

Bushfire management plan/Statement addressing the Bushfire Protection Criteria coversheet

Site address:

Site visit: Yes No

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

Report author or reviewer:

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: Accreditation expiry: Month Year

Bushfire management plan version number:

Bushfire management plan date: Day Month Year

Client/business name:

	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



Bushfire Management Plan

**Forest Walk Precinct & Rivers Edge, Frasers Landing
Stage 3-6 and 9-10 Subdivision (167 lots)**

Lot 9007 Wanjeep Street Coodanup

City of Mandurah

Planning Stage: Subdivision Application

Planning Development Type: Subdivision - Large Number of Lots

**Bushfire Policy – Specific
Development or Use Type:** N/A

Job Number: 220028

Assessment Date: 20 January 2022

Report Date: 27 January 2022

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DOCUMENT CONTROL

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Review/Authorise:	Select.			
VERSION HISTORY				
Version	Version Details	Date		
1.0	Original	23 February 2022		
-				
BMP (Subdivision) Template v8.4				
DISTRIBUTION				
Destination	Version	No. Copies	Hard Copy	Electronic Copy
Person/Business: Frasers Property Australia Email: stuart.carter@frasersproperty.com.au	V1.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Person/Business: Email:			<input type="checkbox"/>	<input type="checkbox"/>
<p>Limitation of Liability: The measures contained in this Bushfire Management Plan, are considered to be minimum requirements and they do not guarantee that a building 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 bushfire protection measures will depend upon, among other things, the ongoing actions of the landowners and/or operators over which Bushfire Prone Planning has no control.</p> <p>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.</p> <p>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.</p> <p>Copyright ©2020 BPP Group Pty Ltd: All intellectual property rights, including copyright, in format and proprietary content contained in documents created by Bushfire Prone Planning, remain the property of BPP Group Pty Ltd. Any use made of such format or content without the prior written approval of Bushfire Prone Planning, will constitute an infringement on the rights of the Company which reserves all legal rights and remedies in respect of any such infringement.</p>				

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EXECUTIVE SUMMARY

Bushfire Prone Planning (BPP Group Pty Ltd) has been commissioned by Frasers Property Australia to prepare a Bushfire Management Plan for Lot 9007 on Wanjeep Street, Coodanup (Forrest Walk Precinct and Rivers Edge: Frasers Landing – Stages 3-6 and 9-10 Subdivision), in the City of Mandurah. The proposed subdivision site (167 residential lots and Public Open Space areas) of approximately 56.6892 ha in size (31.4446 ha – Rivers Edge, and 25.2446 Forest Walk) is within a designated bushfire prone area and the Proposal requires the application of State Planning Policy No. 3.7: Planning in Bushfire Prone Areas (SPP. 3.7).

Against the Bushfire Protection Criteria, the decision maker's assessment of the Proposal will be on the basis of it being able to meet the Acceptable Solutions, once construction and landscaping are complete. The assessed bushfire risk is considered to be manageable and will be achieved by the identified stakeholders, implementing and maintaining the bushfire risk management measures that are presented in this Plan. Assessment of the planned location, vegetation and consideration of existing infrastructure indicates that compliance is able to be achieved against all applicable bushfire related legislation, policy, standards, and guidelines, including the Bushfire Protection Criteria.

Contained within this Bushfire Management Plan, contour mapping is utilised to visually show the potential radiant heat impacts (from the bushfire prone vegetation), as separate Bushfire Attack Level contours across the site. The BAL's have been derived for the proposed Lots within the assessed area. The purpose is to inform future development planning by indicating the Bushfire Attack Levels (BAL's) that future buildings, within the development site, are potentially subject to.

An indicative Bushfire Attack Level (BAL) assessment (contour map) has been undertaken as part of the BMP based on the proposed post-development scenario to provide visually the BAL ratings in conjunction with the lot layouts. This indicates that all future lots, excluding a lot located in the north eastern corner, will be able to achieve BAL-29 or below with consideration to siting and design of the future buildings. The lot located in the north eastern corner will be excised from sale due to BAL-FZ encroachment, until the land to the north is developed and the excised lot can achieve BAL 29 or less (refer Figure 3.3.0). The outcome of this BMP indicates that the bushfire protection criteria outlined within the Guidelines for Planning in Bushfire Prone Areas (WAPC V1.4 2015) can be achieved as part of the proposed development. Bushfire risk will be managed through the following:

- For Element 1 'Location': the subdivision is able to achieve the acceptable solution (by being located in an area that will on completion be subject to BAL-29 or less). Public Open Space (POS) areas will be maintained in a low threat state in perpetuity as lawn or gardens.
- For Element 2 'Siting and Design': the Proposal is able to meet the acceptable solutions by future habitable buildings being able to achieve an Asset Protection Zone (APZ) of sufficient size to ensure the radiant heat impact does not exceed BAL-29. APZ's will be managed in a low-fuel state within each new Lot and across boundaries in the adjoining residential lots, where it can be reasonably expected that these Residential Lots be maintained in a low threat state, in perpetuity with exception to the lot located in the north eastern corner, which will be excised from sale until the land to the north is developed and the excised lot can achieve BAL 29 or less.
- For Element 3 'Vehicular Access': the location of the subdivision is able to meet the current acceptable solutions and construct the new public roads to the construction and technical requirements of the Guidelines.
- For Element 4 'Water Supply': the location of the proposed subdivisions can achieve the acceptable solution (by being located in a reticulated water supply area where existing hydrants are available for firefighting operations).

Future buildings within 100 metres of classified vegetation will be constructed to the standards which correspond to the determined BALs as detailed by AS 3959-2018 Construction of buildings in bushfire prone areas. As this proposal does not identify the actual location of future building works, there may be a requirement by the City of Mandurah to determine the BAL ratings for individual building works once a building site has been identified.

1 PROPOSAL DETAILS

1.1 Description and Associated Plans and Maps

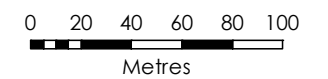
Bushfire Prone Planning Commissioned to Produce the Bushfire Management Plan (BMP) By:	Frasers Property Australia
For Submission To:	WA Planning Commission (WAPC)
Purpose of the BMP:	To accompany a subdivision application
'Development' Site Total Area:	56.6892 hectares
No. of Existing/Proposed Lots:	Proposed lots = 167 and POS areas
Description of the Proposed Development/Use:	
Subdivision of 167 lots and Public Open Space (POS) areas within a staged development local structure plan area. Lots to be zoned residential.	
Staged Development and Management of Potential Bushfire Hazard Issues	
The bushfire management planning for the stage of subdivision will address the bushfire risk that considers the future development on the subject site can be undertaken independently of subsequent subdivision stages, ensuring the acceptable solutions for the four key bushfire planning elements are met.	



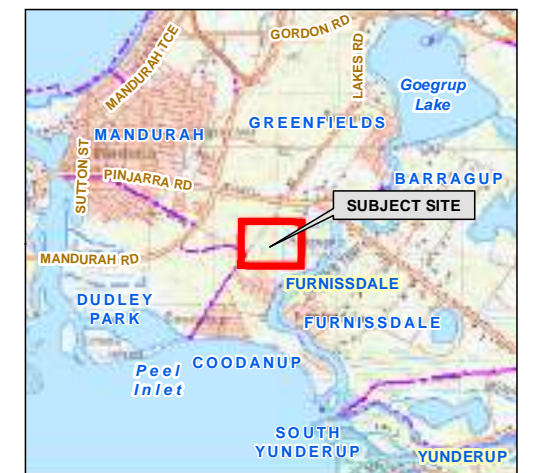
Figure 1.1
Proposed Subdivision

**STAGES 3,4,5,6, 9 AND 10
 RIVERS EDGE AND FOREST WALK**
 Lot 9007 on Plan 418868, Area : 252,446 sq m
 Wanjeep Street
 COODANUP
 CITY OF MANDURAH

- **LEGEND** -----
- Subject Site
 - Stage Boundaries
 - Other Lots
 - Proposed Subdivision
 - Locality / Suburb
 - H Hydrant



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



Aerial Imagery : Landgate/SLIP
 Image Date : Feb 2021

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator Units: Metre
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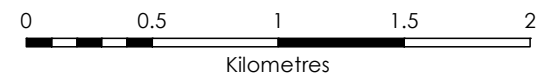




Figure 1.2
Location Plan

**STAGES 3,4,5,6, 9 AND 10
 RIVERS EDGE AND FOREST WALK**
 Lot 9007 on Plan 418868, Area : 252,446 sq m
 Wanjeep Street
 COODANUP
 CITY OF MANDURAH

- LEGEND -----
- Subject Site
 - Local Government Authority
 - Locality / Suburb
 - Bush Fire Brigade
 - Career Fire & Rescue Service
 - State Emergency Service Unit
 - Volunteer Fire & Rescue Service
- Environmental Considerations**
- Reserves
- Legislated Lands and Waters**
- Nature Reserve
 - Conservation Park
 - Section 5(1)(h) Reserve
- DBCAs Lands of Interest**
- Crown Freehold - Dept Interest



Aerial Imagery : Landgate/SLIP
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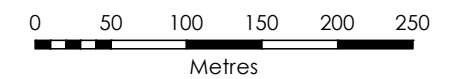
Disclaimer and Limitation: This map has been prepared for bushfire management planning purposes only. All depicted areas, contours and any dimensions shown are subject to survey. Bushfire Prone Planning does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence arising from relying on any information depicted.
 Map Document Path / Name: K:\Projects\Jobs 2022\220028 - Wanjeep Street Coodanup (BMP SD)\Mapping\MXD\220028_FW_RE_Fig1-2_LOC_Wanjeep St.mxd

Figure 1.3
Bushfire Prone Area

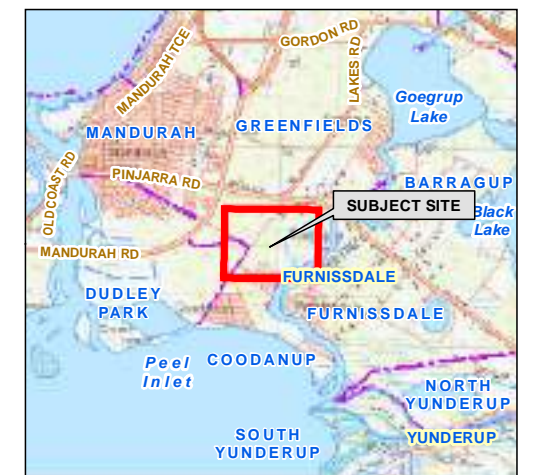
**STAGES 3,4,5,6, 9 AND 10
 RIVERS EDGE AND FOREST WALK**
 Lot 9007 on Plan 418868, Area : 252,446 sq m
 Wanjeep Street
 COODANUP
 CITY OF MANDURAH

----- LEGEND -----

-  Subject Site
-  Stage Boundaries
-  Proposed Subdivision
-  Locality / Suburb
- Bush Fire Prone Areas**
-  Bushfire Prone Areas (2021)



----- LOCALITY -----



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1.2 Existing Documentation Relevant to the Construction of this Plan

This section acknowledges any known reports or plans that have been prepared for previous planning stages, that refer to the subject area and that may or will impact upon the assessment of bushfire risk and/or the implementation of bushfire protection measures and will be referenced in this Bushfire Management Plan.

Table 2.1: Existing relevant documentation.

RELEVANT EXISTING DOCUMENTS		
Existing Document	Copy Provided by Client	Title
Structure Plan	Yes	<i>Fraser's Landing – Wanjeep Street, Coodanup City of Mandurah (16/04/2021)</i>
Environmental Report	Yes	<i>Foreshore and Core Conservation Management Plan Vegetation Retention Management Plan</i>
Landscaping (Revegetation) Plan	Yes	<i>Landscaping and Public Space Management Plan - Fraser's Landing, City of Mandurah LD Total (11 April 2022)</i>
Bushfire Risk Assessments	-	N/A

2 ENVIRONMENTAL CONSIDERATIONS

2.1 Native Vegetation – Restrictions to Modification and/or Clearing

Many bushfire prone areas also have high biodiversity values. SPP 3.7 policy objective 5.4 recognises the need to consider bushfire risk management measures alongside environmental, biodiversity and conservation values (Guidelines s2.3).

There is a requirement to identify the need for onsite modification and/or clearing of native vegetation and whether this might trigger potential environmental impact/referral requirements under State and Federal environmental legislation. Confirmation that any proposed native vegetation modification and/or clearing is acceptable, should be received from the relevant agencies by the proponent and provided to the bushfire consultant for inclusion in the Bushfire Management Plan if it will influence the required bushfire planning assessments and outcomes. The following table details any potential environmental restrictions of which the author of this report is aware.

Table 2.2: Native vegetation and potential environmental considerations and restrictions.

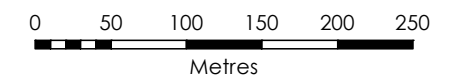
NATIVE VEGETATION MODIFICATION / CLEARING - POTENTIAL ENVIRONMENTAL RESTRICTIONS IDENTIFIED				
Environmental Considerations / Features	Potential Mapping Data Source (SLIP / Local Planning)	Relevant to Proposed Development	Data Applied	Action Required
Onsite clearing of native vegetation is required.		Yes		
Environmental impact/referral requirements under State and Federal environmental legislation may be triggered.		Unlikely		
National Park / Nature Reserve	DBCA-011	No-Confirmed by Bushfire Consultant	Relevant Database Reviewed by Bushfire Consultant	None
Conservation Covenant	DPIRD-023	No-Confirmed by Bushfire Consultant	Relevant Database Reviewed by Bushfire Consultant	None
Bush Forever Site	DPLH-019	No-Confirmed by Bushfire Consultant	Relevant Database Reviewed by Bushfire Consultant	None
RAMSAR Wetland	DBCA-010	No-Confirmed by Bushfire Consultant	Relevant Database Reviewed by Bushfire Consultant	None
Geomorphic and Other Wetland	DBCA-011- 019, 040, 043, 044	No-Confirmed by Bushfire Consultant	Relevant Database Reviewed by Bushfire Consultant	None
Threatened and Priority Ecological Communities (TECs or PECs)	DBCA-038	Not Known	Data Not Readily Available to Bushfire Consultant	Proponent to Seek Advice
Threatened and Priority Flora including Declared Rare Flora (DRFs)	DBCA-036	Not Known	Data Not Readily Available to Bushfire Consultant	Proponent to Seek Advice
Land Identified as significant through a Local Biodiversity Strategy	LG - Intramaps	Not Known	Data Not Readily Available to Bushfire Consultant	Proponent to Seek Advice
<p>Statement of how the identified environmental feature(s) is dealt with in this Bushfire Management Plan:</p> <p>The assessments and bushfire protection measures detailed the BMP, assume that environmental approval will be achieved or clearing permit exemptions will apply. The eastern boundary of Rivers Edge Stages 3-6 is located within clearing regulations. The clearing regulations follow vegetation bordering the Serpentine River.</p> <p>It is advised that the proponent seek further advice from an Environmental Consultant or the WA Department of Biodiversity Conservation and Attractions for further information on the condition and species contained within the proposed development area and the requirement for referral of the proposal.</p>				

Figure 2.1
Environmental Considerations

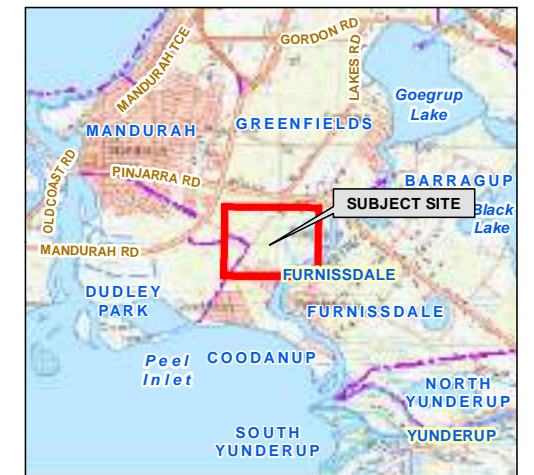
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 CITY OF MANDURAH


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

-  Subject Site
 -  Stage Boundaries
 -  Proposed Subdivision
 -  Locality / Suburb
- Environmental Considerations**
-  Reserves
 -  Floodplain
 -  River
 -  Clearing Regulations




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



 Aerial Imagery : Landgate/SLIP
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 Map Document Path / Name: K:\Projects\Jobs 2022\220028 - Wanjeep Street Coodanup (BMP SD)\Mapping\MXD\220028_FW_RE_Fig2-1_ENV_Wanjeep St.mxd

Development Design Considerations

Establishing development in bushfire prone areas can adversely affect the retention of native vegetation through clearing associated with the creation of lots and/or asset protection zones. Where loss of vegetation is not acceptable or causes conflict with landscape or environmental objectives, it will be necessary to consider available design options to minimise the removal of native vegetation.

