Local Government Use:

BUSHFIRE PRONE PLANNING

# BAL Contour Assessment Report

## (AS 3959:2018 Bushfire Attack Level Methodology)

### PROPERTY LOCATION DETAILS

Lot 164 #286 Yangedi Road

Hopeland WA 6125

Shire of Serpentine Jarrahdale

### PROPOSED WORKS (BUILDING) OR USE

**Planning Stage:** Building Application (submitted through planning)

**Main BCA Class:** Class 4 **Use(s):** Aircraft Hanger/Short term accommodation

**Description:** Feasibility assessment for installation of short term accommodation in hangers.

### REPORT DETAILS

| | |
|---|---|
| **Job Reference Number:** | 210767 |
| **Report Version:** | 1.0 |
| **Assessment Date:** | 14 October 2021 |
| **Report Date:** | 2 February 2022 |

## BUSHFIRE PLANNING AND DESIGN (BPAD) ACCREDITED PRACTITIONER DETAILS

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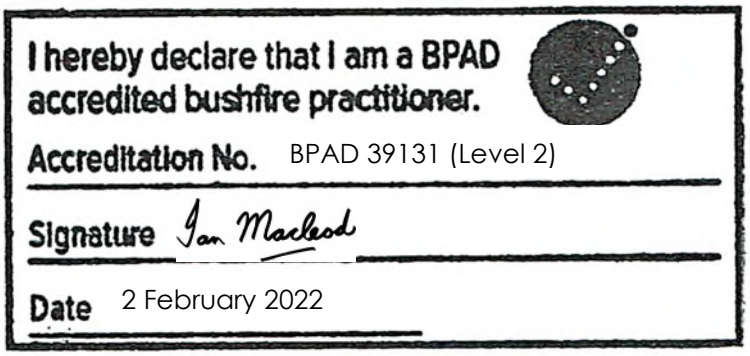



*Authorised Practitioner Stamp*

This report has been prepared by an Accredited BPAD Practitioner using the Simplified Procedure (Method 1) as detailed in Section 2 of AS 3959:2018.

Fire Protection Association Australia as the accrediting body for BPAD accreditation, makes no warranties as to the accuracy of the information provided in the report. All enquiries related to the information and conclusions presented in this report must be made to the practitioner who prepared this report.

*Reliance on the assessment and determination of the Bushfire Attack Level contained in this report should not extend beyond a period of 12 months from the date of issue of the report. If this report was issued more than 12 months ago, it is recommended that the validity of the determination be confirmed with the Accredited Practitioner and where required an updated report and/or BAL Certificate issued.*



BAL (Master) Template v12.3

## LANDOWNER RESPONSIBILITIES

**Construction Requirements:** The bushfire construction standard to be applied to the assessed building works must be that which corresponds to the determined BAL in this assessment report and are established by AS 3959:2018 or the NASH Standard (refer to additional landowner information at the end of this report).

**Comply with the Landowner Responsibilities Established by the Bushfire Management Plan (BMP):** If the property (lot) is subject to an approved BMP (refer to the land title), all responsibilities created must be complied with. This will include the management of vegetation within the lot to a minimal fuel, low threat state to create an asset protection zone (APZ). The required dimensions of the APZ are established by either those corresponding to the determined BAL established by this BAL Assessment Report or those established by the Firebreak and Fuel Load Notice, whichever is greater (refer to additional landowner information at the end of this report).

**Comply with the Local Government Firebreak & Fuel Load Notice:** The requirement exists to comply with the relevant local government's Firebreak & Fuel Load Notice created under Section 33 of the Bushfires Act 1954 and issued annually to landowners (and available on their website).

