Bushfire management plan/Statement addressing the Bushfire Protection Criteria coversheet

Site address: Lot 9500 320 Gull Road Keralup

Site visit: Yes ☑ No ☐

Date of site visit (if applicable): Day 15 Month 09 Year 2022

Report author or reviewer: Kathy Nastov

WA BPAD accreditation level (please circle):

Not accredited ☐ Level 1 BAL assessor ☐ Level 2 practitioner ☐ Level 3 practitioner ☑

If accredited please provide the following.

BPAD accreditation number: 27794 Accreditation expiry: Month August Year 2024

Bushfire management plan version number: 1.2

Bushfire management plan date: Day 15 Month December Year 2023

Client/business name: C-Wise

	Yes	No
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?		✔
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the bushfire protection criteria elements)?		✔

Is the proposal any of the following (see SPP 3.7 for definitions)?	Yes	No
Unavoidable development (in BAL-40 or BAL-FZ)		✔
Strategic planning proposal (including rezoning applications)		✔
High risk land-use	✔	
Vulnerable land-use	✔	

None of the above ☐

Note: Only if one (or more) of the above answers in the tables is yes should the decision maker (e.g. local government or the WAPC) refer the proposal to DFES for comment.

Why has it been given one of the above listed classifications (E.g. Considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?

The information provided within this bushfire management plan to the best of my knowledge is true and correct:

Signature of report author or reviewer 

Date 15/12/2023

BUSHFIRE PRONE PLANNING

FOGO Facility Keralup

Bushfire Management Plan (BMP)

Produced to meet the relevant requirements of STATE PLANNING POLICY 3.7 Planning in Bushfire Prone Areas & Guidelines

320 Gull Road, Keralup

Shire of Murray

Development Application

15 December 2023

Job Reference No: 220666

BPP GROUP PTY LTD T/A BUSHFIRE PRONE PLANNING

ACN: 39 166 551 784 | ABN: 39 166 551 784

LEVEL 1, 159-161 JAMES STREET
GUILDFORD WA 6055

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DOCUMENT CONTROL

PREPARATION		
Author:	Gearoid Fitzmaurice (BPAD Level 1 No. 61156)	
Reviewed:	Kathy Nastov (BPAD Level 3 No. 27794)	

VERSION HISTORY		
Version	Details	Date
1.0	Original	3 October 2023
1.1	Addressing client comments	17 October 2023
1.2	Addition of Executive Summary	25 October 2023
1.3	Additional recommendations	15 December 2023

DISTRIBUTION					
Destination		Version	No. Copies	Hard Copy	Electronic Copy
Person	Email				
Matthew Hobley	matthew.hobley@talisconsultants.com.au	1.0	1	☐	☒
		1.1	1	☐	☒
		1.2	1	☐	☒
		1.3	1	☐	☒

Limitations: *The protection measures that will be implemented based on information presented in this Bushfire Management Plan are minimum requirements and they do not guarantee that buildings or infrastructure will not be damaged in a bushfire, persons injured, or fatalities occur either on the subject site or off the site while evacuating.*

This is substantially due to the unpredictable nature and behaviour of fire and fire weather conditions. Additionally, the correct implementation of the required protection measures (including bushfire resistant construction) and any other required or recommended measures, will depend upon, among other things, the ongoing actions of the landowners and/or operators over which Bushfire Prone Planning has no control.

All surveys, forecasts, projections and recommendations made in this report associated with the proposed development are made in good faith based on information available to Bushfire Prone Planning at the time. All maps included herein are indicative in nature and are not to be used for accurate calculations.

Notwithstanding anything contained therein, Bushfire Prone Planning will not, except as the law may require, be liable for any loss or other consequences whether or not due to the negligence of their consultants, their servants or agents, arising out of the services provided by their consultants.

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LIST OF FIGURES

EXECUTIVE SUMMARY

In July of 2022 Bushfire Prone Planning were commissioned by Talis Consulting (on behalf of C-Wise) to undertake a Bushfire Management Plan for the proposed FOGO Facility located at Lot 9500 320 Gull Road Keralup. A site visit was conducted in September 2022. During the assessment photos of the vegetation surrounding the development were photographed and then classified in accordance with AS3959:2018. The vegetation and their distances to the building determine the BAL (Bushfire Attack Level) rating which inform the developers what building materials to use. The development was also assessed against 5 elements of bushfire protection criteria in the Guidelines for Planning in Bushfire Prone Areas (Version 1.4). These are Location, Siting and Design, Vehicular Access Water and Vulnerable Land Use

The vegetation immediately surrounding the lot was found to be predominantly scrub and grassland. This will be managed to a low threat state in perpetuity. Nearby wetland vegetation has received a buffer and will be allowed to revegetate within it. The office near the weighbridge has been given an indicative BAL-29 rating. The workshop has been given an indicative rating of BAL-19. Note these are indicative ratings and lower BAL ratings (such as BAL12.5) can be achieved with the appropriate management of the surrounding vegetation. Lower BAL ratings can only be given during the compliance check prior to the construction of any buildings. A tension fabric roof cover can be installed on the plant, but it cannot be within 6m of a habitable building.

During this assessment it was found that the development would be non-compliant with Vehicular Access. Due to site constraints the nearest two-way access road is 4km from the lot boundary. This is longer than the maximum distance of 200m set by the Guidelines. An acceptable solution of an onsite shelter was proposed. The onsite shelter will be integrated into the crib room and office area. In the event of a bushfire where early evacuation is not possible the onsite shelter can be used to house up to 65 people. This building can only be subject to 10kW/m^2 and a larger asset protection zone will be installed around it. It will be constructed using NASH Standard to BAL-29. A 10kW/m^2 buffer around all buildings has been recommended by this report and the subsequent risk report.

The BMP also established the need for water tanks exclusive for firefighting to be installed on site. The proposed private driveways will be two-way and complaint with public road standards. They will need to be slashed to 3m as required on road verges.

Due to the land use being classed as "Vulnerable", it was also determined that a Bushfire Emergency Plan and a Bushfire Risk Management Plan be developed to be used in conjunction with this report.

SUMMARY STATEMENTS

THIS DOCUMENT – STATEMENT OF PURPOSE

The Bushfire Management Plan (BMP)

The BMP sets out the required package of bushfire protection measures to lessen the risks associated with a bushfire event. It establishes the responsibilities to implement and maintain these measures.

The BMP also identifies the potential for any negative impact on any environmental, biodiversity and conservation values that may result from the application of bushfire protection measures or that may limit their implementation.

Risks Associated with Bushfire Events

The relevant risks are the potential for loss of life, injury, or destroyed or damaged assets which results in personal loss and economic loss. For a given site, the level of that risk to persons and assets (the exposed elements) is a function of the potential threat levels generated by the bushfire hazard, and the level of exposure and vulnerability of the at risk elements to the threats.

Bushfire Protection Measures

The required package of protection measures is established by *State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7)*, its associated *Guidelines* and any other relevant guidelines or position statements published by the Department of Planning, Lands and Heritage. These measures are limited to those considered by the WA planning authorities as necessary to be addressed for the purpose of land use planning. They do not encompass all available bushfire protection measures as many are not directly relevant to the planning approval stage. For example:

- Protection measures to reduce the vulnerability of buildings to bushfire threats is primarily dealt with at the building application stage. They are implemented through the process of applying the Building Code of Australia (Volumes 1 and 2 of the national Construction Code) in accordance with WA building legislation and the application of construction requirements based on a building's level of exposure - determined as a Bushfire Attack Level (BAL) rating); or
- Protection measures to reduce the threat levels of consequential fire (ignited by bushfire and involving combustible materials surrounding and within buildings) and measures to reduce the exposure and vulnerability of elements at risk exposed to consequential fire, are not specifically considered.

The package of required bushfire protection measures established by the Guidelines includes:

- The requirements of the bushfire protection criteria which consist of:
    - Element 1: Location (addresses threat levels).
    - Element 2: Siting and Design of Development (addresses exposure levels of buildings).
    - Element 3: Vehicular Access (addresses exposure and vulnerability levels of persons).
    - Element 4: Water (addresses vulnerability levels of buildings).
    - Element 5: Vulnerable Tourism Land Uses (addresses exposure and vulnerability as per Elements 1-4 but in use specific ways and with additional considerations of persons exposure and vulnerability).
- The requirement to develop Bushfire Emergency Plans / Information for 'vulnerable' land uses for persons to prepare, respond and recover from a bushfire event (this addresses vulnerability levels).
- The requirement to assess bushfire risk and incorporate relevant protection measures into the site emergency plans for 'high risk' land uses (this addresses threat, exposure and vulnerability levels).

Compliance of the Proposed Development or Use with SPP 3.7 Requirements

The BMP assesses the capacity of the proposed development or use to implement and maintain the required 'acceptable' solutions and any additionally recommended bushfire protection measures - or its capacity to satisfy the policy intent through the justified application of additional bushfire protection measures as supportable 'alternative' solutions.

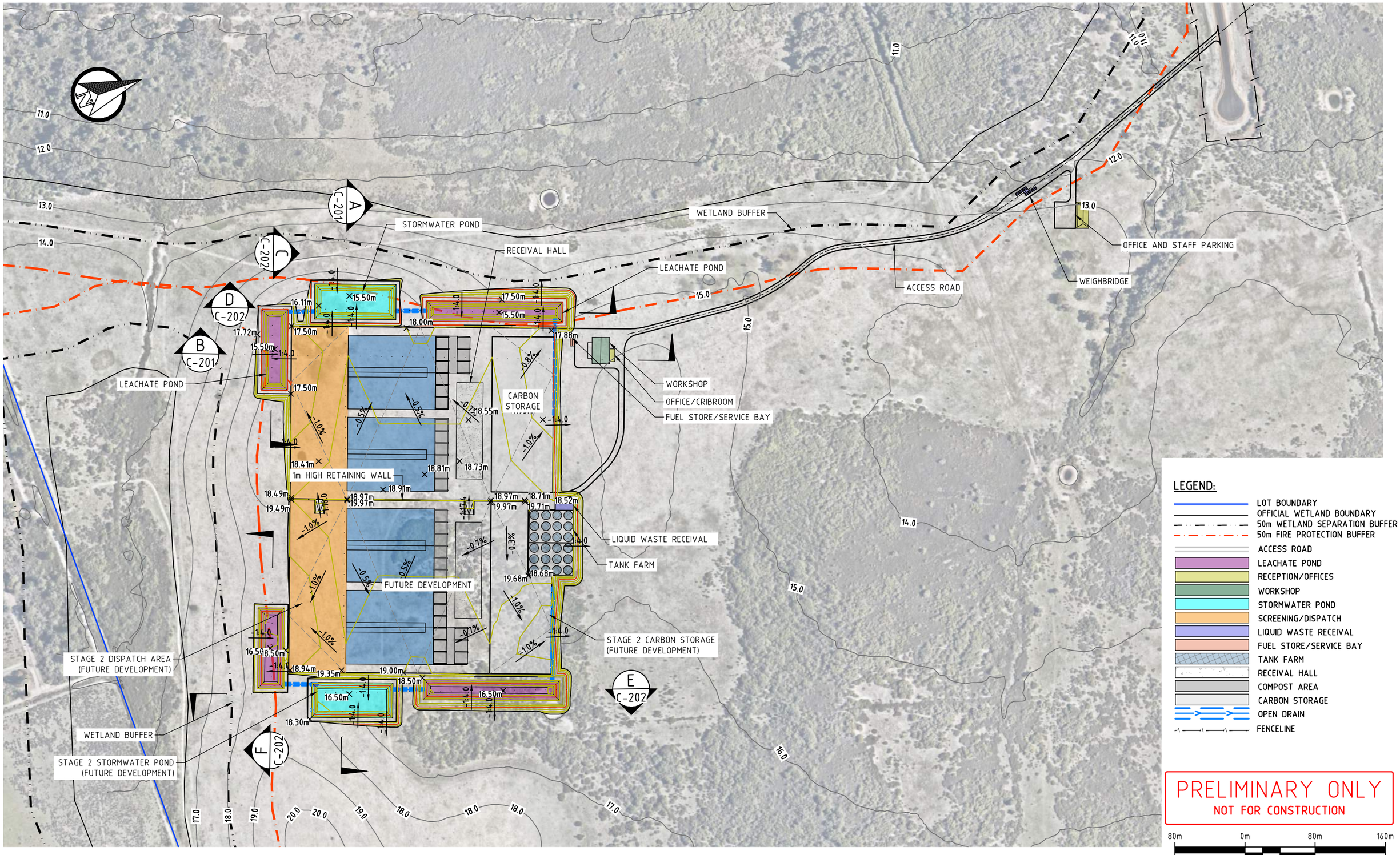
THE PROPOSED DEVELOPMENT/USE – BUSHFIRE PLANNING COMPLIANCE SUMMARY		
Environmental Considerations		**Assessment Outcome**
Will land with identified environmental, biodiversity and conservation values limit the full application of the required bushfire protection measures?		No
Will land with identified environmental, biodiversity and conservation values need to be managed in the implementation and maintenance of the bushfire protection measures - but not limit their application?		No
Required Bushfire Protection Measures The Acceptable Solutions of the Bushfire Protection Criteria (Guidelines)		**Assessment Outcome**
Element	The Acceptable Solutions	
1: Location	A1.1 Development location	Fully Compliant
2: Siting and Design of Development	A2.1 Asset Protection Zone (APZ)	Fully Compliant
3: Vehicular Access	A3.1 Public roads	Fully Compliant
	A3.2a Multiple access routes	Not Compliant
	A3.2b Emergency access way	N/A
	A3.3 Through-roads	Partly Compliant
	A3.4a Perimeter roads	N/A
	A3.4b Fire service access route	N/A
	A3.5 Battle-axe legs	N/A
	A3.6 Private driveways	Fully Compliant
4: Water	A4.1 Identification of future water supply	N/A
	A4.2 Provision of water for firefighting purposes	Fully Compliant
5: Vulnerable Tourism Land Uses		
Day Uses	A5.13a Siting and design – APZ	Fully Compliant
	A5.13b Siting and design – onsite shelter – pedestrian paths	N/A
	A5.13c Siting and design – onsite shelter – exposure to hazard	Fully Compliant
	A5.13d Siting and design – onsite shelter – construction requirements.	Fully Compliant
	A5.14a Vehicular access – multiple access routes	Not Compliant

	A5.14b Vehicular access – no-through roads – maximum length	N/A
	A5.14c Vehicular access – EAW – alternative access option	N/A
	A514d Vehicular access – access limitations - onsite shelter option	Fully Compliant
	A5.14e Vehicular access – public roads - technical requirements	Fully Compliant
	A5.14f Vehicular access – internal access/private driveway – tech. req.	Partly Compliant
	A5.14g Vehicular access – internal access/private driveway - availability	Fully Compliant
	A5.14h Vehicular access – signage	Fully Compliant
	A5.15a Provision of water – reticulated	N/A
	A5.15b Provision of water – non-reticulated – tank capacity	Fully Compliant
	A5.15c Provision of water – non-reticulated technical requirements	Fully Compliant
Other 'Bushfire Planning' Documents to Be Produced This necessity for additional documents is determined by the proposed development/use type and the requirements established by SPP 3.7 and the associated Guidelines (as amended). They may be produced concurrently or subsequent to the BMP. Relevant actions will be identified within Section 6 'Responsibilities for Implementation of Bushfire Protection Measures.		**Required**
Bushfire Emergency Plan: An operational document presenting prevent, prepare, respond and recover procedures and associated actions. As necessary, supporting information to justify determinations is included.		Yes
Summary Statement: Due to the type of facility and its remote location a BEP will be required.		
Bushfire Emergency Information (Poster): As a concise response information poster for certain vulnerable land uses.		Yes
Summary Statement: A Bushfire Emergency Poster will be created as part of the Bushfire Emergency Plan and will be required to be displayed on site.		
Bushfire Emergency Information (Content): As content for inclusion into the Site's Emergency Plan for certain high risk land uses:		Yes
Bushfire Risk Assessment and Management Report:		Yes
Summary Statement: The proposed development is considered a 'high-risk' land use as defined by SPP 3.7 and its associated Guidelines. This triggers the requirement, through the development of a Risk Assessment and Management Report to: • Identify the level of exposure and vulnerability of any onsite stored materials and liquids to bushfire attack mechanisms (threats); • Identify any potential source of ignition threat the use may present to adjoining and/or adjacent bushfire prone vegetation; and • Recommend protection measures that can be incorporated into the site operations emergency plan as necessary. The requirement for this report to be developed and any variation to content, can be decided by the planning approval decision maker (e.g., the local government). Otherwise, SPP 3.7 states it 'should' be produced.		

1 PROPOSAL DETAILS AND THE BUSHFIRE MANAGEMENT PLAN

1.1 The Proposed Development/Use Details, Plans and Maps

The Proposal's Planning Stage For which certain bushfire planning documents are required to accompany the planning application.		Development Application	
The Subject Land/Site		Lot 9500 on Plan 414516	
Total Area of Subject Lot/Site		1608.903 hectares	
Number of Additional Lots Created		N/A	
Primary Proposed Construction	**Type(s)**	Waste management	
	NCC Classification	Class 8 (factory/workshop/laboratory)	Class 5 (office building - professionals)
The 'Specific' Land Use Type for **Bushfire Planning** When applicable, this classification establishes a requirement to conduct assessments and develop documents that are additional to this Bushfire Management Plan.		Facility: High-Risk Land Use Additional consideration: Vulnerable Tourism Land Use	
Factors Determining the 'Specific Bushfire Planning' Land Use Type		The land use will store combustible materials and/or flammable hazardous materials onsite that may be exposed and vulnerable to ignition from the direct attack mechanisms of bushfire (flame contact, radiant heat and embers). Business operations/activities may include those that are a potential source of ignition for onsite or offsite combustible/flammable materials, including bushfire prone vegetation.	
Additional Factors Determining the 'Specific' Land Use Type		The proposed development is a land use that is categorised as a Day uses (Group Tours)	
Additional Factors Determining the 'Specific' Land Use Type		The proposed land use involves visitors who are unfamiliar with the surroundings and/or presents evacuation challenges. The proposal would benefit from a Bushfire Emergency Plan to manage the safety of occupants in a bushfire event.	
Description of the Proposed Development/Use			
Proposed Food Organics and Garden Organics (FOGO) Facility including provision for educational day tours/school groups.			



