and installed in accordance with: (a) <i>Fire Hydrant and Vehicle Access Guidelines for residential, commercial and industrial lots</i>, Queensland Fire and Emergency Services, 2015, unless otherwise specified by the relevant water entity; and	Not applicable

Performance outcomes	Acceptable outcomes	Compliance assessment
	(b) the <i>Road Planning and Design Manual 2nd edition</i> , Department of Transport and Main Roads, 2013.	

Section D

Reconfiguring a lot (RaL) – where creating additional lots for the purpose of residential development and a reticulated water supply is not provided.

PO9 The subdivision layout provides for perimeter roads or fire trail and working areas that are accessible by the type of fire-fighting vehicles servicing the area, to facilitate emergency access and operational space for fire-fighting, maintenance works and hazard reduction activities.	AO9.1 The subdivision layout includes: (a) a fire trail and working area designed and constructed in accordance with the design parameters in Table 6 that separates the residential lot or development footprint plan from adjacent mapped medium, high or very high potential bushfire intensity areas; or (b) a perimeter road designed and constructed in accordance with AO8.1. Refer Figure 6.	Not applicable Notwithstanding, as a minimum requirement, access tracks will meet the design specifications for category 1 fire-fighter vehicles by the New South Wales Rural Fire Service in <i>NSW RFS Fire Trail Standard 2016</i> .
--	--	---

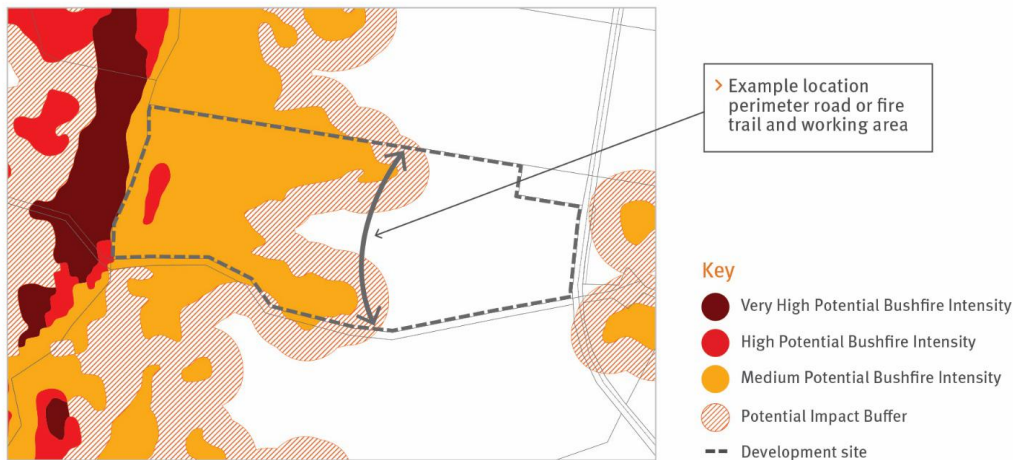


Figure 6 – Siting of fire trail and working area

Section E

Material change of use

PO10 Site layout achieve an acceptable or tolerable risk to people. Landscape or open space provided as part of the development: (a) acts as a buffer between hazardous vegetation and	AO10.1 Site layout places the landscape and open spaces within the site between premises and adjacent mapped medium, high or very high potential bushfire intensity areas. Refer Figure 7.	Complies with AO10.1 Asset protection zones (APZs) will be established and maintained around above ground infrastructure as specified in Section 6.1 of the bushfire management plan (BMP).
---	---	---

Performance outcomes	Acceptable outcomes	Compliance assessment
development; and (b) does not create additional bushfire prone areas. Note – An applicant may seek to undertake a site-level verification of the location and nature of hazardous vegetation and resulting potential bushfire intensity levels, for example where changes in foliage have occurred (e.g. as a consequence of adjoining permanent urban development) or where an applicant seeks to verify the regional ecosystem map inputs. This verification should form part of a bushfire hazard assessment in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document. The outcomes of this assessment can demonstrate how an alternate solution to the acceptable outcome can deliver an acceptable or tolerable level of risk.	AO10.2 This landscaping and open space comprises protective landscape treatments that: (a) comprise only low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses and cultivated gardens; or (b) are designed to ensure a potential available fuel load is maintained at less than 8 tonnes/hectare in aggregate and that fuel structure remains discontinuous. Note – Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack, for example short-cropped grass to a nominal height of 10 centimetres.	Complies with AO10.2 APZs will be cleared of vegetation and established as a gravel hardstand area or grass area. Gravel hardstand areas will be maintained free of weeds and grass cover. Where establishing a gravel hardstand area is not practical, a grass area will be established and maintained free of woody vegetation and with grass cover which has a height of ≤ 30 centimetres.

