Land and environment consultants

Bushfire management plan

Proposed development | 58-68 Delancey Street | Ormiston | Queensland
Prepared for The Hub Precinct Pty Ltd | 28 April 2023

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Bushfire management plan

Final V1

Report 22087 | The Hub Precinct Pty Ltd | 28 April 2023

Approved by	Robert Janssen
Position	Managing principal
Signature	
Date	28 April 2023

Document control

Version	Date	Prepared by	Reviewed by
Draft	12 September 2022	C. Turner	R. Janssen
Final	23 September 2022	C. Turner	R. Janssen
Final V1	28 April 2023	C. Turner	R. Janssen

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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

Land and Environment Consultants Pty Ltd (**LEC**) was engaged to prepare a bushfire management plan (**BMP**) for the proposed Hub68 Centre of Excellence – Aging and Wellness (**proposed development**) at 58-68 Delancey Street, Ormiston (**the site**), properly described as lot 0/SP308738, lots 0, 1 and 2/SP308739, lots 0 and 4/SP308740 and lots 10-16/SP314782.

The proposed development will proceed through a ministerial infrastructure designation (**MID**) in accordance with Chapter 2, Part 5 of the Queensland *Planning Act 2016*.

The site is identified as a bushfire prone area by the Queensland State Planning Policy (**SPP**) *Bushfire prone area map* (**SPP bushfire prone area map**) which is provided at Appendix 1. Therefore, the proposed development is subject to compliance with the SPP *Bushfire prone area overlay code* (**SPP bushfire prone area overlay code**) in the *Natural Hazards, Risk and Resilience – State Planning Policy State Interest guidance material* (DSDMIP 2019) (**SPP guidance material – bushfire**).

This BMP has been prepared in accordance with *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience - Bushfire'* (QFES 2019) (**Bushfire resilient communities**) which was prepared by the Queensland Fire and Emergency Services (**QFES**) to provide technical guidance for the implementation of the SPP guidance material – bushfire. It documents the site-specific bushfire hazard assessment and demonstrates how the proposed development will comply with the SPP bushfire prone area overlay code. It includes:

- an introduction (this section) and description of methods and information resources used for the preparation of this BMP;
- description of the site and the proposed development;
- site-specific bushfire hazard assessment;
- identification of bushfire hazards associated with the site and the proposed development;
- radiant heat exposure assessment;
- a plan for mitigating bushfire hazards; and
- assessment of the proposed development against the SPP bushfire prone area overlay code.

1.1 Method

To meet requirements of Bushfire resilient communities, the following steps were undertaken:

- review of the SPP bushfire prone area map in the SPP interactive mapping system (DILGP 2022) and the Queensland regional ecosystem map, vegetation hazard class (**VHC**) map, severe fire weather map and fire history map in the QFES online mapping system (QFES 2022) (**Catalyst**);
- inspection of land within 100 metres (**m**) of the site for vegetation characteristics, current land management practices, slope and evidence of previous fires;
- site-specific bushfire hazard assessment in accordance with the method in Bushfire resilient communities;
- radiant heat exposure assessment using the Fire Protection Association of Australia *BAL calculator V4.9* (**BAL calculator**) which models the 'method 2' bushfire attack level assessment procedure in the *Australian Standard* (AS 3959-2018) *Construction of buildings in bushfire prone areas*; and
- assessment of the proposed development against the SPP bushfire prone area overlay code.

Aerial imagery of the site was accessed online from Google Earth to assist in validating observations and measurements made during the site assessment.

1.2 Suitably qualified person

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

Robert is the managing principal at LEC and has over 20 years of experience in bushfire planning and operations. He has prepared BMPs 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 site and the proposed development

This chapter provides a description of the site and the proposed development.

2.1 Site description

The location of the site is shown in Figure 2.1. The site is approximately 5.18 hectares (**ha**), has road frontage to Delancey Street and Finucane Road and access to mains water.

The eastern portion of the site is developed with a medical and educational precinct which includes a medical and educational facility, café and carpark. The western portion of the site is mostly cleared of bushland vegetation and has been used for horticulture and is now considered vacant land. A small area of bushland vegetation and a large water body occur in the far western part of the site which adjoins a broad area of bushland vegetation in the adjoining property to the west.

The northern and eastern boundaries of the site adjoin residential and commercial development. The southern boundary adjoins Finucane Road, which is a four laned road, and land used for horticulture within the Redlands and Queensland Crop Development Facility.

2.2 Proposed development

The site plan for the proposed development is provided at Appendix 2 and shows the proposed layout of buildings, driveways and carparking.

The proposed development will be developed in two stages. The first stage will be assessed by the MID and will include a hospital, medical consulting suites, research and education facility, residential aged care facility and ancillary services. The second stage, which is considered future development and to be assessed by development application, includes a community hub, assisted living and childcare.

The waterbody and bushland vegetation in the far western part of the site will be retained.

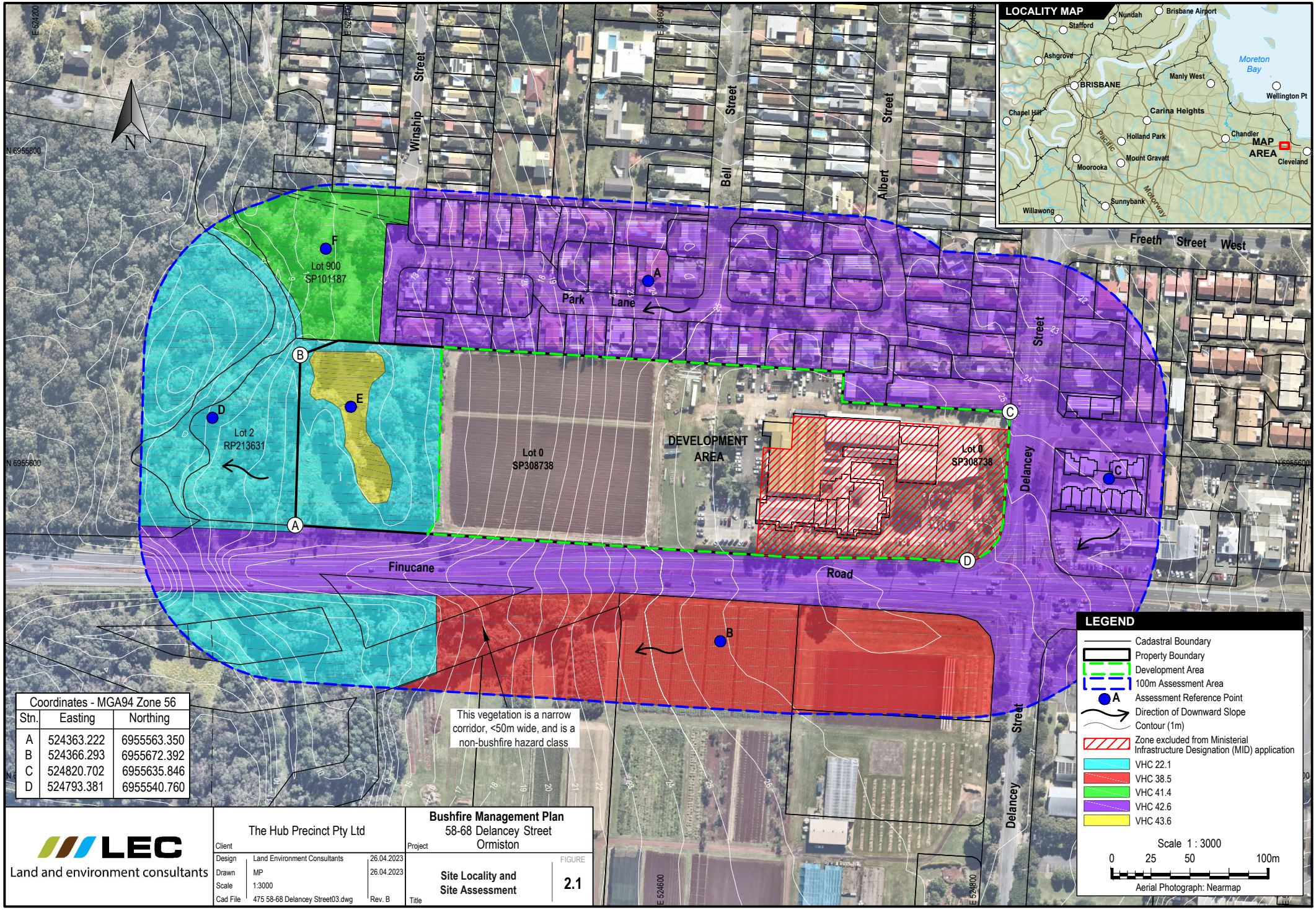
Access and egress for the proposed development will be via Delancey Street and Finucane Road and driveways within the site.