Table 2.3: Development design.

MINIMISE THE REMOVAL OF NATIVE VEGETATION	
Design Option	Assessment / Action
Reduction of lot yield	N/A
Cluster development	N/A
Construct building to a standard corresponding to a higher BAL as per BCA (AS 3959:2018 and/or NASH Standard)	N/A
Modify the development location	N/A
The subject sites will be cleared for future development, except trees and shrubs within identified POS areas. Future buildings will be constructed to the required BAL construction standards.	
IMPACT ON ADJOINING LAND	
Is this planning proposal able to implement the required bushfire protection measures within the boundaries of the land being developed so as not to impact on the bushfire and environmental management of neighbouring reserves, properties or conservation covenants?	No
<p>The subdivision is reliant upon bushfire measures being implemented external to the site to achieve compliance with bushfire protection criteria. The subdivision can achieve maintenance of future on-site and off-site landscaped vegetation (small gardens, lawn areas, POS) in a low threat state, which will ensure the bushfire risk will be reduced to the immediate surrounding properties due to the continued ongoing management of this vegetation and limited ignition sources. Therefore, the asset protection zone is achieved across adjoining low threat and non-vegetated areas than can reasonably be expected to remain as such in perpetuity.</p> <p>The developers/landowners will need approval to remove vegetation within Stages 3 -6 as clearing regulations apply. The subdivision areas have allowed a POS buffer zone to separate classified native vegetation (Conservation Reserves and river edge vegetation) to ensure all proposed lots can facilitate a building site that can achieve a BAL-29 or lower. All POS areas within Stages 3-6 and 9-10 will need to be maintained to a low threat state in perpetuity.</p> <p>Note: A lot located in the north eastern corner, will be excised from sale until the land to the north is developed and the excised lot can achieve BAL 29 or less.</p>	

2.2 Retained Vegetation / Re-vegetation / Landscape Plans (including POS)

Riparian zones, wetland/foreshore buffers, road verges and public open space may have plans to re-vegetate or retain vegetation as part of the proposed development. Vegetation corridors may be created between offsite and onsite vegetation and provide a route for fire to enter a development area.

All retained/planned vegetation and its management will be considered in the development of this Bushfire Management Plan.

Is re-vegetation of riparian zones and/or wetland or foreshore buffers and/or public open space a part of this Proposal?	Yes
The subject site landowners have a responsibility to implement the 'Foreshore and Core Conservation Reserve Management Plan' for the vegetation adjoining the Serpentine River and within the Core Conservation Reserve (south of Stages 9-10). This includes management of invasive weed species and vegetation degradation. It does not allow vegetation to be managed to a low threat state, but rather ensure a fauna corridor is protected.	

The onsite identified POS areas will be maintained to a low threat state in perpetuity, as lawn, gardens, and recreational spaces.	
Is the requirement for ongoing maintenance of existing vegetation in riparian zones and/or wetland or foreshore buffers and/or public open space a part of this Proposal?	Yes
The interface buffers along Serpentine River tributary will undergo annual fuel load management, weed management and vegetation degradation inspections.	
Has a landscape plan been developed for the proposed development?	Yes
<p>The POS areas will be irrigated and maintained in a low threat state in perpetuity. The landscaping plan states that unhealthy plants will be replaced by the client, that trees and shrubs will be pruned and maintained to a low threat state and that the lawn will be maintained a minimum 20 times per year.</p> <p>The Core Conservation Reserve that adjoins Stages 9 & 10 will follow a fuel clearing regime, using regular burns to maintain low fuel levels while maintaining canopy cover and ensuring wildlife can seek refuge during burning.</p>	

3 POTENTIAL BUSHFIRE IMPACT ASSESSMENT

3.1 Assessment Input

3.1.1 Fire Danger Index (FDI) Applied

AS 3959:2018 Table 2.1 specifies the fire danger index values to apply for different regions. The values used in the model calculations are for the Forest Fire Danger Index (FFDI) and for which equivalent representative values of the Grassland Fire Danger Index (GFDI) are applied as per Appendix B. The values can be modified if appropriately justified.

Table 3.1: Applied FDI Value

FDI VALUE			
Vegetation Areas	As per AS 3959:2018 Table 2.1	As per DFES for the Location	Value Applied
1-18	80	N/A	80

3.1.2 Vegetation Classification and Effective Slope

Classification: Bushfire prone vegetation identification and classification has been conducted in accordance with AS 3959:2018 s2.2.3 and the Visual Guide for Bushfire Risk Assessment in WA (DoP February 2016).

When more than one vegetation type is present, each type is identified separately, and the applied classification considers the potential bushfire intensity and behaviour from the vegetation types present and ensures the worst case scenario is accounted for – this may not be from the predominant vegetation type.

The vegetation structure has been assessed as it will be in its mature state (rather than what might be observed on the day). Areas of modified vegetation are assessed as they will be in their natural unmodified state (unless maintained in a permanently low threat, minimal fuel condition, satisfying AS 3959:2018 s2.2.3.2(f) and asset protection zone standards). Vegetation destroyed or damaged by a bushfire or other natural disaster has been assessed on its revegetated mature state.

Effective Slope: Refers to the ground slope under each area of classified vegetation and is described in the direction relative to the view from the building or proposed development site. Effective slope is not the same as 'average slope', rather it is the slope which most significantly influences fire behaviour. This slope has a direct and significant influence on a bushfire's rate of spread and intensity.

Where there is a significant change in effective slope under an area of classified vegetation, that will cause a change in fire behaviour, separate vegetation areas will be identified to enable the correct assessment.

When the effective slope, under a given area of bushfire prone vegetation, will be different relative to multiple proposed development sites, then the effective slopes corresponding to the different locations, are separately identified.

Planned Re-vegetation/Landscaping Considerations/Public Open Space Management





The future post-development considerations have been applied to vegetation classifications within the Lot. This assumes that vegetation will be removed for the creation of the subdivision, and that areas cleared of vegetation will remain in a low threat state in perpetuity, as cleared land or developed land with low threat vegetation. The BMP will ensure there is an obligation to manage remaining areas of vegetation within the subdivision lots that may impact bushfire attack level ratings, in perpetuity and is detailed in the responsibilities section of the BMP. Remaining areas of vegetation include POS areas, conservation boundaries and street verge vegetation.

Table 3.2: Vegetation classification and effective slope.

ALL VEGETATION WITHIN 150 METRES OF THE PROPOSED DEVELOPMENT				
Vegetation Area	Identified Vegetation Types ¹ or Description if 'Excluded'	Applied Vegetation Classification ¹	Effective Slope (degrees) ² (AS 3959:2018 Method 1)	
			Assessed	Applied Range
1	Open forest A-03	Class A Forest	Flat 0	Upslope or flat
2	Woodland B-05	Class B Woodland	Downslope 1	Downslope >0-5
3	Open forest A-03	Class A Forest	Flat 0	upslope or flat
4	Open forest A-03	Class A Forest	Flat 0	Upslope or flat
5	Woodland B-05	Class B Woodland	Flat 0	Upslope or flat
6	Tussock grassland G-22	Class G Grassland	Flat 0	Upslope or flat
7	Open forest A-03	Class A Forest	Flat 0	Upslope or flat
8	Open forest A-03	Class A Forest	Flat 0	Upslope or flat
9	Woodland B-05	Class B Woodland	Flat 0	Upslope or flat
10	Tussock grassland G-22	Class G Grassland	Flat 0	Upslope or flat
11	Open scrub D-14	Class D Scrub	Flat 0	Upslope or flat
12	Low shrubland C-12 , Low open shrubland G-19	Class C Shrubland	Flat 0	Upslope or flat
13	Open scrub D-14	Class D Scrub	Flat 0	Upslope or flat
14	Open forest A-03	Class A Forest	Flat 0	Upslope or flat
15	Non-Vegetated Areas, Low Threat Vegetation	Excluded as per Section 2.2.3.2 (e)(f)	N/A	N/A
16	Closed tussock grassland G-21	Class G Grassland	Flat 0	Upslope or flat
17	Open scrub D-14	Class D Scrub	Flat 0	Upslope or flat
18	Open heath C-11	Class C Shrubland	Flat 0	Upslope or flat
Representative photos of each vegetation area, descriptions and classification justification, are presented on the following pages. The areas of classified vegetation are defined, and the photo locations identified on Figure 3.1.0 and Fig 3.1.1, the vegetation and topography maps.				
Note ¹ : Described and classified as per AS 3959:2018 Table 2.3 and Figures 2.3 and 2.4 (A)-(H)				
Note ² : Effective slope measured as per AS 3959:2018 Section 2.2.5 and Appendix B Part B4				

Additional Supporting Information

The identified vegetation areas comprise multiple types of vegetation required to be classified. A worst-case scenario approach has been applied for each vegetation Area classification.

VEGETATION AREA 1	
AS 3959:2018 Vegetation Classification Applied:	Class A Forest
Vegetation Types Present:	Open forest A-03
Description/Justification:	Mixed species tree composition including tuarts, jarrah, and marri trees up to 15 m in height, foliage cover >30%. Midstory comprised of mixed species banksia (including <i>Banksia attenuate</i> , and <i>B. menziesii</i>), sheoak, nuytsia and tall shrubs up to 6 m in height. Understory comprised of mixed species small shrubs including zamia, sparse small grasses, and mixed species grass up to 40 cm in height.
Post Dev. Assumptions:	Vegetation is classified as worst-case scenario Vegetation offsite cannot be managed or removed by the subject site landowners. Some areas of vegetation are within the subject site boundaries and will need to be removed for subdivision and development. Additional areas of forest vegetation will be established into POS Conservation Areas and managed as lawn and low threat gardens in perpetuity.
	
Photo ID: 1	Photo ID: 2
	
Photo ID: 3	Photo ID: 4

VEGETATION AREA 1



Photo ID: 5



Photo ID: 6



Photo ID: 7

VEGETATION AREA 2

AS 3959:2018 Vegetation Classification Applied:	Class B Woodland
Vegetation Types Present:	Woodland B-05
Description/Justification:	Mixed species tree composition including tuarts, jarrah, and marri trees up to 15 m in height, foliage cover <30%. Understory comprised of sparse unmanaged tall grass, and sparse small shrubs and groundcovers.
Post Dev. Assumptions:	Vegetation is offsite and cannot be managed by the subject site landowner. Vegetation is classified as worst-case scenario.



Photo ID: 8



Photo ID: 9



Photo ID: 10

VEGETATION AREA 3

AS 3959:2018 Vegetation Classification Applied:	Class A Forest
Vegetation Types Present:	Open forest A-03
Description/Justification:	Forest vegetation along riverfront: mixed species tree composition including tuarts, jarrah, and marri trees up to 12 m in height, foliage cover ~30%. Midstory comprised of mixed species banksia (including <i>Banksia attenuate</i> , and <i>B. menziesii</i>), sheoak, and tall shrubs up to 6 m in height. Understory comprised of mixed species small shrubs and mixed species grass, including sedge up to 40 cm in height.
Post Dev. Assumptions:	Vegetation is offsite and cannot be managed by the subject site landowner. Vegetation is classified as worst-case scenario. Vegetation is classified as a Reserve and is located in an area with Clearing Regulations and within the Flood Plain.



Photo ID: 11



Photo ID: 12



Photo ID: 13



Photo ID: 14



Photo ID: 15



Photo ID: - 61

VEGETATION AREA 3



Photo ID: 66

VEGETATION AREA 4

AS 3959:2018 Vegetation Classification Applied:	Class A Forest
Vegetation Types Present:	Open forest A-03
Description/Justification:	Mixed species tree composition including tuarts, jarrah, and marri trees up to 15 m in height, foliage cover >30%. Midstory comprised of mixed species banksia (including <i>Banksia attenuate</i> , and <i>B. menziesii</i>), sheoak and tall shrubs up to 6 m in height. Understory comprised of mixed species small shrubs including zamia, sparse small shrubs, and mixed species grass up to 40 cm in height.
Post Dev. Assumptions:	Vegetation is offsite and cannot be managed by the subject site landowner. Vegetation is classified as worst-case scenario.



Photo ID: 16



Photo ID: 17



Photo ID: 18



Photo ID: 19

VEGETATION AREA 4



Photo ID: 20



Photo ID: 21





Photo ID: 22



VEGETATION AREA 5

AS 3959:2018 Vegetation Classification Applied:	Class B Woodland
Vegetation Types Present:	Woodland B-05
Description/Justification:	Mixed species tree composition dominated by mature tuart, jarrah and marri trees up to 15 m in height, foliage cover <30%. Understory comprised of tall unmanaged grass >50 cm in height.
Post Dev. Assumptions:	Vegetation is offsite and cannot be managed by the subject site landowner. Vegetation is classified as worst-case scenario.



Photo ID: 23

VEGETATION AREA 6	
AS 3959:2018 Vegetation Classification Applied:	Class G Grassland
Vegetation Types Present:	Tussock grassland G-22
Description/Justification:	Tall unmanaged grassland with grass >50 cm in height. Some areas with slashed grass and maintained firebreaks present. Sparse trees including tuarts, jarrah and marri up to 15 m in height, <10% foliage cover.
Post Dev. Assumptions:	Vegetation is offsite and cannot be managed by the subject site landowner. Vegetation is classified as worst-case scenario.
	
Photo ID: 24	Photo ID: 25

VEGETATION AREA 7	
AS 3959:2018 Vegetation Classification Applied:	Class A Forest
Vegetation Types Present:	Open forest A-03
Description/Justification:	Mixed species tree composition including tuarts, jarrah, and marri trees up to 15 m in height, foliage cover >30%. Midstory comprised of mixed species banksia (including Banksia attenuate, and B. menziesii), sheoak, nuytsia and tall shrubs up to 6 m in height. Understory comprised of mixed species small shrubs including zamia, sparse small grasstrees, and mixed species grass up to 40 cm in height.
Post Dev. Assumptions:	Vegetation is offsite and cannot be managed by the subject site landowner. Vegetation is classified as worst-case scenario.
	
Photo ID: 26	Photo ID: 27

VEGETATION AREA 7








Photo ID: 28





Photo ID: 29



VEGETATION AREA 8

AS 3959:2018 Vegetation Classification Applied:		Class A Forest	
Vegetation Types Present:		Open forest A-03	
Description/Justification:		Mixed species tree composition including tuarts, jarrah, and marri trees up to 15 m in height, foliage cover >30%. Midstory comprised of mixed species banksia (including Banksia attenuate, and B. menziesii), sheoak, nuytsia and tall shrubs up to 6 m in height. Understory comprised of mixed species small shrubs including zamia, sparse small grasstrees, and mixed species grass up to 40 cm in height.	
Post Dev. Assumptions:		Vegetation will be removed for subdivision Stages 3-6. This area has been Excluded under s2.2.3.2 (e) for the post-development assessment. Once cleared, the lots will be maintained in a non-vegetated state until building development, where lots will remain in a low threat state in perpetuity.	
			
