



Capricorn Village Subdivision Bushfire Management Plan

Capricorn Village Joint Venture

DOCUMENT TRACKING

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Project Manager	James Leonard
Prepared by	James Leonard
Reviewed by	Daniel Panickar (BPAD Level 2 – 37802)
Approved by	Daniel Panickar (BPAD Level 2 – 37802)
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Template 2.8.1

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1. Introduction

1.1 Proposal details

Eco Logical Australia (ELA) was commissioned by Capricorn Village Joint Venture (CVJV) to prepare a Bushfire Management Plan (BMP) to support a subdivision application being prepared for Stage 6CB, 9C, 10C, RWA and RWB of Capricorn Village Estate, Yanchep (hereafter referred to as the subject site, **Figure 1**).

The subject site is within a designated bushfire prone area as per the Western Australia State Map of Bush Fire Prone Areas (DFES 2018; **Figure 2**), which triggers bushfire planning requirements under State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7; WAPC 2015) and reporting to accompany submission of the subdivision application in accordance with the associated Guidelines for Planning in Bushfire Prone Areas v 1.3 (the Guidelines; WAPC 2017).

This assessment has been prepared by ELA Bushfire Consultant James Leonard with quality assurance undertaken by Senior Bushfire Consultant, Daniel Panickar (FPAA BPAD Level 2 Certified Practitioner No. BPAD37802-L2).

1.2 Purpose and application of the plan

The primary purpose of this BMP is to act as a technical supporting document to inform planning assessment. This BMP is also designed to provide guidance on how to plan for and manage the bushfire risk to the subject site through implementation of a range of bushfire management measures in accordance with the Guidelines.

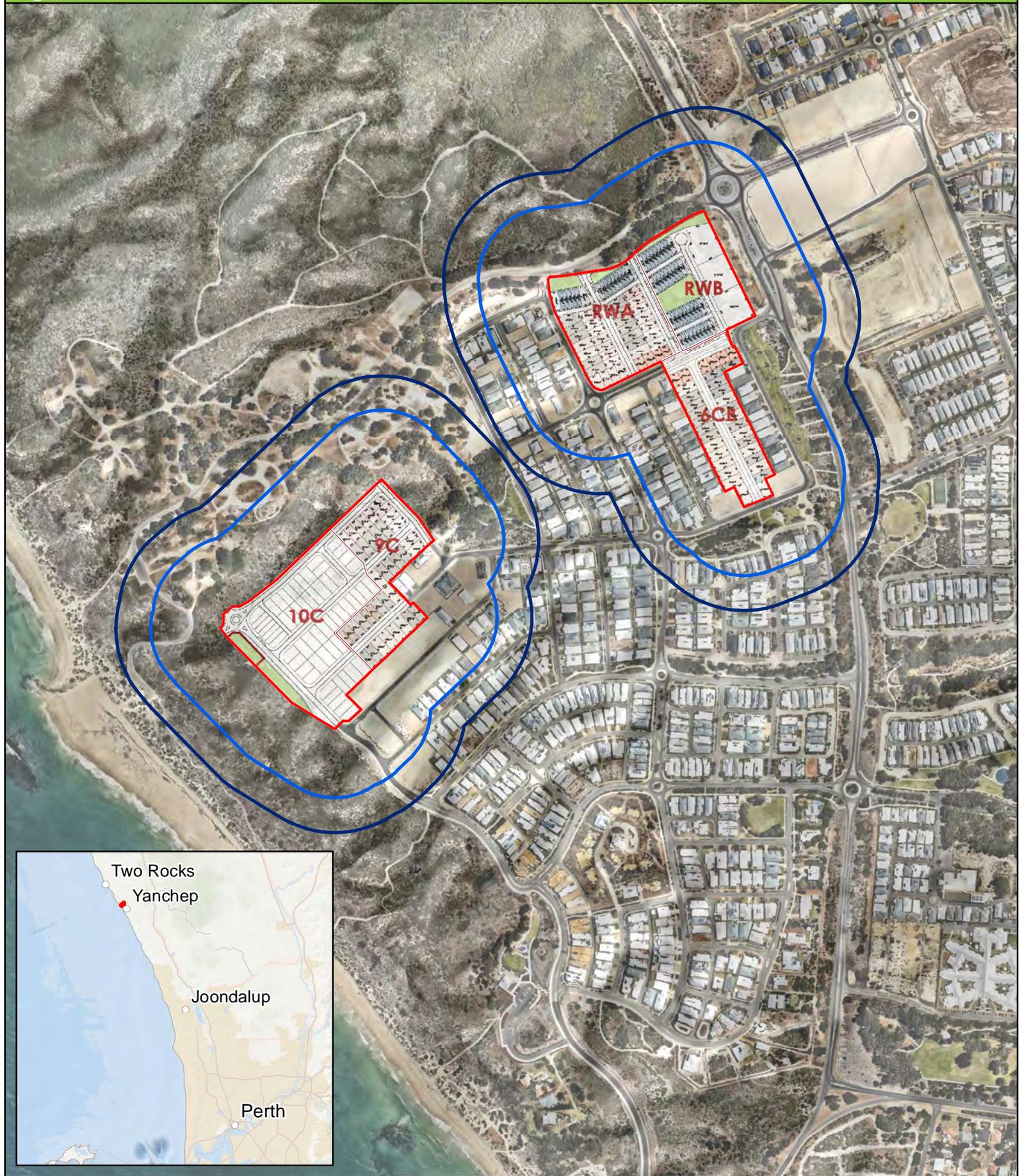
1.3 Environmental considerations

Some 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.

The subject site will be cleared of native vegetation for the development of the site. There is no requirement for any environmental approvals for the development to proceed.