LEGEND:

- LOT BOUNDARY
- OFFICIAL WETLAND BOUNDARY
- 50m WETLAND SEPARATION BUFFER
- 50m FIRE PROTECTION BUFFER
- ACCESS ROAD
- LEACHATE POND
- RECEPTION/OFFICES
- WORKSHOP
- STORMWATER POND
- SCREENING/DISPATCH
- LIQUID WASTE RECEIVAL
- FUEL STORE/SERVICE BAY
- TANK FARM
- RECEIVAL HALL
- COMPOST AREA
- CARBON STORAGE
- OPEN DRAIN
- FENCELINE

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

80m 0m 80m 160m

1:4000 @ A3

VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM
HORIZONTAL DATUM: MGA 94 ZONE 50

talis consultants
ASSET
ENGINEERING
ENVIRONMENT
NOISE
SPATIAL
WASTE
PERTH
604 Newcastle Street Leederville WA 6007
PO Box 454 Leederville WA 6903
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Client: C-WISE Soil Carbon Solutions

NOTES

1. This drawing is the property of Talis Consultants Pty Ltd. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
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No.	Date	Drwn.	Chk.	Amendment / Issue	App.
D	16.01.2023	MH	AB	SITE LAYOUT UPDATED	MH
C	15.11.2022	AB	MH	BOUNDARIES UPDATED	MH
B	02.03.2022	YJ	AB	SECTIONS AND ISOPACHYTE LAYOUT ADDED	MH
A	15.11.2021	YJ	AB	PRELIMINARY ISSUE	MH

Project: C-WISE DUE DILIGENCE AND APPROVALS

Title: SITE PLAN LAYOUT

Scale: 1:4000 @ A3 Date: 02.03.2022
Drawn: YJ Checked: AB Approved: MH
Job No: TW21124 Drg. No: C-101 Rev: D
Filename: TW21124-SET.DWG

Figure 1.2

Proposed Development

Lot 9500 on Plan 414516, Area : 1,608.9031 ha
320 Gull Road,
KERALUP 6182
SHIRE OF MURRAY

OFFICE
WEIGHBRIDGE
Lot 9500
OFFICE / CRIBROOM
WORKSHOP
FUEL STORE SERVICE BAY
LIQUID WASTE RECEIVAL
RECEIVAL HALL
10 m
12 m
14 m
16 m
18 m
8 m

------ LEGEND ------

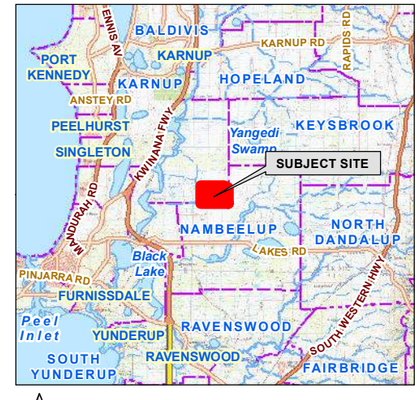
- Development Site
- Subject Site
- Other Lots
- Development

Description

- Office
- Office / Cribroom
- Workshop
- Receival Hall
- Weighbridge
- Liquid Waste Receival
- Fuel Store Service Bay
- Driveway

0 50 100 150 200 250
Metres

------ LOCALITY ------



Aerial Imagery : Landgate/SLIP
Image Date : Feb 2022

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Ian Ross 13/10/2023
Map updated by: Ian 13/10/2023
A3 Scale 1:5,000

BUSHFIRE PRONE PLANNING

Map Document Path / Name: K:\Projects\Jobs 2022\220666 - 320 Gull Road Keralup (BMP)\Mapping\MXD\220666_Fig1-2_DEV_320 Gull Road Keralup.mxd

Figure 1.3

Location Plan

Lot 9500 on Plan 414516, Area : 1,608.9031 ha
320 Gull Road,
KERALUP 6182
SHIRE OF MURRAY

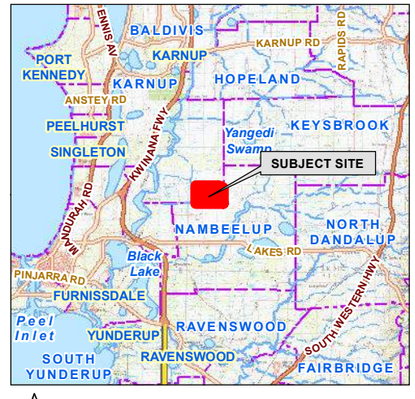
------ LEGEND ------

- Development Site
- Subject Site
- Development
- Future Development
- Locality / Suburb
- Career Fire & Rescue Service
- State Emergency Service Unit
- Volunteer Fire & Emergency Service Unit
- Volunteer Fire & Rescue Service
- Driveway

DEVELOPMENT SITE

0 1 2 3
Kilometres

------ LOCALITY ------



Aerial Imagery : Landgate/SLIP
Image Date : Feb 2022

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Ian Ross 13/11/2022
Map updated by: Ian 13/11/2022
A3 Scale 1:50,000

BUSHFIRE PRONE PLANNING

Map Document Path / Name: K:\Projects\Jobs 2022\220666 - 320 Gull Road Keralup (BMP)\Mapping\MXD\220666_Fig1-3_LOC_320 Gull Road Keralup.mxd

WHERE SPP 3.7 AND THE GUIDELINES ARE TO APPLY – DESIGNATED BUSHFIRE PRONE AREAS

All higher order strategic planning documents, strategic planning proposals, subdivisions and development applications located in designated bushfire prone areas need to address SPP 3.7 and its supporting Guidelines. This also applies where an area is not yet designated as bushfire prone but is proposed to be developed in a way that introduces a bushfire hazard.

For development applications where only part of a lot is designated as bushfire prone and the proposed development footprint is wholly outside of the designated area, the development application will not need to address SPP 3.7 or the Guidelines. (Guidelines DPLH 2021 v1.4, s1.2).

For subdivision applications, if all the proposed lots have a BAL-LOW indicated, a BMP is not required. (Guidelines DPLH 2021 v1.4, s5.3.1).

Figure 1.4

Bushfire Prone Area

Lot 9500 on Plan 414516, Area : 1,608.9031 ha
320 Gull Road,
KERALUP 6182
SHIRE OF MURRAY

Lot 9500

GULL RD

------ **LEGEND** ------

- Development Site
- Subject Site
- Other Lots
- Development

Description

- Office
- Office / Cribroom
- Workshop
- Receival Hall
- Weighbridge
- Liquid Waste Receival
- Fuel Store Service Bay
- Driveway

Bush Fire Prone Areas

- Bushfire Prone Areas (2021)

0 200 400 600 800 1,000
Metres

------ **LOCALITY** ------

Aerial Imagery : Landgate/SLIP
Image Date : Feb 2022

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Ian Ross 13/10/2023
Map updated by: Ian 13/10/2023
A3 Scale 1:15,000

BUSHFIRE PRONE PLANNING

Map Document Path / Name: K:\Projects\Jobs 2022\220666 - 320 Gull Road Keralup (BMP)\Mapping\MXD\220666_Fig1-4_BPA_320 Gull Road Keralup.mxd

1.2 The Bushfire Management Plan (BMP)

1.2.1 Commissioning and Purpose

Landowner / proponent:	C-Wise
Bushfire Prone Planning commissioned to produce the BMP by:	Talis Consultants
Purpose of the BMP:	To apply the requirements established by State Planning Policy 3.7: Planning in Bushfire Prone Areas (SPP 3.7) and accompany the development application.
BMP to be submitted to:	Shire of Murray

1.2.2 Existing Documents with Implications for Development of this BMP

This section identifies any known assessments, reports or plans that have been conducted and prepared previously, or are being prepared concurrently, and are relevant to the subject site and the proposal/application. They potentially have implications for the assessment of bushfire threats and the implementation of the protection measures that are dealt with in the Bushfire Management Plan.

Table 1.4: Existing documents that may impact threat assessments and protection measure development.

EXISTING RELEVANT DOCUMENTS			
Existing Document	Relevant to the Proposal and the BMP	Copy Provided by Proponent / Developer	Title
Structure Plan	No	No	-
Bushfire Management Plan	No	No	-
Bushfire Emergency Plan or Information	Yes	N/A	-
Implications for the BMP: Bushfire Prone Planning to develop BEP for this site.			
Bushfire Risk – Assessment and Management Report	Yes	N/A	-
Implications for the BMP: Bushfire Prone Planning to develop Risk Report for this site.			
Environmental Asset or Vegetation Survey	Yes	Yes	Lot 9500 Gull Road Keralup -Flora, Vegetation and Fauna Survey (December 2021)
Implications for the BMP: Vegetation survey completed in 2021. No Threatened of Priority Flora were identified during the survey. (See Addendum)			
Landscaping (Revegetation) Plan	No	No	-
Implications for the BMP: N/A			
DPLH BMP Guidance 'Regions & Uses'	No	No	-
Implications for the BMP: N/A			

2 ENVIRONMENTAL CONSERVATION (DESKTOP ASSESSMENT)

Important: *This 'desktop' assessment must not be considered as a replacement for a full Environmental Impact Assessment. It is a summary of potential environmental values at the subject site, inferred from information contained in listed datasets and/or reports, which are only current to the date of last modification.*

These data sources must be considered indicative where the subject site has not previously received a site-specific environmental assessment by an appropriate professional.

Many bushfire prone areas also have high biodiversity values. Consideration of environmental priorities within the boundaries of the land being developed can avoid excessive or unnecessary modification or clearing of vegetation. Approval processes (and exemptions) apply at both Commonwealth and State levels.

Any 'modification' or 'clearing' of vegetation to reduce bushfire risk is considered 'clearing' under the ***Environmental Protection Act 1986*** (EP Act) and requires a clearing permit under the ***Environmental Protection (Clearing of Native Vegetation) Regulations 2004*** (Clearing Regulations) – unless for an exempt purpose.

Clearing native vegetation is an offence, unless done under a clearing permit or the clearing is for an exempt purpose. Exemptions are contained in the EP Act or are prescribed in the Clearing Regulations (note: these do not apply in environmentally sensitive areas).

The ***Department of Water and Environmental Regulation*** (DWER) is responsible for issuing 'clearing' permits and the framework for the regulation of clearing. Approvals under other legislation, from other agencies, may also be required, dependent on the type of flora or fauna present.

Local Planning Policy or Local Biodiversity Strategy: Natural areas that are not protected by the above Act and Regulation (or any other National or State Acts) may be protected by a local planning policy or local biodiversity strategy. Permission from the local government will be required for any modification or removal of native vegetation in these Local Natural Areas (LNA's). Refer to the relevant local government for detail.

For further Information refer to Guidelines v1.4, the Bushfire and Vegetation Factsheet - WAPC, Dec 2021 and https://www.der.wa.gov.au/our-work/clearing-permits

2.1 Existing Vegetation on Private Land

2.1.1 Declared Environmentally Sensitive Areas (ESA)

Table 2.1: Identification of relevant ESA.

IDENTIFICATION OF ESA							
ESA Class	Relevant to Proposal	Influence on Bushfire Threat Levels and / or Application of Bushfire Protection Measures	Relevant Dataset	Information Source(s) Applied to Identification of Relevant Vegetation			Further Action Required
				Dataset	Landowner or Developer	Environmental Asset or Vegetation Survey	
Wetlands and their 50m Buffer (Ramsar, conservation category and nationally important)	Yes	Yes-Significant	DBCA-010 and 011, 019, 040, 043, 044	☒	☐	☐	None
Bush Forever	No	No	DPLH-022, SPP 2.8	☒	☐	☐	None
Threatened and Priority Flora + 50m Continuous Buffer	No	No	DBCA-036	Restricted Scale of	☐	☐	None

Threatened Ecological Community	No	No	DBCA-038	Data Available (security)	☐	☐	None
Heritage Areas National / World	No	No	Relevant register or mapping	☒	☐	☐	None
Environmental Protection (Western Swamp Tortoise) Policy 2002	No	No	DWER-062	☒	☐	☐	None

DESCRIPTION OF THE IDENTIFIED ENVIRONMENTALLY SENSITIVE AREAS

A wetland exists to the east and south of the development. A wetland buffer has been applied to the development. Vegetation within the area has been classified as worst-case scenario in the Post Development Vegetation Map(Figure 3.1.1) and BAL Contour map (Figure 3.2)

2.2 Existing Vegetation on Public Land

Table 2.4: Identification of vegetation on public land with environmental, biodiversity and conservation values.

IDENTIFICATION OF PROTECTED VEGETATION ON PUBLIC LAND							
Land with Environmental, Biodiversity, Conservation and Social Values	Relevant to Proposal	Influence on Bushfire Threat Levels and / or Application of Bushfire Protection Measures	Relevant Dataset	Information Source(s) Applied to Identification of Relevant Vegetation			Further Action Required
				Dataset	Landowner or Developer	Environmental Asset or Vegetation Survey	
Legislated Lands (tenure includes national park/reserve, conservation park, crown reserve and state forest)	No	N/A	DBCA-011	☒	☐	☐	N/A
Conservation Covenants	No	N/A	DPIRD-023	Only Available to Govt.	☐	☐	N/A
National World Heritage Areas	No	No	-	☒	☐	☐	N/A
Designated Public Open Space	No	N/A	-	☒	☐	☐	N/A

2.3 Planned Landscaping and/or Re-vegetation

Table 2.5: Identification of land subject to planned vegetation modification.

AREAS OF LAND PLANNED FOR RE-VEGETATION OR LANDSCAPING			
Land with Environmental, Biodiversity, Conservation and Social Values	Relevant to Proposal	Planned Vegetation Modification	Description
Riparian Zones	No	N/A	
Foreshore Areas	No	N/A	
Wetland Buffers	Yes	Re-vegetate	Existing wetland vegetation to the east and south of the development allowed to naturally vegetate within the applied buffers (Figure 2.1). This is classified as worst case scenario (Class A Forest) in Figure 3.1.1.
Legislated Lands	No	N/A	
Public Open Space	No	N/A	
Road Verges	No	N/A	

2.4 Identified Requirement for Onsite Vegetation Modification or Removal

IDENTIFICATION OF POTENTIAL NATIVE VEGETATION MODIFICATION OR REMOVAL	
Has a requirement to modify or remove native vegetation to establish the required bushfire protection measures on the subject site been identified?	Yes
Comments: Modification and removal will be required around the FOGO plant to achieve an Asset Protection Zone of minimum BAL-29.	
Is evidence provided (from relevant agencies, the environmental or planning consultant and/or the local government), that the required modification or removal of the vegetation can be achieved?	Yes
Comments: Always consult with Local Government Authority prior to the removal of native vegetation.	

2.5 Implications for the Proposed Development and the BMP

Table 2.6: Consideration of the implications that identified protected areas of vegetation (i.e., those with environmental and subject to conservation) have for the development proposal and the BMP.

THE IMPLICATIONS FOR THE PROPOSED DEVELOPMENT (AND BMP) FROM THE IDENTIFIED 'PROTECTED' VEGETATION	
The Determination of Bushfire Threat Levels and the Exposure of at Risk Elements	**Relevant to the BMP**
The ability to reduce the potential bushfire impact on the development through modification or removal of vegetation is limited due to the existence of 'protected' areas of vegetation.	No
The planned development will result in additional areas of bushfire prone vegetation (due to re-vegetation and/or landscaping) that will support fire and that may impact the development. This vegetation has been accounted for within the BMP.	No
The Application of Design and/or Construction Responses to Limit Vegetation Modification or Removal	**Relevant to the BMP**
Modify the development location to reduce exposure by increasing separation distance.	Not required
Redesign development, structure plan or subdivision.	Not required
Reduction of lot yield where this can increase available separation distances.	Not required
Cluster development to limit modification or removal of vegetation.	Not required
Construct building(s) to the requirements corresponding to higher BAL ratings to reduce required separation distances.	Not required

Figure 2.1

Environmental Considerations

Lot 9500 on Plan 414516, Area : 1,608.9031 ha
320 Gull Road,
KERALUP 6182
SHIRE OF MURRAY

Lot 9500

GULL RD

------ **LEGEND** ------

- Development Site
- Subject Site
- Other Lots
- Development
- 50m Wetland Buffer

Description

- Office
- Office / Cribroom
- Workshop
- Receival Hall
- Weighbridge
- Liquid Waste Receival
- Fuel Store Service Bay
- Driveway

Geomorphic Wetlands

- Dampland
- Palusplain
- Sumpland

Clearing Regulations

- Clearing Regulations

0 200 400 600 800 1,000
Metres

------ **LOCALITY** ------

Aerial Imagery : Landgate/SLIP
Image Date : Feb 2022

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Ian Ross 13/10/2023
Map updated by: Ian 13/10/2023
A3 Scale 1:15,000

BUSHFIRE PRONE PLANNING

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3 BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT

BUSHFIRE ATTACK LEVELS (BAL) - UNDERSTANDING THE RESULTS

The transfer (flux/flow) of radiant heat from the bushfire to a receiving object is measured in kW/m^2. The AS 3959:2018 BAL determination methodology establishes the ranges of radiant heat flux that correspond to each bushfire attack level. These are identified as BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ.

The bushfire performance requirements for certain classes of buildings are established by the Building Code of Australia (Vol. 1 & 2 of the NCC). The BAL will establish the bushfire resistant construction requirements that are to apply in accordance with AS 3959:2018 - Construction *of buildings in bushfire prone areas* and the NASH Standard – *Steel framed construction in bushfire areas (NS 300 2021),* whose solutions are deemed to satisfy the NCC bushfire performance requirements.

DETERMINED BAL RATINGS

A BAL Certificate can be issued for a determined BAL. A BAL can only be classed as 'determined' for an existing or future building/structure when:

1. It's final design and position on the lot are known and the stated separation distance from classified bushfire prone vegetation exists and can justifiably be expected to remain in perpetuity; or

2. It will always remain subject to the same BAL regardless of its design or position on the lot after accounting for any regulatory or enforceable building setbacks from lot boundaries as relevant and necessary (e.g., R-codes, restrictive covenants, defined building envelopes) or the retention of any existing classified vegetation either onsite or offsite.

If the BMP derives determined BAL(s), the BAL Certificate(s) required for submission with building applications can be provided, using the BMP as the assessment evidence.

INDICATIVE BAL RATINGS

A BAL Certificate cannot be issued for an indicative BAL. A BAL will be classed as 'indicative' for an existing or future building/structure when the required conditions to derive a determined BAL are not met.

This class of BAL rating indicates what BAL(s) could be achieved and the conditions that need to be met are stated.

Converting the indicative BAL into a determined BAL is conditional upon the currently unconfirmed variable(s) being confirmed by a subsequent assessment and evidential documentation. These variables will include the future building(s) location(s) being established (or changed) and/or classified vegetation being modified or removed to establish the necessary vegetation separation distance. This may also be dependent on receiving approval from the relevant authority for that modification/removal.

BAL RATING APPLICATION – PLANNING APPROVAL VERSUS BUILDING APPROVAL

1. **Planning Approval**: SPP.3.7 establishes that where BAL- LOW to BAL-29 will apply to relevant future construction (or existing structures for proposed uses), the proposed development may be considered for approval (dependent on the other requirements of the relevant policy measures being met). That is, BAL40 or BAL-FZ are not acceptable on planning grounds (except for certain limited exceptions).

   Because planning is looking forward at what can be achieved, as well as looking at what may currently exist, both determined and indicative BAL ratings are acceptable assessment outcomes on which planning decisions can be made (including conditional approvals).

2. **Building Approval:** The Building Code of Australia (Vol. 1 & 2 of the NCC) establishes that relevant buildings in bushfire prone areas must be constructed to the bushfire resistant requirements corresponding to the BAL rating that is to apply to that building. Consequently, a determined BAL rating and the BAL Certificate is required for a building permit to be issued - an indicative BAL rating is not acceptable.

3.1 BAL Assessment Summary - Contour Map Format

INTERPRETATION OF THE BAL CONTOUR MAP

The BAL contour map is a diagrammatic representation of the results of the bushfire attack level assessment.

The map presents different coloured contours extending out from the areas of classified vegetation. Each contour represents a set range of radiant heat flux that potentially will transfer to an exposed element (building, person or other defined element), when it is located within that contour.

Each of the set ranges of radiant heat flux corresponds to a different BAL rating as defined by the AS 3959:2018 BAL determination methodology.

The width of each shaded BAL contour will vary dependant on both the BAL rating and the relevant parameters (calculation inputs) for the subject site. Their width represents the minimum and maximum vegetation separation distances that correspond to each BAL rating (refer to the relevant table below for these distances).

The areas of classified vegetation to be considered in developing the BAL contours, are those that will remain at the intended end state of the subject development once earthworks, clearing and/or landscaping and re-vegetation have been completed. Variations to this statement that may apply include:

- Both pre and post development BAL contour maps are produced; and/or
- Each stage of a development is assessed independently.