The proposed development will be connected to mains water and will have a reticulated hydrant system.

2.3 SPP bushfire prone area map

The SPP bushfire prone area map for the site is provided at Appendix 1. Verification of the bushfire hazard areas shown in the SPP bushfire prone area map is provided via the bushfire hazard assessment in Chapter 3.

Please note, the terms ‘bushfire prone area’ and ‘bushfire hazard area’ have the same meaning and are interchanged throughout this report. Both terms mean an area of vegetation which is determined to have a potential bushfire intensity ≥ 4,000 kilowatts/m (**kW/m**) and the land within 100 m of this vegetation.



Coordinates - MGA94 Zone 56		
Stn.	Easting	Northing
A	524363.222	6955563.350
B	524366.293	6955672.392
C	524820.702	6955635.846
D	524793.381	6955540.760

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Land and environment consultants

Client: The Hub Precinct Pty Ltd

Project: **Bushfire Management Plan** 58-68 Delancey Street Ormiston

Design	Land Environment Consultants	26.04.2023
Drawn	MP	26.04.2023
Scale	1:3000	
Cad File	475 58-68 Delancey Street03.dwg	Rev. B

Title: **Site Locality and Site Assessment**

FIGURE **2.1**

3 Bushfire hazard assessment

This chapter provides details of the desktop review, site inspection and site-specific bushfire hazard assessment.

3.1 Severe fire weather

The severe fire weather map in Catalyst indicates the 5 % annual exceedance probability forest fire danger index (**FFDI**) for the site is 53. This FFDI value has been used for the potential bushfire intensity calculations in Section 3.4 and the radiant heat exposure assessment in Section 5.9.

3.2 Fire history

Fire history data in Catalyst indicates that no fires have occurred within 1 kilometre (**km**) of the site during the past 10 years.

3.3 Site assessment

LEC inspected land within 100 m of the site on 16 August 2022. Observations were recorded about current land use and management, vegetation characteristics, the slope of land and evidence of previous fires.

The locations of assessment reference points used for the bushfire hazard assessment are shown in Figure 2.1. Table 3.1 provides a summary of observations from the site inspection and notes about the bushfire hazard assessment of assessment reference points. Features of assessment reference points are shown in Photographs 3.1-3.6.

Table 3.1 Site observations

Assessment reference point	Catalyst VHC	Ground truthed VHC	Notes
A	VHC 42.6 *Nil to very low vegetation cover* (**VHC 42.6**)	VHC 42.6	Residential development which has nil to very low vegetation cover.
B	VHC 41.4 *Discontinuous low grass or tree cover* (**VHC 41.4**)	VHC 38.5 *Discontinuous irrigated cropping and horticulture* (**VHC 38.5**)	Horticulture within the Redlands and Queensland Crop Development Facility.
C	VHC 42.6	VHC 42.6	Residential development which has nil to very low vegetation cover.
D	VHC 9.1 *Moist to dry eucalypt open forests on coastal lowlands and ranges* and VHC 22.1 *Melaleuca open forests on seasonally inundated lowland and coastal swamps* (**VHC 22.1**) and VHC 41.4	VHC 22.1	The bushland vegetation is part of a broader area of continuous bushland vegetation.
E	VHC 22.1	VHC 43.6 *Water bodies or very low vegetation cover* (**VHC 43.6**)	Permanent water body.

Table 3.1 Site observations

Assessment reference point	Catalyst VHC	Ground truthed VHC	Notes
F	VHC 41.4	VHC 41.4	Hilliards Creek Platypus Corridor Playground which has discontinuous low grass and tree cover.

Photograph 3.1 VHC 42.6 at A

Photograph 3.2 VHC 38.5 at B

Photograph 3.3 VHC 42.6 at C

Photograph 3.4 VHC 22.1 at D

Photograph 3.5 VHC 43.6 at E

Photograph 3.6 VHC 41.4 at F

3.4 Potential bushfire intensity calculations

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

Bushfire resilient communities 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 assessment reference points shown in Figure 2.1 are presented in Table 3.2.

Table 3.2 Potential bushfire intensity

Assessment reference point	VHC	Potential fuel load (tonnes/ha)[1]	Slope (°)[2]	Potential bushfire intensity (kW/m)	Bushfire hazard class
A	VHC 42.6	2	0	131	Non-bushfire hazard class
B	VHC 38.5	2	0	131	Non-bushfire hazard class
C	VHC 42.6	2	0	131	Non-bushfire hazard class
D	VHC 22.1	28.4	0	26,504	High
E	VHC 43.6	0	0	0	Non-bushfire hazard class
F	VHC 41.4	3	0	296	Non-bushfire hazard class

Notes 1 Potential fuel load taken from Bushfire resilient communities.
2 Slope defaults to 0° for VHC 38.5, VHC 41.4, VHC 42.6 and VHC 43.6 which have discontinuous bushfire fuels or no bushfire fuels.

3.5 Bushfire hazard areas

Results of the potential bushfire intensity calculations determined that the site is affected by a high potential bushfire intensity area at assessment reference point D and the 100 m wide potential impact buffer from this area. Therefore, the proposed development is within a bushfire hazard area and must demonstrate compliance with the SPP bushfire prone area overlay code.

4 Bushfire hazards associated with the site

This chapter identifies bushfire hazards associated with the site.

4.1 Fire danger season

The fire danger season in South-east Queensland starts in August, peaks in September and begins to fall in November, but will remain elevated until 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 53 will be associated with hot, dry and windy conditions. If a bushfire starts and takes hold under these conditions, it will be difficult to control and fast moving in large areas of bushland vegetation.

4.2 Fire history

As discussed in Section 3.2, fire history data indicates no fires have occurred within 1 km of the site during the past 10 years. Nonetheless, there are numerous bushland conservation reserves in close proximity to the site which could be subject to prescribed burns. Therefore, it is considered possible that the site could be subjected to the impacts of a fire in the future.

4.3 Potential directions of bushfire attack

Bushfire attack on the proposed development is possible from the west, ie assessment reference point D shown in Figure 2.1, where hazardous vegetation occurs. This bushfire attack scenario is further assessed in Section 5.9.

4.4 Potential bushfire hazard from adjacent land use

Residential and commercial development and the area of horticulture adjoining the site are not bushfire hazards to the proposed development given they correlate with VHCs that are defined in Bushfire resilient communities as a low hazard.