No revegetation is proposed within the development, however if this changes, it will be addressed in future BMPs. The proposed Public Open Space will be landscaped with native low fuel species in accordance with bushfire planning requirements.

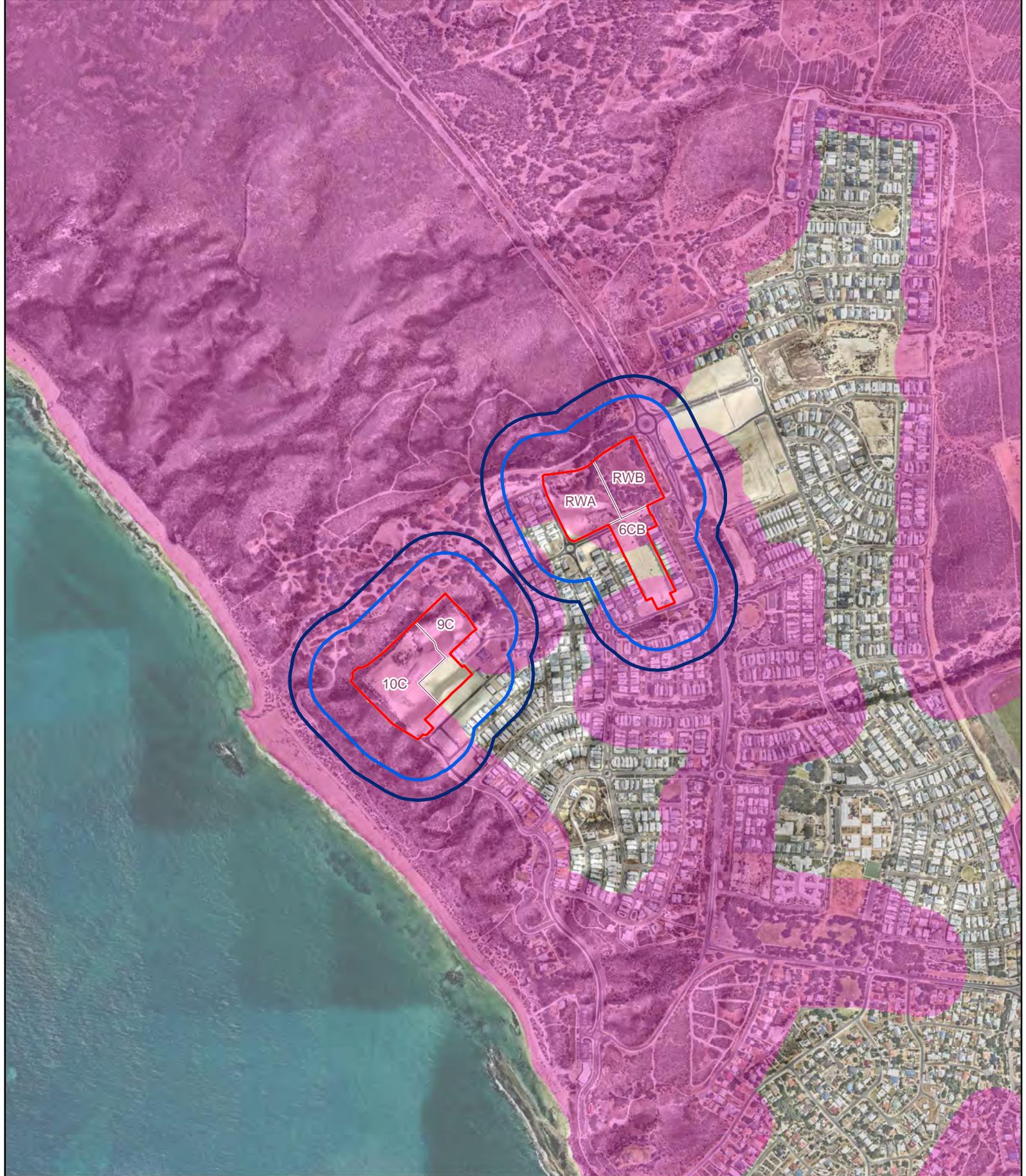
Figure 1: Site Overview



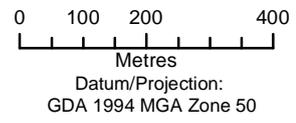
- Legend**
- Subject site
 - Stage boundary
 - 100m site assessment
 - 150m site assessment

0 55 110 220
Metres
Datum/Projection:
GDA 1994 MGA Zone 50

Figure 2: Bushfire Prone Areas



- Legend**
- Subject site
 - Stage boundary
 - 100m site assessment
 - 150m site assessment
 - Bushfire Prone Mapping (DFES 2018)



Datum/Projection:
GDA 1994 MGA Zone 50



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Prepared by: SM Date: 26/02/2019

2. Bushfire assessment results

2.1 Bushfire assessment inputs

The following section is a consideration of spatial bushfire risk and has been used to inform the bushfire assessment in this report.

2.1.1 General

The subject site is located in the City of Wanneroo. Stages 9C and 10C are bound by residential development to the east and south and native vegetation to the north and west (**Figure 1**). Stages 6CB, RWA and RWB are bound by residential development to the east, south and west and native vegetation to the north (**Figure 1**). Two Rocks Rd runs north-south next to Stages 6C and RWB. An access road, to the north of the subject site, runs east-west from Two Rocks Rd to the beach.

Visual assessment of the surrounding vegetation within the assessment area did not identify any recent fire scars and fire history was not able to be determined. Accumulation of vegetative matter over time, combined with the moderate to high risk of ignition associated with high levels of public access and proximity to urban areas would potentially facilitate a bushfire occurrence in this area.