Photo ID: 30		Photo ID: 31	
			
Photo ID: 32		Photo ID: 33	

VEGETATION AREA 9	
AS 3959:2018 Vegetation Classification Applied:	Class B Woodland
Vegetation Types Present:	Woodland B-05
Description/Justification:	Mixed species tree composition including tuarts, jarrah, and marri trees up to 15 m in height, foliage cover <30%. Understory comprised of sparse unmanaged tall grass, and sparse small shrubs and groundcovers.
Post Dev. Assumptions:	Vegetation will be removed for subdivision Stages 3-6. This area has been Excluded under s2.2.3.2 (e) for the post-development assessment. Once cleared, the lots will be maintained in a non-vegetated state until building development, where lots will remain in a low threat state in perpetuity.
	
Photo ID: 34	Photo ID: 35

VEGETATION AREA 10	
AS 3959:2018 Vegetation Classification Applied:	Class G Grassland
Vegetation Types Present:	Tussock grassland G-22
Description/Justification:	Tall unmanaged grassland with grass >50 cm in height. Some areas with slashed grass and maintained firebreaks present. Sparse trees including tuarts, jarrah and marri up to 15 m in height, <10% foliage cover.
Post Dev. Assumptions:	Vegetation will be removed for subdivision Stages 3-6. This area has been Excluded under s2.2.3.2 (e) for the post-development assessment. Once cleared, the lots will be maintained in a non-vegetated state until building development, where lots will remain in a low threat state in perpetuity.
	
Photo ID: 36	Photo ID: 37

VEGETATION AREA 11	
AS 3959:2018 Vegetation Classification Applied:	Class D Scrub
Vegetation Types Present:	Open scrub D-14
Description/Justification:	Mixed species shrubs dominated by dried canola oil plants up to 4 m in height. Understory comprised of tall unmanaged grass. Vegetation is surrounded by areas of forest.
Post Dev. Assumptions:	Vegetation will be removed for subdivision Stages 3-6. This area has been Excluded under s2.2.3.2 (e) for the post-development assessment. Once cleared, the lots will be maintained in a non-vegetated state until building development, where lots will remain in a low threat state in perpetuity.
	
Photo ID: 38	

VEGETATION AREA 12	
AS 3959:2018 Vegetation Classification Applied:	Class C Shrubland
Vegetation Types Present:	Low shrubland C-12 Low open shrubland G-19
Description/Justification:	Revegetation from cleared development sites. Mixed species shrubs <2 m in height with sparse tree. Sandy understory with sparse mixed species grasses and groundcovers <30 cm in height.
Post Dev. Assumptions:	Vegetation will be cleared for future development of Stages 9 and 10. Once cleared, the lots will be maintained in a non-vegetated state until building development, where lots will remain in a low threat state in perpetuity.
	
Photo ID: 39	Photo ID: 40

VEGETATION AREA 12



Photo ID: 41





Photo ID: 42



Photo ID: 43

VEGETATION AREA 13	
AS 3959:2018 Vegetation Classification Applied:	Class D Scrub
Vegetation Types Present:	Open scrub D-14
Description/Justification:	Revegetation from cleared development sites. Mixed species shrubs >2 m in height with sparse tree. Sandy understory with sparse mixed species grasses and groundcovers <30 cm in height.
Post Dev. Assumptions:	Vegetation will be cleared for future development of Stages 9 and 10. Once cleared, the lots will be maintained in a non-vegetated state until building development, where lots will remain in a low threat state in perpetuity.
	
Photo ID: 44	

VEGETATION AREA 14	
AS 3959:2018 Vegetation Classification Applied:	Class A Forest
Vegetation Types Present:	Open forest A-03
Description/Justification:	Mixed species tree composition including tuarts, jarrah, and marri trees up to 15 m in height, foliage cover >30%. Midstory comprised of mixed species banksia (including Banksia attenuate, and B. menziesii), sheoak, nuytsia and tall shrubs up to 6 m in height. Understory comprised of mixed species small shrubs including zamia, sparse small grasstrees, and mixed species grass up to 40 cm in height.
Post Dev. Assumptions:	Vegetation to be removed for the establishment of POS and drainage area within proposed subdivision Stages 9 & 10. The POS will be maintained as grass and gardens in a low threat state in perpetuity.
	
Photo ID: 45	Photo ID: 46

VEGETATION AREA 15

AS 3959:2018 Vegetation Classification Applied:	Excluded as per Section 2.2.3.2 (e)(f)
Vegetation Types Present:	Non-Vegetated Areas Low Threat Vegetation
Description/Justification:	Non-vegetated areas include water bodies/water ways, sealed public roads, footpaths, private driveways and built out areas as well as cleared land for future development. Low threat vegetation includes private residential reticulated maintained gardens and lawn, managed public open space.
Post Dev. Assumptions:	Low threat areas offsite can be reasonably expected to remain in a low threat state in perpetuity.



Photo ID: 47



Photo ID: 48



Photo ID: 49



Photo ID: 50



Photo ID: 51



Photo ID: 52

VEGETATION AREA 15



Photo ID: 53



Photo ID: 54

VEGETATION AREA 16

AS 3959:2018 Vegetation Classification Applied:

Excluded as per Section 2.2.3.2 (f) Low Threat Vegetation

Vegetation Types Present:

Tidal river – the river flats vegetation are high in moisture content due to river tidal movement and the prominent understorey consist of rushers, sedges and saltbush

Description/Justification:

Conservation Category Wetland: mixed species grasses and sedges with sparse mixed species trees <10% foliage cover.



Photo ID: 55



Photo ID: 58



Photo ID: 59



Photo ID: 60

VEGETATION AREA 16



Photo ID: 62



Photo ID: 64



Photo ID: 65

VEGETATION AREA 17

AS 3959:2018 Vegetation Classification Applied:	Class A Forest
Vegetation Types Present:	Low open forest A-04
Description/Justification:	Background (cannot access) - Conservation Category Wetlands: mixed species tree composition dominated by swamp sheoak, paperbark, and marri <15 m in height. Understory comprised of mixed species unmanaged grasses and sedges and mixed species small shrubs.
Post Dev. Assumptions:	Vegetation is offsite and cannot be managed by the subject site landowner. Vegetation is classified as worst-case scenario.



Photo ID: 56


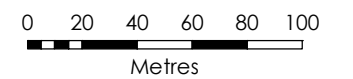
VEGETATION AREA 18	
AS 3959:2018 Vegetation Classification Applied:	Class C Shrubland
Vegetation Types Present:	Open heath C-11
Description/Justification:	Vegetation bordering lake comprised of mixed species shrubs <2 m in height with understory comprised of mixed species grasses including sedge up to 1 m in height.
Post Dev. Assumptions:	Vegetation is offsite and cannot be managed by the subject site landowner. Vegetation is classified as worst-case scenario.
	
Photo ID: 57	

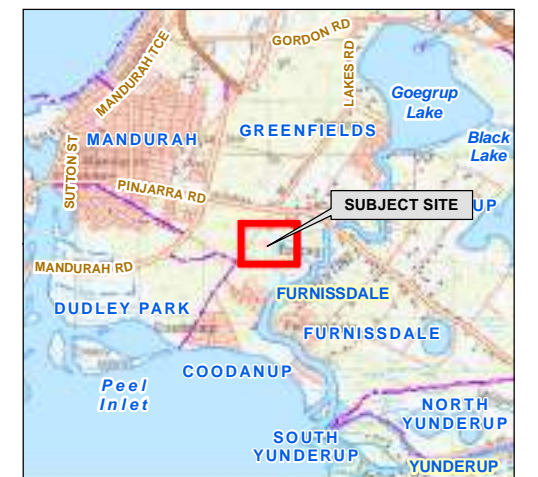
Figure 3.1.0
Topography & Classified Vegetation
STAGES 3 TO 6 RIVERS EDGE
 Lot 9007 on Plan 418868, Area : 252,446 sq m
 Wanjeep Street
 COODANUP
 CITY OF MANDURAH



- LEGEND -----
- Subject Site
 - Stage Boundaries
 - Other Lots
 - Proposed Subdivision
 - Lot Excised From Development
 - Proposed Pathway
 - Photo & Direction
 - H Hydrant
- 150m Vegetation Assessment Area**
 150m from Subject Site
- 100m Vegetation Assessment Area**
 100m from Subject Site
- Classified Vegetation**
- Class (A) Forest
 - Class (B) Woodland
 - Class (C) Shrubland
 - Class (D) Scrub
 - Class (G) Grassland
 - Exclusion 2.2.3.2



----- LOCALITY -----



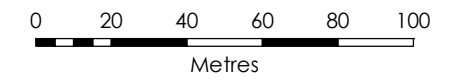
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 Image Date : Feb 2021

Coordinate System : GDA 1994 MGA Zone 50
 Projection : Universal Transverse Mercator Units : Metre
 Map compiled by : Ian Ross 23/02/2022
 Map updated by : Ian Ross 23/02/2022
 A3 Scale 1:2,750

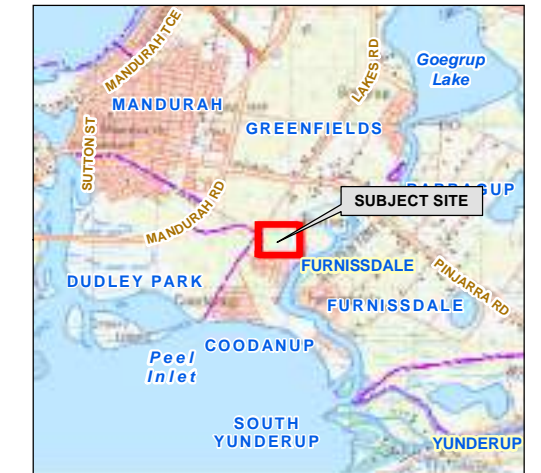


Figure 3.1.1
Topography & Classified Vegetation
STAGES 9 AND 10 FOREST WALK
 Lot 9007 on Plan 418868, Area : 252,446 sq m
 Wanjeep Street
 COODANUP
 CITY OF MANDURAH

- **LEGEND** -----
- Subject Site
 - Stage Boundaries
 - Other Lots
 - Proposed Suidivision
 - ← Photo & Direction
 - H Hydrant
- 150m Vegetation Assessment Area**
- 150m from Subject Site
- 100m Vegetation Assessment Area**
- 100m from Subject Site
- Classified Vegetation**
- Class (A) Forest
 - Class (B) Woodland
 - Class (C) Shrubland
 - Class (D) Scrub
 - Exclusion 2.2.3.2



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



Aerial Imagery : Landgate/SLIP
 Image Date : Feb 2021

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator Units: Metre
 Map compiled by: Ian Ross 23/02/2022
 Map updated by: Ian Ross 23/02/2022
 A3 Scale 1:2,000

Disclaimer and Limitation: This map has been prepared for bushfire management planning purposes only. All depicted areas, contours and any dimensions shown are subject to survey. Bushfire Prone Planning does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence arising from relying on any information depicted.
 Map Document Path / Name: K:\Projects\Jobs 2022\220028 - Wanjeep Street Coodanup (BMP SD)\Mapping\MXD\220028_ST9-10_FW_Fig3-1-1_VEG_Wanjeep St.mxd

Figure 3.2.0
Topography & Classified Vegetation (Post Development)

STAGES 3 TO 6 RIVERS EDGE
 Lot 9007 on Plan 418868, Area : 252,446 sq m
 Wanjeep Street
 COODANUP
 CITY OF MANDURAH



----- LEGEND -----

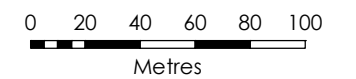
- Subject Site
- Stage Boundaries
- Other Lots
- Proposed Subdivision
- Lot Excised From Development
- Proposed Pathway
- Hydrant

150m Vegetation Assessment Area

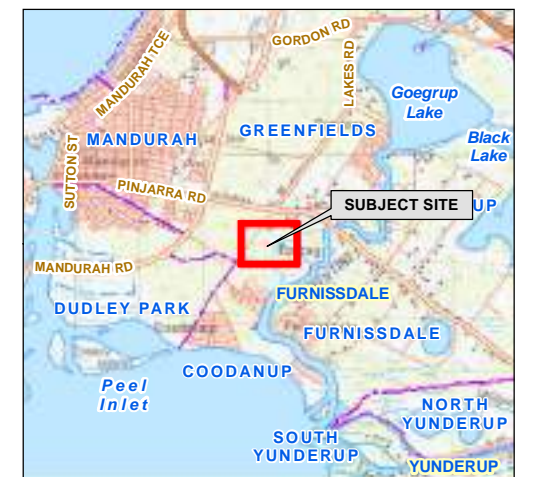
- 150m from Subject Site
- 100m from Subject Site

Classified Vegetation

- Class (A) Forest
- Class (B) Woodland
- Class (C) Shrubland
- Class (G) Grassland
- Exclusion 2.2.3.2



----- LOCALITY -----



Aerial Imagery : Landgate/SLIP
 Image Date : Feb 2021

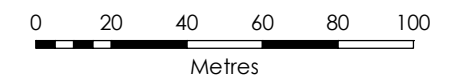
Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator Units: Metre
 Map compiled by: Ian Ross 23/02/2022
 Map updated by: Ian Ross 23/02/2022
 A3 Scale 1:2,750



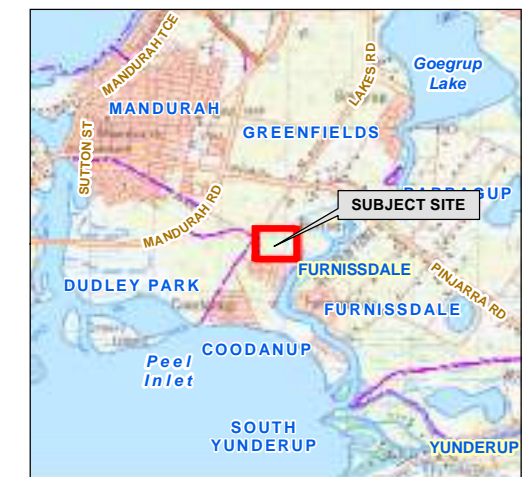


Figure 3.2.1
Topography & Classified Vegetation (Post Development)
STAGES 9 AND 10 FOREST WALK
 Lot 9007 on Plan 418868, Area : 252,446 sq m
 Wanjeep Street
 COODANUP
 CITY OF MANDURAH

- LEGEND -----
- Subject Site
 - Stage Boundaries
 - Other Lots
 - Proposed Subdivision
 - Hydrant
- 150m Vegetation Assessment Area**
- 150m from Subject Site
- 100m Vegetation Assessment Area**
- 100m from Subject Site
- Classified Vegetation**
- Class (A) Forest
 - Class (B) Woodland
 - Class (C) Shrubland
 - Exclusion 2.2.3.2



----- LOCALITY -----










Aerial Imagery : Landgate/SLIP
 Image Date : Feb 2021

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator Units: Metre
 Map compiled by: Ian Ross 23/02/2022
 Map updated by: Ian Ross 23/02/2022
 A3 Scale 1:2,000



Landscape Masterplan

Landscape Structures and Elements

-  Existing Main Entry
-  Indicative Location of future River Jetty
-  Existing River Jetty
-  Existing Lake Jetty
-  3.5m Concrete Path/Dual Use Path
-  3.5m Limestone Track/Dual Use Path
-  2m/3.5m Indicative Bush Tracks
-  Swale (Refer to Civil Drawings)
-  Interpretive Signage
-  Artificial Nesting Pole
-  Recreation Nodes
-  Potential carpark location
*subject to future subdivision approvals

**The subdivision design for Rivers Edge and Stages 9 & 10 of Forest Walk are indicative and subject to further design and approval.