## TABLE OF CONTENTS



## LIST OF FIGURES

*Figure 1*

# Proposed Development Site Map

Lot 164 on Plan 202726
286 Yangedi Road
HOPELAND
SHIRE OF SERPENTINE JARRAHDALE

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

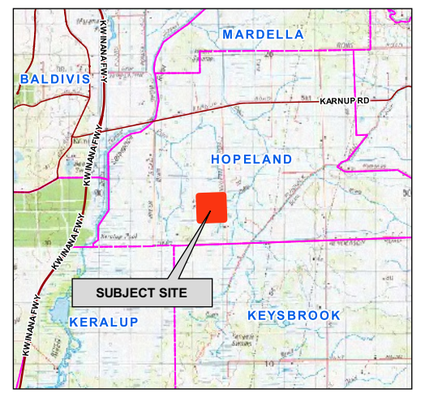
**Buildings**

- Hangar
- Proposed Extension
- Accommodation Units
- Caravan Site
- Shed
- Clubrooms
- Toilets
- Buffer Zone
- Subject Site

0 10 20 30 40 50 60 70

Metres

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




AERIAL IMAGERY: Landgate/SLIP

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Merctaor Units: Metre
Map by: Ian Macleod 01-02-2022
Scale (A3): 1 : 1200

| Vegetation Area | Vegetation Class | Vegetation Type | Effective Slope |
|---|---|---|---|
| 1 | D | Scrub | 0 |
| 2 | A | Forest | 0 |
| 3 | A | Forest | 0 |
| 4 | G | Grassland | 0 |
| 5 | B | Woodland | 0 |
| 6 | B | Woodland | 0 |
| 7 | B | Woodland | 0 |
| 8 | B | Woodland | 0 |
| 9 | Ex | Exempt | |