2.1.2 Fire Danger Index

A blanket rating of FDI 80 is adopted for Western Australian environments, as outlined in AS 3959–2009 and endorsed by Australasian Fire and Emergency Service Authorities Council (AFAC).

2.1.3 Vegetation classification

Vegetation within the subject site and surrounding 150 m (the assessment area) was assessed in accordance with the Guidelines and *AS 3959-2009 Construction of Buildings in Bushfire Prone Areas* (SA 2009) with regard given to the Visual guide for bushfire risk assessment in Western Australia (DoP 2016). The site inspection was undertaken on 18 January 2019.

The following vegetation classes and exclusions were identified within the assessment area as depicted in **Figure 3** and listed below. Photographs relating to each vegetation type are included in **Appendix A**.

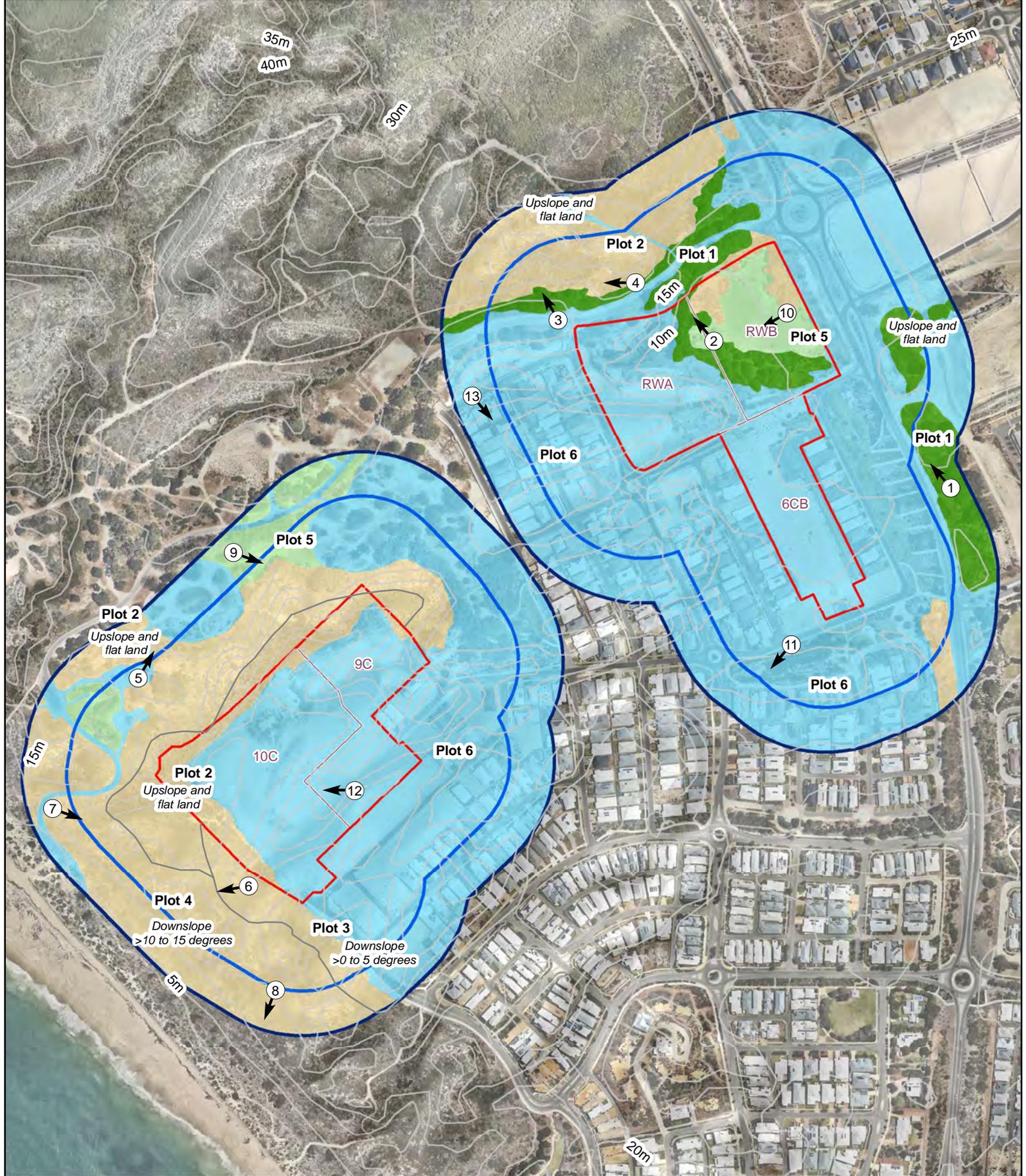
- Class B Woodland;
- Class C shrubland;
- Class G Grassland; and
- Exclusions as per clause 2.2.3.2 (e) and (f) (i.e. non-vegetated areas and low-threat vegetation).

2.1.4 Topography and slope under vegetation

Effective slope under vegetation was assessed for a distance of 150 m from the subject site in accordance with the Guidelines and AS 3959-2009 and is depicted in **Figure 3**. Slope under classified vegetation was assessed as upslope / flat within the subject site and surrounding Stages 6CB, RWA and RWB.

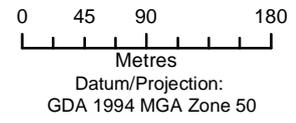
Slope under the vegetation to the west of Stages 10C was classified as downslope >0 to 5 degrees immediately to the west increasing to >10 to 15 degrees further towards the ocean. Slope under the vegetation to the north of Stages 9C and 10C was classified as upslope/ flat land immediately to the north, increasing to >0 to 5 degrees further north.