3.1.1 The BAL Determination Method(s) Applied and the Location of Data and Results

Procedure Method (AS 3959:2018)	Applied to the BAL Assessment	Location of the Site Assessment Data			Location of the Results
		Classified Vegetation and Topography Map(s)	Calculation Input Variables		Assessed Bushfire Attack Levels and/or Radiant Heat Levels
			Summary Data	Detailed Data with Explanatory and Supporting Information	
Method 1 (Simplified)	Yes	Figure 3.1	Table 3.1	Appendix A1	BAL Contour Map Table 3.1

Figure 3.1

Classified Vegetation & Topography

Lot 9500 on Plan 414516, Area : 1,608.9031 ha
320 Gull Road,
KERALUP 6182
SHIRE OF MURRAY

AREA : 1
Class (D) Scrub
Effective slope: 0°

AREA : 2
Class (A) Forest
Effective slope: 0°

AREA : 3
Class (G) Grassland
Effective slope: 0°

Excluded

Lot 9500

------ LEGEND ------

- Development Site
- Subject Site
- Other Lots
- Development
- Photo & Direction

Description

- Office
- Office / Cribroom
- Workshop
- Receival Hall
- Weighbridge
- Liquid Waste Receival
- Fuel Store Service Bay
- Driveway

150m Vegetation Assessment Area

- 150m from Subject Site

Classified Vegetation

- Class (A) Forest
- Class (D) Scrub
- Class (G) Grassland
- Exclusion 2.2.3.2

0 100 200 300 400 500
Metres

------ LOCALITY ------

Aerial Imagery : Landgate/SLIP
Image Date : Feb 2022

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Ian Ross 13/10/2023
Map updated by: Ian 13/10/2023
A3 Scale 1:7,500

BUSHFIRE PRONE PLANNING

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Figure 3.1.1

Classified Vegetation & Topography (Post Development)

Lot 9500 on Plan 414516, Area : 1,608.9031 ha
320 Gull Road,
KERALUP 6182
SHIRE OF MURRAY

------ LEGEND ------

- Development Site
- Subject Site
- Other Lots
- 50m Wetland Buffer
- Development

Radiant Heat Flux

- <10kw Zone (Within Subject Site)

Asset Protection

- Indicative BAL 29 APZ

Description

- Office
- Office / Cribroom
- Workshop
- Receival Hall
- Weighbridge
- Liquid Waste Receival
- Fuel Store Service Bay
- Driveway

150m Vegetation Assessment Area

- 150m from Subject Site

Classified Vegetation

- Class (A) Forest
- Class (D) Scrub
- Class (G) Grassland
- Exclusion 2.2.3.2
- APZ Distance
- Vegetation Distance

0 100 200 300 400 500
Metres

------ LOCALITY ------

Aerial Imagery : Landgate/SLIP
Image Date : Feb 2022

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Ian Ross 17/10/2023
Map updated by: Ian 17/10/2023
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BUSHFIRE PRONE PLANNING

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Figure 3.1.2

Classified Vegetation & Topography (Post Development) Showing 10kw APZ

Lot 9500 on Plan 414516, Area : 1,608.9031 ha
320 Gull Road,
KERALUP 6182
SHIRE OF MURRAY

------ LEGEND ------

- Development Site
- Subject Site
- Other Lots
- 50m Wetland Buffer
- Development

Radiant Heat Flux

- <10kw Zone (Within Subject Site)

Description

- Office
- Office / Cribroom
- Workshop
- Receival Hall
- Weighbridge
- Liquid Waste Receival
- Fuel Store Service Bay
- Driveway

150m Vegetation Assessment Area

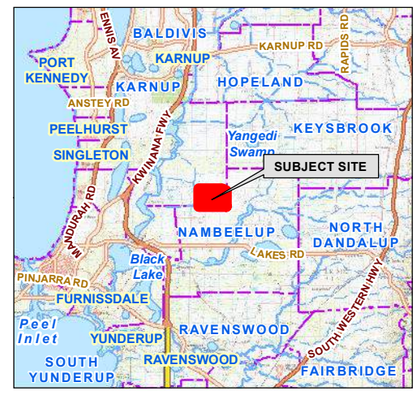
- 150m from Subject Site

Classified Vegetation

- Class (A) Forest
- Class (D) Scrub
- Class (G) Grassland
- Exclusion 2.2.3.2
- APZ Distance

0 100 200 300 400 500
Metres

------ LOCALITY ------



Aerial Imagery : Landgate/SLIP
Image Date : Feb 2022

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Ian Ross 5/12/2023
Map updated by: Ian 5/12/2023
A3 Scale 1:7,500

BUSHFIRE PRONE PLANNING

Map Document Path / Name: K:\Projects\Jobs 2022\220666 - 320 Gull Road Keralup (BMP)\Mapping\MXD\220666_BRMP_Fig3-1-2_VEG_POST_320 Gull Road.mxd

CONSTRUCTION OF THE BAL CONTOUR MAP(S) – RELEVANT CLASSIFIED VEGETATION	
Identification of Classified Vegetation that is Relevant to the Production of the BAL Contour Map(s)	Relevant Map
All identified areas of classified vegetation that exist at the time of the site assessment – both within the subject site (onsite) and external to the subject site (offsite) will be the relevant vegetation.	Figure No.3.1.1
All identified areas of classified vegetation that exist at the time of the site assessment – both within the subject site (onsite) and external to the subject site (offsite) will be the relevant vegetation for the post-development BAL contour map.	Figure No.3.2
Supporting Assessment Details: N/A	

3.1.3 Summary Site Data Applied to Construction of the BAL Contour Map(s)

Table 3.1: Summary of applied calculation input variables applied to determining the site specific separation distances corresponding to each bushfire attack level.

SUMMARY OF CALCULATION INPUT VARIABLES (INCLUDING SITE DATA) APPLIED TO THE DETERMINATION OF SEPARATION DISTANCES CORRESPONDING TO BUSHFIRE ATTACK LEVELS [1]												
Applied BAL Determination Method		METHOD 1 - SIMPLIFIED PROCEDURE (AS 3959:2018 CLAUSE 2.2)										
Calculation Variables Corresponding to BAL Determination Method												
Methods 1 and 2		Method 1	Method 2									
Vegetation Classification		FDI	Effective Slope		Site Slope	FFDI or GFDI	Flame Temp.	Elevation of Receiver	Flame Width	Fireline Intensity	Flame Length	Modified View Factor
			Applied Range	Measured								
Area	Class		degree range	degrees	degrees		K	metres	metres	kW/m	metres	% Reduction
1	(D) Scrub	80	Upslope or flat 0	flat 0	-	-	-	-	-	-	-	-
2	(A) Forest	80	Upslope or flat 0	flat 0	-	-	-	-	-	-	-	-
3	(G) Grassland	80	Upslope or flat 0	flat 0	-	-	-	-	-	-	-	-

[1] All data and information supporting the determination of the classifications and values stated in this table and any associated justification, is presented in Appendix A.

Where the values are stated as 'default' these are either the values stated in AS 3959:2018, Table B1 or the values calculated as intermediate or final outputs through application of the equations of the AS 3959:2018 BAL determination methodology. They are not values derived by the assessor.

Table 3.2: Vegetation separation distances corresponding to radiant heat levels and illustrated as BAL contours in Figure 3.2.

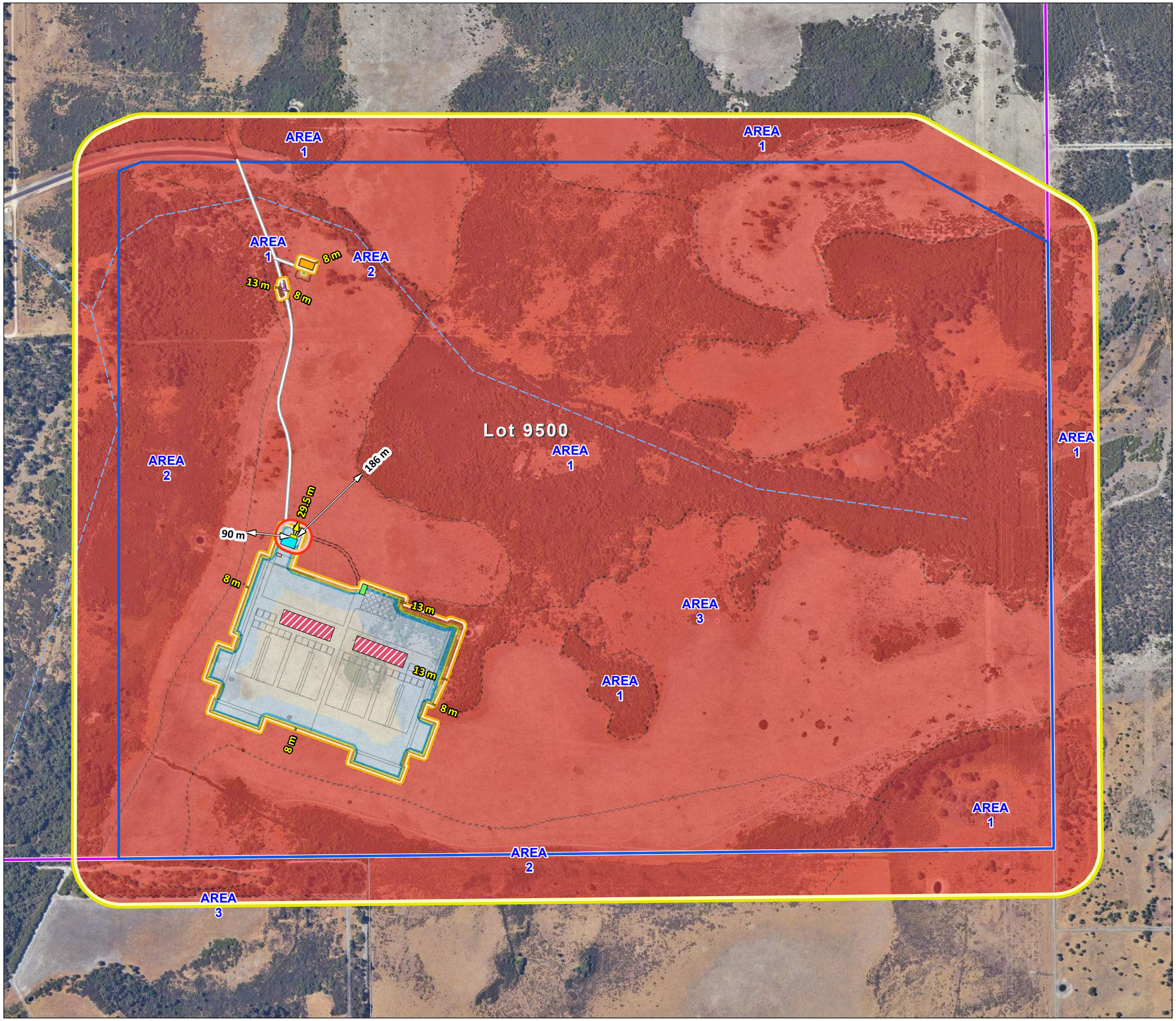
THE CALCULATED VEGETATION SEPARATION DISTANCES CORRESPONDING TO THE STATED LEVEL OF RADIANT HEAT [1]									
Vegetation Classification		Separation Distances Corresponding to Stated Level of Radiant Heat (metres)							
		Bushfire Attack Level						Maximum Radiant Heat Flux	
Area	Class	BAL-FZ	BAL-40	BAL-29	BAL-19	BAL12.5	BAL-LOW	10 kW/m^2	2 kW/m^2
1	(C) Shrubland	<7	7-<9	9-<13	13-<19	19-<100	>100	-	-
2	(A) Forest	<16	16-<21	21-<31	31-<42	42-<100	>100		
3	(G) Grassland	<6	6-<8	8-<12	12-<17	17-<50	>50	-	-

[1] All calculation input variables are presented in Table 3.1. The summary 'printouts' of calculation input and output values for each area of classified vegetation are presented in Appendix A.

Figure 3.2

BAL Contour Map

Lot 9500 on Plan 414516, Area : 1,608.9031 ha
320 Gull Road,
KERALUP 6182
SHIRE OF MURRAY



------ **LEGEND** ------

- Development Site
- Subject Site
- Other Lots
- Development

Radiant Heat Flux
- <10kw Zone (Within Subject Site)

Asset Protection
- Indicative BAL 29 APZ

Description
- Office
- Office / Cribroom
- Workshop
- Receival Hall
- Weighbridge
- Liquid Waste Receival
- Fuel Store Service Bay
- Driveway

100m Vegetation Assessment Area
- 100m from Subject Site

Indicative Bushfire Attack Levels
- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL LOW
- APZ Distance
- Vegetation Distance

0 100 200 300 400 500
Metres

------ **LOCALITY** ------

N

Aerial Imagery : Landgate/SLIP
Image Date : Feb 2022

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Ian Ross 17/10/2023
Map updated by: Ian 17/10/2023
A3 Scale 1:7,500

BUSHFIRE PRONE PLANNING

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Figure 3.2.1

BAL Contour Map

Infrastructure Detail

Lot 9500 on Plan 414516, Area : 1,608.9031 ha
320 Gull Road,
KERALUP 6182
SHIRE OF MURRAY

OFFICE AND WEIGHBRIDGE INSET

OFFICE / CRIBROOM INSET

See Inset

AREA 1
AREA 2
AREA 3

8 m
13 m
29.5 m
90 m
186 m

Office
Workshop

0 20 40 60 80
Metres

0 50 100 150 200
Metres

------ LEGEND ------

- Development
- 50m Wetland Buffer

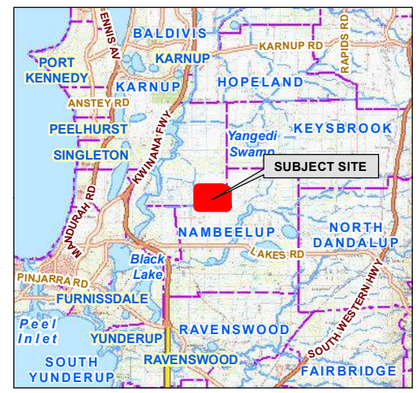
Radiant Heat Flux
- <10kw Zone (Within Subject Site)

Asset Protection
- Indicative BAL 29 APZ

Description
- Office
- Office / Cribroom
- Workshop
- Receival Hall
- Weighbridge
- Liquid Waste Receival
- Fuel Store Service Bay
- Driveway

Indicative Bushfire Attack Levels
- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL LOW
- APZ Distance
- Vegetation Distance

------ LOCALITY ------



Aerial Imagery : Landgate/SLIP
Image Date : Feb 2022

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Mercator Units: Metre
Map compiled by: Ian Ross 17/10/2023
Map updated by: Ian 17/10/2023
A3 Scale 1:4,500

BUSHFIRE PRONE PLANNING

Map Document Path / Name: K:\Projects\Jobs 2022\220666 - 320 Gull Road Keralup (BMP)\Mapping\MXD\220666_Fig3-2-1_BAL_ZOOM_320 Gull Road Keralup.mxd

3.1.5 BAL Ratings Derived from the Contour Map

Table 3.3: Indicative and determined BAL(s) for existing and/or proposed building works.

BUSHFIRE ATTACK LEVEL FOR EXISTING/PLANNED BUILDINGS/STRUCTURE [1]		
Building/Structure Description	Indicative BAL [2]	Determined BAL [2]
Office near weighbridge	BAL-29	N/A
Office/Crib-room (onsite shelter)	BAL-12.5	N/A
Workshop	BAL-19	N/A

[1] The assessment data used to derive the BAL ratings is sourced from Table 3.1 and Figure 3.2.

[2] Refer to the start of Section 3 for an explanation of indicative versus determined BAL ratings.

4 IDENTIFICATION OF BUSHFIRE HAZARD ISSUES

The Guidelines for Planning in Bushfire Prone Areas (WAPC 2021 v1.4), Appendix 5, establish that the application of this section of the BMP is intended to support ***strategic planning*** proposals. At the strategic planning stage there will typically be insufficient proposed development detail to enable all required assessments, including the assessment against the bushfire protection criteria.

Strategic Planning Proposals

For strategic planning proposals this section of the BMP will identify:

- Issues associated with the level of the threats presented by any identified bushfire hazard;
- Issues associated with the ability to implement sufficient and effective bushfire protection measures to reduce the exposure and vulnerability levels (of elements exposed to the hazard threats), to a tolerable or acceptable level; and
- Issues that will need to be considered at subsequent planning stages.

All Other Planning Proposals

For all other planning stages, this BMP will address what are effectively the same relevant issues but do it within the following sections:

- Section 2 – Environmental Conservation: Assess environmental, biodiversity and conservation values);
- Section 3 – Potential Bushfire Impact: Assess the bushfire threats with the focus on flame contact and radiant heat; and
- Section 5 – Assessment Against the Bushfire Protection Criteria (including the guidance provided by the *Position Statement: 'Planning in bushfire prone areas – Demonstrating Element 1: Location and Element 2'):* Assess the ability of the proposed development to apply the required bushfire protection measures thereby enabling it to be considered for planning approval for these factors.

Is the proposed development a strategic planning proposal?	No

5 ASSESSMENT AGAINST THE BUSHFIRE PROTECTION CRITERIA (GUIDELINES V1.4)

5.1 Bushfire Protection Criteria Elements Applicable to the Proposed Development/Use

APPLICATION OF THE CRITERIA, ACCEPTABLE SOLUTIONS AND PERFORMANCE ASSESSMENT

The criteria are divided into five elements – location, siting and design, vehicular access, water and vulnerable tourism land uses. Each element has an intent outlining the desired outcome for the element and reflects identified planning and policy requirements in respect of each issue.

The example acceptable solutions (bushfire protection measures) provide one way of meeting the element's intent. Compliance with these automatically achieves the element's intent and provides a straightforward pathway for assessment and approval.

Where the acceptable solutions cannot be met, the ability to develop design responses (as alternative solutions that meet bushfire performance requirements) is an alternative pathway that is provided by addressing the applicable performance principles (as general statements of how best to achieve the intent of the element).

A merit based assessment is established by the SPP 3.7 and the Guidelines as an additional alternative pathway along with the ability of using discretion in making approval decisions (sections 2.5, 2.6 and 2.7). This is formally applied to certain development (minor and unavoidable – sections 5.4.1 and 5.7). Relevant decisions by the State Administrative Tribunal have also supported this approach more generally.

Elements 1 – 4 should be applied for all strategic planning proposals, subdivision or development applications, except for vulnerable tourism land uses which should refer to Element 5. Element 5 incorporates the bushfire protection criteria in Elements 1 – 4 but caters them specifically to tourism land uses. (Guidelines DPLH 2021v1.4)

The Bushfire Protection Criteria	Applicable to the Proposed Development/Use
Element 1: Location	Yes
Element 2: Siting and Design	Yes
Element 3: Vehicular Access	Yes
Element 4: Water	Yes
Element 5: Vulnerable Tourism Land Uses	Yes

5.2 Local Government Variations to Apply

Local governments may add to or modify the acceptable solutions to recognise special local or regional circumstances (e.g., topography / vegetation / climate). These are to be endorsed by both the WAPC and DFES before they can be considered in planning assessments. (Guidelines DPLH 2021v1.4).	
Do endorsed regional or local variations to the acceptable solutions apply to the assessments against the Bushfire Protection Criteria for the proposed development /use?	None known or identified

5.3 Assessment Statements for Element 1: Location

LOCATION	
Element Intent	To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure.
Proposed Development/Use – Relevant Planning Stage	(Do) Development application other than for a single dwelling, ancillary dwelling or minor development
Element Compliance Statement	The proposed development/use achieves the intent of the element by being fully compliant with all applicable acceptable solutions.
Pathway Applied to Provide an Alternative Solution	N/A

Acceptable Solutions - Assessment Statements

All details of acceptable solution requirements are established in the Guidelines for Planning in Bushfire Prone Areas, DPLH v1.4 (Guidelines) and apply the guidance established by the Position Statement: 'Planning in bushfire prone areas – Demonstrating Element 1: Location and Element 2: Siting and design' (WAPC Nov 2019) and the 'Bushfire Management Plan Guidance for the Dampier Peninsula' (WA Department of Planning, Lands and Heritage, 2021 Rev B) as relevant. These documents are available at https://www.wa.gov.au/government/document-collections/state-planning-policy-37-planning-bushfire-prone-areas.

Solution Component Check Box Legend	☑ Relevant & met	☒ Relevant & not met	⃠ Not relevant

A1.1 Development location	**Applicable:**	Yes	**Compliant:**	Yes

ASSESSMENT AGAINST THE REQUIREMENTS ESTABLISHED BY THE GUIDELINES

☑ ☐ ☐ The development application is located in an area that is or will, on completion, be subject to either a moderate or low bushfire hazard level, or BAL-29 or below.