Rivers Edge Precinct

- Stage 3 Public Open Space
 - Nature Play Elements - Age 5-12yrs
 - Walking Trail
 - Concrete Walking Path
 - Shade/Tables and Chairs
 - Drainage
- Stage 4 Public Open Space
 - Walking Trail
 - Concrete Walking Path
 - Drainage
- Stage 5 Public Open Space A
 - Walking Trail
 - Concrete Walking Path
 - Drainage
- Stage 5 Public Open Space B
 - Walking Trail
 - Concrete Walking Path
 - Drainage
- Stage 6 Public Open Space
 - Play Elements - Ages 1 - 12 years
 - Walking Trail
 - Concrete Walking Path
 - Drainage
- FN 1 (FORESHORE NODE) - Stage 6
 - Turf Area
 - Native Planting
 - Walking Trails
- FN 2 and 3 (FORESHORE NODE) - Stage 5
 - Turf Area
 - Native Planting
 - Walking Trails
 - Exercise Equipment
- FN 4 (FORESHORE NODE)- Stage 3
 - Turf Area
 - Native Planting
 - Walking Trails
 - River Jetty
 - Exercise Node
- Stage 2 - Public Open Space Complete
 - Small Turf Area
 - Native Planting
 - Drainage
- Stage 2 - Lake Playground - Complete
 - Kickabout Turf Area
 - Nature Play Elements - Various Ages
 - Walking Trail
 - Concrete Walking Path
 - Shade/Tables and Chairs
 - Lake Jetty & 1st River Jetty

Forest Walk Precinct

- Stage 3B Public Open Space
 - Nature Play Elements - Age 1-5yrs
 - Small Turf Area
 - Shade/Tables and Chairs
 - Walking Trails
 - Drainage
- Stage 9 Public Open Space
 - Play Area
 - Turf Area
 - Native Planting
 - Bench Seats
 - Drainage
- Roadside Swales
 - Native Planting
 - Drainage

Relevant Management Plans across the Frasers Landing site which are referenced in Landscape Design:

1. Designed and proposed Shared Paths along the Foreshore and through the Core Conservation area take into consideration the **Foreshore & Core Conservation Reserve Management Plan**. Providing low trafficable walking access to recreation areas for wildflower viewing, dieback management including fencing, phospite treatment, signage and construction of the Shared Foreshore Path.
2. Consideration has been given to the **Vegetation Retention Management Plan** when planning and designing POS areas. Landscape design and documentation have been adjusted, while providing CoM with a vegetation protection plan as part of construction documentation. Assistance and supporting documentation provided in supplying revegetation plans for areas in the CCR.
3. Proposed interpretive signage along the foreshore shared path through the CCR (landscape drawings submitted Oct 2021) & future signage within the ROS which depict local endemic flora comply with the **Wildlife Management Plan**.

** Indicative landscape design and assets. Subject to detailed design and approval with CoM

3.1.3 Vegetation Separation Distance

The vegetation separation distance is the horizontal distance measured from the relevant parts of an existing building or a future building's planned location (within a lot), to the determined edge of an area of classified vegetation.

This separation distance applied to determining a Bushfire Attack Level (BAL) can be either:

- The measured distance – for which the location of the building relative to the edge of classified vegetation must be known. This will result in single determined BAL that will apply to a building. (The measured distance is a required calculation input); or
- A calculated minimum and maximum distance (range) that will correspond to each individual BAL. The calculated distances provide an indicative (or achievable) BAL for which the determined BAL will be dependent on the known location of the building relative to the edge of classified vegetation.

The calculated range of distances corresponding to each BAL can be presented in different formats (tables or a BAL contour map), dependent on the form of information that is most appropriate for the proposed development/use. These distance ranges corresponding to BAL(s) will be presented in Section 3.2: 'Assessment Output'.

For the proposed development/use, the applicable vegetation separation distances will be presented within the Bushfire Management Plan in this location:

In Section 3.2 'Assessment Output' as a table containing the calculated ranges of distance corresponding to each BAL and illustrated as a BAL Contour Map.

3.2 Assessment Output

UNDERSTANDING THE RESULTS OF THE BUSHFIRE IMPACT ASSESSMENT

Bushfire Attack Levels (BALs) – Their Application in the Building Environment is Different to the Planning Environment

In the building environment, a **determined BAL** is required for the proposed construction at the building application stage. This is to inform approval considerations and establish the bushfire construction standards that are to apply. An indicative BAL is not acceptable for a building application.

In the planning environment, through the application of SPP 3.7 and associated Guidelines, the deemed to satisfy requirement for a proposed 'development site' or sites (defined by the LPS Amendment Regulations 2015 as "that part of a lot on which a building that is the subject of development stands or is to be constructed"), is that a BAL-29 or lower rating can be achieved once all works associated with the proposal are completed. For planning approval purposes, an **indicative BAL** can provide the required information.

Determined Bushfire Attack Level

A determined BAL is to apply to an existing building or the 'development site' on which the building is to be constructed and not to a lot or building envelope. Its purpose is to state the potential radiant heat flux to which the building will be exposed, thereby determining the construction standard to be applied.

A determined BAL cannot be given for a future building whose design and position on the lot are unknown or the vegetation separation distance has not been established. It is not until these variables have been fixed that a determined BAL can be stated, and a BAL Certificate can be issued.

The one exception is when a building **of any dimension** can be **positioned anywhere** on a proposed lot (within R-Code building setbacks) or within a defined building envelope, and always remain subject to the same BAL, regardless of the retention of any existing classified vegetation either onsite or offsite.

Indicative Bushfire Attack Level

If a BAL is not able to achieve 'determined' status it will be an indicative BAL. It indicates the BAL that can be achieved by the proposed development/use. However, it is conditional upon an assessment variable(s) being confirmed at a later stage (e.g. the building location is established/changed, or vegetation is modified/removed to establish the vegetation separation distance).

A BAL certificate cannot be issued for an indicative BAL – unless that BAL cannot vary (refer to 'Determined BAL' above).

In table form, a single or a range of indicative BAL(s) may be presented. If a single indicative BAL is stated for a defined area (i.e. the lot or building envelope), this will be the highest indicative BAL impacting the defined area.

In BAL contour map form (refer to Section 3.2.2), the illustrated BAL contours visually identify areas of land for which if any part of an existing or proposed building is located on that land and within the BAL contours, then the highest BAL affecting that building (or part of the land on which the building will be constructed), will be the indicative BAL that is to apply.

The BAL can only become a determined BAL once the actual location of that building on the land is known and/or the required minimum vegetation separation distance corresponding to the relevant BAL contour is established (refer to Table 3.3).

3.2.1 Bushfire Attack Level Results - BAL Contour Map Format

INTERPRETATION OF THE BUSHFIRE ATTACK LEVEL (BAL) CONTOUR MAP

The contour map will present different coloured contour intervals extending from the areas of classified bushfire prone vegetation. These represent the different bushfire attack levels that will exist at varying distances away from the classified vegetation in the event of a bushfire in that vegetation.

The areas of classified vegetation to be considered in developing the BAL contours, are those that will remain as the intended end state of the subject development once earthworks, clearing and/or landscaping and re-vegetation have been completed (or each stage completed).

Each bushfire attack level corresponds to a set range of radiant heat flux that is generated by a bushfire. That range is defined by the AS 3959:2018 BAL determination methodology.

The width of each shaded BAL contour is a diagrammatic representation of the separation distances from the classified vegetation that correspond to each BAL for each separately identified area of classified vegetation. They have been calculated by the application of the unique site variables including vegetation types and structure, ground slope and applied fire weather.

(Refer to Section 3.2 'Understanding the Results of the Bushfire Impact Assessment' for the explanation of how BAL(s) for buildings will be assessed from the BAL Contour Map).

Construction of the BAL Contours

VEGETATION AREAS APPLIED TO THE DEVELOPMENT OF THE BAL CONTOUR MAP

All identified areas of classified vegetation have been applied with the following exceptions:

1. For Figure 3.3.0 and 3.3.1, all classified vegetation within the proposed lots is excluded and the BAL contours are constructed into the lots from any classified vegetation outside the boundaries of proposed lots.

This approach is applied to indicate the achievable bushfire attack levels within the specified lot and the resultant area of developable land (i.e. subject to BAL-29 or less). It is based on the following assumptions:

1. Any classified vegetation within each new lot can potentially be managed by the landowner to meet asset protection zone standards and dimensions corresponding to an indicated BAL; and
2. Each lot must be considered independent of what development may or may not take place external to the stage of subdivision.
3. The lot located in the north eastern corner will be excised from sale until the land to the north is developed, and the excised lot can achieve BAL 29 or less (refer Figure 3.3.0)

VEGETATION SEPARATION DISTANCES APPLIED

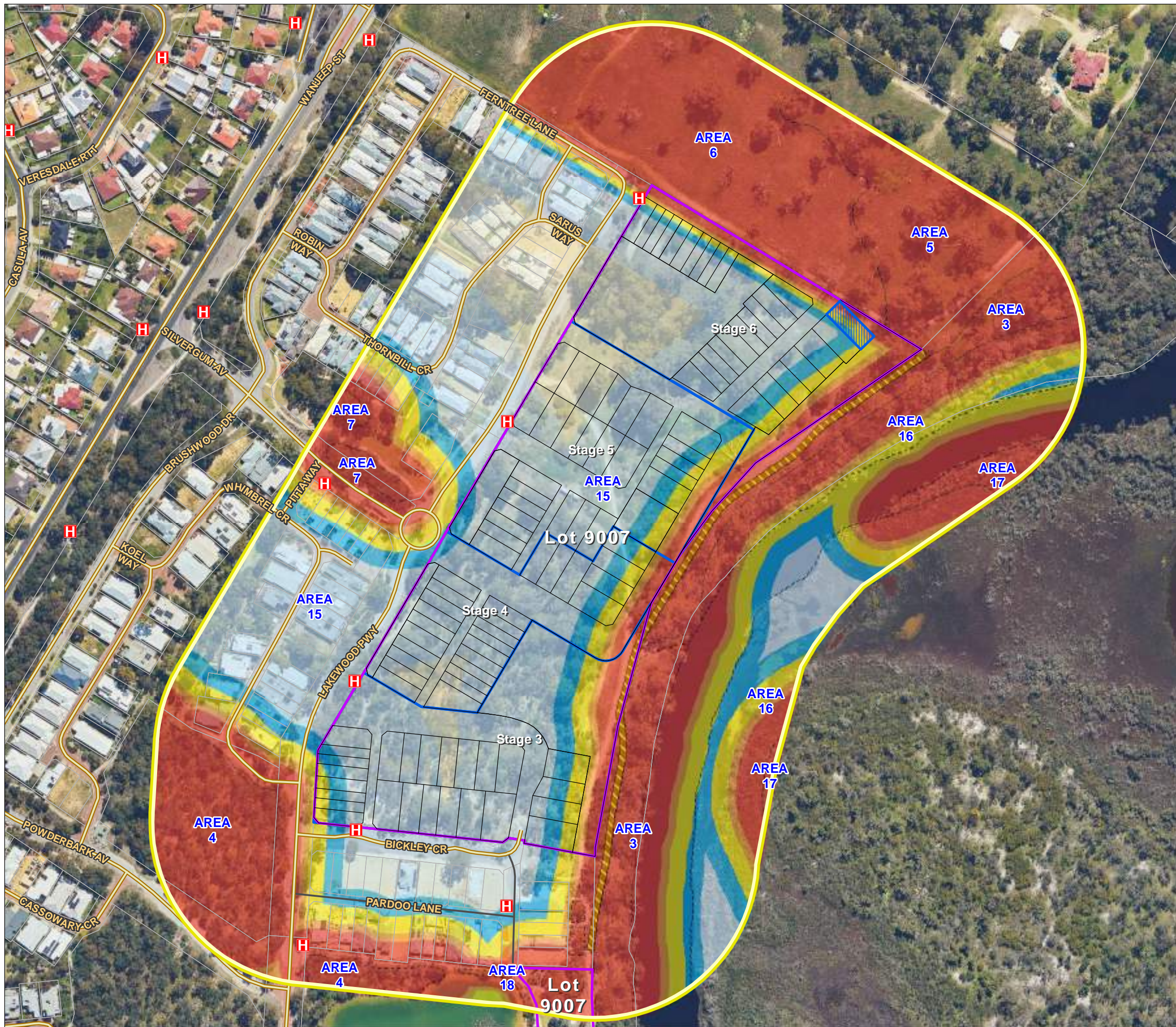
The distances that have been applied to illustrating the width of each BAL contour shown in Figures 3.3.0 and 3.3.1 are stated in Table 3.3. These correspond to each Bushfire Attack Level and are specific to the proposed development site.

Table 3.3: Vegetation separation distances applied to construct the BAL contours.

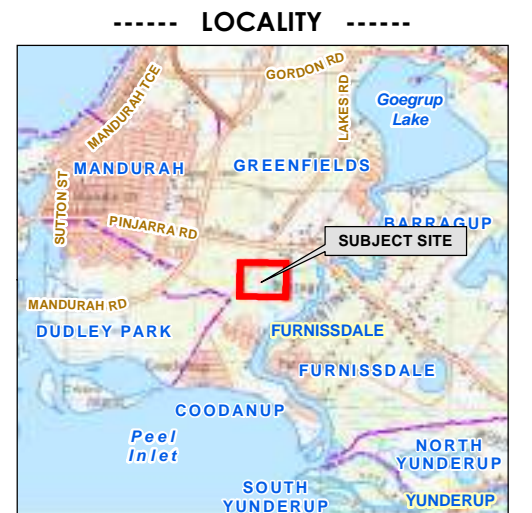
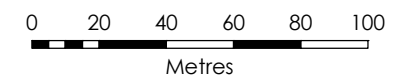
BAL CONTOUR MAP – APPLIED VEGETATION SEPARATION DISTANCES								
Derived from the Application of Method 1 BAL Determination Methodology (AS 3959:2018 Section 2, Table 2.5) ¹								
Vegetation Area	Vegetation Classification	Effective Slope (degree range)	BAL and Corresponding Separation Distance (m)					
			BAL-FZ	BAL-40	BAL-29	BAL-19	BAL12.5	BAL-LOW
1	Class A Forest	Upslope or flat	<16	16-<21	21-<31	31-<42	42-<100	>100
2	Class B Woodland	Downslope >0-5	<13	13-<17	17-<25	25-<35	35-<100	>100
3	Class A Forest	upslope or flat	<16	16-<21	21-<31	31-<42	42-<100	>100
4	Class A Forest	Upslope or flat	<16	16-<21	21-<31	31-<42	42-<100	>100
5	Class B Woodland	Upslope or flat	<10	10-<14	14-<20	20-<29	29-<100	>100
6	Class G Grassland	Upslope or flat	<6	6-<8	8-<12	12-<17	17-<50	>50
7	Class A Forest	Upslope or flat	<16	16-<21	21-<31	31-<42	42-<100	>100
8	Class A Forest	Upslope or flat	<16	16-<21	21-<31	31-<42	42-<100	>100
9	Class B Woodland	Upslope or flat	<10	10-<14	14-<20	20-<29	29-<100	>100
10	Class G Grassland	Upslope or flat	<6	6-<8	8-<12	12-<17	17-<50	>50
11	Class D Scrub	Upslope or flat	<10	10-<13	13-<19	19-<27	27-<100	>100
12	Class C Shrubland	Upslope or flat	<7	7-<9	9-<13	13-<19	19-<100	>100
13	Class D Scrub	Upslope or flat	<10	10-<13	13-<19	19-<27	27-<100	>100
14	Class A Forest	Upslope or flat	<16	16-<21	21-<31	31-<42	42-<100	>100
15	Excluded as per Section 2.2.3.2 (e)(f)	N/A	-	-	-	-	-	-
16	Class G Grassland	Upslope or flat	<6	6-<8	8-<12	12-<17	17-<50	>50
17	Class D Scrub	Upslope or flat	<10	10-<13	13-<19	19-<27	27-<100	>100
18	Class C Shrubland	Upslope or flat	<7	7-<9	9-<13	13-<19	19-<100	>100

Figure 3.3.0
BAL Contour Map

STAGES 3 TO 6 RIVERS EDGE
 Lot 9007 on Plan 418868, Area : 252,446 sq m
 Wanjeep Street
 COODANUP
CITY OF MANDURAH



- **LEGEND** -----
- Subject Site
 - Stage Boundaries
 - Other Lots
 - Proposed Subdivision
 - Lot Excised From Development
 - Proposed Pathway
 - Hydrant
- 100m Vegetation Assessment Area**
- 100m from Subject Site
 - Classified Vegetation Boundary
- Indicative Bushfire Attack Levels**
- BAL FZ
 - BAL 40
 - BAL 29
 - BAL 19
 - BAL 12.5
 - BAL LOW



Aerial Imagery : Landgate/SLIP
 Image Date : Feb 2021

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator Units: Metre
 Map compiled by: Ian Ross 22/02/2022
 Map updated by: Ian Ross 22/02/2022
 A3 Scale 1:2,250

Figure 3.3.1

BAL Contour Map

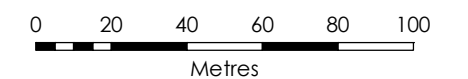
STAGES 9 AND 10 FOREST WALK

Lot 9007 on Plan 418868, Area : 252,446 sq m
 Wanjeep Street
 COODANUP
 CITY OF MANDURAH



----- LEGEND -----

- Subject Site
- Stage Boundaries
- Other Lots
- Proposed Subdivision
- Hydrant
- 100m Vegetation Assessment Area**
 - 100m from Subject Site
 - Classified Vegetation Boundary
- Indicative Bushfire Attack Levels**
 - BAL FZ
 - BAL 40
 - BAL 29
 - BAL 19
 - BAL 12.5
 - BAL LOW



----- LOCALITY -----



Aerial Imagery : Landgate/SLIP
 Image Date : Feb 2021

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Universal Transverse Mercator Units: Metre
 Map compiled by: Ian Ross 23/02/2022
 Map updated by: Ian Ross 23/02/2022
 A3 Scale 1:2,000

4 IDENTIFICATION OF BUSHFIRE HAZARD ISSUES

In response to the Bushfire Management Plan requirements established by Appendix 5 of the Guidelines for Planning in Bushfire Prone Areas (WAPC 2021 v1.4), the following statements are made to assist in the understanding of whether the proposal is likely to be able to comply with the bushfire protection criteria now or in subsequent planning stages.