Bushland vegetation to the west of the site is a potential bushfire hazard to the proposed development. Notwithstanding, the large permanent water body in the far western part of the site and Finucane Road will impede bushfire attack on the proposed development from a westerly direction.

4.5 Water and access for emergency services

The site has access to mains water and a public road network which will provide access and egress for emergency services and future occupants.

5 Bushfire hazards associated with the proposed development

This chapter identifies potential bushfire hazards associated with the proposed development.

5.1 Siting and design

The proposed development will be designed to mitigate the risk of bushfire hazards determined by the site-specific bushfire hazard assessment in this BMP.

Building envelopes will be appropriately setback from the area of hazardous vegetation at assessment reference point D which is shown in Figure 2.1.

Driveways will be designed to provide efficient access and egress for emergency services and future occupants.

The proposed development will be connected to mains water and will include a reticulated hydrant system.

5.2 Vulnerable use

The proposed development involves a hospital, research and educational facility and residential aged-care facility which are all defined as vulnerable uses in Table 7 of the SPP guidance material – bushfire.

Performance outcome PO14 of the example bushfire overlay code in the SPP guidance material – bushfire seeks the avoidance of vulnerable use development in bushfire hazard areas. However, where these developments are unavoidable in a bushfire hazard area, Bushfire resilient communities identifies that site planning may incorporate an asset protection zone (**APZ**) as a risk mitigation.

The proposed development will be appropriately separated from the hazardous vegetation at assessment reference point D shown in Figure 2.1, by an APZ which meets requirements of Bushfire resilient communities.

5.3 Community infrastructure for essential services

The hospital component of the proposed development is also defined as community infrastructure for essential services in Table 7 of the SPP guidance material – bushfire.

Community infrastructure for essential services must be able to function during and after a bushfire event. This outcome will be achieved with an APZ as explained in Section 5.2.

5.4 Hazardous materials in the context of bushfire hazard

The proposed development could involve the bulk storage of oxygen, nitrogen, liquified petroleum gas, etc, which could be defined as hazardous materials in the context of bushfire hazard in Table 7 of the SPP guidance material – bushfire.

5.5 Emergency access and egress

Access and egress for the proposed development will be via Delancey Street and Finucane Road.

Driveways and carparks will be appropriately designed for an urban fire truck to drive and manoeuvre within the site.

5.6 Fire-fighter water supply

The proposed development will be connected to mains water and advice will be obtained from a hydraulic engineer about any requirements for a hydrant system within the site.

5.7 Vegetation retention

The area of VHC 22.1 adjoining the waterbody in the far western part of the site will be retained under the proposed development. The bushfire hazard assessment in this BMP determined that this area of vegetation is associated with a high potential bushfire intensity area.

5.8 Development and operation

The proposed development will be developed and operated in accordance with requirements of the Queensland *Work Health and Safety Act 2011* (**WHS Act**) and associated regulation and guidelines, the Queensland *Environmental Protection Act 1994* (**EP Act**) and the relevant building assessment provisions under the Queensland *Building Act 1975* (**Building Act**).

5.9 Radiant heat exposure

The SPP bushfire prone area overlay code recommends avoiding vulnerable uses, community infrastructure for essential services, and hazardous materials in the context of bushfire hazard in a bushfire hazard area unless the bushfire risks can be mitigated to an acceptable or tolerable level.

Bushfire resilient communities provides a solution for mitigating bushfire risks to a tolerable level. It states that in addition to maintaining capability and capacity for disaster management, the bushfire hazard affecting a vulnerable use, community infrastructure for essential services or hazardous materials in the context of bushfire hazard can be mitigated to a tolerable level by separating buildings/storage infrastructure associated with these uses from hazardous vegetation by a distance which achieves a radiant heat flux level ≤ 10 kW/m^2 at the buildings/storage infrastructure.

As discussed in Section 4.3, bushfire attack on the proposed development is possible from assessment reference point D shown in Figure 2.1, where hazardous vegetation occurs. The radiant heat profile of this bushfire attack scenario was assessed using the BAL calculator. Inputs used in the BAL calculator and results are provided at Appendix 3.

Results determined that buildings/storage infrastructure must be separated from the edge of hazardous vegetation within the site by 16.2 m and from the edge of hazardous vegetation on the southern side of Finucane Road by 42.6 m, to achieve a radiant heat flux level ≤ 10 kW/m^2.

6 Bushfire mitigation plan

This chapter identifies mitigation measures that must be implemented as part of the proposed development to comply with the SPP bushfire prone area 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 actions in their entirety could result in an increased level of exposure to the bushfire hazards.

6.1 Asset protection zone

The APZ shown in Figure 6.1 must be established and maintained within the site. It is designed to ensure the proposed development achieves a radiant heat flux ≤ 10 kW/m^2.

Buildings and structures other than pathways/driveways, outdoor carparks, fencing or retaining walls must not be constructed within the APZ. Any construction within the APZ must be of fire-resisting materials.

An emergency assembly area or evacuation area must not be located within the APZ.

Landscaping within the APZ must be designed in accordance with Part 5 of *Bushfire Resilient Building Guidance for Queensland Homes* (QRA 2020) (**Bushfire resilient building**) which is publicly available online. Plant selection must favour species in Appendix E of Bushfire resilient building.

The APZ must be maintained as a low fuel hazard area with discontinuous bushfire fuels. Fallen leaves and branches and garden waste must be removed at regular time intervals during a calendar year. Lawn must be maintained at a nominal height of 100 millimetres.

6.2 Storage of hazardous materials

Hazardous materials must not be stored within the APZ. If hazardous materials are to be stored within 100 m of the edge of hazardous vegetation shown in Figure 6.1, the storage area must be indoors or have shielding against ember attack.

6.3 Access and egress

Driveways and carparks must be designed and constructed to meet the design requirements for urban fire trucks in the *Queensland Fire and Emergency Services – Fire Hydrant and Vehicle Access Guidelines for Residential Commercial and Industrial Lots* (QFES 2019) (**Fire hydrant and vehicle access guidelines**) which defers to the *Road Planning and Design Manual – 2nd Edition* (DTMR 2013) for load bearing capacity, geometry and turning radii.

Driveways and connections to Finucane Road and Delancey Street are shown in Figure 6.1.

6.4 Fire-fighter water supply

The proposed development must be connected to mains water and advice must be obtained from a hydraulic engineer about requirements for a hydrant system within the site.

The mains connection must be tested (and if required, augmented) to ensure that it has sufficient flow and pressure characteristics for fire-fighting purposes at all times, ie minimum pressure and flow of 10 litres/second at 200 kilopascals.