Figure 3: Vegetation Classification



- Legend**
- Subject site
 - Stage boundary
 - 100m site assessment
 - 150m site assessment
 - Contour (5m)
 - Photo location

- Vegetation classification**
- Class B woodland
 - Class C shrubland
 - Class G grassland
 - Excluded as per clause 2.2.3.2 (e) and (f)



2.2 Bushfire assessment outputs

A Bushfire Attack Level (BAL) assessment has been undertaken in accordance with SPP 3.7, the Guidelines, AS 3959-2009 and the bushfire assessment inputs in Section 2.1.

2.2.1 BAL assessment

All land located within 100 m of the classified vegetation depicted in **Figure 3** considered bushfire prone and is subject to a BAL assessment in accordance with AS 3959 2009.

A Method 1 BAL assessment (as outlined in AS 3959 2009) has been completed for the proposed development and incorporates the following factors:

- State adopted Fire Danger Index (FDI) rating;
- Vegetation class;
- Slope under classified vegetation; and
- Distance between proposed development area and the classified vegetation.

Based on the identified BAL, construction requirements for proposed buildings can then be assigned. The BAL rating gives an indication of the expected level of bushfire attack (i.e. radiant heat flux, flame contact and ember penetration) that may be received by proposed buildings and subsequently informs the standard of construction required to increase building survivability.

2.2.2 Method 1 BAL assessment

Table 1 and **Figure 4** display the Method 1 BAL assessment (in the form of BAL contours) that has been completed for the proposed development in accordance with AS 3959-2009 methodology.

Table 1: Method BAL Calculation (BAL contours)

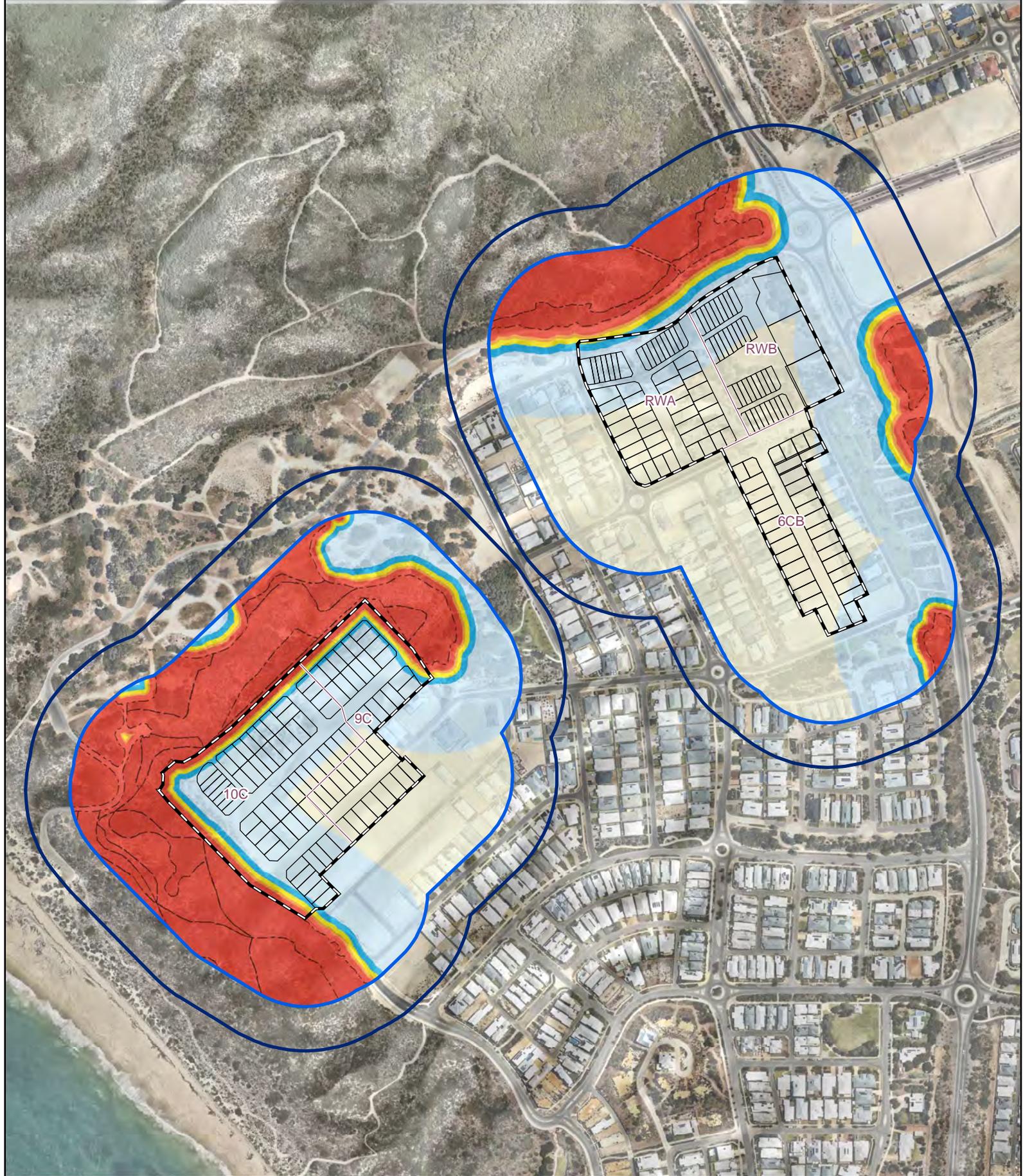
Plot and vegetation classification	Effective slope	Hazard separation distance	BAL rating	Comment
Plot 1 Class B Woodland	Upslope Flat	0-<10	BAL-FZ	No development proposed in this area
		10-<14	BAL-40	No development proposed in this area
		14-<20	BAL-29	No development proposed in this area
		20-<29	BAL-19	Development proposed in this area
		29-<100	BAL-12.5	Development proposed in this area
Plot 2 Class C shrubland	Upslope/flat	0-<7	BAL-FZ	No development proposed in this area
		7-<9	BAL-40	No development proposed in this area
		9-<13	BAL-29	No development proposed in this area
		13-<19	BAL-19	Development proposed in this area
		19-<100	BAL-12.5	Development proposed in this area
Plot 3 Class C shrubland	Downslope >0 to 5 degrees	0-<7	BAL-FZ	No development proposed in this area
		7-<10	BAL-40	No development proposed in this area
		10-<15	BAL-29	No development proposed in this area
		15-<22	BAL-19	Development proposed in this area
		22-<100	BAL-12.5	Development proposed in this area
Plot 4 Class C shrubland	Downslope >10 to 15 degrees	0-<9	BAL-FZ	No development proposed in this area
		9-<13	BAL-40	No development proposed in this area
		13-<19	BAL-29	No development proposed in this area
		19-<28	BAL-19	Development proposed in this area
		28-<100	BAL-12.5	Development proposed in this area
Plot 5 Class G Grassland	Upslope/flat	0-<6	BAL-FZ	No development proposed in this area
		6-<8	BAL-40	No development proposed in this area
		8-<12	BAL-29	No development proposed in this area
		12-<17	BAL-19	Development proposed in this area
		17-<50	BAL-12.5	Development proposed in this area
Plot 6				
Excluded as per clause 2.2.3.2 (e) and (f) of AS3959- 2009		N/A		