Spatial Context - Broader Landscape Considerations	
Wider road network and access constraints	The surrounding area has an extensive public road network at the larger scale associated with the residential zoning. At a more local level, numerous access/egress options are available in different directions. The proposed subdivision site roads connect to Wanjeep Street and Coodanup Drive which provide access to main roads such as Pinjarra Road (north), Lakes Road, and Mandurah Road. There is no access constraint for the subject site with regard to what is considered acceptable from a planning perspective.
Proximity of settlements and emergency services	The subject site is part of a large area of urban settlement. The Mandurah city centre is 3.2 km and 6 minutes travel time from the subject site. Emergency services are located in West Murray, Mandurah and in South Yunderup (5.3 km 6 minutes travel, 5.8 km 9 minutes travel and 15.2 km 14 minutes travel).
Bushfire prone vegetation types and extent (including conserved vegetation)	Bushfire prone vegetation exist across the broader landscape as retained native vegetation (tuart/jarrah/mari forest and conservation wetland areas) but interspersed with improved pastures (grassland) and extensive build out areas or asset protection zones around existing dwellings. A 11.85 ha conservation reserve adjoins the subject lot's (Stage 9 & 10) southern and eastern boundary. In addition, forest reserves adjoin the eastern boundary of Rivers Edge Stages. The forest vegetation will produce significant embers and firebrands in a bushfire event primarily due to the type of bark.
Topography and fire behaviour interactions.	The topography is undulating rather than rugged. Most areas surrounding the subject site are flat land but some slopes of zero to five degrees do exist. Bushfire rates of spread can double for every ten degrees of upslope while downslopes will slow the rate of spread. Bushfire rates of spread will be predominantly influenced by location of fire, wind speed and prevailing wind direction.
Potential for extreme fire behaviour and pyro convective events.	Not possible due to the fragmentation of areas of bushfire prone vegetation due to cleared areas for development, residential built out areas, fuel load management by landowners and the availability of emergency services (including being a part of the greater Perth metropolitan area).
Environmental Considerations	
Constraints to implementing required and/or additional bushfire protection measures	The proponent will need to seek advice/approval to clear and manage the areas within clearing regulations for the required asset protection zones and development within Stages 3-6. A Landscape Plan is provided.
Provision of Access Within the Subject Site	
Potential constraints	No constraints to establishing the required access will exist.
Potential Bushfire Impacts	
Flame and radiant heat and ability to establish an APZ	The proposed lot sizes will allow a minimum BAL-29 dimensioned APZ to be established within each lot. This will prevent flame contact from the classified vegetation. Application of the BAL-29 bushfire construction standard will mitigate the risks from radiant heat impact to what is considered an acceptable level. The lot located in the north eastern corner will be excised from sale until the land to the north is developed and the excised lot can achieve BAL 29 or less (refer Figure 3.3.0).

Embers/firebrands, smoke and fire-driven wind	These will be the major impacts to the subject site. The appropriate protection measures of building construction and strict management of the APZ will mitigate the risk to what is considered an acceptable level.
Discretionary Decision Making and the Precautionary Principle (SPP 3.7 and Guidelines)	
Does the bushfire consultant consider there are issues that need to be addressed in this space?	No.

5 ASSESSMENT AGAINST THE BUSHFIRE PROTECTION CRITERIA ESTABLISHED BY THE GUIDELINES

For a subdivision application to be considered compliant with SPP 3.7, it must satisfy (achieve) the intent of each of the four elements of the bushfire protection criteria. These criteria are established by the *Guidelines for Planning in Bushfire Prone Areas* (WAPC 2021 v1.4). Compliance can be achieved by either:

- Meeting all applicable acceptable solutions corresponding to each element (i.e. the minimum bushfire protection measures that are deemed to satisfy planning requirements); or
- Where an acceptable solution cannot be met, by developing a performance solution that satisfies the established requirements.

5.1 Local Government Variations to Apply

Local governments may add to or modify the acceptable solutions of the Bushfire Protection Criteria (BPC) and/or apply technical requirements that vary from those specified in the *Guidelines for Planning in Bushfire Prone Areas* (WAPC). In such instances, this Proposal will be assessed against these variations and/or any specific local government technical requirements for emergency access and water. Refer to Appendices 2 and 3 for relevant technical requirements.

Will local or regional variations (endorsed by WAPC / DFES) to the applicable acceptable solutions established by the <i>Guidelines</i> or the <i>Position Statement: Tourism land uses in bushfire prone areas WAPC October 2019</i> , apply to this Proposal?	No
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----

Specific Local Government technical requirements where required to be applied will be addressed at the subsequent development stage/s where request by the local government.

5.2 Summary of Assessment Against the Bushfire Protection Criteria

SUMMARISED OUTCOME OF THE ASSESSMENT AGAINST THE BUSHFIRE PROTECTION CRITERIA					
Element of the Bushfire Protection Criteria	Basis for the Proposal Achieving Full Compliance with SPP 3.7			The Proposal Cannot Achieve Full Compliance with SPP 3.7	
	Acceptable Solutions Met	Achieves the Intent of the Element			
	All applicable solutions are fully met	All applicable solutions are not fully met. A merit based assessment and/or a bushfire performance comparison of the proposals residual risk with that of the residual risk of the acceptable solution is conducted (refer Note 4)	A performance principle-based solution is applied	Bushfire planning development type that may not require full compliance is applied	An improvement in bushfire performance compared to the existing development is detailed (refer Note 4)
1. Location	✓			N/A	
2. Siting and Design of Development	✓				
3. Vehicular Access	✓				
4. Water	✓				
5. Vulnerable Tourism & Land Uses	N/A				

Note: The development proposal has been assessed:

- Against the requirements established in Appendix 4 of the *Guidelines for Planning in Bushfire Prone Areas, WAPC 2021 v1.4 (Guidelines)*. The Guidelines are found at <https://www.planning.wa.gov.au/8194.aspx>; and
- Applying the interpretation guidance provided in *Position Statement: Planning in bushfire prone areas – Demonstrating Element 1: Location and Element 2: Siting and design (WAPC Nov 2019)*.
- Applying any endorsed variations to the Guideline's acceptable solutions and associated technical requirements that have been established by the local government. If known and applicable these have been stated in Section 5.1 with the detail included as an appendix if required by the local government.
- When non-compliant with SPP 3.7 and when appropriate, by utilising additional compliance pathways that include the application of merit based assessment and comparative bushfire performance. The validity of this approach is derived from relevant decisions made by the responsible authorities (refer Appendix 2).

5.3 Assessment Detail

Element 1: Location	
<p>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.</p>	
<p>Compliance: How the proposed development achieves the intent of Element 1:</p>	<p>By fully meeting all applicable acceptable solutions established by the bushfire protection criteria (Guidelines v1.4 WAPC 2021)</p>
<p>ASSESSMENT (COMPLIANCE) STATEMENTS</p>	
<p>For each applicable acceptable solution, the following statements present the results of the assessment of the proposed development/use against the requirements established by the <i>Guidelines (WAPC 2021 v1.4)</i> and apply the interpretation guidance established by the <i>Position Statement: Planning in bushfire prone areas – Demonstrating Element 1: Location and Element 2: Siting and design (WAPC Nov 2019)</i>.</p>	
<p>Acceptable Solution: A1.1: Development Location</p>	
<p>ASSESSMENT AGAINST THE REQUIREMENTS ESTABLISHED BY THE GUIDELINES</p>	
<p>The proposed subdivision will provide an area of land within each lot that can be considered suitable for development by being able to obtain a BAL-29 or lower rating. Identified on the BAL Contour Maps (Figure 3.3.0 and Figure 3.3.1) areas of the development site are subject to radiant heat levels corresponding to BAL-40 and BAL-FZ ratings, this is addressed by development design through minimum setbacks from unmanaged vegetation. This meets the requirements established by Acceptable Solution A1.1 and its associated explanatory note.</p> <p>Note: The lot located in the north eastern corner will be excised from sale due to BAL -FZ encroachment, until the land to the north is developed and the excised lot can achieve BAL 29 or less (refer Figure 3.3.0).</p>	
<p>ASSESSMENT AGAINST THE REQUIREMENTS ESTABLISHED BY THE POSITION STATEMENT</p>	
<p>The position statement establishes that:</p> <ul style="list-style-type: none"> • The source of risk (the hazard) to be considered in Element 1 is the "level of bushfire exposure" from the type and extent of bushfire prone vegetation and the topography of the land on which it exists; and • "Consideration should be given to the site context" which includes 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." <p>The position statement also recognises:</p> <ul style="list-style-type: none"> • That the proposed development site and its surrounding land may be part of an area "identified for development or intensification of land use prior to the release of SPP 3.7"; consequently • Consideration by decision-makers "should also be given to improving bushfire management of the site and surrounding area, thereby reducing the vulnerability of people property and infrastructure to bushfire"; and • The application of mitigation measures to lessen the risk to the broader area would include improvements to the local road network (including emergency access ways), improvements/additions to firefighting water supply and increasing separation distance from the hazard. 	
<p>The Hazard Within the Subject Site</p> <p>The subject site lots are vegetated with native vegetation classified as Class A Forest, Class B Woodlands, Class C Shrubland, Class Scrub and Class G Grassland. Areas of the subject site lots are non-vegetated, with woodchips or</p>	

Element 1: Location

sand. The impact of the slopes under the vegetation will be dependent on a bushfire's direction of travel, but the subject sites are flat and therefore bushfire will not be influenced by the site slope, but rather wind driven.

In its current state, significantly intense bushfire behaviour is possible, particularly if onsite vegetation is ignited by bushfire in the adjoining hazard and they are involved together.

However, the ability to establish a minimum BAL-29 dimensioned APZ within each proposed lot's boundaries removes the threat of greater levels of radiant heat or flame contact upon a future dwelling. The BAL-29 APZ will exist over a significant area of each proposed lot.

The primary bushfire threat from bushfire prone vegetation remaining within the proposed lot will be embers. This threat will be mitigated by the application of appropriate building design, bushfire construction standards and the ongoing maintenance of the APZ to ensure the buildings will not be impacted by consequential fire within combustible materials used, stored or accumulated within the APZ.

The subject site lots will be mostly cleared of native vegetation for subdivision and future development (See Figure 3.2.0 and 3.2.1 Post-Development vegetation). The future development of individual lots, within the context of each lot location in the subject site, cannot be considered as being at high risk from the direct flame contact impacts of bushfire.

The Hazard Adjoining the Subject Site

Bushfire prone vegetation within the surrounding residential and rural locality exists as native vegetation classified as Class A Forest, Class B Woodland, Class C Shrubland, Class D Scrub, and Class G Grassland.

The impact of the slope under the vegetation will be dependent on a bushfire's direction of travel, but slopes in the range of zero to five degrees downslope from the proposed lots do exist. Bushfire travelling upslope will have increased intensity and rate of spread. However, the adjoining land cannot be considered as rugged (which would present the potential for more extreme and variable fire behaviour).

- To the west: High density built-out residential areas extend to the Mandurah estuaries and further to the coast. Limited bushfire prone native vegetation exists. Small areas of retained Class A Forest, Class B Woodlands, and Class D Scrub exist surrounding Mandurah Catholic College, and in parks including Duck Park and Creery Wetland Nature Reserve. Class A Forest exists, however, this will be removed for later stages of Fraser's Landing subdivision.
- To the east: retained native vegetation in the form of Class A Forest and Class B Woodland separates the subject site from the Serpentine River. The Serpentine River is bordered by areas of Class G Grassland and a mix of Class D Scrub and Class A Forest (Regional Open Space, under WAPC Management). To the east of the Serpentine River, rural lots have retained native vegetation, interspersed with asset protection zones surrounding existing dwellings and vegetation that is managed to varying levels.
- To the north: Retained native vegetation adjoins the riverfront of the Serpentine River and extends until Pinjarra Road. Small areas of retained native vegetation do exist, however the surrounding area is mostly high density built-out residential suburbs.
- To the south: Core Conservation Reserve, approximately 11.85 ha of Class A Forest, adjoins the subject site lot (Stages 9 & 10). The forest vegetation is approximately 240 m in length before built-out residential areas and Collins Pool. Beacham Reserve (~5.6 ha) is approximately 740 m from the subject site boundary.

Consequently, there are limited scenarios in which the subject development site is likely to be subject to a significant bushfire event. The development site, within the context of its location in the broader landscape, cannot be considered as being at high risk from the impacts of bushfire.

The potential exists for intense bushfire behaviour to occur within areas of bushfire prone vegetation (particularly the Core Conservation Reserve adjoining the subject site – Stages 9 & 10). The potential bushfire impact on persons and property within the proposed lots will be to increase the level of ember attack in the event of a bushfire.

This ember threat will be mitigated by the application of appropriate building design, bushfire construction standards and the ongoing maintenance of the BAL-29 dimensioned APZ, to ensure the buildings will not be impacted by consequential fire within combustible materials used, stored or accumulated within the APZ.

Element 2: Siting and Design of Development

Intent: To ensure that the siting and design of development (note: not building/construction design) minimises the level of bushfire impact.

Compliance: How the proposed development achieves the intent of Element 2:

By fully meeting all applicable acceptable solutions established by the bushfire protection criteria (Guidelines v1.4 WAPC 2021)

ASSESSMENT (COMPLIANCE) STATEMENTS

For each applicable acceptable solution, the following statements present the results of the assessment of the proposed development/use against the requirements established by the *Guidelines (WAPC 2021 v1.4)* and apply the interpretation guidance established by the *Position Statement: Planning in bushfire prone areas – Demonstrating Element 1: Location and Element 2: Siting and design (WAPC Nov 2019)*.