A hydraulic engineer must provide design and construction specifications for the hydrant system. Notwithstanding, these are outlined in Fire hydrant and vehicle access guidelines which defers to the

local water retailer's specifications and the *Australian Standard* (**AS 2419.1-2021**) *Fire hydrant installations System design, installation and commissioning.*

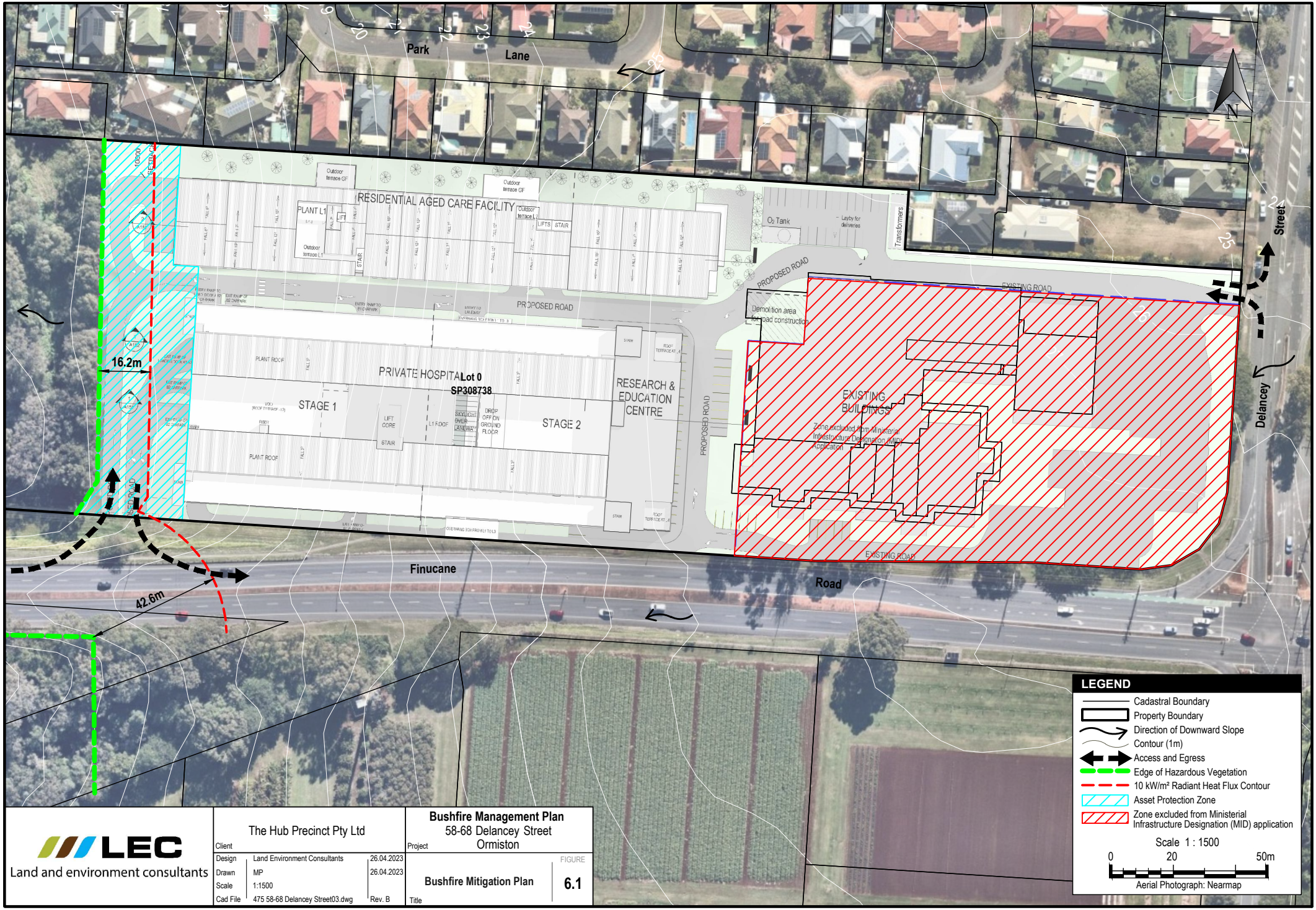
Fire hydrant and vehicle access guidelines state, where there are differences between a local water retailer's specifications and AS 2419.1-2021 the higher-level standard should prevail.

6.5 Service installation

Reticulated services, ie water, electricity and gas, must be installed underground.

6.6 Disaster management capacity and capability

In addition to the requirements in Sections 6.1-6.5, the proposed development must be developed and operated in accordance with requirements of the WHS Act and associated regulation and guidelines, the EP Act and the relevant building assessment provisions under the Building Act.



LEGEND

- Cadastral Boundary
- Property Boundary
- Direction of Downward Slope
- Contour (1m)
- Access and Egress
- Edge of Hazardous Vegetation
- 10 kW/m² Radiant Heat Flux Contour
- Asset Protection Zone
- Zone excluded from Ministerial Infrastructure Designation (MID) application

Scale 1 : 1500

0 20 50m

Aerial Photograph: Nearmap

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Client	The Hub Precinct Pty Ltd	Project	**Bushfire Management Plan** 58-68 Delancey Street Ormiston
Design	Land Environment Consultants	26.04.2023	
Drawn	MP	26.04.2023	
Scale	1:1500		
Cad File	475 58-68 Delancey Street03.dwg	Rev. B	
Title	**Bushfire Mitigation Plan**	FIGURE	**6.1**

7 Conclusion

This BMP was technically reviewed and approved by a suitably qualified person and is in general accordance with Bushfire resilient communities.

A site-specific bushfire hazard assessment confirmed that the site is affected by bushfire hazard and that the proposed development is subject to compliance with the SPP bushfire prone area overlay code.

Mitigation measures that must be implemented as part of the development and operation of the proposed development are specified in Chapter 6. With the implementation of these mitigation measures, the proposed development complies with the SPP bushfire prone overlay code as demonstrated at Appendix 4.

References

Queensland Department of Infrastructure, Local Government and Planning (DILGP) 2016, *Queensland State Planning Policy Natural Hazards, Risk and Resilience Technical Manual – A 'fit-for-purpose' approach in undertaking natural hazard studies and risk assessments*, April 2016

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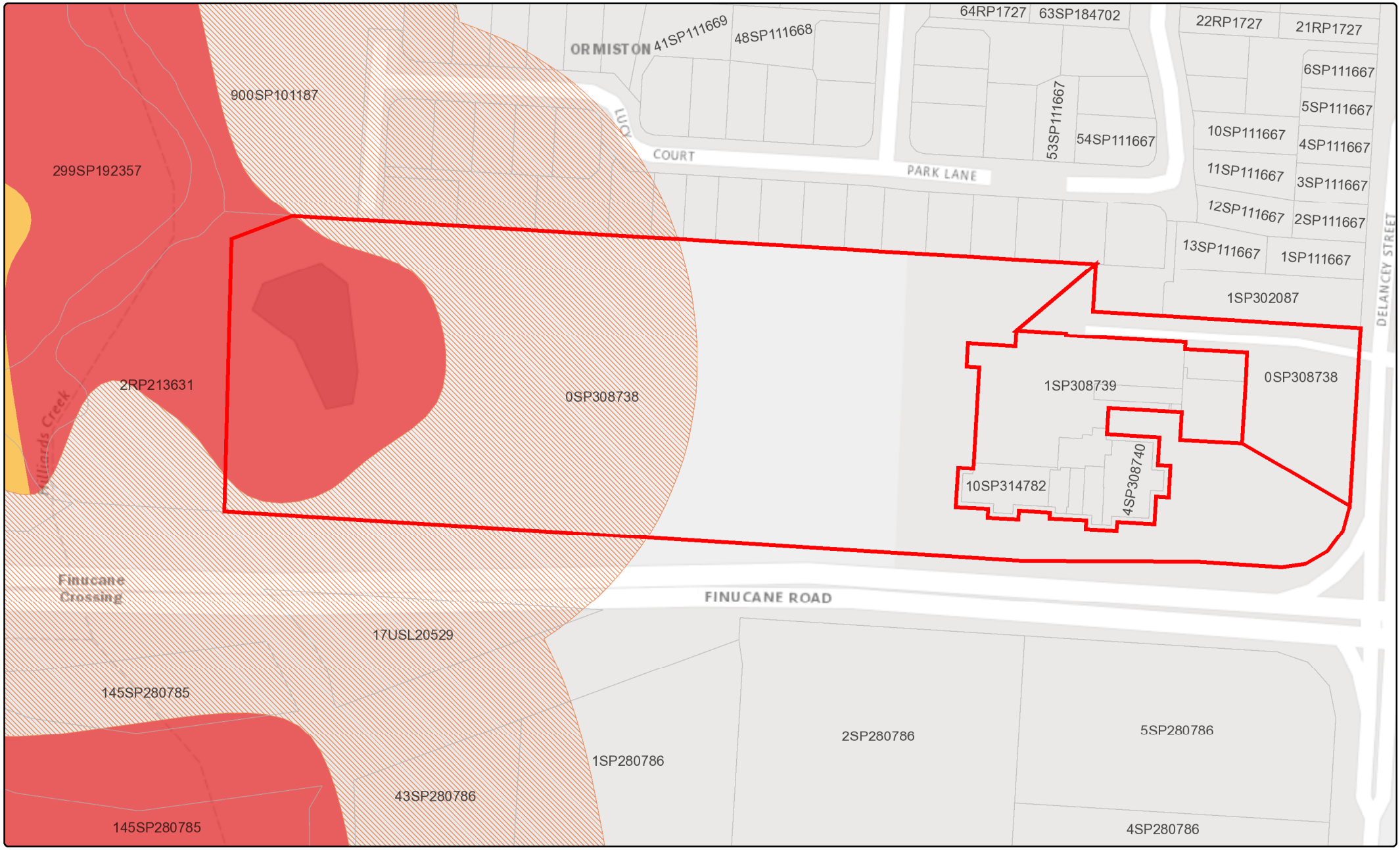
Queensland Reconstruction Authority (QRA) 2020, *Bushfire Resilient Building Guidance for Queensland Homes*, July 2020