Supporting Assessment Details:

All habitable buildings and associated buildings within the development fall within BAL-29. BAL-40 or BAL-FZ construction requirements will not be required to be applied. This meets the requirements established by Acceptable Solution A1.1 and its associated explanatory note. In addition, the vegetation surrounding the proposed development can be classed as a moderate bushfire hazard level.

ASSESSMENTS APPLYING THE GUIDANCE ESTABLISHED BY THE WAPC ELEMENT 1 & 2 POSITION STATEMENT (2019)

"Consideration should be given to the site context where 'area' is the land both within and adjoining the subject site. The hazards remaining within the site should not be considered in isolation of the hazards adjoining the site, as the potential impact of a bushfire will be dependent on the wider risk context, including how a bushfire could affect the site and the conditions for a bushfire to occur within the site."

Strategic Planning Proposals: Consider the threat levels from any vegetation adjoining and within the subject site for which the potential intensity of a bushfire in that vegetation would result in it being classified as an Extreme Bushfire Hazard Level (BHL). Identify any proposed design strategies to reduce these threats.

Structure Plans (lot layout known) and Subdivision Applications: As for strategic planning proposals but within the subject site the relevant threat levels to consider are the radiant heat levels represented by BAL-FZ and BAL-40 ratings.

The planning proposal is a development application, consequently the referred to position statement is not applicable to the Element 1 assessment.

5.4 Assessment Statements for Element 2: Siting and Design

SITING AND DESIGN OF DEVELOPMENT					
Element Intent	To ensure that the siting and design of development minimises the level of bushfire impact. (BPP Note: not building/construction design)				
Proposed Development/Use – Relevant Planning Stage	(Do) Development application other than for a single dwelling, ancillary dwelling or minor development				
Element Compliance Statement	The proposed development/use achieves the intent of the element by being fully compliant with all applicable acceptable solutions.				
Pathway Applied to Provide an Alternative Solution	N/A				
Acceptable Solutions - Assessment Statements *All details of acceptable solution requirements are established in the Guidelines for Planning in Bushfire Prone Areas, DPLH v1.4 (Guidelines) and apply the guidance established by the Position Statement: 'Planning in bushfire prone areas – Demonstrating Element 1: Location and Element 2: Siting and design' (WAPC Nov 2019) and the 'Bushfire Management Plan Guidance for the Dampier Peninsula' (WA Department of Planning, Lands and Heritage, 2021 Rev B) as relevant. These documents are available at https://www.wa.gov.au/government/document-collections/state-planning-policy-37-planning-bushfire-prone-areas.*					
Solution Component Check Box Legend	☑ Relevant & met	☒ Relevant & not met	⃠ Not relevant		
A2.1 Asset Protection Zone (APZ)	**Applicable**: Yes		**Compliant**: Yes		

UNDERSTANDING THE APZ PLANNING ASSESSMENT VERSUS APZ IMPLEMENTATION REQUIREMENTS

Note: Appendix B: 'Onsite Vegetation Management' provides further information regarding the different APZ dimensions that can be referenced, their purpose and the specifications of the APZ that is to be established and maintained.

To reduce risk to buildings (and indirectly to persons) from a bushfire event, a key bushfire protection measure required to be implemented is reducing the exposure of building elements to the direct bushfire threats of flame contact, radiant heat and embers and the indirect threat of consequential fires that result from the subsequent ignition of other combustible materials that may be constructed, stored or accumulate in the area surrounding buildings.

This is achieved by separating existing and/or proposed buildings from areas of classified bushfire prone vegetation. The total area of separation is identified as the Asset Protection Zone (APZ), which exists as an area of minimal fire fuels (or no fuel) and is considered able and likely to remain a low threat and/or be maintained to a low threat state in perpetuity. The required separation distances will vary according to the site specific conditions.

THE APZ PLANNING ASSESSMENT: To achieve planning approval for this factor it must be demonstrated that separation distances that correspond to a maximum level of radiant transfer to a building (29 kW/m^2), either exist or can be established (with certain exceptions). These separation distances are the dimensions of the **'Planning BAL-29' APZ**.

The purpose of this planning assessment is to identify and justify how this low threat area (the Planning BAL-29' APZ) can exist – or not.

THE DIMENSIONS OF THE 'PLANNING BAL-29' APZ MAY EXTEND OUTSIDE SUBJECT LOT BOUNDARIES. THE APZ MAY NOT BE EQUIDISTANT AROUND A BUILDING AS THE REQUIRED SEPARATION DISTANCES DEPEND ON THE TYPE OF VEGETATION PRESENT IN EACH DIRECTION ALONG WITH OTHER SITE VARIABLES.

IT IS IMPORTANT TO UNDERSTAND THAT THE 'PLANNING BAL-29' APZ IS NOT NECESSARILY THE SIZE OF THE APZ THAT MUST BE PHYSICALLY ESTABLISHED AND MAINTAINED BY A LANDOWNER. IT IS A SCREENING TOOL FOR MAKING PLANNING APPROVAL DECISIONS.

THE APZ TO BE IMPLEMENTED: The required dimensions to be established and maintained by the landowner will be those that correspond to the determined BAL rating of a relevant building but limited to the land of the subject lot (with limited exceptions). The requirement for a greater dimension within a lot will only exist if it is required by the relevant local government's annual firebreak / hazard reduction notice or the APZ size is increased as an additional bushfire protection measure as a recommendation of this BMP.

> Within this BMP it is the 'Planning BAL-29' APZ that will be identified on maps, diagrams and in tables as necessary.
>
> The exceptions are the data provided in Appendix B part B1 and when a Property Bushfire Management Statement is required to be produced for a development application, in which case the '**Landowner' APZ** dimensions will be shown on the site map (refer to s6.3.1 when relevant).

ASSESSMENT AGAINST THE REQUIREMENTS ESTABLISHED BY THE GUIDELINES

☑ ☐ ☐	**APZ Width:** The proposed (or a future) habitable building(s) on the lot(s) of the proposed development - or an existing building for a proposed change of use – can be (or is) located within the developable portion of the lot and be surrounded by a 'Planning BAL-29' APZ of the required dimensions (measured from any external wall or supporting post or column to the edge of the classified vegetation), that will ensure their exposure to the potential radiant heat impact of a bushfire does not exceed 29 kW/m^2. Notes: When established by the relevant decision maker, the meeting of this requirement may also apply to proposed non-habitable buildings and other structures.
☐ ☐ ⊘	**Restriction on Building Location:** It has been identified that the current developable portion of a lot(s) provides for the proposed future (or a future) building/structure location that will result in that building/structure being subject to a BA-40 or BAL-FZ rating. Consequently, it may be considered necessary to impose the condition that a restrictive covenant to the benefit of the local government pursuant to section 129BA of the Transfer of Land Act 1893, is to be placed on the certificate(s) of title of the proposed lot(s) advising of the existence of a restriction on the use of that portion of land (refer to Code F3 of Model Subdivision Conditions Schedule, WAPC June 2021 and Guidelines s5.3.2).
☑ ☐ ☐	**APZ Location:** The required dimensions for a 'Planning BAL-29' APZ can be contained solely within the boundaries of the lot(s) on which the proposed (or a future) habitable building(s) - or an existing building(s) for a proposed change of use – is situated.
☐ ☐ ⊘	**APZ Location:** The required dimensions for a 'Planning BAL-29' APZ can be partly established within the boundaries of the lot(s) on which the proposed (or a future) habitable building(s) - or an existing building(s) for a proposed change of use – is situated. The balance of the APZ would exist on adjoining land that satisfies the exclusion requirements of AS 3959:2018 cl 2.2.3.2 for low threat vegetation and non-vegetated areas.
☐ ☐ ⊘	**APZ Location:** It can be justified that any adjoining (offsite) land forming part of a 'Planning BAL-29' APZ will: • If non-vegetated, remain in this condition in perpetuity; and/or • If vegetated, be low threat vegetation managed in a minimal fuel condition in perpetuity.
☑ ☐ ☐	**APZ Management:** The area of land (within each lot boundary), that is to make up the required 'Landowner' APZ dimensions (refer to Appendix B, Part B1), can and will be managed in accordance with the requirements of the Guidelines Schedule 1 'Standards for Asset Protection Zones' (refer to Appendix B).

☐ ☐ ⊘	**Subdivision Staging:** There are undeveloped future stages of subdivision, containing bushfire prone vegetation, that have been taken into consideration for their potentially 'temporary' impact on the ability to establish a 'Planning BAL-29' APZ on adjoining developed lots. A staging plan is developed to manage this.
☑ ☐ ☐	**Firebreak/Hazard Reduction Notice:** Any additional requirements established by the relevant local government's annual notice to install firebreaks and manage fuel loads (issued under s33 of the Bushfires Act 1954), can and will be complied with.

Supporting Assessment Details: Asset Protection Zones will be maintained in accordance with Schedule 1: Standards for Asset Protection Zones (see extract below) established by the Guidelines;

The associated explanatory notes (Guidelines E2) that address (a) managing an asset protection zone (APZ) to a low threat state (b) landscaping and design of an asset protection zone and (c) plant flammability; and

Any additional requirements established by the Shire of Murray Firebreak Notice.

ASSESSMENTS APPLYING THE GUIDANCE ESTABLISHED BY THE WAPC ELEMENT 1 & 2 POSITION STATEMENT (2019)

Strategic Planning Proposals: "At this planning level there may not be enough detail to demonstrate compliance with this element. The decision-maker may consider this element is satisfied where A1.1 is met."

Structure Plans (lot layout known) and Subdivision Applications: "Provided that Element 1 is satisfied, the decision-maker may consider approving lot(s) containing BAL-40 or BAL-FZ under the following scenarios.

The planning proposal is a development application, consequently the position statement is not applicable to the proposed development.

5.5 Assessment Statements for Element 3: Vehicular Access

VEHICULAR ACCESS	
Element Intent	To ensure that the vehicular access serving a subdivision/development is available and safe during a bushfire event.
Proposed Development/Use – Relevant Planning Stage	(Do) Development application other than for a single dwelling, ancillary dwelling or minor development
Element Compliance Statement	The proposed development/use cannot comply with all applicable acceptable solutions. An alternative solution cannot be provided. The intent of the element cannot be achieved.
Pathway Applied to Provide an Alternative Solution	Bushfire Risk - Assessment and Management Report - is developed to demonstrate all possible bushfire protection measures that can be implemented and identify the subsequent residual risk levels applying to elements exposed to the bushfire hazard.

Acceptable Solutions - Assessment Statements

All details of acceptable solution requirements are established in the Guidelines for Planning in Bushfire Prone Areas, DPLH v1.4 (Guidelines) and apply the guidance established by the Position Statement: 'Planning in bushfire prone areas – Demonstrating Element 1: Location and Element 2: Siting and design' (WAPC Nov 2019) and the 'Bushfire Management Plan Guidance for the Dampier Peninsula' (WA Department of Planning, Lands and Heritage, 2021 Rev B) as relevant. These documents are available at https://www.wa.gov.au/government/document-collections/state-planning-policy-37-planning-bushfire-prone-areas.

The technical construction requirements for access types and components, and for each firefighting water supply component, are also presented in Appendices 2 and 3. The local government will advise the proponent where different requirements are to apply and when any additional specifications such as those for signage and gates are to apply (these are included in the relevant appendix if requested by the local government).

Solution Component Check Box Legend	☑ Relevant & met	☒ Relevant & not met	⃠ Not relevant

A3.1 Public roads	**Applicable**: Yes	**Compliant**: Yes

☑ ☐ ☐ The technical construction requirements of vertical clearance and weight capacity (Guidelines, Table 6) can and will be complied with (Refer also to Appendix C in this BMP).

All other applicable technical requirements of trafficable width, gradients and curves, are required to be in "accordance with the class of road as specified in the IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Ausroad Standards and/or any applicable standard in the local government area" (Guidelines, Table 6 and E3.1. Refer also to Appendix C in this BMP).

☑ ☐ ☐ The assessment conducted for the bushfire management plan indicates that it is likely that the proposed development can and will comply with the requirements.

However, the applicable class of road, the associated technical requirements and subsequent proposal compliance, will need to be confirmed with the relevant local government and/or Main Roads WA.

☑ ☐ ☐ A traversable verge is available adjacent to classified vegetation (Guidelines, E3.1), as recommended.

Supporting Assessment Details: Existing public road network is compliant with the local government standards.

A3.2a Multiple access routes	**Applicable**: Yes	**Compliant**: No
☐ ☐ ⊘	For each lot, two-way public road access is provided in two different directions to at least two different suitable destinations with an all-weather surface.	
☐ ☐ ⊘	The two-way access <u>is</u> available at an intersection no greater than 200m from the relevant boundary of each lot, via a no-through road.	
☐ ☒ ☐	The two-way access is <u>not</u> available at an intersection within 200m from the relevant boundary of each lot. However, the available no-through road satisfies the established exemption for the length limitation in every case. These requirements are: • Demonstration of no alternative access (refer to A3.3 below); • The no-through road travels towards a suitable destination; and • The balance of the no-through road that is greater than 200m from the relevant lot boundary is within a residential built-out area or is potentially subject to radiant heat levels from adjacent bushfire prone vegetation that correspond to the BAL-LOW rating (<12.5 kW/m^2).	
Supporting Assessment Details: Gull Road is the only access route to and from site. It is approximately 4km from the site to the nearest two-way access route at Lakes Road. However, an onsite shelter building will be provided for occupants as an alternative solution.		
A3.2b Emergency access way	**Applicable**: No	**Compliant**: N/A
☐ ☐ ⊘	The proposed or existing EAW provides a through connection to a public road.	
☐ ☐ ⊘	The proposed or existing EAW is less than 500m in length and will be signposted and gated (remaining unlocked) to the specifications stated in the Guidelines and/or required by the relevant local government.	
☐ ☐ ⊘	The technical construction requirements for widths, clearances, capacity, gradients and curves (Guidelines, Table 6 and E3.2b. Refer also to Appendix C in this BMP), can and will be complied with.	
Supporting Assessment Details: None		
A3.3 Through-roads	**Applicable**: Yes	**Compliant**: Partly
☑ ☐ ☐	A no-through public road is necessary as no alternative road layout exists due to site constraints.	
☐ ☒ ☐	The no-through public road length does not exceed the established maximum of 200m to an intersection providing two-way access (Guidelines, E3.3).	
☐ ☒ ☐	The no-through public road exceeds 200m but satisfies the exemption provisions of A3.2a as demonstrated in A3.2a above.	
☑ ☐ ☐	The public road technical construction requirements (Guidelines, Table 6 and E3.1. Refer also to Appendix C in this BMP), can and will be complied with as established in A3.1 above.	
☑ ☐ ☐	The turnaround area requirements (Guidelines, Figure 24) can and will be complied with.	

Supporting Assessment Details: Gull Road is the only access route to and from site. It is approximately 4km from the site to the nearest two-way access route at Lakes Road. However, an onsite shelter building will be provided for occupants as an alternative solution.				
A3.4a Perimeter roads	**Applicable**:	No	**Compliant**:	No
☐ ☐ ⊘	The proposed greenfield or infill development consists of 10 or more lots (including those that are part of a staged subdivision) and therefore should have a perimeter road. This is planned to be installed.			
☐ ☐ ⊘	The proposed greenfield or infill development consists of 10 or more lots (including those that are part of a staged subdivision). However, it is not required on the established basis of: • The vegetation adjoining the proposed lots is classified Class G Grassland; • Lots are zoned rural living or equivalent; • It is demonstrated that it cannot be provided due to site constraints; or • All lots have existing frontage to a public road.			
☐ ☐ ⊘	The technical construction requirements of widths, clearances, capacity, gradients and curves (Guidelines, Table 6 and E3.4a) can and will be complied with.			
Supporting Assessment Details: None Required.				
A3.4b Fire service access route	**Applicable**:	No	**Compliant**:	No
☐ ☐ ⊘	The FSAR can be installed as a through-route with no dead ends, linked to the internal road system every 500m and is no further than 500m from a public road.			
☐ ☐ ⊘	The technical construction requirements of widths, clearances, capacity, gradients and curves (Guidelines, Table 6 and E3.4b. Refer also to Appendix C in this BMP), can and will be complied with.			
☐ ☐ ⊘	The FSAR can and will be signposted. Where gates are required by the relevant local government, the specifications can be complied with.			
☐ ☐ ⊘	Turnaround areas (to accommodate type 3.4 fire appliances) can and will be installed every 500m on the FSAR.			
Supporting Assessment Details: None Required.				
A3.5 Battle-axe access legs	**Applicable**:	No	**Compliant**:	No
☐ ☐ ⊘	A battle-axe leg cannot be avoided due to site constraints.			
☐ ☐ ⊘	The proposed development is in a reticulated area and the battle-axe access leg length from a public road is no greater than 50m. No technical requirements need to be met.			
☐ ☐ ⊘	The technical construction requirements for widths, clearances, capacity, gradients and curves (Guidelines, Table 6 and E3.5. Refer also to Appendix C in this BMP), can and will be complied with.			
☐ ☐ ⊘	Passing bays can and will be installed every 200m with a minimum length of 20m and a minimum additional trafficable width of 2m.			

Supporting Assessment Details: None Required.

A3.6 Private driveways	**Applicable**: Yes	**Compliant**: Yes
☐ ☐ ⊘	The private driveway to the most distant external part of the development site is within a lot serviced by reticulated water, is accessed via a public road with a speed limit of 70 km/hr or less and has a length is no greater than 70m (measured as a hose lay). No technical requirements need to be met.	
☑ ☐ ☐	The technical construction requirements for widths, clearances, capacity, gradients and curves (Guidelines, Table 6 and E3.6. Refer also to Appendix C in this BMP), can and will be complied with.	
☐ ☐ ⊘	Passing bays can and will be installed every 200m with a minimum length of 20m and a minimum additional trafficable width of 2m.	
☑ ☐ ☐	The turnaround area requirements (Guidelines, Figure 28, and within 30m of the habitable building) can and will be complied with.	
Supporting Assessment Details: The proposed private driveway will be two-way and 6 metres wide. The driveway will be a limestone road base and compliant with the technical standards (see Appendix C). Slashing of 3m is required on road verges.		

5.6 Assessment Statements for Element 4: Water

FIREFIGHTING WATER					
Element Intent	To ensure water is available to enable people, property and infrastructure to be defended from bushfire.				
Proposed Development/Use – Relevant Planning Stage	(Do) Development application other than for a single dwelling, ancillary dwelling or minor development				
Element Compliance Statement	The proposed development/use achieves the intent of the element by being fully compliant with all applicable acceptable solutions.				
Pathway Applied to Provide an Alternative Solution	N/A				
Acceptable Solutions - Assessment Statements *All details of acceptable solution requirements are established in the Guidelines for Planning in Bushfire Prone Areas, DPLH v1.4 (Guidelines) and apply the guidance established by the Position Statement: 'Planning in bushfire prone areas – Demonstrating Element 1: Location and Element 2: Siting and design' (WAPC Nov 2019) and the 'Bushfire Management Plan Guidance for the Dampier Peninsula' (WA Department of Planning, Lands and Heritage, 2021 Rev B) as relevant. These documents are available at https://www.wa.gov.au/government/document-collections/state-planning-policy-37-planning-bushfire-prone-areas.* *The technical construction requirements for access types and components, and for each firefighting water supply component, are also presented in Appendices 2 and 3. The local government will advise the proponent where different requirements are to apply and when any additional specifications such as those for signage and gates are to apply (these are included in the relevant appendix if requested by the local government).*					
Solution Component Check Box Legend	☑ Relevant & met	☒ Relevant & not met	⃠ Not relevant		
A4.1 Identification of future firefighting water supply	**Applicable**:	No	**Compliant**:	N/A	
☐ ☐ ⃠	It can be demonstrated that reticulated or sufficient non-reticulated water for firefighting can be provided at the subdivision and/or development application stage in accordance with the specifications of the relevant water supply authority or the requirements of Schedule 2.				
Supporting Assessment Details: None Required.					
A4.2 Provision of water for firefighting purposes	**Applicable**:	Yes	**Compliant**:	Yes	
☐ ☐ ⃠	A reticulated water supply is available to the proposed development. The existing hydrant connection(s) are provided in accordance with the specifications of the relevant water supply authority.				
☐ ☐ ⃠	A reticulated water supply will be available to the proposed development. Hydrant connection(s) can and will be provided in accordance with the specifications of the relevant water supply authority.				
☑ ☐ ☐	A static water supply (tank) for firefighting purposes will be installed on the lot that is additional to any water supply that is required for drinking and other domestic purposes.				
☐ ☐ ⃠	A strategic water supply (tank or tanks) for firefighting purposes will be installed within or adjacent to the proposed development that is additional to any water supply that is required for drinking and other domestic purposes. The required land will be ceded free of cost to the local government and the lot or road reserve where the tank is to be located will be identified on the plan of subdivision.				