Acceptable Solution: A2.1: Asset Protection Zone

THE APZ - DEVELOPMENT SITING AND DESIGN PLANNING REQUIREMENTS

The necessary outcome of bushfire planning for development siting and design, is to ensure that a building can be located within the developable portion of any lot (i.e. outside those parts of the lot that form the required R-Code building setbacks, or any other excluded area), and be subject to potential radiant heat from a bushfire not exceeding 29 kW/m² (i.e. a maximum BAL of BAL-29).

Note: The lot located in the north eastern corner will be excised from sale due to BAL -FZ encroachment, until the land to the north is developed and the excised lot can achieve BAL 29 or less (refer Figure 3.3.0).

This will be achieved when the size of the "low fuel area immediately surrounding a building", the asset protection zone (APZ), is large enough. This requires a certain separation distance to exist between the building and areas of classified vegetation. These are the BAL-29 APZ dimensions and they will vary dependent on site specific parameters.

The APZ should be contained solely within the boundaries of each lot, except in instances where the neighbouring lot(s) or adjacent public land will be managed in a low-fuel state on an ongoing basis, in perpetuity.

Where possible, planning for siting and design should incorporate elements that include non-vegetated areas (e.g. roads/parking/drainage) and/or formally managed areas of vegetation (public open space/recreation areas/services installed in a common section of land), as either part of the required APZ dimensions or to additionally increase separation distances to provide greater protection. These elements create robust and easier managed asset protection zones.

THE ASSESSMENT

Future buildings on the newly created lots within the proposed subdivision can be surrounded by an APZ that will ensure the potential radiant heat impact of a bushfire does not exceed 29 kW/m² (BAL-29). The required APZ specifications of width, location and management can be achieved.

APZ Width: The required APZ dimensions to ensure buildings are subject to a maximum BAL of BAL-29 (measured from any external wall or supporting post or column to the edge of the classified vegetation), has been determined in Section 3.2 of this BMP and are:

BAL-29 APZ Dimensions		
Applicable to Following Lot(s):	Building to Vegetation Area 1	Minimum 21 metres
Stage 2 – 6	Building to Vegetation Area 2	Minimum 17 metres
Stage 9 & 10	Building to Vegetation Area 3	Minimum 21 metres
	Building to Vegetation Area 4	Minimum 21 metres
	Building to Vegetation Area 5	Minimum 14 metres
	Building to Vegetation Area 6	Minimum 8 metres

Element 2: Siting and Design of Development

Building to Vegetation Area 7	Minimum 21 metres
Building to Vegetation Area 8	Minimum 21 metres
Building to Vegetation Area 9	Minimum 14 metres
Building to Vegetation Area 10	Minimum 8 metres
Building to Vegetation Area 11	Minimum 13 metres
Building to Vegetation Area 12	Minimum 9 metres
Building to Vegetation Area 13	Minimum 13 metres
Building to Vegetation Area 14	Minimum 21 metres
Building to Vegetation Area 15	-
Building to Vegetation Area 16	Minimum 8 metres
Building to Vegetation Area 17	Minimum 13 metres
Building to Vegetation Area 18	Minimum 9 metres

APZ Location: The APZs should be contained solely within the boundaries of each Lot, except in instances, where the neighbouring lot(s) or adjacent public land will be managed in a low-fuel state on an ongoing basis, in perpetuity.

The BAL-29 APZ will exist both within and outside the proposed lots. The portions of the required size APZ that exist outside each proposed lot consist of:

- Roads
- Footpaths
- Parking bays
- Landscaped public open space
- Adjacent lots with no existing vegetation and planned high density residential construction and associated landscaping
- Road verge with a commitment from the local government to manage.
-

Onsite vegetation will be required to be modified/removed, the authority for which will need to be received from the local government.

APZ Management: All vegetation that will require modification/removal and future management is onsite and therefore under the control of the landowner. POS within all stages will be managed as lawn and/or maintained gardens.

Retained vegetation will be managed in accordance with the technical requirements established by the Schedule 1: 'Standards for Asset Protection Zones (Guidelines). The APZ specifications are also detailed in Appendix 1 and the City of Mandurah may have additional requirements established by their Fire Compliance Notice.

THE APZ – REQUIRED DIMENSIONS TO SATISFY FUTURE BUILDING (AND ONGOING MANAGEMENT)

It is important for the landowner to be aware that the APZ dimensions that will be required to be physically established and maintained on each lot surrounding relevant future buildings, may be different to those stated above for the BAL-29 APZ - which is the minimum dimension a planning proposal needs to show can be established to comply with SPP 3.7.

The actual APZ dimensions to be physically established and maintained, will be based on which of the following establishes the larger APZ dimension:

- The dimensions corresponding to the determined BAL of a building (refer to Section 3.2 for explanation of the 'planning' versus 'building' requirements and 'indicative' versus 'determined' BAL); or
- The APZ dimensions established by the local government's Firebreak Notice.

If the dimensions of the APZ that are to be established are known at this time, they will be stated below.

Element 2: Siting and Design of Development

The potential to reduce future construction BAL's for future buildings below BAL-29 is possible on identified lots (See Figures 3.3.0 and 3.3.1), assuming all neighbouring properties within the subdivision are maintained in a low threat state in perpetuity.

Element 3: Vehicular Access

Intent: To ensure that the vehicular access serving a subdivision/development is available and safe during a bushfire event.

Compliance: How the proposed development achieves the intent of Element 3:

By fully meeting all applicable acceptable solutions established by the bushfire protection criteria (Guidelines v1.4 WAPC 2021)

ASSESSMENT (COMPLIANCE) STATEMENTS

For each applicable acceptable solution, the following statements present the results of the assessment of the proposed development/use against the requirements established by the *Guidelines (WAPC 2021 v1.4)*.

Acceptable Solution: A3.1: Public Roads

The existing and future road network within the subdivision will provide public and emergency vehicles a suitable trafficable transport route and will be available at all times under all weather conditions. The construction technical requirements established by the Guidelines and/or the local government can and will be complied with.

Acceptable Solution: A3.2a: Multiple Access Routes

The subject sites will have a minimum two access routes available to the public at all times under all weather conditions. Forest Walk Stages 9 & 10 will be accessed via Landings Boulevard and three exits to Angelo Road, Ironstone Lane, and Lakewood Parkway. Rivers Edge Stages 3 – 6 will be accessed via Lakewood Parkway and Ferntree Lane.

Acceptable Solution: A3.2b: Emergency Access Way

- Not Applicable -

Acceptable Solution: A3.3: Through Roads

Wanjeep Street is a 'Through Road'. The construction technical requirements established by the Guidelines and/or the local government can and will be complied with.

Acceptable Solution: A3.4a: Perimeter Roads

- Not Applicable -

Acceptable Solution: A3.4b: Fire Service Access Routes

- Not Applicable -

Element 3: Vehicular Access

Acceptable Solution: A3.5: Battle-axe Access Legs

- Not Applicable -

Acceptable Solution: A3.6: Private Driveways

Future buildings will be located within 70 m of the local road. No additional driveway access standards are required. The construction technical requirements established by the Guidelines and/or the local government can and will be complied with. These requirements are set out in Appendix 2.

Element 4: Water

Intent: To ensure water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.

Compliance: How the proposed development achieves the intent of Element 4:

By fully meeting all applicable acceptable solutions established by the bushfire protection criteria (Guidelines v1.4 WAPC 2021)

ASSESSMENT (COMPLIANCE) STATEMENTS

For each applicable acceptable solution, the following statements present the results of the assessment of the proposed development/use against the requirements established by the *Guidelines (WAPC 2021 v1.4)*.

Acceptable Solution: A4.1: Identification of Future Water Supply

- Not Applicable -

Acceptable Solution: A4.2: Provision of Water for Fire Fighting Purposes

A reticulated water supply is available to the subject site. Hydrants are currently located along Landings Boulevard, Lakewood Parkway, Bickley Crescent, Angelo Road (see Figures 3.1.0 and 3.1.1).

Required hydrant separation distances – 100 m commercial, 200 m residential, 400 m rural residential >1ha

The construction technical requirements established by the Guidelines and/or the local government can and will be complied with.

5.4 Additional Bushfire Protection Measures

The following bushfire protection measures are to be implemented and maintained. They are additional to those established by the relevant acceptable solutions applied to the proposed subdivision, development or use.

The relevant acceptable solutions are those against which this planning proposal has been assessed in Section 5.3 of this Bushfire Management Plan.

5.4.1 Additional Measures to Improve Bushfire Performance

SUMMARY OF ADDITIONAL BUSHFIRE PROTECTION MEASURES (TREATMENTS) TO BE APPLIED (Detail Contained in Section 5.4)		
Treatment Category	Brief Description	The Relevant Element and its Intent the Treatment Has Been Developed to Help Achieve
Siting and Design	Locating future buildings on each Lot within the subdivision stage, where an APZ to achieve a minimum 29 kW/m ² around each new building required to be constructed to an increased standard is achieved.	Avoid areas of BAL-40 or BAL-FZ to lessen the bushfire impact on the buildings and occupants. Ensure options are available for occupants unable to self-evacuate off-site i.e. buildings will provide a level of shelter relevant to the bushfire attack level impact
Siting and Design	POS will be managed in accord to the Landscape Plan	To ensure low threat areas are maintained
Vehicular Access	Ensuring there are a minimum of two access/egress routes constructed for the subdivision stage	Vehicular Access – To provide a safe operational environment for emergency services and while occupants are accessing or egressing the site

6 RESPONSIBILITIES FOR IMPLEMENTATION AND MANAGEMENT OF THE BUSHFIRE PROTECTION MEASURES

Table 6.1: BMP Implementation responsibilities prior to the issue of titles.

Developer (Landowner) - Prior to Issue of Titles		
No.	Implementation Actions	Subdivision Clearance
<p>Note: Planning approval may be conditioned with the requirements:</p> <ol style="list-style-type: none"> To place certain notifications on the certificates of title and the deposited plan, regarding the existence of this bushfire management plan and the obligations it creates; and To provide certification of the implementation of certain bushfire protection measures established by this bushfire management plan. 		
1	<p>Condition (as per Code F2 of Model Subdivision Schedule, WAPC April 2020):</p> <p>A notification, pursuant to Section 165 of the <i>Planning and Development Act 2005</i>, may be required to be placed on the certificate(s) of title of the proposed lot(s) with a Bushfire Attack Level (BAL) rating of 12.5 or above, advising of the existence of a hazard or other factor.</p> <p>Notice of this notification is to be included on the diagram or plan of survey (deposited plan). The notification is to state as follows:</p> <p><i>"This land is within a bushfire prone area as designated by an Order made by the Fire and Emergency Services Commissioner and is/may be subject to a Bushfire Management Plan. Additional planning and building requirements may apply to development on this land."</i> (Western Australian Planning Commission).</p>	<input type="checkbox"/>
2	<p>Condition (as per Code F3 of Model Subdivision Schedule, WAPC April 2020):</p> <p>A restrictive covenant to the benefit of the local government pursuant to section 129BA of the <i>Transfer of Land Act 1893</i>, may be required 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 land within areas that have been assessed a BAL-40 or BAL-FZ.</p>	<input type="checkbox"/>
3	Construct the public roads and cul-de-sacs to the standards stated in the BMP.	<input type="checkbox"/>
4	Construct the private driveways and battle axes to the standards stated in the BMP.	<input type="checkbox"/>
5	Install the reticulated water supply (hydrants) to the standards stated in the BMP.	<input type="checkbox"/>
6	Include notification on title for the lot located in the north eastern corner will be excised from sale due to BAL -FZ encroachment, until the land to the north is developed and the excised lot can achieve BAL 29 or less (refer Figure 3.3.0).	<input type="checkbox"/>

Table 6.2: BMP Implementation responsibilities prior to lot sale, occupancy or building.

Landowner (Developer) - Prior to Sale of Lot(s)	
No.	Implementation Actions
1	Prior to sale and post planning approval, the entity responsible for having the BMP prepared should ensure that anyone listed as having responsibility under the Plan has endorsed it and is provided with a copy for their information and informed that it contains their responsibilities. This includes the landowners/proponents (including future landowners where the Plan was prepared as part of a subdivision approval), local government and any other authorities or referral agencies ('Guidelines' s4.6.3).
2	<p>Prior to sale of the subject lots, each individual lot is to be compliant with the City of Mandurah Firebreak Compliance Notice issued under s33 of the Bushfires Act 1954.</p> <p>This may include specifications for asset protection zones that differ from the Guideline's APZ Standards, with the intent to better satisfy local conditions. When these are more stringent than those created by the Guidelines, or less stringent and endorsed by the WAPC and DFES, they must be complied with. Refer to Appendix 1.</p>
3	Prior to occupancy, install the private driveways and battle axes to the standards stated in the BMP.
4	<p>Prior to any building work, inform the builder of the existence of this Bushfire Management Plan and the responsibilities it contains, regarding the required construction standards. This will be:</p> <ul style="list-style-type: none"> • The standard corresponding to the determined BAL, as per the bushfire provisions of the Building Code of Australia (BCA); and/or • A higher standard because the BMP establishes that the construction standard is to correspond to a higher BAL as an additional bushfire protection measure.
5	The lot located in the north eastern corner will be excised from sale due to BAL -FZ encroachment, until the land to the north is developed and the excised lot can achieve BAL 29 or less (refer Figure 3.3.0). The lot will be maintained as low threat.

Table 6.3: Ongoing management responsibilities for the Landowner/Occupier.

Landowner/Occupier - Ongoing	
No.	Ongoing Management Actions
1	<p>Maintain the Asset Protection Zone (APZ) surrounding all existing buildings to the largest dimension as determined by either:</p> <ul style="list-style-type: none"> The dimensions corresponding to the determined BAL of a building (refer to Section 3.2 for explanation of the 'planning' versus 'building' requirements and 'indicative' versus 'determined' BAL); or The dimensions corresponding to the local government's Firebreak Notice. <p>Maintain the APZ to the above dimensions and to the standards established by the Guidelines (refer to Appendix 1) or as varied by the local government through their Firebreak Notice (refer to the following responsibility).</p>
2	<p>Comply with the City of Mandurah Fire Compliance Notice issued under s33 of the Bush Fires Act 1954.</p> <p>This may include specifications for asset protection zones that differ from the Guideline's APZ Standards, with the intent to better satisfy local conditions. When these are more stringent than those created by the Guidelines, or less stringent and endorsed by the WAPC and DFES, they must be complied with. Refer to Appendix 1.</p>
3	<p>Maintain vehicular access routes within the lot to the required surface condition and clearances as stated in the BMP.</p>
4	<p>Ensure that any builders (of future structures on the lot) are aware of the existence of this Bushfire Management Plan and the responsibilities it contains regarding the application of construction standards corresponding to a determined BAL.</p>
5	<p>Ensure all future buildings the landowner has responsibility for, are designed and constructed in full compliance with:</p> <ol style="list-style-type: none"> the requirements of the WA Building Act 2011 and the bushfire provisions of the Building Code of Australia (BCA); and with any identified additional requirements established by this BMP or the local government.
6	<p>To implement and maintain, the additional bushfire protection measures contained in Section 5.4 of this Bushfire Management Plan, in addition to the measures that are established by the acceptable solutions.</p>
7	<p>The lot located in the north eastern corner will be excised from sale due to BAL -FZ encroachment, until the land to the north is developed and the excised lot can achieve BAL 29 or less (refer Figure 3.3.0). The lot to be maintained to low threat</p>

Table 6.4: Ongoing management responsibilities for the Local Government.