Standards Australia Limited (Standards Australia) 2021, *Australian Standard 2419.1-2021 – Fire hydrant installation, System design, installation and commissioning*, Sixth edition, September 2021

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

Appendix 1 SPP bushfire prone area map



State Planning Policy

Making or amending a local planning instrument and designating land for community infrastructure

0 30 60 90 120

Metres

Date: 09/08/2022

Queensland Government

Disclaimer:
This map has been prepared with due care based on the best available information at the time of publication. However, the State of Queensland (acting through the department) makes no representations, either express or implied, that the map is free from errors, inconsistencies or omissions. Reliance on information contained in this map is the sole responsibility of the user. The State disclaims responsibility for any loss, damage or inconvenience caused as a result of reliance on information or data contained in this map.

Legend

Drawn Polygon Layer

Override 1

Cadastre

Cadastre

Bushfire prone area

Very High Potential Bushfire Intensity

High Potential Bushfire Intensity

Medium Potential Bushfire Intensity

Potential Impact Buffer

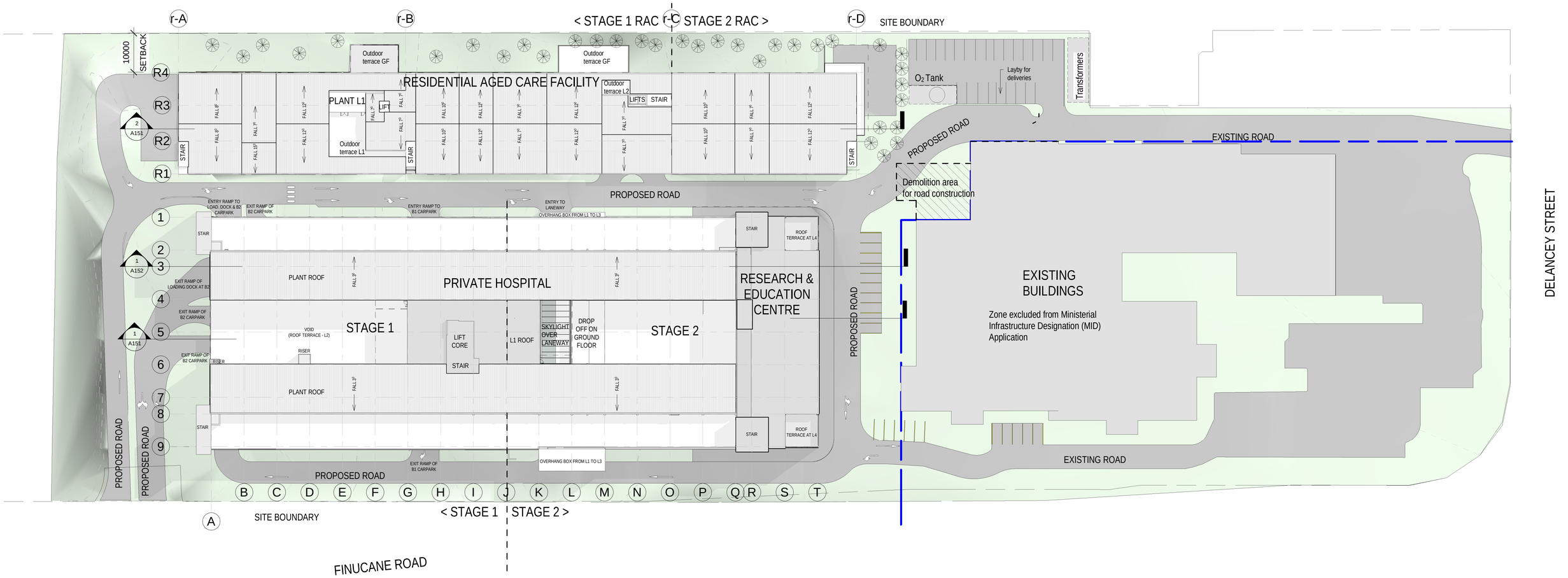
Queensland Government

State Planning Policy

Making or amending a local planning instrument and designating land for community infrastructure

Date: 09/08/2022

Appendix 2 Proposed site plan



CLARIFICATIONS AND DISCLAIMERS

1. THE MAXIMUM BUILDING HEIGHT VARIES IN RELATION TO THE ADJACENT AT GRADE GROUND LEVEL DUE TO SITE TOPOGRAPHY
2. REFER TO BUILDING SECTIONS FOR BUILDING HEIGHT INFORMATION, WHICH ARE TO BE READ IN CONJUNCTION WITH SITE PLANS FOR AT GRADE GROUND LEVELS
3. ALL PLANS ARE PRELIMINARY AND SUBJECT TO FURTHER DEVELOPMENT OF THE FUNCTIONAL BRIEF AND FINAL DESIGN
4. TENANCY SPACES ARE PROVIDED AS "COLD SHELL" AREAS FOR FIT OUT BY TENANTS
5. PARKING NUMBERS ARE SUBJECT TO DEVELOPMENT OF THE FINAL DESIGN FINAL DESIGN

0 5 10 15 m
SCALE 1:500 AT ORIGINAL SIZE

DESTRAVIS GROUP

PRELIMINARY

REV	DESCRIPTION	DATE	INIT
1	Revision 2	28/02/2023	
2	Revision 3	10/03/2023	NB
3	Coordination and Comments	27/03/2023	NB
4	Client's comments incorporated	04/04/2023	NS
5	MID Issue	26/04/2023	NS