2.3 Identification of issues arising from the BAL assessment

All proposed lots are located in areas subject to a BAL rating of BAL-19 or lower, post clearing and development, however vegetation clearing and management works will be undertaken as part of the subdivision to reduce the BAL ratings for Stages 9C and 10C to \leq BAL-12.5 (**Figure 5**). Managing this vegetation to Asset Protection Zone standards, as outlined in **Appendix B**, will be undertaken by the developer until these areas are replaced by residential dwellings and associated infrastructure.

Should there be any changes in development design or vegetation/hazard extent that requires a modified bushfire management response, then the above BAL ratings will need to be reassessed for the affected areas and documented in a brief addendum to this BMP.

Figure 4: Bushfire Attack Level (BAL) Contours – Post Development



- Legend**
- Subject site
 - Stage boundary
 - Lot boundary
 - 100m site assessment
 - 150m site assessment
 - Bushfire hazard interface

Bushfire attack level (BAL)

	BAL - FZ
	BAL - 40
	BAL - 29
	BAL - 19
	BAL - 12.5
	BAL - LOW

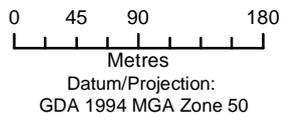
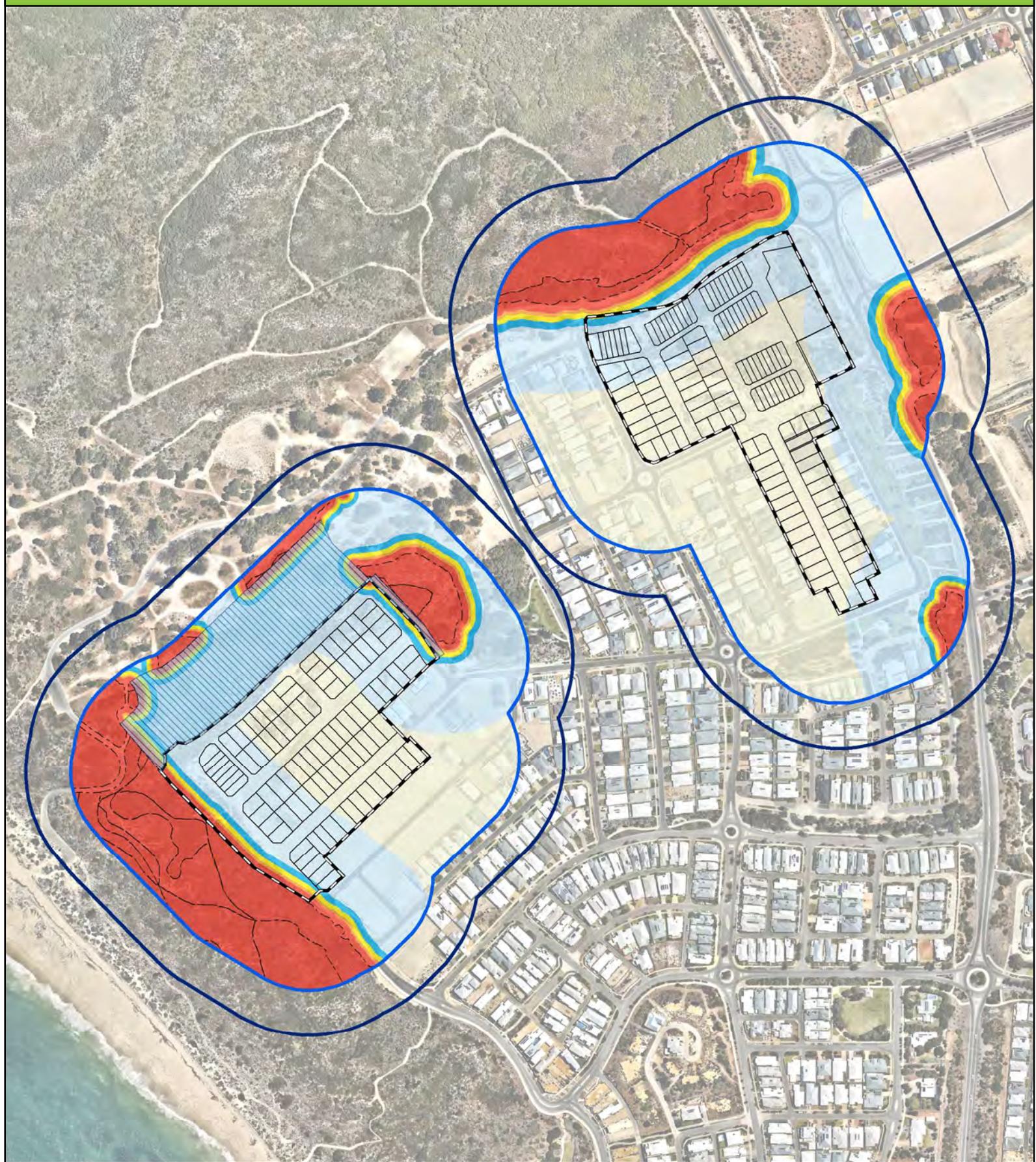
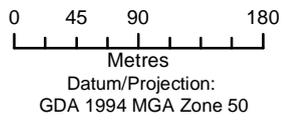