Local Government - Ongoing	
No.	Ongoing Management Actions
1	<p>Monitor landowner compliance with the Bushfire Management Plan and the annual Firebreak Compliance Notice.</p>

APPENDIX 1: TECHNICAL REQUIREMENTS FOR ONSITE VEGETATION MANAGEMENT

A1.1 Requirements Established by the Guidelines – Standards for Asset Protection Zones

(Source: Guidelines for Planning in Bushfire Prone Areas - WAPC 2021 v1.4 Appendix 4, Element 2, Schedule 1 and Explanatory Note E2)

DEFINING THE ASSET PROTECTION ZONE (APZ)

Description: An APZ is an area surrounding a building that is managed to reduce the bushfire hazard to an acceptable level (by reducing fuel loads). The width of the required APZ varies with slope and vegetation and varies corresponding to the BAL rating determined for a building (lower BAL = greater dimensioned APZ).

For planning applications, the minimum sized acceptable APZ is that which is of sufficient size to ensure the potential radiant heat impact of a fire does not exceed 29kW/m² (BAL-29). It will be site specific.

For subdivision planning, design elements and excluded/low threat vegetation adjacent to the lot(s) can be utilised to achieve the required vegetation separation distances and therefore reduce the required dimensions of the APZ within the lot(s).

Defendable Space: The APZ includes a defendable space which is an area adjoining the asset within which firefighting operations can be undertaken to defend the structure. Vegetation within the defendable space should be kept at an absolute minimum and the area should be free from combustible items and obstructions. The width of the defendable space is dependent on the space, which is available on the property, but as a minimum should be 3 metres.

Establishment: The APZ should be contained solely within the boundaries of the lot on which the building is situated, except in instances where the neighbouring lot or lots will be managed in a low-fuel state on an ongoing basis, in perpetuity.

The APZ may include public roads, waterways, footpaths, buildings, rocky outcrops, golf courses, maintained parkland as well as cultivated gardens in an urban context, but does not include grassland or vegetation on a neighbouring rural lot, farmland, wetland reserves and unmanaged public reserves.

[Note: Regardless of whether an Asset Protection Zone exists in accordance with the acceptable solutions and is appropriately maintained, fire fighters are not obliged to protect an asset if they think the separation distance between the dwelling and vegetation that can be involved in a bushfire, is unsafe.]

E2 Managing an Asset Protection Zone (APZ) to a low threat state

An APZ is a low fuel area maintained around a habitable building to increase the likelihood that it will survive a bushfire, by providing a defensible space and reducing the potential for direct flame contact, radiant heat exposure and ember attack.

Vegetation management within an APZ should provide defensible space and be maintained to a low threat state, in perpetuity, in accordance with the requirements outlined in Schedule 1.

The width of an APZ varies with slope and vegetation type, however it should only be as wide as needed to ensure the potential radiant heat impact of a bushfire does not exceed 29kW/m² (BAL-29), or 10kW/m² where a building is identified for use as an on-site shelter. An APZ is generally not required where a building or development site achieves 29kW/m² (BAL-29) or lower in its pre-development state (prior to any vegetation clearing or modification).

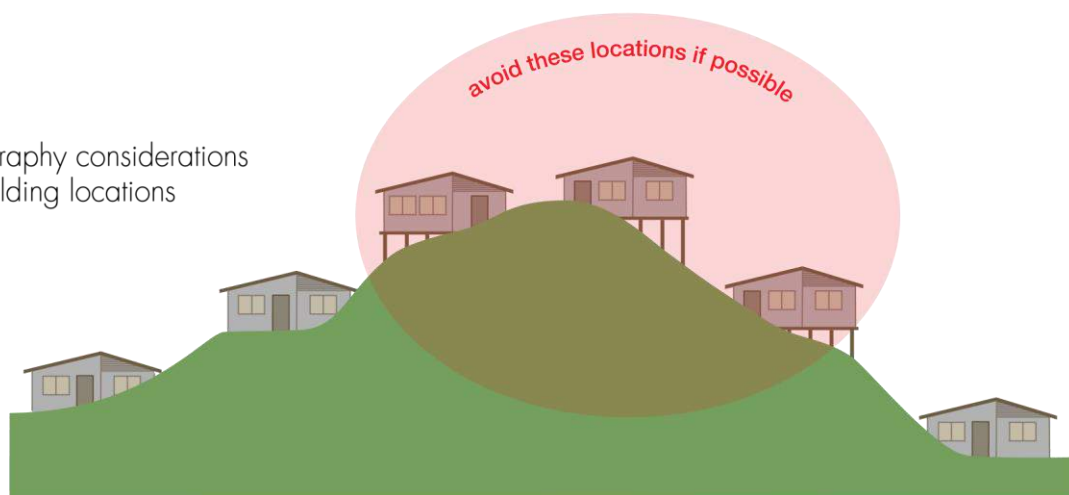
An APZ should include an area of defensible space immediately adjoining a building, that is kept free from combustible items and obstructions, within which firefighting operations can be undertaken to defend the structure. Where a lot contains a building envelope, it may not be necessary for the entire building envelope to achieve 29kW/m² (BAL-29) as this may result in significant unnecessary clearing. It is recommended that the BMP identifies that a sufficient APZ can be accommodated within the building envelope, with the development site and associated APZ to be determined at the development approval stage.

An APZ should be contained within the boundaries of the lot on which the building is situated, except in instances where it is demonstrated that the vegetation on the adjoining land is managed in a low threat state, as per cl. 2.2.3.2 of AS 3959, such as a road, managed park, rocky outcrop or a water body.

The siting of a habitable building and associated APZ should aim to minimise the clearing of vegetation. The BMP should demonstrate that the proposed APZ has minimised the unnecessary loss of vegetation or potential for conflict with landscape or environmental objectives; and complies with environmental approvals/exemptions (where necessary). A re-design or reduction in lot yield may be necessary to minimise the removal and modification of remnant vegetation.

It is recommended that development be located on flat areas or slopes less than 20 degrees (especially where classified vegetation is located downslope to a building) and away from ridge tops, crests or narrow gullies, as bushfire can spread rapidly in these areas. Circumstances where these locations may be suitable for development to occur include where the land is already cleared, and 29kW/m² (BAL-29) or lower can be achieved for the whole development site without the use of an APZ. To ensure soil stability within an APZ, vegetation removal on slopes exceeding 18 degrees is discouraged.

Figure 17: Topography considerations for building locations



(Source: Guidelines for Planning in Bushfire Prone Areas 2021, Appendix 4)

Fine fuel load should be maintained to less than two tonnes per hectare; however this is often a subjective assessment. Reducing fuel load levels does not necessarily require the removal of existing vegetation. A combination of methods can be utilised to reduce fuel load such as raking, weed removal, pruning, mulching and/or the removal of plant material.

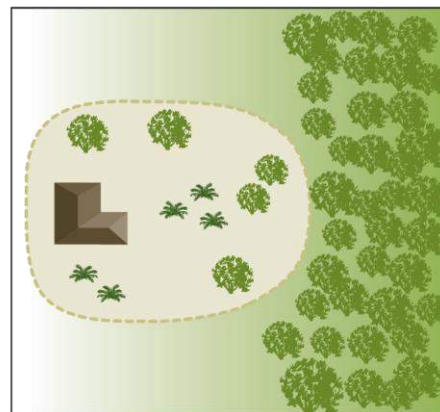
A simple method to estimate fuel load is to roughly equate one tonne of fuel load per hectare as 100 grams per square metre. For example, two tonnes per hectare of leaf litter is roughly 200 grams of leaf litter per square metre and eight tonnes per hectare is roughly 800 grams. Eucalyptus leaf litter is approximately 100 grams per handful, so two handfuls of litter per square metre will roughly equate to two tonnes per hectare. Different types of fine fuel, like mulch or pine needles may be more or less than a handful, however the 100 grams per square metre rule of thumb can still be used.

The landowner or proponent is responsible for maintaining an APZ in accordance with Schedule 1 - Standards for Asset Protection Zones. Ongoing maintenance of an APZ is usually enforced through the local government firebreak notice issued under section 33 of the *Bushfires Act 1954*, and/or through a condition of a development approval, which requires the implementation of measures identified within a BMP.

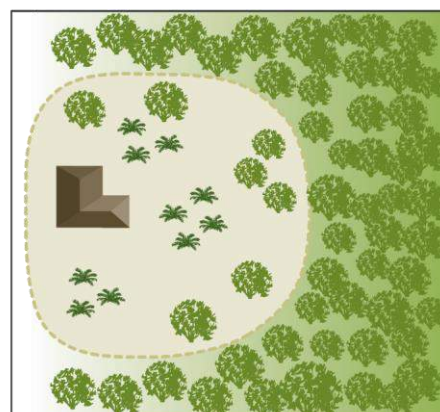
A copy of the firebreak notice and Schedule 1 should be included in a BMP specifically as a how-to guide for the landowner, and to demonstrate to decision-makers that the measures outlined in the BMP to achieve the appropriate BAL rating through provision and ongoing management of an APZ, can be implemented.

Regardless of whether an Asset Protection Zone exists in accordance with the acceptable solutions and is appropriately maintained, it should be noted that fire fighters are not obliged to protect an asset if they think the separation distance between the dwelling and vegetation is unsafe.

Hazard on one side



Hazard on three sides



Legend

-  APZ
-  trees
-  shrubs

(Source: Guidelines for Planning in Bushfire Prone Areas 2021, Appendix 4)

E2 Landscaping and design of an asset protection zone

Landscaping, design, and maintenance of an APZ in a bushfire prone area can significantly improve the bushfire resilience of a building. An APZ should not be seen as an area entirely cleared of vegetation, but as a strategically designed space that gives holistic consideration to how existing or proposed vegetation or non-combustible features interact with or affect the building's bushfire resilience.

A well designed APZ provides a greater level of vegetation management within the first few metres of a building with, for example, less vegetation or inclusion of non-combustible materials. The vegetation within the remainder of an APZ can increase further away from the building with carefully considered plant selection and landscaping techniques.

Strategic landscaping measures can be applied, such as replacing weeds with low flammability vegetation (refer to E2 Plant Flammability) to create horizontal and vertical separations between the retained vegetation. The accumulation of fine fuel load from different plants is an important consideration for ongoing maintenance in accordance with Schedule 1. For example, when planting ground covers under deciduous trees within an APZ, the total fine fuel load prescribed in Schedule 1 will include any dead plant material from ground covers and leaf litter from the trees.

Plant density and final structure and form of mature vegetation should be considered in the initial landscaping stages. For example, clumps of sapling shrubs planted at a density without consideration of future growth, may increase the bushfire risk as a clump will quickly grow to exceed 5m². It should be noted that in some cases, a single shrub in a mature state may be so dense as to fill a 5m² clump alone.

The location of plants within an APZ is a key design technique. Separation of garden beds with areas of low fuel or non-combustible material, will break up fuel continuity and reduce the likelihood of a bushfire running through an APZ and

subjecting a dwelling to radiant heat or direct flame contact. It is important to note, where mature trees are separated from a building by six metres, but the canopy has grown to extend or overhang a building, maintenance and pruning to remove the overhanging branches should be undertaken without the entirety of the tree being removed.

Mulches used within the APZ should be non-combustible. The use of stone, gravel, rock and crushed mineral earth is encouraged. Wood mulch >6mm in thickness may be used, however it is recommended that it is used in garden beds or areas where the moisture level is higher by regular irrigation. These materials could be sourced from non-toxic construction and demolition waste giving the added benefit of reducing the environmental impact of any 'hard landscaping' actions.

Combustible objects, plants, garden supplies such as mulches, fences made from combustible material, should be avoided within 10 metres of a building. Vines or climbing plants on pergolas, posts or beams, should be located away from vulnerable parts of the building, such as windows and doors. Non-flammable features can be used to provide hazard separation from classified vegetation, such as tennis courts, pools, lawns and driveways or paths that use inorganic mulches (gravel or crushed rock). Consider locating firewood stacks away from trees and habitable buildings.

Incorporation of landscaping features, such as masonry feature walls can provide habitable buildings with barriers to wind, radiant heat and embers. These features can include noise walls or wind breaks. Use of Appendix F of AS 3959 for bushfire resistant timber selection within areas of 29kW/m² (BAL-29) or below, or the use of non-combustible fencing materials such as iron, brick, limestone, metal post and wire is encouraged.

In addition to regular maintenance of an APZ, further bushfire protection can be provided at any time by:

- ensuring gutters are free from vegetation;
- installing gutter guards or plugs;
- regular cleaning of underfloor spaces, or enclosing them to prevent gaps;
- trimming and removing dead plants or leaf litter;
- pruning climbing vegetation (such as vines) on a trellis, to ensure it does not connect to a building, particularly near windows and doors;
- removing vegetation in close proximity to a water tank to ensure it is not touching the sides of a tank; and/or
- following the requirements of the relevant local government section 33 fire break notice, which may include additional provisions such as locating wood piles more than 10 metres from a building.

Preparation of a property prior to the bushfire season and/or in anticipation of a bushfire is beneficial even if your plan is to evacuate. As embers can travel up to several kilometres from a bushfire and fall into small spaces and crevices or land against the external walls of a building, best practice recommends that objects within the APZ are moved away from the building prior to any bushfire event. Objects may include, but are not limited to:

- door mats;
- outdoor furniture;
- potted plants;
- shade sails or umbrellas;
- plastic garbage bins;
- firewood stacks;
- flammable sculptures; and/or
- playground equipment and children's toys.

E2 Plant flammability

There are certain plant characteristics that are known to influence flammability, such as moisture or oil content and the presence and type of bark. Plants with lower flammability properties may still burn during a bushfire event but may be more resistant to burning and some may regenerate faster post-bushfire.

There are many terms for plant flammability that should not be confused, including:

- Fire resistant – plant species that survive being burnt and will regrow after a bushfire and therefore may be highly flammable and inappropriate for a garden in areas of high bushfire risk.
- Fire retardant – plants that may not burn readily or may slow the passage of a bushfire.
- Fire wise – plants that have been identified and selected based on their flammability properties and linked to maintenance advice and planting location within a garden.

Although not a requirement of these Guidelines, local governments may develop their own list of fire wise or fire-retardant plant species that suit the environmental characteristics of an area. When developing a recommended plant species list, local governments should consult with ecologists, land care officers or environmental authorities to ensure the plants do not present a risk to endangered ecological communities, threatened, or endangered species or their habitat.

When selecting plants, private landholders and developers should aim for plants within the APZ that have the following characteristics:

- grow in a predicted structure, shape and height;
- are open and loose branching with leaves that are thinly spread;
- have a coarse texture and low surface-area-to-volume ratio;
- will not drop large amounts of leaves or limbs, that require regular maintenance;
- have wide, flat, and thick or succulent leaves;
- trees that have bark attached tightly to their trunk or have smooth bark;
- have low amounts of oils, waxes, and resins (which will often have a strong scent when crushed);
- do not produce or hold large amounts of fine dead material in their crowns; and/or will not become a weed in the area.

Refer to the WAPC Bushfire and Vegetation Fact Sheet for further information on clearing and vegetation management and APZ landscaping, design and plant selection reference material.

Schedule 1: Standards for APZ

Fences: 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.



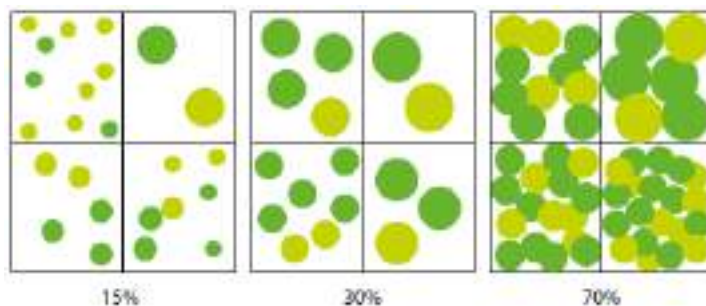
Example: Fine fuel load of 2 t/ha

(Image source: Shire of Augusta Margaret River's Firebreak and Fuel Reduction Hazard Notice)

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.

Tree canopy cover – ranging from 15 to 70 per cent at maturity



(Source: Guidelines for Planning in Bushfire Prone Areas 2021, Appendix 4)

Shrub* and Scrub* (0.5 metres to 6 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 greater than >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.