☐ ☐ ⊘	The strategic static water supply (tank or tanks) will be located no more than 10 minutes travel time from a subject site (at legal road speeds).
☑ ☐ ☐	The technical requirements (location, number of tanks, volumes, design, construction materials, pipes and fittings), as established by the Guidelines (A4.2, E4 and Schedule 2) and/or the relevant local government, can and will be complied with.

Supporting Assessment Details:

A 50,000L water tank will need to be installed for bushfire firefighting. This will be located near the Tank farm. It can be moved or removed if hydrants are installed.

Refer to information contained in Appendix D for the firefighting water supply specifications and technical requirements.

5.7 Assessments Statements for Element 5: Vulnerable Tourism Land Uses

5.7.1 Day Uses

VULNERABLE TOURISM	
Element Intent	To provide bushfire protection for tourism land uses relevant to the characteristics of the occupants and/or the location, to preserve life and reduce the impact of bushfire on property and infrastructure.
Proposed Development/Use – Relevant Type	**Day uses (with no overnight accommodation) including art gallery, brewery, exhibition centre, hotel, reception centre, restaurant/cafe, small bar, tavern, winery.**
Element Compliance Statement	The proposed development/use cannot fully comply with all applicable acceptable solutions. An alternative solution(s) is provided.
Pathway Applied to Provide an Alternative Solution	Bushfire Risk - Assessment and Management Report - is developed to demonstrate all possible bushfire protection measures that can be implemented and identify the subsequent residual risk levels applying to elements exposed to the bushfire hazard.

Acceptable Solutions - Assessment Statements

All details of acceptable solution requirements are established in the Guidelines for Planning in Bushfire Prone Areas, DPLH v1.4 (Guidelines) and apply the guidance established by the 'Bushfire Management Plan Guidance for the Dampier Peninsula' (WA Department of Planning, Lands and Heritage, 2021 Rev B) as relevant. These documents are available at https://www.wa.gov.au/government/document-collections/state-planning-policy-37-planning-bushfire-prone-areas.

The technical construction requirements for access types and components, and for each firefighting water supply component, are also presented in Appendices C and D. The local government will advise the proponent where different requirements are to apply and when any additional specifications such as those for signage and gates are to apply (these are included in the relevant appendix if requested by the local government).

Solution Component Check Box Legend	☑ Relevant & met	☒ Relevant & not met	⃠ Not relevant

A5.13 Siting and Design				
A5.13a Asset protection zone (APZ)	**Applicable**:	Yes	**Compliant**:	Yes

APZ DIMENSIONS – DIFFERENCES IN REQUIREMENTS FOR PLANNING ASSESSMENTS COMPARED TO IMPLEMENTATION

A key required bushfire protection measure is to reduce the exposure of buildings/infrastructure (as exposed vulnerable elements at risk), to the direct bushfire threats of flame contact, radiant heat and embers and the indirect threat of consequential fires that result from the subsequent ignition of other combustible materials that may be constructed, stored or accumulate in the area surrounding these structures. This reduces the associated risks of damage or loss.

This is achieved by separating buildings (and consequential fire fuels as necessary) from areas of classified bushfire prone vegetation. This area of separation surrounding buildings is identified as the Asset Protection Zone (APZ) and consists of no vegetation and/or low threat vegetation or vegetation continually managed to a minimal fuel condition. The required separation distances will vary according to the site specific conditions and local government requirements.

The APZ dimensions stated and/or illustrated in this Report can vary dependent on the purpose for which they are being identified.

> *Note: Appendix B 'Onsite Vegetation Management' provides further information regarding the different APZ dimensions that can be referenced, their purpose and the specifications of the APZ that are to be established and maintained on the subject lot.*

THE 'PLANNING BAL-29' APZ DIMENSIONS

Purpose: To provide evidence of the development or use proposal's ability to achieve minimum vegetation separation distances. To achieve 'acceptable solution' planning approval for this factor, it must be demonstrated that the minimum separation distances corresponding to a maximum level of radiant transfer to a building of 29 kW/m^2, either exist or can be implemented (with certain exceptions). These separation distances are the 'Planning BAL-29' APZ dimensions.

The 'Planning BAL-29' APZ is not necessarily the size of the APZ that must be physically implemented and maintained by a landowner. Rather, its sole purpose is to identify if an acceptable solution for planning approval can be met.

THE 'REQUIRED' APZ DIMENSIONS

Purpose: Establishes the dimensions of the APZ to be physically implemented by the landowner on their lot: These will be the minimum required separation distances from the subject building(s) to surrounding bushfire prone vegetation (identified by type and associated ground slope). These are established by:

A. The 'BAL Rating APZ' of the subject building(s) when distances are greater than 'B' below (except when 'B' establishes a maximum distance); or

B. The 'Local Government' APZ' derived from the Firebreak/Hazard Reduction Notice when distances are greater than 'A' above, other than when a maximum distance is established, in which case this will apply; or

C. A combination of 'A' and 'B'.

> *Within this Report/Plan it is the **'Planning BAL-29' APZ** that will be identified on maps, diagrams and in tables as necessary – unless otherwise stated.*
>
> *The **'Required' APZ** dimension information will be presented in Appendix B1.1 and on the Property Bushfire Management Statement, when required to be included for a development application.*

☑ ☐ ☐	**APZ Width:** The proposed (or a future) habitable building(s) on the lot(s) of the proposed development - or an existing building(s) for a proposed change of use – can be (or is) located within the developable portion of the lot and be surrounded by a 'Planning BAL-29' APZ of the required dimensions (measured from any external wall or supporting post or column to the edge of the classified vegetation), that will ensure their exposure to the potential radiant heat impact of a bushfire does not exceed 29 kW/m^2.
☑ ☐ ☐	**Restriction on Building Location:** It has been identified that the current developable portion of a lot(s) provides for a future building location that will result in that building being subject to a BAL-40 or BAL-FZ rating. Consequently, it may be considered necessary to impose the condition that a restrictive covenant to the benefit of the local government pursuant to section 129BA of the Transfer of Land Act 1893, is to be placed on the certificate(s) of title of the proposed lot(s) advising of the existence of a restriction on the use of that portion of land (refer to Code F3 of Model Subdivision Conditions Schedule, WAPC June 2021 and Guidelines s5.3.2).
☑ ☐ ☐	**APZ Location:** The required dimensions for a 'Planning BAL-29' APZ can be contained solely within the boundaries of the lot(s) on which the proposed (or a future) habitable building(s) - or an existing building(s) for a proposed change of use – is situated.
☐ ☐ ⃠	**APZ Location:** The required dimensions for a 'Planning BAL-29' APZ can be partly established within the boundaries of the lot(s) on which the proposed (or a future) habitable building(s) - or an existing building(s) for a proposed change of use – is situated. The balance of the APZ would exist on adjoining land that satisfies the exclusion requirements of AS 3959:2018 cl 2.2.3.2 for non-vegetated areas and/or low threat vegetation and/or vegetation managed in a minimal fuel condition.

☐ ☐ ⊘	**APZ Location:** It can be justified that any adjoining (offsite) land forming part of a 'Planning BAL-29' APZ will: • If non-vegetated, remain in this condition in perpetuity; and/or • If vegetated, be low threat vegetation or vegetation managed in a minimal fuel condition in perpetuity.
☑ ☐ ☐	**APZ Management:** The area of land (within each lot boundary), that is to make up the required 'Landowner' APZ dimensions (refer to Appendix B, Part B1), can and will be managed in accordance with the requirements of the Guidelines Schedule 1 'Standards for Asset Protection Zones' (refer to Appendix B).
☐ ☐ ⊘	**Subdivision Staging:** There are undeveloped future stages of subdivision, containing bushfire prone vegetation, that have been taken into consideration for their potentially 'temporary' impact on the ability to establish a 'Planning BAL-29 APZ' on adjoining developed lots. A staging plan is developed to manage this.
☑ ☐ ☐	**Firebreak/Hazard Reduction Notice:** Any additional requirements established by the relevant local government's annual notice to install firebreaks and manage fuel loads (issued under s33 of the Bushfires Act 1954), can and will be complied with.
Supporting Assessment Details: The ability to establish the 10kW/m2 Zone dimensions is illustrated in Figure 3.2.1. Onsite native vegetation will be required to be modified and/or removed, for which the appropriate authority will be required (refer to Section 2 of this BMP). The onsite shelter to be constructed using NASH Standard and to BAL-29.	
A5.13b Onsite shelter – pedestrian paths	**Applicable**: Yes **Compliant**: Yes
☑ ☐ ☐	To comply with acceptable solution A5.14d (lack of vehicular access), pedestrian paths to an onsite shelter area or building, with the required signage, can and will be provided.
Supporting Assessment Details: Signage to be installed to direct persons on-site to the shelter building.	
A5.13c Onsite shelter – exposure to the bushfire hazard	**Applicable**: Yes **Compliant**: Yes
☑ ☐ ☐	To comply with acceptable solution A5.14d, a building that will function as a suitable onsite shelter can and will be provided that will reduce persons exposure to bushfire threats (through the shielding provided by the building). The building's exposure to the bushfire hazard threat of radiant heat will be limited to a maximum radiant heat flux of 10 kW/m2 (calculated with an assumed flame temperature of 1200K) by providing the required separation distances from the bushfire hazard.
☐ ☐ ⊘	To comply with acceptable solution A5.14d (lack of vehicular access), an open area that will function as a suitable onsite shelter can and will be provided that will limit persons exposure to a maximum radiant heat flux of 2 kW/m2 (calculated with an assumed flame temperature of 1200K) by providing the required separation distances from the bushfire hazard.
Supporting Assessment Details: The proposed admin/crib room will serve as on-site shelter building. The ability to establish the 10kW/m2 Zone dimensions is illustrated in Figure 3.2.1. Onsite native vegetation will be required to be modified and/or removed, for which the appropriate authority will be required (refer to Section 2 of this BMP).	
A5.13d Onsite shelter – bushfire construction requirements	**Applicable**: Yes **Compliant**: Yes
☐ ☐ ⊘	The building provided as an onsite shelter can and will be designed and constructed in accordance with the National Construction Code and the ABCB Community Shelter Handbook.

☑ ☐ ☐	The building(s) provided as an onsite shelter can and will be built to the bushfire construction requirements corresponding to BAL-29 (as per AS 3959 or the NASH Standard) as a minimum – while complying with A15.13c (being subject to a maximum radiant heat flux of 10 kW/m^2).
Supporting Assessment Details: The admin/crib room (on-site shelter building) is sited in an area that will be subject to a maximum heat flux of 10 kW/m^2 and built to BAL-29 construction standards.	
A5.14 Vehicular Access	
A5.14a Multiple access routes	**Applicable**: Yes **Compliant**: No
☐ ☒ ☐	Two-way access is available. Public road access is provided in two different directions to at least two different suitable destinations.
☐ ☐ ⦸	This exception applies. Secondary access cannot be achieved. The tourism land use is in a residential built out area.
☐ ☐ ⦸	This exception applies. Secondary access cannot be achieved. The bushfire emergency plan provides for closure on days with forecast extreme or fire danger rating and a total fire ban and provides for the early evacuation of patrons and staff.
☐ ☐ ⦸	This exception applies. Secondary access cannot be achieved. The bushfire emergency plan provides for non-operation during the bushfire season.
Supporting Assessment Details: Gull Road is the only access route to and from site. It is approximately 4km from the site to the nearest two-way access route at Lakes Road. However, an onsite shelter building will be provided for persons on site as an alternative solution.	
A5.14b No-through roads – maximum length	**Applicable**: No **Compliant**: N/A
☐ ☐ ⦸	The no-through public road for the proposed development is no longer than 200 metres. It is unavoidable and the adjoining classified vegetation (excluding the road reserve) is categorised an Extreme Bushfire Hazard Level (Guidelines, Table 3).
☐ ☐ ⦸	The no-through public road for the proposed development is no longer than 500 metres. It is unavoidable and the adjoining classified vegetation (excluding the road reserve) is categorised a Moderate Bushfire Hazard Level (Guidelines, Table 3).
☐ ☐ ⦸	The no-through public road is unavoidable and the adjoining classified vegetation (excluding the road reserve) is categorised a Low Bushfire Hazard Level (Guidelines, Table 3) or is not identified as bushfire prone. Consequently, there is no limit on its length.
Supporting Assessment Details: N/A	
A5.14c Emergency access way – alternative access options	**Applicable**: No **Compliant**: N/A
☐ ☐ ⦸	A5.14a andA5.14b cannot be achieved.
☐ ☐ ⦸	The proposed or existing EAW provides a through connection to a public road.

☐ ☐ ⊘	The proposed or existing EAW is less than 500m in length and will be signposted and gated (remaining unlocked) to the specifications stated in the Guidelines and/or required by the relevant local government.
☐ ☐ ⊘	The technical construction requirements for widths, clearances, capacity, gradients and curves (Guidelines, Table 6. Refer also to Appendix C in this BMP.), can and will be complied with.
Supporting Assessment Details: None required.	
A5.14d Access limitations - onsite shelter option	**Applicable**: Yes **Compliant**: Yes
☑ ☐ ☐	The access requirements of two-way access, restricted no-through road length and provision of an EAW (established by A5.14a, A5.14b and A5.14c) cannot be achieved. The Guidelines provide for the protection measure of an onsite shelter to be provided in lieu of achieving these acceptable solutions.
☑ ☐ ☐	The capacity of the proposed development is no greater than 100 guests and staff at any one time.
☑ ☐ ☐	An onsite shelter can and will be provided in accordance with the requirements for exposure to the bushfire hazard, bushfire construction requirements and pedestrian paths (established by acceptable solutions A13b, A13c and A13d in 'Siting and Design').
Supporting Assessment Details: The nearest two-way intersection is Lakes Road approximately 6km from the development. The proposed admin /crib room will be the designated onsite shelter building. A maximum of 65 people will be present on site.	
A5.14e Public roads - technical requirements	**Applicable**: Yes **Compliant**: Yes
☑ ☐ ☐	The technical construction requirements of vertical clearance and weight capacity (Guidelines, Table 6. Refer also to Appendix C in this BMP), can and will be complied with.
☑ ☐ ☐	The applicable class(s) of road and technical requirements have been confirmed with the relevant local government/Main Roads WA. These can and will be complied with.
☑ ☐ ☐	A traversable verge is available adjacent to classified vegetation (Guidelines, E3.1), as recommended.
Supporting Assessment Details: No new public roads are to be built as part of this development however the existing road network is complaint with the relevant standards. Flat gravel verge (1m each side) will be maintained on the sides of public roads.	
A5.14f Internal access/private driveway - technical requirements	**Applicable**: Yes **Compliant**: Yes
☐ ☐ ⊘	The internal vehicular access/private driveway length is no greater than 70m. No technical requirements need to be met.
☑ ☐ ☐	The technical construction requirements for widths, clearances, capacity, gradients and curves (Guidelines, Table 6. Refer also to Appendix C in this BMP), can and will be complied with.
☐ ☐ ⊘	Passing bays can and will be installed every 200m with a minimum length of 20m and a minimum additional trafficable width of 2m.

☑ ☐ ☐	The turnaround area requirements (Guidelines, Figure 28, and within 30m of the habitable building) can and will be complied with.
Supporting Assessment Details: The proposed private driveway will be two-way and 6 metres wide. All proposed driveways will be constructed to public road standards and slashing of 3m is required on road verges.	
A5.14g Internal access/private driveway - availability	**Applicable**: Yes **Compliant**: Partly
☑ ☐ ☐	The internal vehicular access/private driveway can provide emergency access/egress for all patrons and staff in the event of a bushfire.
☐ ☒ ☐	It is possible to provide at least two internal access/egress points to the public road network.
Supporting Assessment Details: The nearest two-way intersection is Lakes Road approximately 6km from the development. The proposed admin /crib room will be the designated onsite shelter building .	
A5.14h Signage	**Applicable**: Yes **Compliant**: Yes
☑ ☐ ☐	The required information to inform the actions of those persons onsite in the event of a bushfire will be prominently displayed within the site.
☑ ☐ ☐	This information will include evacuation routes and distance and the site specific procedural detail that will be established by the Bushfire Emergency Plan (or Information) that is required to be developed for the proposed use.
Supporting Assessment Details: The Bushfire Information Poster will be displayed in an area for all occupants to view. A Bushfire Emergence Plan will be developed as part of the Development Application. Directional signage to the onsite shelter building will also be installed.	
A5.15 Provision of Water for Firefighting Purposes	
A5.15a Reticulated supply	**Applicable**: No **Compliant**: N/A
☐ ☐ ⊘	A reticulated water supply is available to the proposed development. The existing hydrant connection(s) are provided in accordance with the specifications of the relevant water supply authority.
☐ ☐ ⊘	A reticulated water supply is available to the proposed development. Hydrant connection(s) can and will be provided in accordance with the specifications of the relevant water supply authority.
Supporting Assessment Details: N/A	
A5.15b Non-reticulated supply – water tank capacity	**Applicable**: Yes **Compliant**: Yes
☑ ☐ ☐	A static water supply (tank) for firefighting purposes will be installed on the lot that is additional to any water supply that is required for drinking and other domestic purposes.
☐ ☐ ⊘	A water tank(s) will be provided with a minimum capacity of 10,000 litres/500 m^2 of habitable floor space to a maximum of 50,000 litres.
Supporting Assessment Details: A static water supply for firefighting purposes will be made available to the development. A 50,000L water tank will need to be installed for bushfire firefighting. This will be located near the Tank farm. It can be moved or removed if hydrants are installed.	

A5.15c Non-reticulated supply – technical requirements	Applicable: Yes	Compliant: Yes
☑ ☐ ☐ The technical requirements (design, construction materials, pipes and fittings), as established by the Guidelines (Element 4, Schedule 2, s2.2) and/or the relevant local government, can and will be complied with.		
Supporting Assessment Details: Refer to information contained in Appendix D for the firefighting water supply specifications and technical requirements.		

5.8 Additional Bushfire Protection Measures to be Implemented (derived from Bushfire Risk Management Report)

BUSHFIRE HAZARD THREAT REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
Prevent Bushfire ignition and/or severity by managing the fuels	1.4	Remove onsite bushfire fuel	Before clearing, approval must be obtained from the local government before removing or managing native vegetation.	Highest
	1.6	Reduce onsite bushfire fuel - mechanical	Local government approval required before clearing or managing native vegetation.	Highest
	1.8	Enforce compliance with local government property management directives	Include ongoing management requirements in facility guidance and operational documents.	High
Prevent bushfire ignition by managing heat energy sources	1.9	Robust and effective site operational procedures	Develop guidance documents and operating procedures.	High
	1.11	Design and construct equipment to prevent airborne ignition	Monitor purchase and construction of plant equipment for adequate protection measure against potential ignition sources.	Medium
	1.12	Actively enforce activity restrictions	Develop Standard Operating Procedures to restrict operation during TFB days. Consider documenting the process for exemptions for certain critical operations.	High
	1.14	Bushfire awareness and 'good practices' education	Basic fire awareness to be included in company induction. Relevant staff training required, site specific Bushfire Awareness and emergency response.	Medium
Prevent bushfire ignition	1.15	Barriers (shielding) between ignition sources and fuels	Include in the facility design stage items and equipment that may be exposed to excessive radiant heat or has the potential to allow the spread of fire.	High

BUSHFIRE HAZARD THREAT REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
by managing the interactions of heat energy sources and fuels	1.16	Equipment design and construction to reduce heat transfer	Consider in the facility design stage, to reduce the potential of ignition and heat transfer.	Medium
	1.17	Separation distance between ignition sources and fuels	Include the critical assets within the 10kWm2 area.	Highest
[1] The full description of each bushfire protection measure and the detail of the assessment is presented in Section 5.1.5 [2] Refer to Appendix A1.2.5 for implementation priority rating explanation.				