CLIENT
THE HUB PRECINCT PTY LTD

PROJECT NAME
Hub68 Centre of Excellence - Aging & Wellness

LOCATION
58-68 DELANCEY STREET, ORMISTON QLD 4160

STATUS
MID ISSUE

DRAWING
STG2 - WHOLE SITE PLAN

SCALE @ A1
1 : 500

DATE
26/04/2023

DRAWN BY
JPS, NB & NS

JOB No
4_2301_03

DWG No
A140

REV
5

NORTH

Plot Date: 27/04/2023 10:24:37 AM

File Path: D:\Destravis Dropbox\DES_Projects\Hub 68_Cleveland M\DA\23_Working Drawings\230427 - HUB68 Centre of Excellence - Aging & Wellness.rvt

Appendix 3 Radiant heat exposure assessment

Bushfire attack – D (from within the site)

- Forest fire danger index - 53
- Vegetation - VHC 22.1 *Melaleuca open forests on seasonally inundated lowland coastal swamps*
- Understorey fuel load – 28.4 t/ha[1]
- Total fuel load – 28.4 t/ha[2]
- Effective slope – 0° slope
- Site slope – 0° slope
- Flame width – 6.5 m (based on a short-fire run of 35 m)

Note 1 Fuel load taken from *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire'* (QFES 2019) (**Bushfire resilient communities**).
2 A large permanent water body will impede bushfire attack from this area of vegetation. Bushfire attack is from a short-fire run between the water body and the development area. Flame width is reduced and a full intensity fire involving canopy fuel will not develop. Therefore, total fuel load is set to same value as understorey fuel load in the radiant heat flux model.

FPA AUSTRALIA | FLAMESOL

Calculated August 24, 2022, 9:48 am (MDc v.4.9)

J22087

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	53	Rate of spread	1.8 km/h
Vegetation classification	Forest	Flame length	15.14 m
Understorey fuel load	28.4 t/ha	Flame angle	25 °, 29 °, 35 °, 41 °, 44 ° & 62 °
Total fuel load	28.4 t/ha	Elevation of receiver	3.2 m, 3.67 m, 4.34 m, 4.96 m, 5.26 m & 6.68 m
Vegetation height	n/a	Fire intensity	26,503 kW/m
Effective slope	0 °	Transmissivity	0.891, 0.885, 0.876, 0.866, 0.86 & 0.8149999999999999
Site slope	0 °	Viewfactor	0.5835, 0.4258, 0.2808, 0.1883, 0.1525 & 0.0401
Flame width	6.5 m	Minimum distance to < 40 kW/m²	9.800000000000001 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	12.8 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	14.9 m
		Minimum distance to < 10 kW/m²	16.2 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

Short-fire run flame width calculations

Reference: New South Wales Rural Fire Service (NSW RFS) 2019, *Short Fire Run – Methodology for Assessing Bushfire Risk for Low Risk Vegetation*, May 2019

The shape and growth of a fire run can be determined mathematically and presented as an ellipse as shown in Figure 1.

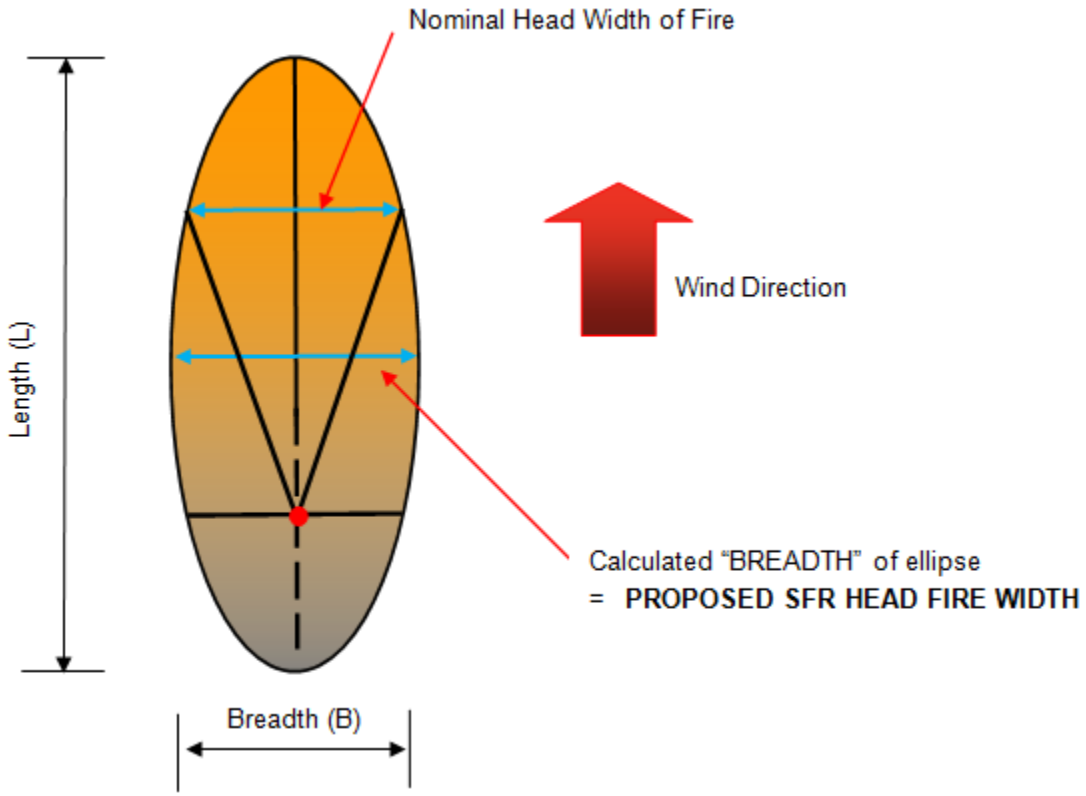


Figure 1 Schematic diagram of a simple elliptical fire growth model

The two basic dimensions of an elliptical fire outline are its length and breadth. The shape factor identified is more commonly referred to as the length-to-breadth ration or L/B. The L/B ratio is determined by dividing the total fire length by the maximum fire width or breadth.

L/B ratio

The short-run fire head width represents the horizontal dimension of the view factor used in the BAL model. To calculate the short-run fire head width we need to determine the L/B ratio using the following equation:

$L/B\ ratio = 1.0 + 0.0012V^{2.154}$

where

V = wind speed kilometres (km)/hour (hr) (AS 3959-2009 standard is 45 km/hr)

$L/B\ ratio = 1.0 + (0.0012 \times 45)^{2.154}$

L/B ratio = 5.4

Flame width

The breadth or short-run fire head width is determined by rearranging the L/B ratio equation.

If

L/B ratio = 5.4

Then

B = L/5.4

Bushfire attack from potential maximum fire run of 35 m

B = 35/5.4

B = 6.5

Bushfire attack – D (from the southern side of Finucane Road)

- Forest fire danger index - 53
- Vegetation - VHC 22.1 *Melaleuca open forests on seasonally inundated lowland coastal swamps*
- Understorey fuel load – 28.4 t/ha[1]
- Total fuel load – 38.4 t/ha[2]
- Effective slope – 0° slope
- Site slope – 0° slope
- Flame width – 100 m

Note 1 Fuel load taken from Bushfire resilient communities.
2 10 t/ha added to understorey fuel to determine total fuel load.