Figure 5: Bushfire Attack Level (BAL) Contours – Post Development and post-establishment of Asset Protection Zone



- Legend**
- Subject site
 - Stage boundary
 - Lot boundary
 - 100m site assessment
 - 150m site assessment
 - Bushfire hazard interface
 - Low threat vegetation managed to Asset Protection Zone (APZ) standard

- Bushfire attack level (BAL)**
- BAL - FZ
 - BAL - 40
 - BAL - 29
 - BAL - 19
 - BAL - 12.5
 - BAL - LOW



3. Assessment against the Bushfire Protection Criteria

3.1 Compliance

The proposed subdivision is required to comply with policy measures 6.2 and 6.4 of SPP 3.7 and the Guidelines. Implementation of this BMP is expected to meet objectives 5.1 5.4 of SPP 3.7.

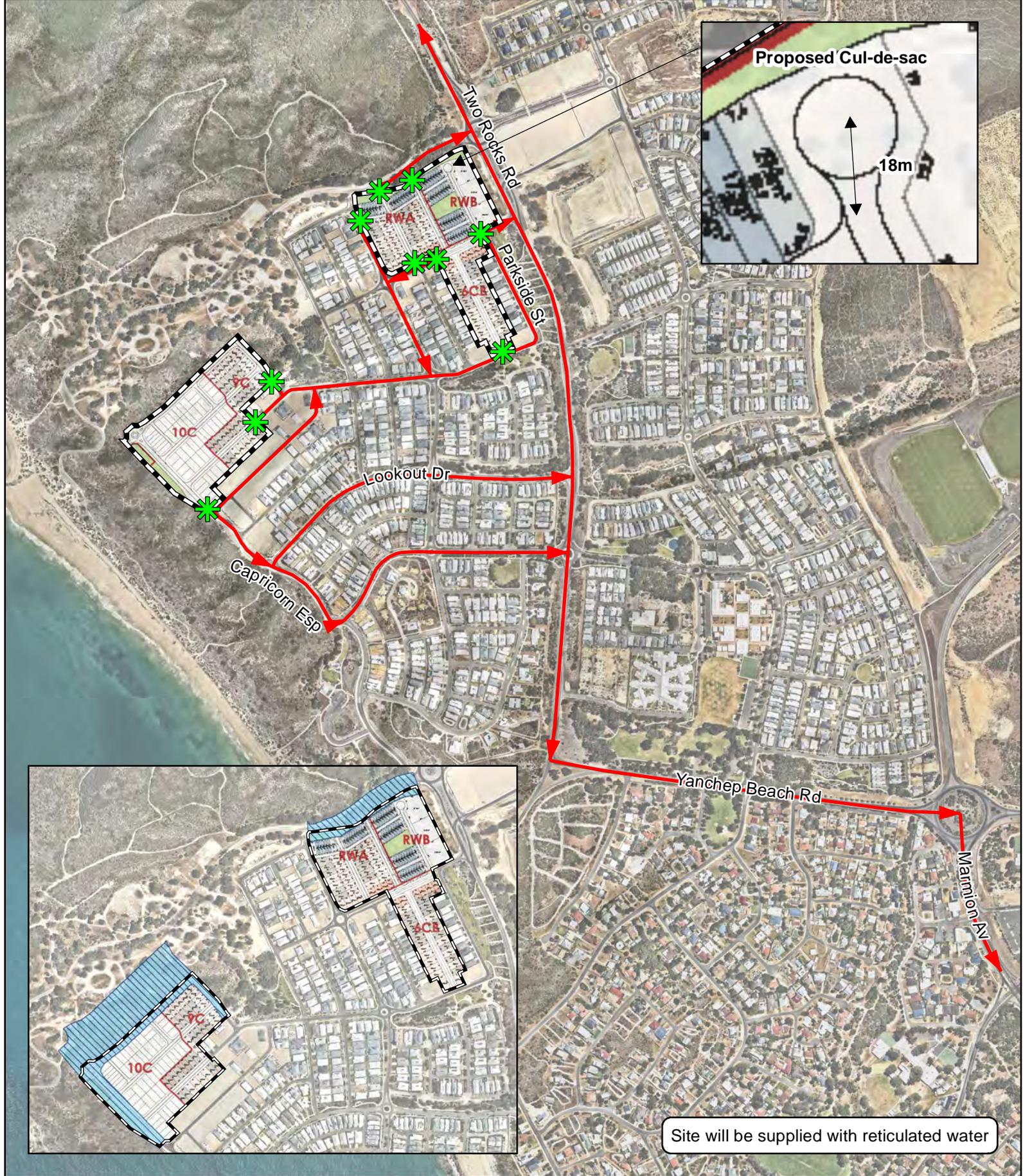
In response to the above requirements of SPP 3.7 and the Guidelines, bushfire management measures, as outlined, have been devised for the proposed development in accordance with Guideline acceptable solutions to meet compliance with bushfire protection criteria.