EXPOSURE REDUCING MEASURES - PERSONS

PERSONS EXPOSURE REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
	Persons Located Onsite and Temporarily Offsite			
Establish sufficient separation from relevant bushfire hazard threats	2.1	Stay away from the subject site	Recommend closing facility to non-essential staff and contractors during heightened fire conditions, being FDI above 75 and catastrophic fire danger days.	Medium
	2.2	Remote tourism sites - stay within the subject site	Apply protection measures. Include safer pathways in the facility design.	Medium
	2.4	Relocate (evacuate) to designated safer offsite location(s)	Include Bushfire Emergency Plan into operational documents including the site emergency plan. The cribroom is the nominated shelter in place building.	High
	2.6	Safer pathways for onsite movement	Apply protection measures. Include safer pathways in the facility design.	Highest
	2.7	Pre-emptively relocate to designated safer offsite location(s)	Develop guidelines and procedures to respond to pre-determined FDI and FDR days and other established conditions, eg restricted site access for non-essential people.	High
	Persons on Access / Egress Routes in Vehicles			
	3.1	Locating route away from adjacent hazards		Lowest
	3.2	Egress routes located to ensure driving away from hazard	Driveway verge to be managed. 3m from the limestone road base will be slashed prior fire season.	Medium

PERSONS EXPOSURE REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
	3.3	Greater road width	The driveway will meet public road requirements and additional verge slashing is required. 3m wide verge slashing is required.	Medium
	3.4	Reduce and maintain road verge fuel to low threat state	3m wide verge slashing is required.	Medium
Establish shielding from relevant bushfire hazard threats	Persons Located Onsite and Temporarily Offsite			
	2.9	On-site shelter building – not to community refuge standard	Will be constructed to NASH Standard	High
	2.10	On-site shelter building – not a 'vulnerable' use	The flame temperature will be calculated at 1200k rather than 1090k and the office/crib room will be constructed to NASH standard	Highest
	Persons on Access / Egress Routes in Vehicles			

[1] The full description of each bushfire protection measure and the detail of the assessment is presented in Section 5.3.1.1 and Section 5.3.2.1

[2] Refer to Appendix A1.2.5 for implementation priority rating explanation.

EXPOSURE REDUCING MEASURES – ALL STRUCTURES AND MATERIALS STORED OUTDOORS

ALL STRUCTURES & MATERIALS STORED OUTDOORS EXPOSURE REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
Establish sufficient separation from relevant bushfire hazard threats	4.2 5.2 6.2 6.1	Designed location of non-vegetated areas and/or managed open space	Use roads, hardstand areas and footpaths as open managed spaces. Construct and maintain the APZ to ensure maximum heat flux exposure does not exceed 10kWm2.	Medium
	4.3 5.3 6.2	Landscaping - asset protection zone (APZ)	10kWm2 @ 1200k APZ will be constructed and maintained around the nominated shelter in place building. A Landscape Management Plan will be provided. To minimise exposure from external radiant heat, a <10kWm2 @ 1090k APZ is required to be established. The dimensions for this APZ are provided within the associated BMP. The increased APZ to 10kWm2 will reduce the overall preheating on combustible materials. Develop an emergency Management Plan Install an appropriate fire hydrant system (and water runoff/catchment) Install appropriate fire sprinkler suppression systems (and water runoff/catchment) External storage management of organic material Maximum height of any stockpile loosed piled or baled <4.8m. Maximum width of a stockpile is to be 20m Maximum length of a stockpile to be <50m Arrangement of stockpiles is to minimise the likelihood of fire spread and provide access for fire appliances.	Highest

ALL STRUCTURES & MATERIALS STORED OUTDOORS EXPOSURE REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
			DFES Information Note September 2014 – Spontaneous combustion of green waste windrows and stockpiles due to elevated internal temperatures. Moisture content of the composting windrows will be maintained above 45% as part of the composting process, and by virtue will reduce the risk of spontaneous combustion. This will be maintained by watering once a day or as required. Moisture content of the green waste received on site will not exceed 20% to prevent the generation of heat occurring through biological activity occurring and in turn resulting in spontaneous combustion.	
	4.4 5.4	Landscaping - tree location	Avoid planting trees that allow fire to ascend the trunk and produce embers and firebrands. A Landscape Management Plan will be provided.	High
	4.6 5.6 6.3	Separation from stored flammable products – fuels / other hazardous materials (consequential fire fuels)	Include in facility guidelines to direct the storage of fuel, flammable liquids and workshop gas bottles, used and new oils storage and other flammable items. Where external heat sources have not been considered by the manufacture or Standard, then the separation distance, than item # 7.7 is to be used. If cabling and other flammable items are exposed to direct radiant heat, than <10kWm2 will be the maximum exposure. Include in the facilities emergency plan and operational documents where to store the items, state the separation distances and provide direction on maintaining buildup of fine and heavy fuels. Provide staff training.	High

ALL STRUCTURES & MATERIALS STORED OUTDOORS EXPOSURE REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
	4.7 5.7 6.4	Separation from stored and constructed combustible items (consequential fire fuels)	Details: Include in the guidance document separation distances required for flammable and combustible materials. Detail in the facilities guidance document and information in the Emergency Management Plan guidance on storage of heavy fuels and separation distances. It is recommended that this 10m buffer form all hard fix assets is sealed or compacted with concrete, compacted limestone, gravel, blue metal etc.	Highest
Establish shielding from relevant bushfire hazard threats	4.8 5.8 6.5	Constructed barrier – shielding from bushfire	Fencing, external walls and retaining walls to be constructed using non-combustible materials.	Medium
	4.9 5.9 6.9 8.6	Constructed barrier – shielding from consequential fire	Ensure all subfloor spaces are sealed. Shield fuel lines and electrical components extending form the infrastructure. When Separating Masonry walls are used, the walls are to be marked showing the maximum height and width to identify the stockpile limits.	Medium
	4.11 5.11 6.8	Planted vegetation barrier	Include in the facility guidance documents and operational documents management of planted vegetation. Vegetation planting to be in accordance with the Landscape Plan. Plantings to be managed to low threat if located in the APZ and Guidelines for Planning lin Bushfire Prone Areas - Schedule 1.	Medium
	4.12 5.12	Shield operation critical non-structural elements	Position all critical non-structural items in less than 10kWms area and shield electrical cabling, poly tanks and pipes, valves and any other item susceptible to low radiant heat. Include a maintenance regime for debris accumulation management within the guidance document.	Highest

[1] The full description of each bushfire protection measure, the detail of the assessment and any recommendation, is presented in Section 5.3.3.1. and Section 5.3.4.1 & 5.3.5.1

ALL STRUCTURES & MATERIALS STORED OUTDOORS EXPOSURE REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
[2] Refer to Appendix A1.2.5 for implementation priority rating explanation.				

VULNERABILITY REDUCING MEASURES - PERSONS

PERSONS VULNERABILITY REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
Transport and multiple evacuation destinations and routes available	Persons Located Onsite and Temporarily Offsite			
	6.1	Sufficient evacuation transport available	People on site will have their own transport.	Lowest
	6.2	Multiple safer offsite locations available	A BEP has been developed for the facility	High
Provision of bushfire emergency information and education	6.3	Develop a bushfire emergency plan	A BEP has been developed and provided.	High
	6.4	Relevant operational documents to contain the bushfire protection measures to be implemented	Update the Fire Response Plan and develop Guidance documents before facility becomes operational	High
	6.5	Prominent display of bushfire emergency information	Bushfire information to be displayed at the weigh bridge office and the administration office.	Medium
	6.6	Direct to persons emergency messaging system	Emergency messaging system to be developed.	High
	6.7	Egress pathway signage	Identified safer onsite location.	Medium
	6.8	Personnel are trained to implement the bushfire emergency plan	Staff to be trained in emergency response and bushfire awareness.	Highest

PERSONS VULNERABILITY REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
Onsite persons capable of managing a bushfire emergency are available	6.12	Onsite persons available to manage bushfire emergency procedures	Ensure enough appropriately trained staff are onsite at all times during the bushfire season to assist with emergency procedures. Emergency procedures to be reviewed annually.	Highest
	6.13	Onsite persons can operate firefighting equipment	Provide a mobile response unit. Recommend 2 x slip-on units and basic bushfire awareness and response.	Highest
	6.14	External emergency response services available	Safe early evacuation is the preferred response. Local brigade turnout is 20 minutes.	Highest
Lower risk road construction (design and materials)	Persons on Access / Egress Routes in Vehicles			
	7.1	Greater road width	The driveway will be constructed to public road standards as per Table 6 of the Guidelines for planning in Bushfire Prone Areas.	Medium
	7.4	Stable road surfaces	Road surfaces will meet the technical requirement of the Guidelines. Recommend the driveway is limestone road base.	Medium
Evacuees are self-sufficient and have local awareness and own transport	7.8	Self-sufficient persons with local awareness	Site induction and contractor information to include information about the sites evacuation process. Include in the Facility guidelines and induction.	High
	7.9	Onsite persons have own transport	Include in facility training and induction program.	Medium

[1] The full description of each bushfire protection measure, the detail of the assessment and any recommendation, is presented in Section 5.4.1.1 and Section 5.3.5.1

[2] Refer to Appendix A1.2.5 for implementation priority rating explanation.

VULNERABILITY REDUCING MEASURES – STRUCTURES

STRUCTURES VULNERABILITY REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
Construction design and materials	9.1 10.1	Construct to AS 3959:2018	Built infrastructure assets - Fit ember screens, gaps to be 2mm or less. The built infrastructure assets where applicable will implement the protection measures. Comment - Nominated shelter in place building to comply with NASH standard.	Medium
	9.2 10.2	Construct to NASH Standard	Nominated shelter in place building to comply with NASH standard. The facilities built infrastructure assets where applicable will implement the protection measures.	Highest
	9.3 12.3 14.3	Construction materials for external and internal cavity building elements	Where possible use non-combustible material.	Medium
	9.4 10.4	Construction materials for consequential fire fuels	Use of non-combustible materials is preferred/recommended.	Medium
	9.5 10.5	Construction design/materials resistant to high wind damage	Construct shelter in place building to NASH standard. NASH Standard has been designed for impact of wind.	High
	9.7 10.7	Construction of electricity supply	Cabling to be underground wherever possible. Cabling above ground to be shielded and cradled a minimum 100mm above the ground.	High
	9.8 10.8	Minimise re-entrant detail to minimise debris and ember accumulation	The shelter in place building (office) to consider design features to minimise debris and ember accumulation.	Lowest

STRUCTURES VULNERABILITY REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
	9.9 10.9	Minimise debris and ember trapping surfaces	The facility is constructed for a specific industry use therefore the trapping surfaces may be flat.	Lowest
	9.10 10.10	Protect roof plumbing to minimise debris and ember accumulation	Design of facility, workshop pluming and associated structures and equipment to consider reducing the risk off ignition. The office (shelter in place building) will be constructed using the NASH protection measures.	Medium
	9.11 10.11	Minimise construction cavities to minimise debris and ember accumulation	The office will be constructed the BAL-29 requirements. Built infrastructure Assets - Seal subfloor space and apply ember screening to opening.	Highest
	9.12 10.12	Minimise external openings to limit flame / radiant heat / ember / debris entry	For the facility, workshop and associated structures, protection measure to be applied where practicable. Office to comply with the NASH Standard protection measures.	High
	9.13 10.13	Screen and seal gaps and penetrations	For the facility, workshop and associated structures and built assets, protection measure to be applied where practicable. Office to comply with the NASH Standard protection measures.	High
	9.14 12.14 14.14	Screen external doors and windows	For the facility, workshop and associated structures, protection measure to be applied where practicable.	High
	9.15 10.15	Shutter external doors and windows		N/A

STRUCTURES VULNERABILITY REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
	10.16	Construction materials for critical non-structural elements	The critical non-structural elements to be located in <10kWm2 area or shielded.	Highest
Availability of a firefighting response capability	9.16 10.17	Firefighting water supply	Firefighting water tanks are to be non-combustible. Minimum 50,000lt are required and to be fitted with coupling as per BMP requirements. If hydrants are installed, the 50,000lt tank will not be required.	Highest
	9.17 10.18	Firefighting equipment actively operated	Sprinkler system required for all stockpiles of flammable materials. Training required for system operations. Operational plans required for sprinkler operations. As a minimum, 2 x slip-on firefighting units (not trailer type) are required. Staff training required in unit operations. Training operation manual to be developed in response and equipment operations. PPE to be provided to trained staff.	Highest
	9.18 10.19	Firefighting equipment passively operated	Sprinkler system required for all stockpiles of flammable materials. Training required for system operations. Operational plans required for sprinkler operations.	Highest
	9.19 10.20	Firefighting equipment operability maintained	Develop operational manual and maintenance schedule.	Highest
	12.20 10.21	Access via firebreaks provided	The site will comply with the Firebreak Notice.	Medium

STRUCTURES VULNERABILITY REDUCTION RECOMMENDED ADDITIONAL BUSHFIRE PROTECTION MEASURES				
The Protection Mechanism	Ref No	Brief Description [1]	Recommendation Details	Implementation Priority Rating [2]
Manage and maintain effectiveness of applied protection measures	9.21 10.22	Formal documents created to guide and enforce management	Guidance documents to be developed for site operations and emergency management (maintenance of equipment & training) The different documents will be able to satisfactorily perform this function to differing extents.	High

[1] The full description of each bushfire protection measure, the detail of the assessment and any recommendation, is presented in Sections 5.4.3.1 & 5.4.3.4

[2] Refer to Appendix A1.2.5 for implementation priority rating explanation.

6 RESPONSIBILITIES FOR IMPLEMENTATION AND MANAGEMENT OF THE BUSHFIRE PROTECTION MEASURES

6.1 Developer / Landowner Responsibilities – Prior to Sale or Occupancy/Operation

DEVELOPER/LANDOWNER RESPONSIBILITIES – PRIOR TO SALE OR OCCUPANCY/OPERATION	
No.	Implementation Actions
1	The local government may condition a development application approval with a requirement for the landowner/proponent to register a notification onto the certificate of title and deposited plan. This will be done pursuant to Section 70A *Transfer of Land Act 1893* as amended ('Factors affecting use and enjoyment of land, notification on title'). This is to give notice of the bushfire hazard and any restrictions and/or protective measures required to be maintained at the owner's cost. This condition ensures that: 1. Landowners/proponents are aware their lot is in a designated bushfire prone area and of their obligations to apply the stated bushfire risk management measures; and 2. Potential purchasers are alerted to the Bushfire Management Plan so that future landowners/proponents can continue to apply the bushfire risk management measures that have been established in the Plan.
2	Establish the 'Landowner' Asset Protection Zone (APZ) around habitable buildings (and other structures as required) to satisfy: • The minimum required dimensions. These are to be the greatest measurements derived from either the separation distances corresponding to the determined BAL rating for the subject building/structure, or the local government's annual firebreak / hazard reduction notice (issued under s33 of the Bushfires Act 1954), or a combination of these requirements [refer to Appendix B]; and • The standards established by the Guidelines DPLH, 2021 v1.4, Schedule 1, or as varied by the local government through their annually issued firebreak / hazard reduction notice when the variations have been endorsed by the WAPC and DFES as per s4.5.3 of the Guidelines. If native vegetation is required to be modified or removed, ensure that approval has been received from the relevant authority (refer to the applicable local government for advice). This is the responsibility of the developer.
3	Prior to sale or occupancy, a copy of the Bushfire Emergency Plan (BEP) must be provided to the landowner, and they are to be informed that it contains responsibilities that must be actioned due to the use of the land being defined as a 'Vulnerable Land Use' for the reasons identified in Section 1.1. The 'Pre-Season Preparation Procedure' instructions must be complied with.
4	Prior to operation, construct the private driveways to comply with the technical requirements referenced in the BMP.
5	Prior to operation, install the required firefighting static water supply to comply with the technical requirements stated in the BMP.
6	Prior to occupancy, there is an outstanding obligation, created by this Bushfire Management Plan, for a Bushfire Emergency Plan for proposed occupants to be developed and approved for the 'vulnerable' land use.

7	Prior to occupancy, signage must be prominently displayed within the site that informs the actions of those persons onsite in the event of a bushfire. This will include evacuation route information, site procedures – as per the instructions within the Bushfire Emergency Plan or Bushfire Information Poster developed for the site and use.
8	Prior to occupancy, all actions contained within the 'Pre-Season Preparation Procedure' established by the Bushfire Emergency Plan, must be completed.
9	For the 'high risk land use' there is an outstanding obligation, created by Guidelines and consequently this Bushfire Management Plan, for a 'Bushfire Risk Assessment and Management Report' to be produced. Additional protection measures that have been identified in the Report, are to be incorporated into the operation's site emergency plan (produced by the operator to address all potential emergencies) Refer Section 5.8 of this report.
10	Prior to relevant building work, inform the builder of the existence of this approved Bushfire Management Plan (BMP). The plan identifies that the development site is within a designated bushfire prone area and states the indicative (or determined) BAL rating(s) that may (or will) be applied to buildings/structures. A BAL assessment report may be required to confirm determined ratings and will be required when ratings are indicative. BAL certificates will need to be issued to accompany building applications. The BMP may also establish, as an additional bushfire protection measure, that construction requirements to be applied will be those corresponding to a specified higher BAL rating. Compliance with the Building Code of Australia (Volumes 1 and 2 of the National Construction Code), will require certain bushfire resistant construction requirements be applied to residential buildings in bushfire prone areas (i.e., Class 1, 2 and 3 and associated Class 10a buildings and decks). Other classes of buildings may also be required to comply with these construction when established by the relevant authority or if identified as an additional bushfire protection measure within the BMP. The deemed to satisfy solutions that will meet the relevant bushfire performance requirements are found in AS 3959 – Construction of Building in Bushfire Prone Areas (as amended) and the NASH Standard - Steel Framed Construction in Bushfire Areas (as amended).
11	On going maintenance of the separation distances between the onsite shelter building and the bushfire prone vegetation.

6.2 Landowner / Occupier Responsibilities – Ongoing Management

LANDOWNER/OCCUPIER – ONGOING MANAGEMENT	
No.	Management Actions
1	Maintain the 'Landowner' Asset Protection Zone (APZ) around habitable buildings (and other structures as required) to satisfy: • The minimum required dimensions. These are to be the greatest measurements derived from either the separation distances corresponding to the determined BAL rating for the subject building/structure, or the local government's annual firebreak / hazard reduction notice (issued under s33 of the Bushfires Act 1954), or a combination of these requirements [refer to Appendix B]; and • The standards established by the Guidelines DPLH, 2021 v1.4, Schedule 1, or as varied by the local government through their annually issued firebreak / hazard reduction notice when the variations have been endorsed by the WAPC and DFES as per s4.5.3 of the Guidelines.
2	Comply with the Shire of Murray Firebreak Notice and Bushfire Information 2022-2023 issued under s33 of the Bush Fires Act 1954. Check the notice annually for any changes.
3	Maintain private driveway within the lot to comply with the technical requirements referenced in the BMP.
4	Maintain the static firefighting water supply tank and associated pipes/fittings/pump and vehicle hardstand in good working condition.
5	Ensure that builders engaged to construct dwellings/additions and/or other relevant structures on the lot, are aware of the existence of this approved Bushfire Management Plan (BMP). The plan identifies that the development site is within a designated bushfire prone area and states the indicative (or determined) BAL rating(s) that may (or will) be applied to buildings/structures. A BAL assessment report may be required to confirm determined ratings and will be required when ratings are indicative. BAL certificates will need to be issued to accompany building applications. The BMP may also establish, as an additional bushfire protection measure, that construction requirements to be applied will be those corresponding to a specified higher BAL rating. Compliance with the Building Code of Australia (Volumes 1 and 2 of the National Construction Code), will require certain bushfire resistant construction requirements be applied to residential buildings in bushfire prone areas (i.e., Class 1, 2 and 3 and associated Class 10a buildings and decks). Other classes of buildings may also be required to comply with these construction when established by the relevant authority or if identified as an additional bushfire protection measure within the BMP. The deemed to satisfy solutions that will meet the relevant bushfire performance requirements are found in AS 3959 – Construction of Building in Bushfire Prone Areas (as amended) and the NASH Standard - Steel Framed Construction in Bushfire Areas (as amended).
6	Ensure all future buildings the landowner has responsibility for, are designed and constructed in full compliance with: • The bushfire resistant construction requirements of the Building Code of Australia (Volumes 1 and 2 of the National Construction Code), as established by the Building Regulations 2012 (WA Building Act 2011); and • Any additional bushfire protection measures this Bushfire Management Plan has established are to be implemented.