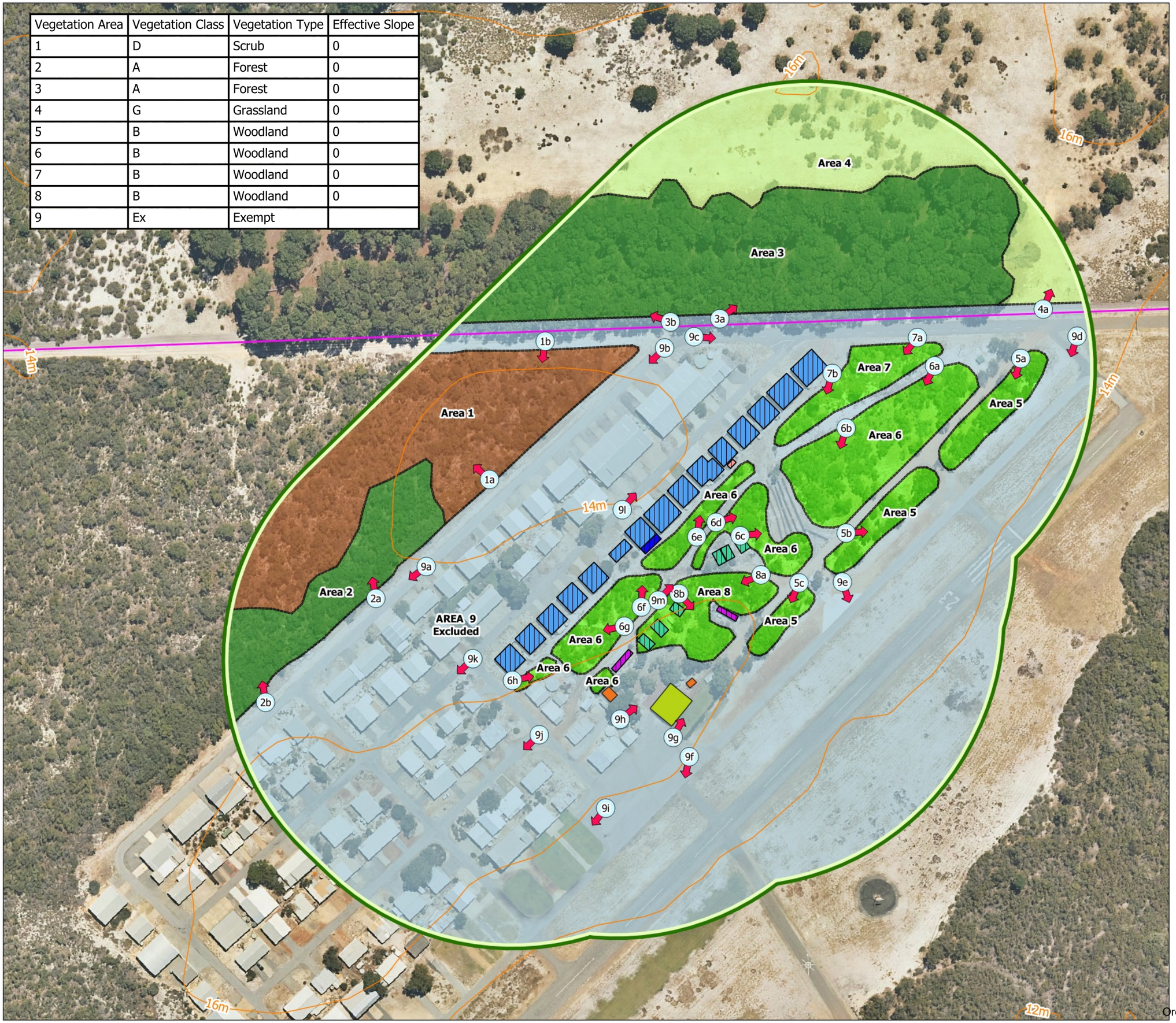



*Figure 2* 10.1.6 - Attachment 2

# Existing Topography & Classified Vegetation

Lot 164 on Plan 202726
286 Yangedi Road
HOPELAND
SHIRE OF SERPENTINE JARRAHDALE

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

- Photos
- Elevation (m)

**Buildings**

- Hangar
- Proposed Extension
- Accommodation Units
- Caravan Site
- Shed
- Clubrooms
- Toilets

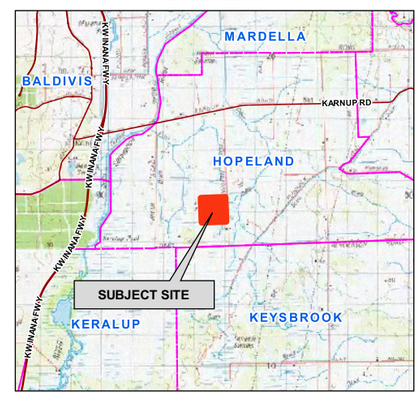
**Classified Vegetation**

- Class A - Forest
- Class B - Woodland
- Class D - Scrub
- Class G - Grassland
- Exclusion 2.2.3.2
- 150m_Assessment_Area
- Subject Site

0 20 40 60 80 100 120

Metres

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




AERIAL IMAGERY: Landgate/SLIP

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Merctaor Units: Metre
Map by: Ian Macleod 26-10-2021
Scale (A3): 1 : 2000

210767 Lot 164 (No 286) Yangedi Rd, Hopeland VEG.qgz

| VEGETATION ASSESSMENT AND CLASSIFICATION | |
|---|---|
| In accordance with AS 3959:2018 Clause 2.2.3, all vegetation within 100 metres of the site ("the part of the allotment of land on which a building stands or is to be erected") is assessed and classified, with the influence of vegetation more than 100m from the site being considered in those assessments. Classification will be guided by the Visual Guide for Bushfire Risk Assessment in WA (DoP February 2016) and any FPA Australia practice notes. | |
| **VEGETATION AREA 1** | |
| **AS 3959:2018 Vegetation Classification Applied:** | Class D Scrub |
| **Vegetation Types Present:** | Open scrub D-14 |
| **Description/Justification:** | Scrub, average height 5 metres, shrubs, heath and sedge understorey. |

| Photo ID: 1a | Photo ID: 1b |
|---|---|

| VEGETATION AREA 2 | |
|---|---|
| **AS 3959:2018 Vegetation Classification Applied:** | Class A Forest |
| **Vegetation Types Present:** | Low open forest A-04 |
| **Description/Justification:** | Banksias (8 metres tall) with thick scrub and shrubs, heath and grass understorey. |

| Photo ID: 2a | Photo ID: 2b |
|---|---|

| VEGETATION AREA 3 | |
|---|---|
| **AS 3959:2018 Vegetation Classification Applied:** | Class A Forest |
| **Vegetation Types Present:** | Open forest A-03 |
| **Description/Justification:** | Pine plantation, trees approximately 25 metres tall, plantation approximately 70 metres wide. |