LPG 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

A1.2 Requirements Established by the Local Government – the Firebreak Notice

The relevant local government's current Firebreak Notice is available on their website, at their offices and is distributed as ratepayer's information. It must be complied with.

These requirements are established by the relevant local government's Firebreak Notice created under s33 of the Bushfires Act 1954 and issued annually (potentially with revisions). The Firebreak Notice may include additional components directed at managing fuel loads, accessibility and general property management with respect to limiting potential bushfire impact.

If Asset Protection Zone (APZ) specifications are defined in the Firebreak Notice, these may differ from the Standards established by the Guideline's, with the intent to better satisfy local conditions. When these are more stringent than those created by the Guidelines, or less stringent and endorsed by the WAPC and DFES, they must be complied with.

The APZ dimensions to be physically established and maintained, will be based on which of the following establishes the larger APZ dimension:

- The dimensions corresponding to the determined BAL of a building; or
- The APZ dimensions established by the local government's Firebreak Notice.

REQUIREMENTS RECOMMENDED BY DFES – PROPERTY PROTECTION CHECKLISTS

Further guidance regarding ongoing/lasting property protection (from potential bushfire impact) is presented in the publication 'DFES – Fire Chat – Your Bushfire Protection Toolkit'. It is available from the Department of Fire and Emergency Services (DFES) website.

REQUIREMENTS ESTABLISHED BY AS 3959:2018 – 'MINIMAL FUEL CONDITION'

This information is provided for reference purposes. It identifies what is required for an area of land to be excluded from classification as a potential bushfire threat.

"Australian Standard - AS 3959:2018 Section 2.2.3.2: Exclusions - Low threat vegetation and non-vegetated areas:

The Bushfire Attack Level shall be classified BAL-LOW where the vegetation is one or a combination of the following:

- a) Vegetation of any type that is more than 100m from the site.*
- b) Single areas of vegetation less than 1ha in area and not within 100m of other areas of vegetation being classified vegetation.*
- c) Multiple area of vegetation less than 0.25ha in area and not within 20m of the site or each other or other areas of vegetation being classified vegetation.*
- d) Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m 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**, (means insufficient fuel available to significantly increase the severity of a bushfire attack – for example, recognisable as short cropped grass to a nominal height of 100mm), 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 (single row of trees)*

Fire Compliance Notice



Burning during the prohibited and restricted burning period

This section relates specifically to fuel hazard reduction burns or running burns. Fuel hazard reduction burns or running burns are generally not permitted within the district of Mandurah. Any exemption is based on a full assessment of the hazard by a City authorised Bush Fire Control Officer in consultation with City's Chief Bush Fire Control Officer. Full demonstration of appropriate risk mitigation planning is required and a Permit to Burn must be issued by an authorised Bushfire Control Officer prior to commencing of any fuel hazard reduction or running burn.

The following sets out the Prohibited and Restricted Burning Periods as Gazetted by the Fire and Emergency Services Commissioner.

RESTRICTED PERIOD 1/4/2021 – 30/11/2021
PERMIT REQUIRED

PROHIBITED BURNING 1/12/2021 – 31/3/2022

RESTRICTED PERIOD 1/4/2022 – 30/11/2022
PERMIT REQUIRED

Burning garden refuse

In accordance with the requirements of Section 24G of the Bush Fires Act 1954 the City notifies that it prohibits the burning of garden refuse or rubbish at all times within the district of Mandurah with the following exemptions:

Land zoned rural residential under the City of Mandurah Town Planning Scheme No. 3, and on all land 4000m² and greater. A Permit to Burn is required and permits will only be issued between **1 May and 31 October** annually.

NOTE: Only those properties that are 4000m² or greater are able to obtain permits to burn, all other sized properties are unable to have a fire to burn garden waste.

Fire Compliance Notice

Preparing for fire is a shared responsibility

The City of Mandurah has a role in setting the requirements for fire preparation on properties within its boundaries.

Owners are encouraged to contact Ranger Services to discuss fire management measures in the lead up to fire season, or seek further information from the City's website.

What is required?

According to Section 33 of the Bush Fires Act 1954 you are required to carry out fire prevention work on land you own. Work must be carried out by 17 November 2021 or within 14 days of becoming the owner, and maintained until 31 May 2022.

Who can enter my property?

An appointed Bush Fire Control officer is authorised under Section 39 of the Bush Fires Act 1954 and can enter your property to inspect firebreaks and/or anything they consider to be a fire hazard.

Firebreak variations

If it is impractical to clear firebreaks or if natural features make firebreaks unnecessary, you may apply to the City by 1 November 2021 for an alternate solution.

Fire Management Plans

Where an approved Fire Management Plan relates to a property, owners are required to fully comply with the requirements of that approved plan.

It can happen to you...

All properties within Mandurah may be subject to ember attacks from nearby fires. Preparing your property can help prevent damage and loss.

If you do not meet your fire prevention responsibilities as a property owner, you could be liable for a **maximum penalty of \$5,000** plus costs. The City may access a property and undertake required work at the expense of the owner.

Property preparation requirements

Larger Blocks



Occupied or unoccupied land 4000m² and over

When the area of land is 4000m² and over, provide a trafficable mineral earth firebreak of 4m wide, with a height clearance of 4.2m:

- Inside all external boundaries on the property.
- Surrounding all outbuildings erected on the property.
- Surrounding haystacks, fuel storage or other flammable materials.
- A vertical height clearance of 4.2m must be maintained on driveway access.
- On all land 4000m² and greater a minimum 2m gap between trees shrubs and any dwelling must be maintained.
- In addition no part of any tree should overhang any dwelling.



Urban Areas



Occupied or unoccupied land less than 4000m²

- Have the entire property clear of all flammable material, this does not include green standing trees, growing bushes and plants in gardens, and/or lawns.
- Mowing, slashing, whipper snipping to a height of no more than 4cm as far as reasonably practical over the entire area of land.
- Ploughing, cultivating, scarifying or chemical spraying, followed by slashing to 4cm or other approved method by the City.
- A four metre firebreak is not acceptable.

Asset Protection Zones (APZ)

On all land 4000m² and greater a minimum 2m gap between trees, shrubs and any building, and to ensure that no trees overhang any dwelling.

An authorised Bush Fire Control Officer may issue a variation from Asset Protection Zone requirements where it is considered that adequate risk mitigation measures have been implemented, such as the reduction of fuel loads and appropriate management of understorey vegetation.

Property owners are encouraged to contact the City to discuss the installation of an APZ.

Applications can be made to the City to remove trees or vegetation in order to create an Asset Protection Zone within a tree preservation area as designated in the City's Town Planning Scheme No 3.

NOTE: Properties with dense vegetation will also need to be thinned out to reduce any significant fire risk, to the satisfaction of the City.

APPENDIX 2: TECHNICAL REQUIREMENTS FOR VEHICULAR ACCESS

Each local government may have their own standard technical requirements for emergency vehicular access, and they may vary from those stated in the Guidelines.

When required, these are stated in Section 5.1 of this bushfire management plan.

Requirements Established by the Guidelines – The Acceptable Solutions

(Source: Guidelines for Planning in Bushfire Prone Areas WAPC 2021 v1.4, Appendix 4)

VEHICULAR ACCESS TECHNICAL REQUIREMENTS - PART 1

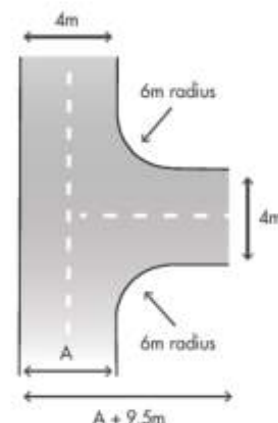
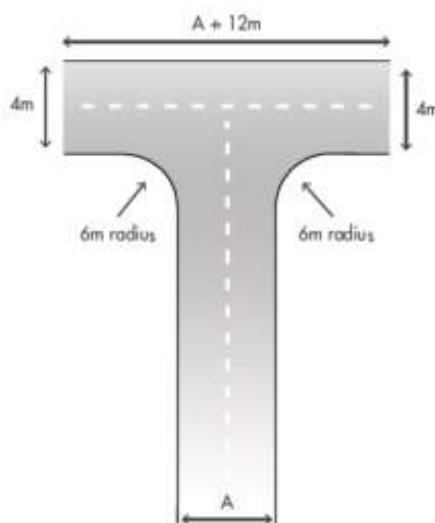
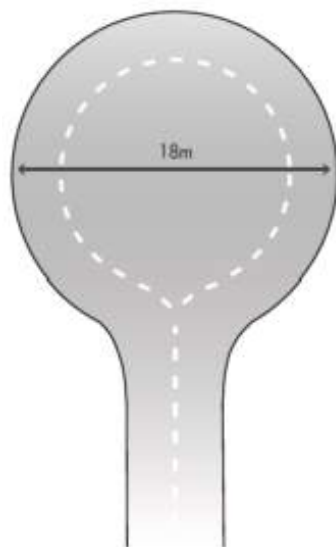
Acceptable Solution 3.6: Private Driveways

The following requirements are to be achieved:

- The design requirements set out in Part 2 of this appendix; and

Where the house site is more than 70 metres from a public road:

- Passing bays every 200 metres with a minimum length of 20 metres and a minimum width of two metres (ie combined width of the passing bay and constructed private driveway to be a minimum six metres);
- Turn-around areas every 500 metres and within 50 metres of a house, designed to accommodate type 3.4 fire appliances to turn around safely (ie kerb to kerb 17.5 metres);
- Any bridges or culverts are able to support a minimum weight capacity of 15 tonnes; and
- All weather surface (i.e. compacted gravel, limestone or sealed).



VEHICULAR ACCESS TECHNICAL REQUIREMENTS

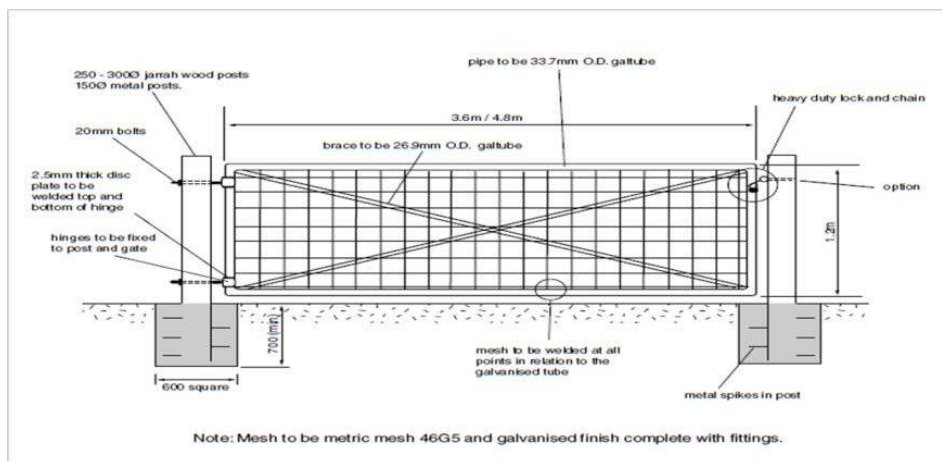
Technical Component	Vehicular Access Types			
	Public Roads	Emergency Access Way ¹	Fire Service Access Routes ¹	Battle-axe and Private Driveways ²
Minimum trafficable surface (m)	In accordance with A3.1	6	6	4
Minimum Horizontal clearance (m)	N/A	6	6	6
Minimum Vertical clearance (m)	4.5			
Minimum weight 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		
Note ¹ : To have crossfalls between 3 and 6%.				
Note 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.				
Note ³ : Dips must have no more than a 1 in 8 (12.5% -7.1 degree) entry and exit angle				

VEHICULAR ACCESS TECHNICAL REQUIREMENTS – GATES AND SIGNS EXAMPLES

Gates

Design and construction to be approved by local government.

- Minimum width 3.6m
- Emergency access way gates must not be locked.
- Fire service access route gates may be locked but only with a common key that is available to local fire service personnel.
- Bollards will be to the local government specifications



Signs

Design and construction to be approved by the local government.

- Minimum height above ground of 0.9m.
- Lettering height to be 100mm.
- To display the words (as appropriate) "Emergency Access Only" or "Fire Service Access – No Public Access".
- Size 600mm x 400mm.
- Sign colour red, base (white) area is reflective background.
- Rounded corners, radius 20mm.
- White key-line 3mm wide, 3mm from outside edge.
- Suggested mounting hole 6mm diameter.



APPENDIX 3: TECHNICAL REQUIREMENTS FOR FIREFIGHTING WATER

Reticulated Areas

[Source: Guidelines for Planning in Bushfire Prone Areas WAPC 2021 v1.4, Appendix 4, Element 4]

The Water Corporation's 'No 63 Water Reticulation Standard' is deemed to be the baseline criteria for developments and should be applied unless local water supply authority's conditions apply.

The requirement is to supply a reticulated water supply and fire hydrants, in accordance with the technical requirements of the relevant water supply authority and DFES.

Key specifications in the most recent version/revision of the design standard include:

- **Residential Standard** – hydrants are to be located so that the maximum distance between the hydrants shall be no more than 200 metres.
- **Commercial Standard** – hydrants are to be located with a maximum of 100 metre spacing in Industrial and Commercial areas.
- **Rural Residential Standard** – where minimum site areas per dwelling is 10,000 m² (1ha), hydrants are to be located with a maximum 400m spacing. If the area is further subdivided to land parcels less than 1ha, then the residential standard (200m) is to be applied.

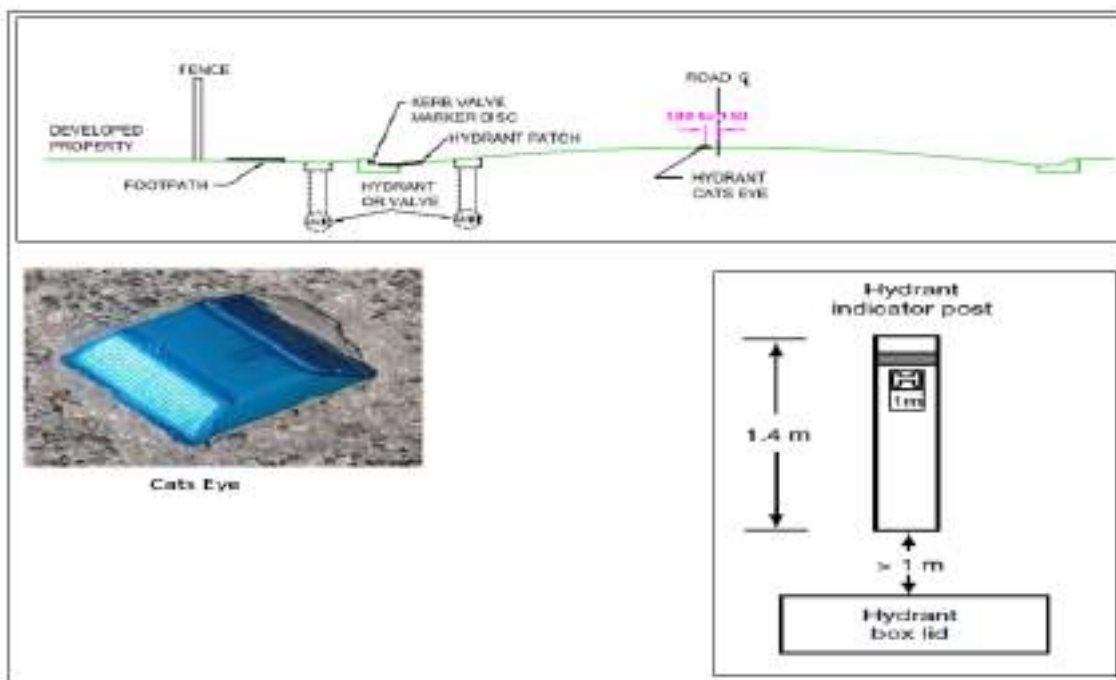


Figure A4.1: Hydrant Location and Identification Specifications