7	Annually review the Bushfire Emergency Plan and complete all actions contained within the 'Pre-Season Preparation Procedure' and the 'In-Season Preparation Procedure' at the appropriate times of the year.
8	The bushfire specific content of the operation's site emergency plan must be reviewed annually, relevant information updated and ensure all bushfire related preparation procedures are carried out.

6.3 Local Government Responsibilities – Ongoing Management

LOCAL GOVERNMENT – ONGOING MANAGEMENT	
No.	Management Actions
1	Monitor landowner compliance with the annual Shire of Murray Firebreak Notice and Bushfire Information 2022-2023 and with any bushfire protection measures that are: • Established by this BMP; • Are required to be maintained by the landowner/occupier; and • Are relevant to local government operations.

APPENDIX A: DETAILED BAL ASSESSMENT DATA AND SUPPORTING INFORMATION

A1: BAL Assessment Inputs Common to the Method 1 and Method 2 Procedures

A1.1: FIRE DANGER INDICES (FDI/FDI/GFDI)

When using Method 1 the relevant FDI value required to be applied for each state and region is established by AS 3959:2018, Table 2.1. Each FDI value applied in Tables 2.4 – 2.7 represents both the Forest Fire Danger Index (FFDI) and a deemed equivalent for the Grassland Fire Danger Index (GFDI), as per Table B2 in Appendix B. When using Method 2, the relevant FFDI and GFDI are applied.

The values may be able to be refined within a jurisdiction, where sufficient climatological data is available and in consultation with the relevant authority.

Relevant Jurisdiction:	WA	Region:	Whole State	Method 1	Applied FDI:	80
				Method 2	Applied FFDI:	N/A
					Applied GFDI:	N/A

A1.2: VEGETATION ASSESSMENT AND CLASSIFICATION

Vegetation Types and Classification

In accordance with AS 3959:2018 clauses 2.2.3 and C2.2.3.1, all vegetation types within 100 metres of the 'site' (defined as "the part of the allotment of land on which a building stands or is to be erected"), are identified and classified. Any vegetation more than 100 metres from the site that has influenced the classification of vegetation within 100 metres of the site, is identified and noted. The maximum excess distance is established by AS 3959: 2018 cl 2.2.3.2 and is an additional 100 metres.

Classification is also guided by the Visual Guide for Bushfire Risk Assessment in WA (WA Department of Planning February 2016) and any relevant FPA Australia practice notes.

Modified Vegetation

The vegetation types have been assessed as they will be in their natural mature states, rather than what might be observed on the day. Vegetation destroyed or damaged by a bushfire or other natural disaster has been assessed on its expected re-generated mature state. Modified areas of vegetation can be excluded from classification if they consist of low threat vegetation managed in a minimal fuel condition, satisfying AS 3959:2018 s2.2.3.2(f), and there is sufficient justification to reasonable expect that this modified state will exist in perpetuity.

The Influence of Ground Slope

Where significant variation in effective slope exists under a consistent vegetation type, these will be delineated as separate vegetation areas to account for the difference in potential bushfire behaviour, in accordance with AS 3959:2018 clauses 2.2.5 and C2.2.5.

THE INFLUENCE OF VEGETATION GREATER THAN 100 METRES FROM THE SUBJECT SITE	
Vegetation area(s) within 100m of the site whose classification has been influenced by the existence of bushfire prone vegetation from 100m – 200m from the site:	None
Assessment Statement:	N/A

<table>
<tr><th colspan="5">VEGETATION AREA 1</th></tr>
<tr><td>Classification</td><td colspan="4">D. SCRUB</td></tr>
<tr><td>Types Identified</td><td colspan="4">Open scrub D-14</td></tr>
<tr><td>Effective Slope</td><td>Measured</td><td>Flat 0 degrees</td><td>Applied Range (Method 1)</td><td>Upslope or flat 0 degrees</td></tr>
<tr><td colspan="2">Dominant & Sub-Dominant Layers (species as relevant)</td><td colspan="3">Mixed shrubs and scrub species growing up to 3 metres in height across undulating terrain.</td></tr>
<tr><td colspan="2">Understorey:</td><td colspan="3">Pastural Grasses and sedges with scattered seasonal herbs.</td></tr>
<tr><td colspan="2">Additional Justification:</td><td colspan="3">Not Required.</td></tr>
<tr><td colspan="2">Post Development Assumptions:</td><td colspan="3">Vegetation is classified as worst-case scenario. Classified vegetation located within the asset protection zone will be managed to a low threat state by subject site landowner.

Note: Any offsite vegetation cannot be managed or removed by the subject site landowner</td></tr>
<tr><td colspan="3">  </td><td colspan="2">  </td></tr>
<tr><td colspan="3">PHOTO ID: 1</td><td colspan="2">PHOTO ID: 2</td></tr>
<tr><td colspan="3">  </td><td colspan="2">  </td></tr>
<tr><td colspan="3">PHOTO ID: 3</td><td colspan="2">PHOTO ID: 4</td></tr>
</table>

	
PHOTO ID: 5	PHOTO ID: 6

VEGETATION AREA 2						
Classification	**A. FOREST**					
Types Identified	Open forest A-03					
Exclusion Clause	N/A					
Effective Slope	Measured	flat 0 degrees	Applied Range (Method 1)	Upslope or flat 0 degrees		
Foliage Cover (all layers)	30-70%	Shrub/Heath Height	1-2m	Tree Height	Over 30m	
Dominant & Sub-Dominant Layers (species as relevant)	Mixed eucalyptus and corymbia species found in low-lying wet areas and creeklines.					
Understorey:	Mixed native shrubs and pastural grasses.					
Additional Justification:	Not Required.					
Post Development Assumptions:	Vegetation is classified as worst-case scenario. Classified vegetation located within the asset protection zone will be managed to a low threat state by subject site landowner Note: Any offsite vegetation cannot be managed or removed by the subject site landowner					

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VEGETATION AREA 3				
Classification	**G. GRASSLAND**			
Types Identified	Tussock grassland G-22 Open herbfield G-27			
Effective Slope	Measured	Flat 0 degrees	Applied Range (Method 1)	Upslope or flat 0 degrees
Additional Justification:	Class G Grassland with occasional shrub present. Foliage cover is less than 10%.			
Post Development Assumptions:	Vegetation is classified as worst-case scenario. Classified vegetation located within the asset protection zone will be managed to a low threat state by subject site landowner Note: Any offsite vegetation cannot be managed or removed by the subject site landowner			

PHOTO ID: 11

PHOTO ID: 12

PHOTO ID: 13

PHOTO ID: 14

PHOTO ID: 15

PHOTO ID: 16

A1.3: EFFECTIVE SLOPE

Measuring

Effective slope refers to the slope "under the classified vegetation which most significantly influences bushfire behaviour (AS 3959:2018, clause B4, CB4). It is not the average slope.

It is described as upslope, flat or downslope when viewed from the exposed element (e.g., building) looking towards the vegetation – and measured in degrees. Ground slope has a direct and significant influence on a bushfire's rate of spread and intensity, which increases when travelling up a slope.

The slope under the vegetation in closest proximity to the exposed element(s), over the distance that will most likely carry the entire depth of the flaming front, will be a significant consideration in the determination of the effective slope. This distance is determined as a function of the potential quasi-steady rate of spread and expected residence time (i.e., the flaming combustion period at a single point on the ground), of a bushfire in the specific vegetation type/landscape scenario.

Slope Variation Within Areas of Vegetation

Where a significant variation in effective slope exists under a consistent vegetation type, these will be delineated as separate vegetation areas to account for the difference in potential bushfire behaviour, in accordance with AS 3959:2018 clauses 2.2.5 and C2.2.5.

Slope Variation Due to Multiple Development Sites

When the effective slope, under a given area of bushfire prone vegetation, will vary significantly relative to multiple proposed development sites (exposed elements), then the effective slopes corresponding to each of the different locations, are separately identified.

The relevant (worst case) effective slope is determined in the direction corresponding to the potential directions of fire spread towards the subject building(s).

Differences in Application of Effective Slope - AS 3959:2018 Method 1 versus Method 2 Procedures

The Method 1 procedure provides five different slope ranges from flat (including all upslopes) to 20 degrees downslope to define the effective slope and bushfire behaviour model calculations apply the highest value in each range (i.e., 0^0, 5^0, 10^0, 15^0 or 20^0).

The Method 2 procedure requires an actual slope (up or down in degrees) to be determined. AS 3959:2018, clause B1 limits the effective slope that can be applied to 30 degrees downslope and 15 degrees upslope. Where any upslope is greater than 15 degrees, then 15 degrees is to be used.

SITE ASSESSMENT DETAILS - EXPLANATION & JUSTIFICATION

The effective slopes determined from the site assessment are recorded in Table 3.1 of this Bushfire Management Plan. When their derivation requires additional explanation and justification, this is provided below.

A1.4: SEPARATION DISTANCE

Measuring

The separation distance is the distance in the horizontal plane between the receiver (building/structure or area of land being considered) and the edge of the classified vegetation (AS 3959:2018, clause 2.2.4)

The relevant parts of a building/structure from which the measurement is taken is the nearest part of an external wall or where a wall does not exist, the supporting posts or columns. Certain parts of buildings are excluded including eaves and roof overhangs.

The edge of the vegetation, for forests and woodlands, will be determined by the unmanaged understorey rather than either the canopy (drip line) or the trunk (AS 3959:2018, clause C2.2.5).

Measured Separation Distance as a Calculation Input

If a separation distance can be measured because the location of the building/structure relative to the edge of the relevant classified vegetation is known, this figure can be entered into the BAL calculation. The result is a determined BAL rating.

Assumed Separation Distance as a Calculation Input

When the building/structure location within the lot is not known, an assumed building location may be applied that would establish the closest positioning of the building/structure relative to the relevant area of vegetation.

The assumed location would be based on a factor that puts a restriction on a building location such as:

- An established setback from the boundary of a lot, such as a residential design code setback or a restrictive covenant; or
- Within an established building envelope.

The resultant BAL rating would be indicative and require later confirmation (via a Compliance Report) of the building/structure actual location relative to the vegetation to establish the determined BAL rating.

Separation Distance as a Calculation Output

With the necessary site specific assessment inputs and using the AS 3959:2018 bushfire modelling equations, the range of separation distances that will correspond to each BAL rating (each of which represents a range of radiant heat flux), can be calculated. This has application for bushfire planning scenarios such as:

- When the separation distance cannot be measured because the exact location of the exposed element (i.e., the building, structure or area), relative to classified vegetation, is yet to be determined.

  In this scenario, the required information is the identification of building locations onsite that will correspond to each BAL rating. That is, indicative BAL ratings can be derived for a variety of potential building/structure locations; or

- The separation distance is known for a given building, structure or area (and a determined BAL rating can be derived), but additional information is required regarding the exposure levels (to the transfer of radiant heat from a bushfire), of buildings or persons, that will exist at different points within the subject site.

The calculated range of separation distances corresponding to each BAL rating can be presented in a table and/or illustrated as a BAL Contour Map – whichever is determined to best fit the purpose of the assessment.

For additional information refer to the information boxes in Section 3 'Bushfire Attack Levels (BAL) - Understanding the Results and Section 3.2. 'Interpretation of the BAL Contour Map'.

SITE ASSESSMENT DETAILS - EXPLANATION & JUSTIFICATION

For the subject development/use the applicable separation distances values are derived from calculations applying the assessed site data. They are an output value, not an input value and therefore are not presented or justified in this appendix.

The derived values are presented in Section 3, Table 3.2 and illustrated as a BAL contour map in Figure 3.2.

APPENDIX B: ONSITE VEGETATION MANAGEMENT - THE APZ

THE ASSET PROTECTION ZONE (APZ) - DESCRIPTION

This is an area surrounding a habitable building containing either no fire fuels and/or low threat fire fuels that are managed in a minimal fuel condition. The primary objectives include:

- To ensure the building is sufficiently separated from the bushfire hazard to limit the impact of its direct attack mechanisms. That is, the dimensions of the APZ will, for most site scenarios, remove the potential for direct flame contact on the building, reduce the level of radiant heat to which the building is exposed and ensure some reduction in the level of ember attack (with the level of reduction being dependent on the vegetation types of present);
- To ensure any vegetation retained within the APZ presents low threat levels and prevents surface fire spreading to the building;
- To ensure other combustible materials that can result in consequential fire (typically ignited by embers) within both the APZ and parts of the building, are eliminated, minimised and/or appropriately located or protected. (Note: The explanatory notes in the Guidelines provide some guidance for achieving this objective and other sources are available. Research shows that consequential fire, ignited by embers, is the primary cause of building loss in past bushfire events); and
- To provide a defendable space for firefighting activities.

B1: The Dimensions and Location of the APZ to be Established and Maintained

UNDERSTANDING THE APZ PLANNING ASSESSMENT VERSUS ITS IMPLEMENTATION REQUIREMENTS

THE 'PLANNING BAL-29' APZ

It is important to understand is that the 'Planning BAL-29' APZ is not necessarily the size of the APZ that must be physically established and maintained by a landowner. It is a screening tool for making planning approval decisions.

The assessment against the Bushfire Protection Criteria is conducted for planning approval purposes. To satisfy acceptable solution 'A2.1: Asset Protection Zone', it must be demonstrated that certain minimum separation distances between the relevant building/structure and different classes of bushfire prone vegetation either exist or can be created and will remain in perpetuity.

The required minimum separation distances are those that will ensure the potential radiant heat impact on relevant existing or future buildings does not exceed 29 kW/m^2. The area of land contained within these separation distances is described as an Asset Protection Zone (APZ) and is to be comprised of non-vegetated land or low threat vegetation managed in a minimal fuel condition.

The applicable minimum separation distances will vary dependent on the vegetation types, the slope of the land they are growing on and other relevant factors specific to the site and its use.

The resulting 'Planning BAL-29' APZ dimensions may extend outside subject lot boundaries.

It is the purpose of the bushfire consultant's 'Supporting Assessment Detail', that is presented in the assessment against the acceptable solution A2.1, that will identify and justify how any offsite land within the 'Planning BAL-29 APZ (which the subject landowner has no authority or responsibility to manage), will meet the requirements of being either non-vegetated land or low threat vegetation managed in a minimal fuel condition and likely to remain in this state in perpetuity. Or otherwise, explain how this condition cannot be met.

It is the 'Planning BAL-29' APZ dimensions that will be stated in relevant tables and shown on maps as necessary in this BMP. The exceptions are the tables that are included within this appendix - when relevant to the subject lot(s) - which will present 'BAL Rating' and 'Landowner' APZ dimensions.

THE 'BAL RATING' APZ

The 'BAL Rating' APZ will ensure that the potential radiant heat exposure of the building/structure will be limited to the level that the applied construction requirements, (i.e., those corresponding to the building/structure's determined BAL rating), are designed to resist.

The minimum dimensions of the 'BAL Rating' APZ to be established and maintained will be those that correspond to the determined BAL rating for the specific building/structure. They will account for the specific conditions on and surrounding the subject lot.

The required dimensions of the 'BAL Rating' APZ establish the size of the APZ that must physically exist either entirely within a subject lot or in combination with an area of adjoining land.

If in combination with adjoining (offsite) land, it must be justified how the offsite land can most reasonably be expected to either remain unvegetated or be able to meet and maintain the APZ Standards in perpetuity, without any actions by the owner of the subject lot.

The applicable determined BAL rating will have been stated in the relevant assessment section of this BMP when it can be assessed as a 'determined' rather than 'indicative' rating. Otherwise, it will be shown on the BAL Certificate that is submitted as part of a building application.

THE 'LANDOWNER' APZ

Dimensions: The 'Landowner' APZ is to be established and maintained by the owner of the subject lot. The minimum dimensions are the 'BAL Rating' APZ dimensions except that they will be limited to the distance that they can be established within the subject lot. (Note: Any removal of native vegetation my require the approval of the relevant authority.

The remaining required separation distance outside the lot has been assessed by the bushfire consultant to be most likely to remain in a low threat state in perpetuity without any actions to be taken by the owner of the subject lot.

These minimum 'within the lot' APZ dimensions will only be greater when the relevant local government's annual firebreak / hazard reduction notice (issued under s33 of the Bushfires Act 1954), specifies the APZ dimensions to be applied within the lot and they are greater. Consequently, the 'Landowner' APZ dimensions can be a combination of the 'BAL Rating' Dimensions and the Local Government requirements. Check their annual notice for revisions to these requirements.

The dimensions of the 'Landowner' APZ establish the size of the APZ that must be established and maintained by the landowner within the subject lot.

Location: The 'Landowner' APZ for which the landowner has the responsibility to establish and maintain, is that which will exist entirely within the boundaries of the relevant lot, unless an approved formal and enforceable agreement allows them to manage a specified area of land external to the subject lot.

In most cases the landowner will only have authority and responsibility to establish and manage the APZ within the subject lot.

Otherwise, when there is a remaining part of the 'BAL Rating' APZ existing outside the subject lot, then these areas of land will, in most situations, include non-vegetated areas (e.g., roads / parking / drainage / water body), formally managed areas of vegetation (e.g., public open space / recreation areas / services installed in a common section of land) or an APZ on a neighbouring lot that is required to be established and maintained by the owner of that adjoining lot.

> *For vulnerable land uses, the 'BAL Rating' APZ and 'Landowner' APZ will also refer to the dimensions corresponding to radiant heat impact levels of 10 kW/m^2 and 2 kW/m^2 (calculated using 1200K flame temperature).*
>
> *For development applications only, the 'Landowner' APZ dimensions are also shown on the Property Bushfire Management Statement in Section 6.3.1 of this BMP when it is a required component of the Bushfire Management Plan.*

Table B1.1: The applicable 'Landowner' APZ Dimensions when indicative BAL ratings have been established by the BMP.

DETERMINATION OF THE 'REQUIRED' APZ DIMENSIONS TO BE IMPLEMENTED AND MAINTAINED BY LANDOWNER WITHIN THEIR LOT									
Relevant Buildings(s)	Vegetation Classification [Refer to Fig 3.1]		Minimum Required Separation Distances from Building to Vegetation (metres)						
			Established by the 'BAL Rating' APZ Dimension					Established by the "Local Government' APZ Dimension	The 'Required' APZ Dimensions [see note]
			Determined Radiant Heat Impact	Stated 'Indicative' or 'Conditional' BAL				Firebreak / Hazard Reduction Notice	
	Area	Class		BAL-29	BAL-19	BAL-12.5	BAL-LOW		
Workshop, Office	1	(D) Scrub	N/A	13	19	27	100	'20m'	20
	2	(A) Forest		21	31	42	100	'20m'	21
	3	(G) Grassland		8	12	17	50	'20m'	20
Office/Cribroom (onsite shelter	1	(D) Scrub		N/A				N/A	44
	2	(A) Forest						N/A	63
	3	(G) Grassland						N/A	29

Note:
Workshop and Office
The 'Required' APZ Dimension corresponding to each area of vegetation is the greater of the 'BAL Rating' or the 'Firebreak/Hazard Reduction Notice' APZ dimensions - unless a local government maximum distance(s) is established as a result of their environmental assessment of the subject site. The area of the APZ will also be limited to the subject lot boundary unless otherwise justified in this Report/Plan. Final determination of the dimensions will require that any indicative or conditional BAL becomes a 'Determined' BAL.