Table 2: Summary of solutions used to achieve bushfire performance criteria

Bushfire Performance Criteria	AS	PS	N/A	Comment
Element 1: Location A1.1 Development location	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	On development, all proposed lots are will be located in areas subject to BAL ratings of BAL-19 or lower. The proposed development is considered to be compliant with A1.1.
Element 2: Siting and design of development A2.1 Asset Protection Zone (APZ)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	APZs can be maintained between all proposed dwellings and classified vegetation in the form of roads and other non-vegetated and landscaped areas (refer to Figure 6) All APZ's will be managed in accordance with the requirements of 'Standards for Asset Protection Zones' (WAPC 2017; Appendix B) The proposed development is considered to be compliant with A2.1.
Element 3: Vehicular access A3.1 Two access routes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ten access routes to/from the subject site are available (Figure 6). Each Stage of development has two or more access points. All roads will comply with requirements outlined in the Guidelines (Appendix C). The proposed development is considered to be compliant with A3.1.
Element 3: Vehicular access A3.2 Public road	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All public roads will comply with vehicular access requirements (Appendix C).
Element 3: Vehicular access A3.3 Cul-de-sac	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The cul-de-sac in Stage RWB provides turn-around areas for conventional two-wheel drive vehicles and 3.4 fire appliances (as per Figure 22 in the Guidelines). The diameter of the cul-de-sac is 18 m across and is approximately 18 m long. The proposed development is considered to be compliant with A3.3.
Element 3: Vehicular access A3.4 Battle-axe	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No battle axe lots are proposed.
Element 3: Vehicular access A3.5 Private Driveway longer than 50 m	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No private driveways longer than 50 m are proposed.

Bushfire Performance Criteria	AS	PS	N/A	Comment
Element 3: Vehicular access A3.6 Emergency Access way	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No emergency access way is required.
Element 3: Vehicular access A3.7 Fire-service access routes	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No fire service access routes are required or proposed.
Element 3: Vehicular access A3.8 Firebreak width	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None of the proposed lots are greater than 0.4 hectares and therefore firebreaks are not required (CoW 2019).
Element 4: Water A4.1 Reticulated areas	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The subject site has a reticulated water supply that will be extended to all proposed lots. The proposed development is considered to be compliant with A4.1. A4.2 and A4.3 are not applicable to this proposed development. .

Figure 6: Spatial representation of the bushfire management strategies



- Legend**
- Access point
 - Subject site
 - Indicative Asset Protection Zone (APZ)
 - Access / egress route

0 75 150 300
Metres
Datum/Projection:
GDA 1994 MGA Zone 50

4. Implementation and enforcement

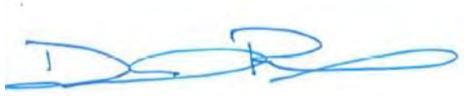
Implementation of the BMP applies to CVJV and the City of Wanneroo to ensure bushfire management measures are adopted and implemented on an ongoing basis. A summary of the bushfire management measures described in **Section 3**, as well as a works program, is provided in **Table 3**. These measures will be implemented to ensure the ongoing protection of life and property assets is achieved. Timing and responsibilities are also defined to assist with implementation of each measure.

Table 3: Proposed work program

No	Bushfire management measure	Responsibility
Prior to issue of Titles		
1	Clear and maintain APZs depicted in Figure 5	Capricorn Village Joint Venture
2	Place Section 70A on title of all Lots within Bushfire Prone Areas	Capricorn Village Joint Venture
Prior to sale or occupancy		
3	Maintenance of vegetation to APZ standard	Capricorn Village Joint Venture. until development completion
4	Implementation of increased building construction standards	Builders
5	Provision of reticulated water supply	Capricorn Village Joint Venture. construction contractor
6	Compliance with current fire control order	Capricorn Village Joint Venture. until development completion
Ongoing management		
7	Maintenance of vegetation to APZ standard	Individual landowners (within property) City of Wanneroo (within public reserves)
8	Compliance with fire break order	Individual landowners (within property) City of Wanneroo (within public reserves)

Conclusion

In the author's professional opinion, the bushfire protection requirements listed in this assessment provide an adequate standard of bushfire protection for the proposed development. As such, the proposed development is consistent with the aim and objectives of SPP 3.7 and associated guidelines and is recommended for approval.



Daniel Panickar

Senior Bushfire Consultant

FPAA BPAD Certified Practitioner

No. BPAD37802-L2



5. References

City of Wanneroo (CoW). 2019. *Fire Breaks / Fuel Hazard Reduction / Fire Break Examples*. Available from: http://www.wanneroo.wa.gov.au/info/20035/community_health_and_safety/195/firebreaks

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Western Australian Planning Commission (WAPC). 2017. *Guidelines for Planning in Bushfire Prone Areas Version 1.3 (including appendices)*. WAPC, Perth.