Calculated August 24, 2022, 9:54 am (MDc v.4.9)

J22087

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	53	Rate of spread	1.8 km/h
Vegetation classification	Forest	Flame length	16.34 m
Understorey fuel load	28.4 t/ha	Flame angle	52 °, 62 °, 70 °, 74 °, 76 ° & 82 °
Total fuel load	38.4 t/ha	Elevation of receiver	6.44 m, 7.21 m, 7.68 m, 7.85 m, 7.93 m & 8.09 m
Vegetation height	n/a	Fire intensity	35,835 kW/m
Effective slope	0 °	Transmissivity	0.869, 0.849, 0.821, 0.796, 0.783 & 0.723
Site slope	0 °	Viewfactor	0.6039, 0.447, 0.3032, 0.2062, 0.1678 & 0.0454
Flame width	100 m	Minimum distance to < 40 kW/m²	13.4 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	18 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	26 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	36.2 m
		Minimum distance to < 10 kW/m²	42.6 m

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

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

Elevation of receiver - Douglas & Tan, 2005

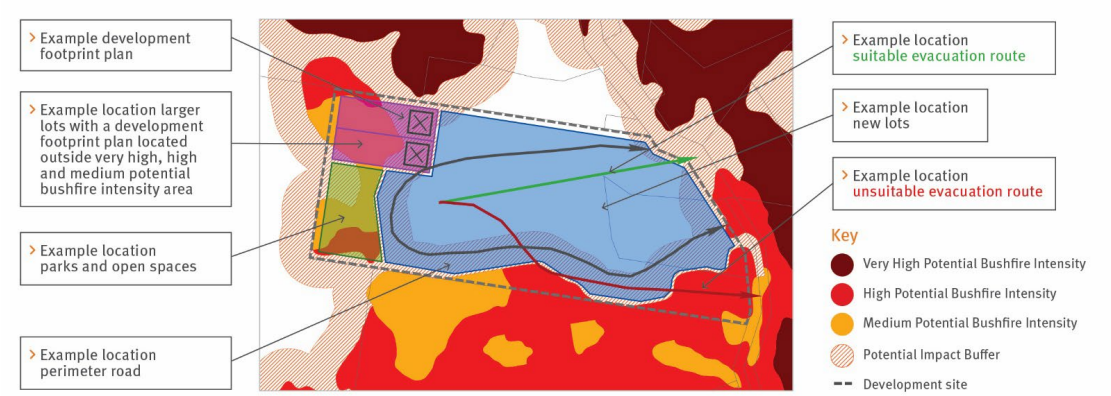
Flame angle - Douglas & Tan, 2005

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

Appendix 4 SPP bushfire prone area 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 *Bushfire resilient communities* 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** The proposed development is not for a reconfiguration of a lot.
	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 Bushfire resilient communities document.	**Not applicable** The proposed development is not for a reconfiguration of a lot.
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** The proposed development is not for a reconfiguration of a lot.
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	**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	**Not applicable** The proposed development is not for a reconfiguration of a lot.

Performance outcomes	Acceptable outcomes	Compliance assessment
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 *Bushfire resilient communities* 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.	in Table 5 at all lot boundaries; or : (b) a distance that achieves a radiant heat flux level of 29 kW/m^2 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 *Bushfire resilient communities* 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).	
	AO3.2 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** The proposed development is not for a reconfiguration of a lot.
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.	**AO4** No acceptable outcome is prescribed	**Not applicable** The proposed development is not for a reconfiguration of a lot.
PO5 The subdivision layout provides for adequate access and egress and safe evacuation routes, to achieve an acceptable or tolerable risk to people.	**AO5.1** The subdivision layout: (a) avoids the creation of bottle-neck points in the movement network within the development (for example, avoids	**Not applicable** The proposed development is not for a reconfiguration of a lot.

Performance outcomes	Acceptable outcomes	Compliance assessment
	hourglass patterns); and (b) ensures the road network has sufficient capacity for the evacuating population.	
	AO5.2 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** The proposed development is not for a reconfiguration of a lot.
 *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 *Bushfire resilient communities* 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.	**AO6.1** 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** The proposed development is not for a reconfiguration of a lot.
	AO6.2 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.	**Not applicable** The proposed development is not for a reconfiguration of a lot.

Performance outcomes	Acceptable outcomes	Compliance assessment
	Refer Figure 5.	
	AO6.3 Where the asset protection zone includes lots greater than 2000 square metres a development footprint plan is identified for each lot that is located in accordance with AO1.2.	**Not applicable** The proposed development is not for a reconfiguration of a lot.
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 *Bushfire resilient communities* 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** The proposed development is not for a reconfiguration of a lot.
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** The proposed development is not for a reconfiguration of a lot.
	AO8.2 Where the subdivision contains a reticulated water supply, the road network and fire hydrants are designed and installed in accordance with: (a) *Fire Hydrant and Vehicle Access Guidelines for residential, commercial and industrial lots*, Queensland	**Not applicable** The proposed development is not for a reconfiguration of a lot.

Performance outcomes	Acceptable outcomes	Compliance assessment
	Fire and Emergency Services, 2015, unless otherwise specified by the relevant water entity; and (b) the *Road Planning and Design Manual 2nd edition*, 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** The proposed development is not for a reconfiguration of a lot.