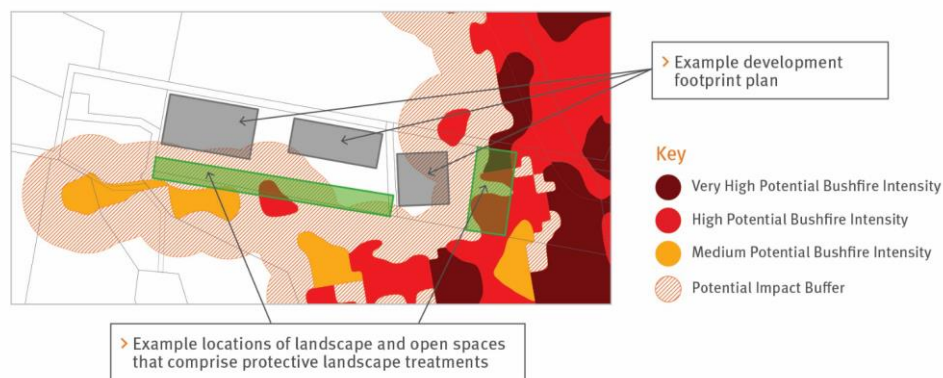


Figure 7 – Siting of protective landscape treatments

PO11 The development establishes evacuation areas, to achieve an acceptable or tolerable risk to people.	AO11 If in an isolated location, development establishes direct access to a safe assembly/evacuation area. Note – Guidance on identifying safe evacuation areas is contained in the QFES <i>Bushfire resilient communities</i> document.	Complies with AO11 Section 6.12.9 and 6.13.9 of the BMP requires separate emergency management plans and evacuation plans to be prepared for the construction and operation phases of Boulder Creek wind farm (the Project). The emergency management plans and evacuation plans must be prepared in accordance with requirements of the <i>Australian Standard (AS 3745-2010) Planning for emergencies in facilities</i>.
PO12 If on a lot of over 2,000 m², where involving a new premises or an existing premises with an increase in development	AO12 No acceptable outcome is prescribed.	Complies with PO12 Specifications for the minimum standard of vehicle access tracks within the disturbance footprint of the Project are provided in Section

Performance outcomes	Acceptable outcomes	Compliance assessment
footprint, development: (a) locates occupied areas as close as possible to property entrances to facilitate safe evacuation during a bushfire event; and (b) ensures vehicular access is located and designed to allow safe evacuation of the site by occupants and maintain access by emergency services under critical event conditions		6.6 of the BMP and are based on the design specifications for category 1 fire-fighter vehicles (or heavy attack fire vehicle) by the New South Wales Rural Fire Service.
PO13 Development is located within a reticulated water supply area or includes a dedicated static water supply that is available solely for fire-fighting purposes and can be accessed by fire-fighting vehicles. Note – Swimming pools, farm ponds and dams are not considered reliable sources of static water supply in Queensland due to regular drought events. Note for Local Government – Information on how to provide an appropriate static water supply, may form a condition of a development approval. For further information on preferred solutions refer to the QFES <i>Bushfire resilient communities</i> document.	AO13 No acceptable outcome is prescribed	Complies with PO13 Specifications for fire-fighter water supply for the Project is provided in Section 6.7 of the BMP.
PO14 Vulnerable uses listed in Table 7 are not established or intensified within a bushfire prone area unless: (a) there is an overriding need in the public interest for the new or expanded service the development provides; and (b) there are no other suitable alternative locations within the required catchment; and (c) site planning can appropriately mitigate the risk (for example, siting ovals for an educational establishment between the hazardous vegetation and structures. Note – The preparation of a bushfire management plan in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this performance outcome	AO14.1 No acceptable outcome is prescribed.	Not applicable
PO15 Community infrastructure providing essential services listed in Table 7 are not established within a bushfire prone area unless:	AO15 No acceptable outcome is prescribed.	Complies with PO15 The substation, switching yard and battery energy storage system (BESS) could be regarded as community