Photo ID: 3a

Photo ID: 3b

| VEGETATION AREA 4 | |
|---|---|
| **AS 3959:2018 Vegetation Classification Applied:** | Class G Grassland |
| **Vegetation Types Present:** | Tussock grassland G-22 |
| **Description/Justification:** | Pen paddock areas. Grass and pigface. |

Photo ID: 4a

| VEGETATION AREA 5 | |
|---|---|
| **AS 3959:2018 Vegetation Classification Applied:** | Class B Woodland |
| **Vegetation Types Present:** | Low woodland B-07 |
| **Description/Justification:** | Banksias and occasional eucalypts, managed grass understorey. |

Photo ID: 5a

Photo ID: 5b

Photo ID: 5c

| VEGETATION AREA 6 | |
|---|---|
| **AS 3959:2018 Vegetation Classification Applied:** | Class B Woodland |
| **Vegetation Types Present:** | Low woodland B-07 |
| **Description/Justification:** | Banksias (average height 8m), scrub, grass understorey. |

Photo ID: 6a

Photo ID: 6b

Photo ID: 6c

Photo ID: 6d

Photo ID: 6e

Photo ID: 6f

| VEGETATION AREA 6 | |
|---|---|
| **AS 3959:2018 Vegetation Classification Applied:** | Class B Woodland |
| **Vegetation Types Present:** | Low woodland B-07 |
| **Description/Justification:** | Banksias (average height 8m), scrub, grass understorey. |


| Photo ID: 6g | Photo ID: 6h |
|---|---|

| VEGETATION AREA 7 | |
|---|---|
| **AS 3959:2018 Vegetation Classification Applied:** | Class B Woodland |
| **Vegetation Types Present:** | Low woodland B-07 |
| **Description/Justification:** | Banksias, occasional eucalypt, scrub, grass understorey, open in areas. |

| Photo ID: 7a | Photo ID: 7b |
|---|---|

| VEGETATION AREA 8 | |
|---|---|
| **AS 3959:2018 Vegetation Classification Applied:** | Class B Woodland |
| **Vegetation Types Present:** | Low woodland B-07 |
| **Description/Justification:** | Banksias, eucalypts, some shrubs, partly managed grass understorey. |

Photo ID: 8a

Photo ID: 8b

| VEGETATION AREA 9 | |
|---|---|
| **AS 3959:2018 Vegetation Classification Applied:** | Excluded as per Section 2.2.3.2 (f) Low Threat Vegetation |
| **Vegetation Types Present:** | Low bushfire threat vegetation |
| **Description/Justification:** | Managed grass verges along taxi ways. |

Photo ID: 9a

Photo ID: 9b

| VEGETATION AREA 9 | |
|---|---|
| **AS 3959:2018 Vegetation Classification Applied:** | Excluded as per Section 2.2.3.2 (f) Low Threat Vegetation |
| **Vegetation Types Present:** | Low bushfire threat vegetation |
| **Description/Justification:** | Photo 9c: Managed road verges.<br>Photos 9d to 9f: Managed grassed areas around aircraft runway.<br>Photos 9g and 9h: Managed lawn and grassed area around clubhouse. |

Photo ID: 9c

Photo ID: 9d


Photo ID: 9e

Photo ID: 9f

Photo ID: 9g

Photo ID: 9h

| VEGETATION AREA 9 | |
|---|---|
| **AS 3959:2018 Vegetation Classification Applied:** | Excluded as per Section 2.2.3.2 (f) Low Threat Vegetation |
| **Vegetation Types Present:** | Low bushfire threat vegetation |
| **Description/Justification:** | Photos 9i to 9l: Managed grasses along runway and taxiway verges.<br>Photo 9m: Firebreak under power lines. |

Photo ID: 9i

Photo ID: 9j

Photo ID: 9k

Photo ID: 9l

Photo ID: 9m

| RELEVANT FIRE DANGER INDEX | | | |
|---|---|---|---|
| The fire danger index (FDI) for this site has been determined in accordance with AS 3959:2018 Table 2.1 or otherwise determined in accordance with a jurisdictional variation applicable to the site.<br>The vegetation separation distances that will correspond to each Bushfire Attack Level (BAL) when Method 1 BAL determination methodology is applied, are established in Tables 2.4 to 2.7 (as associated with each FDI). | | | |
| FDI 40 (Table 2.7) ☐ | FDI 50 (Table 2.6) ☐ | FDI 80 (Table 2.5) ☒ | FDI 100 (Table 2.4) ☐ |