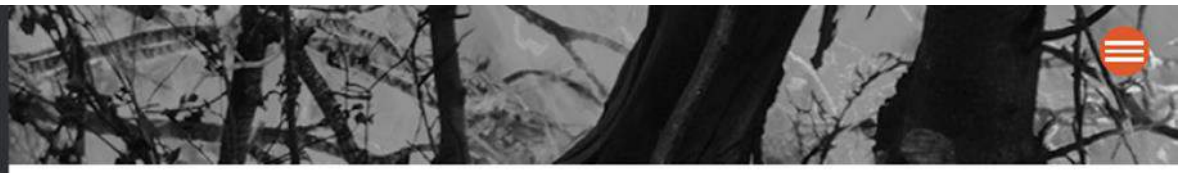
Onsite shelter building: Office /Cribroom
The office/cribroom (on-site shelter building) will be sited in an area 73m from the nearest forest classifiable vegetation. It will be subject to a maximum heat flux of 10 kW/m^2 and built to BAL-29 construction standards.

Comments: In accordance with the Shire of Murray Firebreak Notice all vegetation within the Asset Protection Zone reduced and maintained. The flammable material is to be reduced and maintained to a height of less than 5 centimetres.

B2: The Standards for the APZ as Established by the Guidelines (DPLH, v1.4)

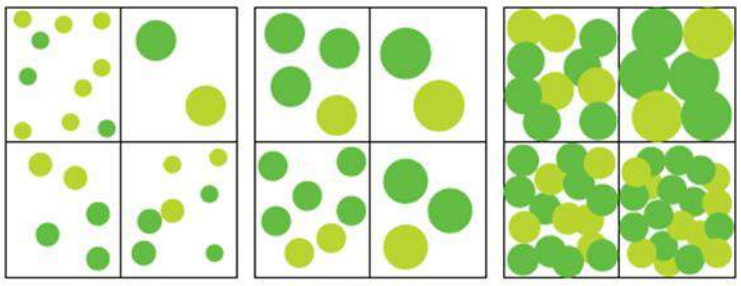
Within the Guidelines (source: https://www.wa.gov.au/government/document-collections/state-planning-policy-37-planning-bushfire-prone-areas), the management Standards are established by:

- Schedule 1: Standards for Asset Protection Zones (see extract below) established by the Guidelines; and
- The associated explanatory notes (Guidelines E2) that address (a) managing an asset protection zone (APZ) to a low threat state (b) landscaping and design of an asset protection zone and (c) plant flammability.



ELEMENT 2: SITING AND DESIGN OF DEVELOPMENT

SCHEDULE 1: STANDARDS FOR ASSET PROTECTION ZONES

OBJECT	REQUIREMENT
Fences within the APZ	• Should be constructed from non-combustible materials (for example, iron, brick, limestone, metal post and wire, or bushfire-resisting timber referenced in Appendix F of AS 3959).
Fine fuel load (Combustible, dead vegetation matter <6 millimetres in thickness)	• Should be managed and removed on a regular basis to maintain a low threat state. • Should be maintained at <2 tonnes per hectare (on average). • Mulches should be non-combustible such as stone, gravel or crushed mineral earth or wood mulch >6 millimetres in thickness.
Trees* (>6 metres in height)	• Trunks at maturity should be a minimum distance of six metres from all elevations of the building. • Branches at maturity should not touch or overhang a building or powerline. • Lower branches and loose bark should be removed to a height of two metres above the ground and/or surface vegetation. • Canopy cover within the APZ should be <15 per cent of the total APZ area. • Tree canopies at maturity should be at least five metres apart to avoid forming a continuous canopy. Stands of existing mature trees with interlocking canopies may be treated as an individual canopy provided that the total canopy cover within the APZ will not exceed 15 per cent and are not connected to the tree canopy outside the APZ. **Figure 19:** Tree canopy cover – ranging from 15 to 70 per cent at maturity  15% 30% 70%

Shrub* and scrub* (0.5 metres to six metres in height). Shrub and scrub >6 metres in height are to be treated as trees.	• Should not be located under trees or within three metres of buildings. • Should not be planted in clumps >5 square metres in area. • Clumps should be separated from each other and any exposed window or door by at least 10 metres.
Ground covers* (<0.5 metres in height. Ground covers >0.5 metres in height are to be treated as shrubs)	• Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load' above. • Can be located within two metres of a structure, but three metres from windows or doors if >100 millimetres in height.
Grass	• Grass should be maintained at a height of 100 millimetres or less, at all times. • Wherever possible, perennial grasses should be used and well-hydrated with regular application of wetting agents and efficient irrigation.
Defendable space	• Within three metres of each wall or supporting post of a habitable building, the area is kept free from vegetation, but can include ground covers, grass and non-combustible mulches as prescribed above.
LP Gas Cylinders	• Should be located on the side of a building furthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building. • The pressure relief valve should point away from the house. • No flammable material within six metres from the front of the valve. • Must sit on a firm, level and non-combustible base and be secured to a solid structure.

** Plant flammability, landscaping design and maintenance should be considered – refer to explanatory notes*

B3: The Standards for the APZ as Established by the Local Government

Refer to the firebreak / hazard reduction notice issued annually (under s33 of the Bushfires Act 1954) by the relevant local government. It may state Standards that vary from those established by the Guidelines and that have been endorsed by the WAPC and DFES as per Section 4.5.3 of the Guidelines.

A copy of the applicable notice is not included here as they are subject to being reviewed and modified prior to issuing each year. Refer to ratepayers notices and/or the local government's website for the current version.

B4: Maintaining Low Threat and Non-Vegetated Areas Excluded from Classification

AS 3959 establishes the methodology for determining a bushfire attack level (BAL). The methodology includes the classification of the subject site's surrounding vegetation according to their 'type' and the application of the corresponding bushfire behaviour models to determine the BAL. Certain vegetation can be considered as low threat and excluded from classification. Where this has occurred in assessing the site, the extract from AS3959:2018 below state the requirements (including the size of the vegetation area if relevant to the assessment) for maintenance of those areas of land.

2.2.3.2 *Exclusions—Low threat vegetation and non-vegetated areas*

The following vegetation shall be excluded from a BAL assessment:

(a) Vegetation of any type that is more than 100 m from the site.

(b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified vegetation.

(c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other or of other areas of vegetation being classified vegetation.

(d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified vegetation.

(e) Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.

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

NOTES:

1 Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100 mm).

2 A windbreak is considered a single row of trees used as a screen or to reduce the effect of wind on the leeward side of the trees.

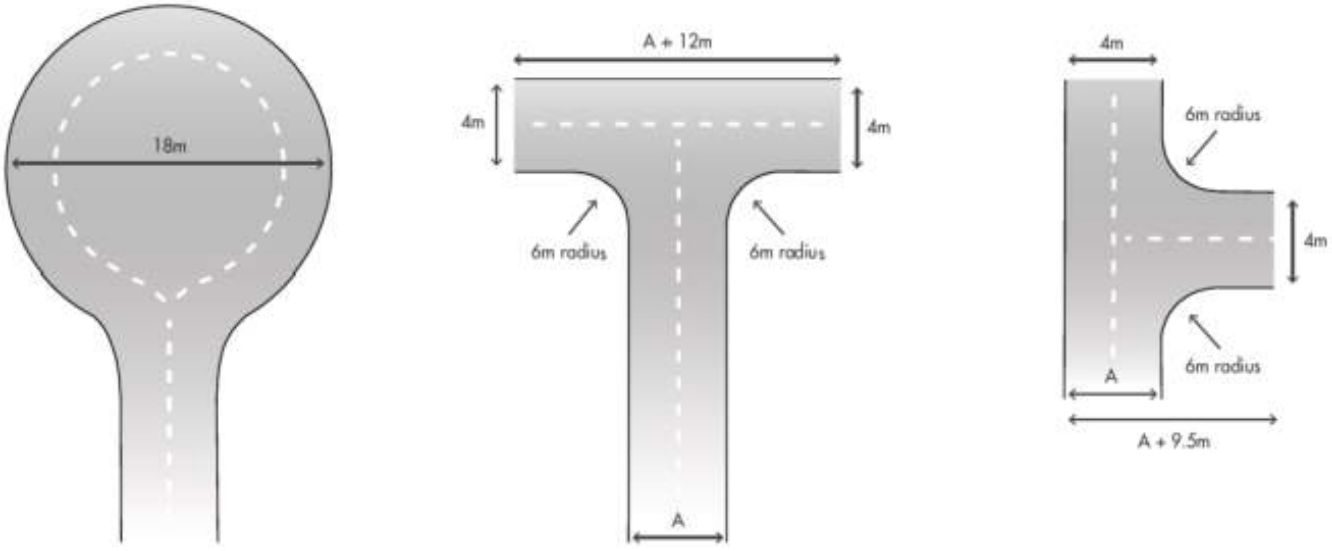
APPENDIX C: TECHNICAL REQUIREMENTS FOR VEHICULAR ACCESS

The design/layout requirements for access are established by the acceptable solutions of the Guidelines (DPLH, 2021 v1.4) Element 3 and vary dependent on the access component, the land use and the presence of 'vulnerable' persons. Consequently, the best reference source are the Guidelines. The technical requirements that are fixed for all components and uses are presented in this appendix.

GUIDELINES TABLE 6, EXPLANATORY NOTES E3.3 & E3.6 AND RELEVANT ACCEPTABLE SOLUTIONS

Technical Component	Vehicular Access Types / Components			
	Public Roads	Emergency Access Way [1]	Fire Service Access Route [1]	Battle-axe and Private Driveways [2]
Minimum trafficable surface (m)	In accordance with A3.1	6	6	4
Minimum Horizontal clearance (m)	N/A	6	6	6
Minimum Vertical clearance (m)	4.5			
Minimum weight capacity (t)	15			
Maximum Grade Unsealed Road [3]	As outlined in the IPWEA Subdivision Guidelines	1:10 (10%)		
Maximum Grade Sealed Road [3]		1:7 (14.3%)		
Maximum Average Grade Sealed Road		1:10 (10%)		
Minimum Inner Radius of Road Curves (m)		8.5		

Turnaround Area Dimensions for No-through Road, Battle-axe Legs and Private Driveways [4]



Passing Bay Requirements for Battle-axe leg and Private Driveway

When the access component length is greater than the stated maximum, passing bays are required every 200m with a minimum length of 20m and a minimum additional trafficable width of 2m (i.e. the combined trafficable width of the passing bay and constructed private driveway to be a minimum 6m).

Emergency Access Way – Additional Requirements

Provide a through connection to a public road, be no more than 500m in length, must be signposted and if gated, gates must be open the whole trafficable width and remain unlocked.

[1] To have crossfalls between 3 and 6%.

[2] Where driveways and battle-axe legs are not required to comply with the widths in A3.5 or A3.6, they are to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision.

[3] Dips must have no more than a 1 in 8 (12.5% or 7.1 degree) entry and exit angle.

[4] The turnaround area should be within 30m of the main habitable building.

APPENDIX D: TECHNICAL REQUIREMENTS FOR FIREFIGHTING WATER SUPPLY

D1: Reticulated Areas – Hydrant Supply

The Guidelines state "where a reticulated water supply is existing or proposed, hydrant connection(s) should be provided in accordance with the specifications of the relevant water supply authority."

The main scheme water suppliers / authorities in WA are The Water Corporation, AqWest – Bunbury Water Corporation and Busselton Water Corporation. Various local authority exists in other non-scheme and regional areas. However, most existing fire hydrants are connected to Water Corporation water mains.

Consequently, the hydrant location specifications from The Water Corporation's 'No 63 Water Reticulation Standard' (Ver 3 Rev 15) are provided in the extract below with the key distances relevant to bushfire planning assessments being highlighted. This Standard is deemed to be the baseline criteria for developments and should be applied unless different local water supply authority conditions apply. Other applicable specification will be found in the Standard.

Note: The maximum distance from a hydrant to the rear of a lot/building is generally interpreted as not applicable to large lot sizes where the maximum distance becomes an impractical limitation i.e., typically rural residential areas.

2.2.1.5 Appurtenances

c. Hydrants

Hydrants shall be screw-down hydrant with built-in isolation valve and installed only on DN100 or larger pipes. Hydrants shall be located:

- so that the maximum distance between a hydrant and the rear of a building envelope, (or in the absence of a building envelope the rear of the lot) shall be 120m;
- so that spacing (as measured by hose-run) between hydrants in non-residential or mixed use areas shall be maximized and no greater than 100m;
- so that spacing (as measured by hose-run) between hydrants in residential areas with lots per dwelling <10,000m² shall be maximized and no greater than 200m;
- so that spacing between hydrants (as measured by hose-run) in rural residential areas where minimum lots per dwelling is >10,000 m² (1ha) shall be maximized and no greater than 400m;
- centrally along the frontage of a lot to avoid being under driveways, unless the lot features a frontage 6m or less, in which case it shall be placed to the side opposite the driveway;
- at lots that have the widest frontage in the local area;
- where appropriate at the truncation of road junctions or intersections so that they can serve more than one street and can be readily located;
- on both sides of the major roads at staggered intervals where there are mains on both sides of the road;
- at major intersections on dual multi-lane roads, where two hydrants are to be sited on diagonally opposite corners;
- hydrants should be located at least 20m from traffic calming devices i.e., median slow points or chokers, chicanes, mini traffic circles, and intersection 'pop-outs' to ensure traffic is not impeded;
- in a position not less than 10m from any high voltage main electrical distribution equipment such as transformers and distribution boards, liquefied petroleum gas or other combustible storage;
- directly on top of the main using a tee unless proved to be impractical.

D2: Non-Reticulated Areas – Static Supply

For specified requirements, refer to the Guidelines Element 4: Water – Acceptable Solution A4.2 , Explanatory Notes E4 (that provide water supply establishment detail under the headings of water supply; independent water and power supply; strategic water supplies, alternative water sources and location of water tanks) and the technical requirements established by Schedule 2 (reproduced below).

SCHEDULE 2: WATER SUPPLY DEDICATED FOR BUSHFIRE FIREFIGHTING PURPOSES

2.1 Water supply requirements

Water dedicated for firefighting should be provided in accordance with Table 7 below, and be in addition to water required for drinking purposes.

Table 7: Water supply dedicated for bushfire firefighting purposes

PLANNING APPLICATION	NON-RETICULATED AREAS
Development application	10,000L per habitable building
Structure Plan / Subdivision: Creation of 1 additional lot	10,000L per lot
Structure Plan / Subdivision: Creation of 3 to 24 lots	10,000L tank per lot **or** 50,000L strategic water tank
Structure Plan / Subdivision: Creation of 25 lots or more	50,000L per 25 lots or part thereof Provided as a strategic water tank(s) or 10,000L tank per lot

2.2 Technical requirements

2.2.1 Construction and design

An above-ground tank and associated stand should be constructed of non-combustible material. The tank may need to comply with AS/NZS 3500.1:2018.

Below ground tanks should have a 200mm diameter access hole to allow tankers or emergency service vehicles to refill direct from the tank, with the outlet location clearly marked at the surface. The tank may need to comply with AS/NZS 3500.1:2018. An inspection opening may double as the access hole provided that the inspection opening meets the requirements of AS/NZS 3500.1:2018. If the tank is required under the BCA as part of fire hydrant installation, then the tank will also need to comply with AS 2419.

Where an outlet for an emergency service vehicle is provided, then an unobstructed, hardened ground surface is to be supplied within four metres of any water supply.

2.2.2 Pipes and fittings

All above-ground, exposed water supply pipes and fittings should be metal. Fittings should be located away from the source of bushfire attack and be in accordance with the applicable section below, unless otherwise specified by the local government.

2.2.2.1 Fittings for above-ground water tanks:

- Commercial land uses: 125mm Storz fitting; or
- Strategic water tanks: 50mm or 100mm (where applicable and adapters are available) male camlock coupling with full flow valve; or
- Standalone water tanks: 50mm male camlock coupling with full flow valve; or
- Combined water tanks: 50mm male camlock coupling with full flow valve or a domestic fitting, being a standard household tap that enables an occupant to access the water supply with domestic hoses or buckets for extinguishing minor fires.

2.2.2.2 Remote outlets

In certain circumstances, it may be beneficial to have the outlet located away from the water supply. In such instances in which a remote outlet is to be used, the applicant should consult the local government and DFES on their proposal.

EXAMPLE CONSTRUCTION AND FITTINGS	
	
Strategic 47,000 Litre Concrete Tank & Protected Fittings	
	
10,000 Litre Concrete Tank	Storz and Camlock Couplings
	
Full Flow 50mm Ball Valve	Full Flow 50mm Gate Valve and Male Camlock

ADDENDUM 1: SITE FLORA AND VEGETATION SURVEY 2021

(To be provided by Proponent)

ADDENDUM 2 : METHOD 2 FLAMESOL CALCULATIONS FOR 10KWM^2 (ONSITE SHELTER)

Calculated December 6, 2022, 5:59 pm (MDc v.4.9)

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	80	Rate of spread	2.4 km/h
Vegetation classification	Forest	Flame length	19.8 m
Understorey fuel load	25 t/ha	Flame angle	63 °, 68 °, 73 °, 75 °, 77 ° & 82 °
Total fuel load	35 t/ha	Elevation of receiver	8.82 m, 9.17 m, 9.460000000000001 m, 9.56 m, 9.640000000000001 m & 9.800000000000001 m
Vegetation height	n/a	Fire intensity	43,400 kW/m
Effective slope	0 °	Transmissivity	0.843, 0.822, 0.796, 0.775, 0.764 & 0.712
Site slope	0 °	Viewfactor	0.4235, 0.3149, 0.2132, 0.144, 0.1168 & 0.0313
Flame width	100 m	Minimum distance to < 40 kW/m²	22.9 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	29.9 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	41.2 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	54.9 m
		Minimum distance to < 10 kW/m²	63.2 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

Calculated December 6, 2022, 6:00 pm (MDc v.4.9)

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	80	Rate of spread	4.16 km/h
Vegetation classification	Scrub	Flame length	11.62 m
Understorey fuel load	25 t/ha	Flame angle	65 °, 71 °, 76 °, 79 °, 80 ° & 84 °
Total fuel load	25 t/ha	Elevation of receiver	5.26 m, 5.49 m, 5.64 m, 5.7 m, 5.72 m & 5.78 m
Vegetation height	m	Fire intensity	53,815 kW/m
Effective slope	0 °	Transmissivity	0.865, 0.848, 0.824, 0.8, 0.788 & 0.732
Site slope	0 °	Viewfactor	0.413, 0.3045, 0.2058, 0.1396, 0.1134 & 0.0304
Flame width	100 m	Minimum distance to < 40 kW/m²	13.9 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	18.7 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	27 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	37.5 m
		Minimum distance to < 10 kW/m²	44.1 m

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

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

Calculated December 6, 2022, 5:57 pm (MDc v.4.9)

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Grassland Fire Danger Index	110	Rate of spread	14.3 km/h
Vegetation classification	Grassland	Flame length	6.87 m
Understorey fuel load	4.5 t/ha	Flame angle	66 °, 72 °, 78 °, 81 °, 82 ° & 86 °
Total fuel load	4.5 t/ha	Elevation of receiver	3.13 m, 3.26 m, 3.36 m, 3.39 m, 3.4 m & 3.42 m
Vegetation height	n/a	Fire intensity	33,247 kW/m
Effective slope	0 °	Transmissivity	0.881, 0.869, 0.85, 0.828, 0.8159999999999999 & 0.75
Site slope	0 °	Viewfactor	0.4037, 0.2976, 0.1994, 0.1344, 0.1096 & 0.0297
Flame width	100 m	Minimum distance to < 40 kW/m²	8.4 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	11.4 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	16.9 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	24.6 m
		Minimum distance to < 10 kW/m²	29.5 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