Performance outcomes	Acceptable outcomes	Compliance assessment
(a) there is an overriding need in the public interest for the new or expanded service the development provides (for example, there are no other suitable alternative locations that can deliver the required level of service or meet emergency service response times during and immediately after a bushfire event); and (b) the infrastructure can function effectively during and immediately after a bushfire event. Note – The preparation of a bushfire management plan in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this performance outcome.		infrastructure providing essential services. Infrastructure within these components of the Project will have an APZ which is designed to achieve a radiant heat flux level ≤ 10 kilowatts/square metre (kW/m^2) at the infrastructure which is considered a tolerable radiant heat flux outcome for community infrastructure providing essential services in <i>Bushfire resilient communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire' 2019</i>.
PO16 Development avoids or mitigates the risks to public safety and the environment from the manufacture or storage of materials listed in Table 7 that are hazardous in the context of bushfire to an acceptable or tolerable level. Note – The preparation of a bushfire management plan in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this acceptable outcome. Editor's note – In addition to the requirements of this code the <i>Work Health and Safety Act 2011</i> and associated Regulation and Guidelines, the <i>Environmental Protection Act 1994</i> and the relevant building assessment provisions under the <i>Building Act 1975</i> contain requirements for the manufacture and storage of hazardous substances. Information is provided by Business Queensland on the requirements for storing and transporting hazardous chemicals, available at: www.business.qld.gov.au/running-business/protecting-business/risk-management/hazardous-chemicals/storing-transporting.	AO16 No acceptable outcome is prescribed.	Complies with PO16 Storage or handling of hazardous chemicals during the construction and operational phases of the Project will not occur in vegetated areas and will be in accordance with <i>Managing risks of hazardous chemicals in the workplace – Code of Practice</i> (SWA 2020), applicable safety data sheets, and otherwise in accordance with <i>Queensland Work Health and Safety Act 2011</i> and its regulations.
Section F		
Where involving an asset protection zone		
PO17 Asset protection zones are designed and managed to ensure they do not increase the potential for bushfire hazard. Note – The preparation of a landscape management plan undertaken in accordance with the methodology in the	AO17.1 Landscaping treatments within any asset protection zone comprise only low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated	Complies with AO17.1 APZs will be cleared of vegetation and established as a gravel hardstand area or grass area. Gravel hardstand areas will be maintained free of weeds and grass cover. Where establishing a gravel hardstand area is not practical, a grass area will be established and maintained free of

Performance outcomes	Acceptable outcomes	Compliance assessment
QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this performance outcome.	gardens, commercial nurseries, nature strips and windbreaks. Note – Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack, for example short-cropped grass to a nominal height of 10 centimetres. OR	woody vegetation and with grass cover which has a height of ≤ 30 centimetres.
	AO17.2 Landscaping management within any asset protection zone maintains a: (a) potential available fuel load which is less than eight tonnes/hectare in aggregate; and (b) fuel structure which is discontinuous. Note – The preparation of a landscape management plan undertaken in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this acceptable outcome.	Complies with AO17.2 See response to AO17.1.
Section G		
Where planning provisions or conditions of approval require revegetation or rehabilitation		
PO18 Revegetation or rehabilitation areas are designed and managed to ensure they do not result in an unacceptable level of risk or an increase in bushfire intensity level. Note – The undertaking of a bushfire hazard assessment in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this performance outcome.	AO18.1 Required revegetation or rehabilitation: (a) is located outside of any asset protection zone; or (b) maintains a potential available fuel load which is less than eight tonnes/hectare in aggregate and fuel structure which is discontinuous. Note – The preparation of a landscape management plan undertaken in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with acceptable outcome (b).	Not applicable The Project does not involve revegetation or rehabilitation.
	AO18.2 Revegetation or rehabilitation of areas located within mapped medium, high or very high potential bushfire intensity areas, revegetate and rehabilitate in a manner that maintains or reduces the existing fuel load. OR Revegetation or rehabilitation of areas located within the mapped potential impact buffer area, revegetate and rehabilitate in a manner that maintains or reduces the existing fuel load. Note – The preparation of a vegetation management plan undertaken in	Not applicable The Project does not involve revegetation or rehabilitation.

Performance outcomes	Acceptable outcomes	Compliance assessment
	accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this acceptable outcome.	

Table 6 – Fire trail and working area design parameters

Parameter	Provisions
Width	Contains a width of at least 20 metres including: 1. A trafficable area (cleared and formed); a. with a minimum width of 4 metres than can accommodate a rural firefighting vehicle b. with no less than 4.8 metres vertical clearance from canopy vegetation c. with no adjacent inhibiting embankments or retaining walls 2. A working area each side of the trafficable area: a. with a minimum width of 3 metres each side b. cleared of all flammable vegetation greater than 10 centimetres in height 3. The balance (i.e. 10 metre width) managed vegetation area: a. sited to separate the trafficable area from adjacent mapped medium, high or very high potential bushfire intensity areas managed vegetation b. comprising managed vegetation clear of major surface hazards.
Access	Access is granted in favour of the local government and Queensland Fire and Emergency Services Note – this access is commonly granted in the form of a easement that is to be maintained by the grantor.
Egress	Contains trafficable vehicle routes in to low hazard areas, every 200 metres

Table 7 – Vulnerable uses, community infrastructure for essential services and materials that are hazardous in the context of bushfire hazard

Group	Uses
Vulnerable uses	<i>childcare centre, community care centre, detention facility, educational establishment, hospital, nature-based tourism, relocatable home park, rooming accommodation, residential care facility, resort complex, retirement facility, tourist park</i>
Community infrastructure for essential services	<i>educational establishment, emergency services, hospital</i>
Hazardous materials in the context of bushfire hazard	Hazardous chemicals that are present at the levels or in the quantities that would constitute the use being a hazardous chemical facility Hazardous materials that are present in the quantities in the Work Health and Safety Regulation, schedule 15