Appendix A - Plates

Plot	Photo ID	Photo and vegetation classification
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1 1



Class B woodland – upslope/ flatland

1 2



Class B woodland (background) – upslope/ flatland

Plot Photo ID Photo and vegetation classification

1 3



Class B woodland – upslope/ flatland

2 4



Class C shrubland – upslope/ flatland

Plot Photo ID Photo and vegetation classification

2 5



Class C shrubland (Background) – upslope/ flatland

3 6



Class C shrubland – Downslope >0 to 5 degrees

Plot Photo ID Photo and vegetation classification

4 7



Class C shrubland (background) – Downslope >10 to 15 degrees

4 8



Class C shrubland – Downslope >10 to 15 degrees

Plot Photo ID Photo and vegetation classification

5 9



Class G grassland – upslope/ flatland

5 10



Class G grassland (foreground) – upslope/ flatland

Plot Photo ID Photo and vegetation classification

4 11



Excluded under 2.2.3.2 (e) and (f) – this is an area of low threat managed vegetation with reticulation

4 12



Excluded under 2.2.3.2 (e) and (f)

Plot Photo ID Photo and vegetation classification

4 13



Excluded under 2.2.3.2 (e) and (f)

Appendix B – Standards for Asset Protection Zones

The following standards have been extracted from the *Guidelines for Planning in Bushfire Prone Areas v 1.2* (WAPC 2017).

Every habitable building is to be surrounded by, and every proposed lot can achieve, an APZ depicted on submitted plans, which meets the following requirements:

a. Width: Measured from any external wall or supporting post or column of the proposed building, and of sufficient size to ensure the potential radiant heat impact of a fire does not exceed 29kW/m^2 (BAL 29) in all circumstances.

b. Location: the APZ should be contained solely within the boundaries of the lot on which a 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 (see explanatory notes).

c. Management: the APZ is managed in accordance with the requirements of ‘Standards for Asset Protection Zones’ (below):

- Fences: within the APZ are constructed from non-combustible materials (e.g. iron, brick, limestone, metal post and wire). It is recommended that solid or slatted non-combustible perimeter fences are used
- Objects: within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e. windows and doors
- Fine Fuel load: combustible dead vegetation matter less than 6 millimetres in thickness reduced to and maintained at an average of two tonnes per hectare
- Trees (> 5 metres in height): trunks at maturity should be a minimum distance of 6 metres from all elevations of the building, branches at maturity should not touch or overhang the building, lower branches should be removed to a height of 2 metres above the ground and or surface vegetation, canopy cover should be less than 15% with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy (**Figure 7**).

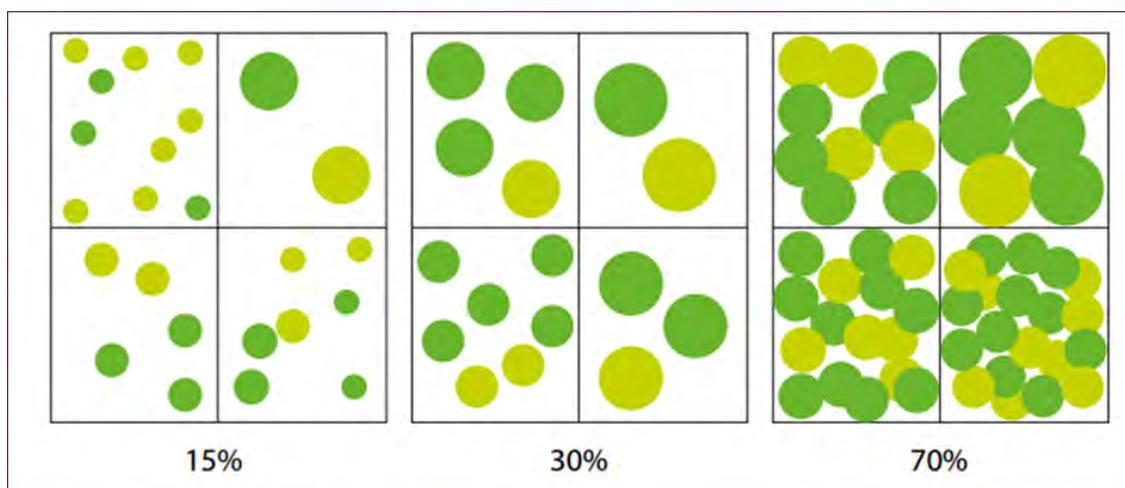


Figure 7: Illustrated tree canopy cover projection (WAPC 2017)

- **Shrubs (0.5 metres to 5 metres in height):** should not be located under trees or within 3 metres of buildings, should not be planted in clumps greater than 5m² in area, clumps of shrubs should be separated from each other and any exposed window or door by at least 10 metres. Shrubs greater than 5 metres in height are to be treated as trees
- **Ground covers (<0.5 metres in height):** can be planted under trees but must be properly maintained to remove dead plant material and any parts within 2 metres of a structure, but 3 metres from windows or doors if greater than 100 millimetres in height. Ground covers greater than 0.5 metres in height are to be treated as shrubs
- **Grass:** should be managed to maintain a height of 100 millimetres or less.

Additional notes

The Asset Protection Zone (APZ) is an area surrounding a building that is managed to reduce the bushfire hazard to an acceptable level. Hazard separation in the form of using subdivision design elements or excluded and low threat vegetation adjacent to the lot may be used to reduce the dimensions of the APZ within the lot.

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.

Appendix C - Vehicular access technical requirements (WAPC 2017)

Technical requirements	Public road	Cul-de-sac	Private driveway	Emergency access way	Fire service access route
Minimum trafficable surface (m)	6*	6	4	6*	6*
Horizontal distance (m)	6	6	6	6	6
Vertical clearance (m)	4.5	N/A	4.5	4.5	4.5
Maximum grade <50 m	1 in 10	1 in 10	1 in 10	1 in 10	1 in 10
Minimum weight capacity (t)	15	15	15	15	15
Maximum crossfall	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius	8.5	8.5	8.5	8.5	8.5
* Refer to E3.2 Public roads: Trafficable surface					