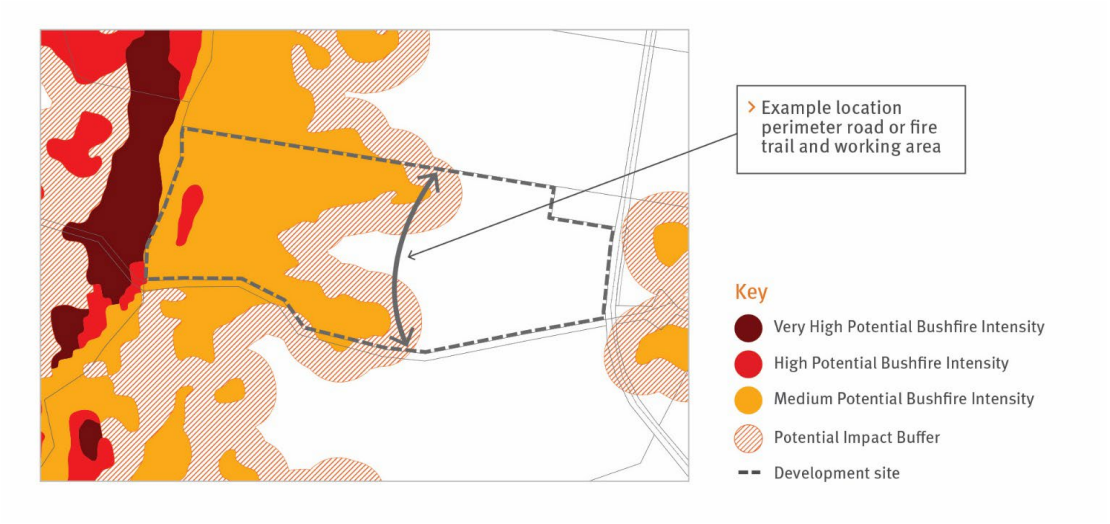


Figure 6 – Siting of fire trail and working area

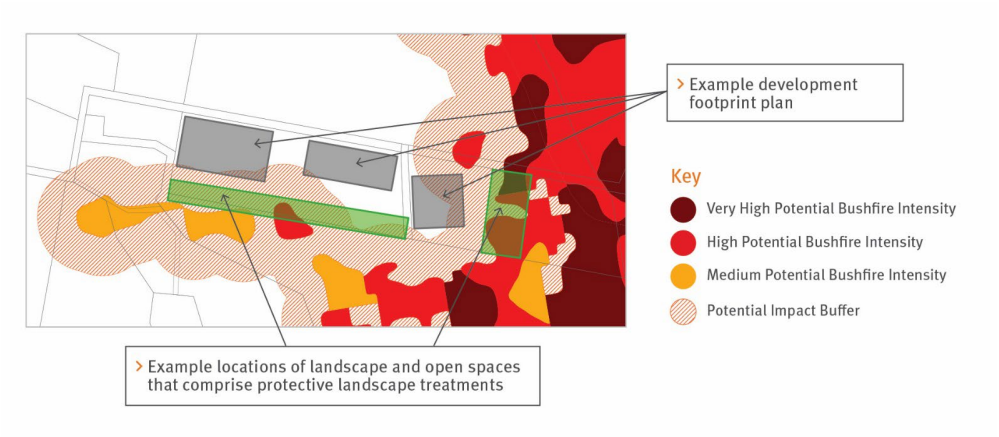
<table>
<tr><th>Performance outcomes</th><th>Acceptable outcomes</th><th>Compliance assessment</th></tr>
<tr><td colspan="3">Section E</td></tr>
<tr><td colspan="3">Material change of use</td></tr>
<tr><td rowspan="2">PO10
Site layout achieve an acceptable or tolerable risk to people.
Landscape or open space provided as part of the development:
(a) acts as a buffer between hazardous vegetation and 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 Bushfire resilient communities 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.</td><td>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.</td><td>Complies with A10.1
Figure 6.1 in the bushfire management plan (BMP) demonstrates that the site layout places landscaping and open spaces within the site between buildings and the hazardous vegetation which occurs in the far western part of the site. This area is identified as an asset protection zone (APZ) in the BMP.</td></tr>
<tr><td>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.</td><td>Complies with A10.2
Section 6.1 of the BMP provides design specifications for landscaping within the APZ. It requires landscaping to be designed in accordance with Part 5 of Bushfire Resilient Building Guidance for Queensland Homes (QRA 2020) (Bushfire resilient building). Plant selection must favour species in Appendix E of Bushfire resilient building.
Maintenance specifications for the APZ are also provided in Section 6.1 of the BMP.</td></tr>
<tr><td colspan="3"> 

Figure 7 – Siting of protective landscape treatments</td></tr>
<tr><td>PO11
The development establishes evacuation areas, to achieve an acceptable or tolerable risk to people.</td><td>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 Bushfire resilient communities document.</td><td>Not applicable
The proposed development is not within an isolated location and does not require an assembly/evacuation area to comply with this code. Nonetheless, Section 6.1 of the BMP does not permit an assembly</td></tr>
</table>

Performance outcomes	Acceptable outcomes	Compliance assessment
		area/evacuation area to be located with the APZ.
PO12 If on a lot of over 2,000 m^2, where involving a new premises or an existing premises with an increase in development 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	**AO12** No acceptable outcome is prescribed.	**Complies with PO12** The proposed development has direct access and egress via Delancey Street and Finucane Road. Driveways and carparks will be designed in accordance with the *Queensland Fire and Emergency Services – Fire Hydrant and Vehicle Access Guidelines for Residential Commercial and Industrial Lots* (QFES 2019) (**Fire hydrant and vehicle access guidelines**) which defers to the Road Planning and Design Manual – 2nd Edition (DTMR 2013). They will facilitate efficient manoeuvring for urban fire trucks and other emergency vehicles and facilitate the safe evacuation of the site.
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 *Bushfire resilient communities* document.	**AO13** No acceptable outcome is prescribed	**Complies with PO13** The proposed development will be connected to mains water and advice will be obtained from a hydraulic engineer about any requirements for a hydrant system which will be in accordance with Fire hydrant and vehicle access guidelines and the *Australian Standard* (AS 2419.1-2021) *Fire hydrant installations System design, installation and commissioning*.
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.	**AO14.1** No acceptable outcome is prescribed.	**Complies with PO14** The proposed development involves a hospital, research and educational facility and residential aged-care facility which are defined as vulnerable uses in Table 7 of the *Natural Hazards, Risk and Resilience – State Planning Policy State Interest guidance material* (DSDMIP 2019) (**SPP guidance material – bushfire**). The BMP defers to *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire'* (QFES 2019) (**Bushfire resilient communities**) for compliance with PO14.

Performance outcomes	Acceptable outcomes	Compliance assessment
Note – The preparation of a bushfire management plan in accordance with the methodology in the QFES *Bushfire resilient communities* document may assist in demonstrating compliance with this performance outcome		Bushfire resilient communities states that in addition to maintaining capability and capacity for disaster management, the bushfire hazard affecting vulnerable uses can be mitigated to a tolerable level by separating vulnerable use buildings from hazardous vegetation by a distance which achieves a radiant heat flux level ≤ 10 kilowatts/square metre (kW/m^2). Figure 6.1 in the BMP demonstrates that the site plan for the proposed development achieves this outcome and Section 6.6 of the BMP provides requirements to ensure disaster management capacity and capability are maintained.
PO15 Community infrastructure providing essential services listed in Table 7 are not established 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 (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 duringand immediately after a bushfire event. Note – The preparation of a bushfire management plan in accordance with the methodology in the QFES *Bushfire resilient communities* document may assist in demonstrating compliance with this performance outcome.	**AO15** No acceptable outcome is prescribed.	**Complies with PO15** The proposed development involves a hospital which is defined as community infrastructure for essential services in Table 7 of the SPP guidance material – bushfire. The BMP defers to Bushfire resilient communities to identify an appropriate mitigation measures for this use. Figure 6.1 in the BMP demonstrates that the site plan for the proposed development achieves this outcome and Section 6.6 of the BMP provides requirements to ensure disaster management capacity and capability are maintained.
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 *Bushfire resilient communities* document may assist in demonstrating compliance with this acceptable outcome. Editor's note – In addition to the requirements of this code the *Work Health*	**AO16** No acceptable outcome is prescribed.	**Complies with PO16** The proposed development could involve the storage of hazardous materials in the context of bushfire hazard as defined in Table 7 of the SPP guidance material – bushfire. As for the response to PO14 and PO15, the BMP defers to Bushfire resilient communities to identify an appropriate mitigation measures for this use. Section 6.2 in the BMP provides specifications for the appropriate storage of hazardous materials

Performance outcomes	Acceptable outcomes	Compliance assessment
and Safety Act 2011 and associated Regulation and Guidelines, the *Environmental Protection Act 1994* and the relevant building assessment provisions under the *Building Act 1975* 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.		within the site and Section 6.6 provides requirements to ensure disaster management capacity and capability are maintained.
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 QFES *Bushfire resilient communities* document may assist in demonstrating compliance with this performance outcome.	**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 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	**Complies with AO17.1** Refer to response to PO10
	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 *Bushfire resilient communities* document may assist in demonstrating compliance with this acceptable outcome.	**Complies with AO17.2** Refer to response to PO10.
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.	**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	**Not applicable** The proposed development does not involve planning provisions or conditions of approval which require revegetation or rehabilitation within the development area.

Performance outcomes	Acceptable outcomes	Compliance assessment
Note – The undertaking of a bushfire hazard assessment in accordance with the methodology in the QFES *Bushfire resilient communities* document may assist in demonstrating compliance with this performance outcome.	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 *Bushfire resilient communities* document may assist in demonstrating compliance with acceptable outcome (b).	
	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 accordance with the methodology in the QFES *Bushfire resilient communities* document may assist in demonstrating compliance with this acceptable outcome.	**Not applicable** The proposed development does not involve planning provisions or conditions of approval which require revegetation or rehabilitation within the development area.

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	*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*
Community infrastructure for essential services	*educational establishment, emergency services, hospital*

Group	Uses
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