Table 1: 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 scrub D-14 | Class D Scrub | 0 | upslope or flat |
| 2 | Low open forest A-04 | Class A Forest | 0 | upslope or flat |
| 3 | Open forest A-03 | Class A Forest | 0 | upslope or flat |
| 4 | Tussock grassland G-22 | Class G Grassland | 0 | upslope or flat |
| 5 | Low woodland B-07 | Class B Woodland | 0 | upslope or flat |
| 6 | Low woodland B-07 | Class B Woodland | 0 | upslope or flat |
| 7 | Low woodland B-07 | Class B Woodland | 0 | upslope or flat |
| 8 | Low woodland B-07 | Class B Woodland | 0 | upslope or flat |
| 9 | Managed grass surrounding runways and taxiways, managed lawns. | Excluded as per Section 2.2.3.2 (f) Low Threat Vegetation | | N/A |
| Representative photos of each vegetation area, descriptions and classification justification, are presented on the previous pages. The areas of classified vegetation are defined, and the photo locations identified on Figure 2, the vegetation and topography map. | | | | |
| Note[1]: Described and classified as per AS 3959:2018 Table 2.3 and Figures 2.3 and 2.4 (A)-(H)<br>Note[2]: Effective slope measured as per AS 3959:2018 Section 2.2.5 and Appendix B Part B4 | | | | |

Note: All vegetation within the Buffer Zone as shown in Figure 1 is to be managed to a low bushfire threat state. No vegetation outside the Buffer Zone is to be removed without prior Shire of Serpentine Jarrahdale approval.

## 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.x).

**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.

## 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, all classified vegetation within the proposed Asset Protection Zones (APZ) are excluded and the BAL contours are constructed from any classified vegetation outside the extents of the APZs.

This approach is applied to indicate the achievable bushfire attack levels for the subject buildings once the proposed Asset Protection Zones are established. It is proposed to establish a minimum 14 metre wide APZ around the subject buildings to achieve a maximum BAL rating for these buildings of BAL-29.

The Buffer Zone, as shown in Figures 1 & 3, is to be managed to a low bushfire threat state and is included as portion of the Asset Protection Zone.

**VEGETATION SEPARATION DISTANCES APPLIED**

The distances that have been applied to illustrating the width of each BAL contour shown in Figure 3 are stated in the Table below. These correspond to each Bushfire Attack Level and are specific to the proposed development site.

Table 2: 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 D Scrub | upslope or flat | <10 | 10-<13 | 13-<19 | 19-<27 | 27-<100 | >100 |
| 2 | Class A Forest | upslope or flat | <16 | 16-<21 | 21-<31 | 31-<42 | 42-<100 | >100 |
| 3 | Class A Forest | upslope or flat | <16 | 16-<21 | 21-<31 | 31-<42 | 42-<100 | >100 |
| 4 | Class G Grassland | upslope or flat | <6 | 6-<8 | 8-<12 | 12-<17 | 17-<50 | >50 |
| 5 | Class B Woodland | upslope or flat | <10 | 10-<14 | 14-<20 | 20-<29 | 29-<100 | >100 |
| 6 | Class B Woodland | upslope or flat | <10 | 10-<14 | 14-<20 | 20-<29 | 29-<100 | >100 |
| 7 | Class B Woodland | upslope or flat | <10 | 10-<14 | 14-<20 | 20-<29 | 29-<100 | >100 |
| 8 | Class B Woodland | upslope or flat | <10 | 10-<14 | 14-<20 | 20-<29 | 29-<100 | >100 |

| Vegetation Area | Vegetation Class | Vegetation Type | Effective Slope |
|---|---|---|---|
| 1 | D | Scrub | 0 |
| 2 | A | Forest | 0 |
| 3 | A | Forest | 0 |
| 4 | G | Grassland | 0 |
| 5 | B | Woodland | 0 |
| 6 | B | Woodland | 0 |
| 8 | B | Woodland | 0 |
| 9 | Ex | Exempt | |

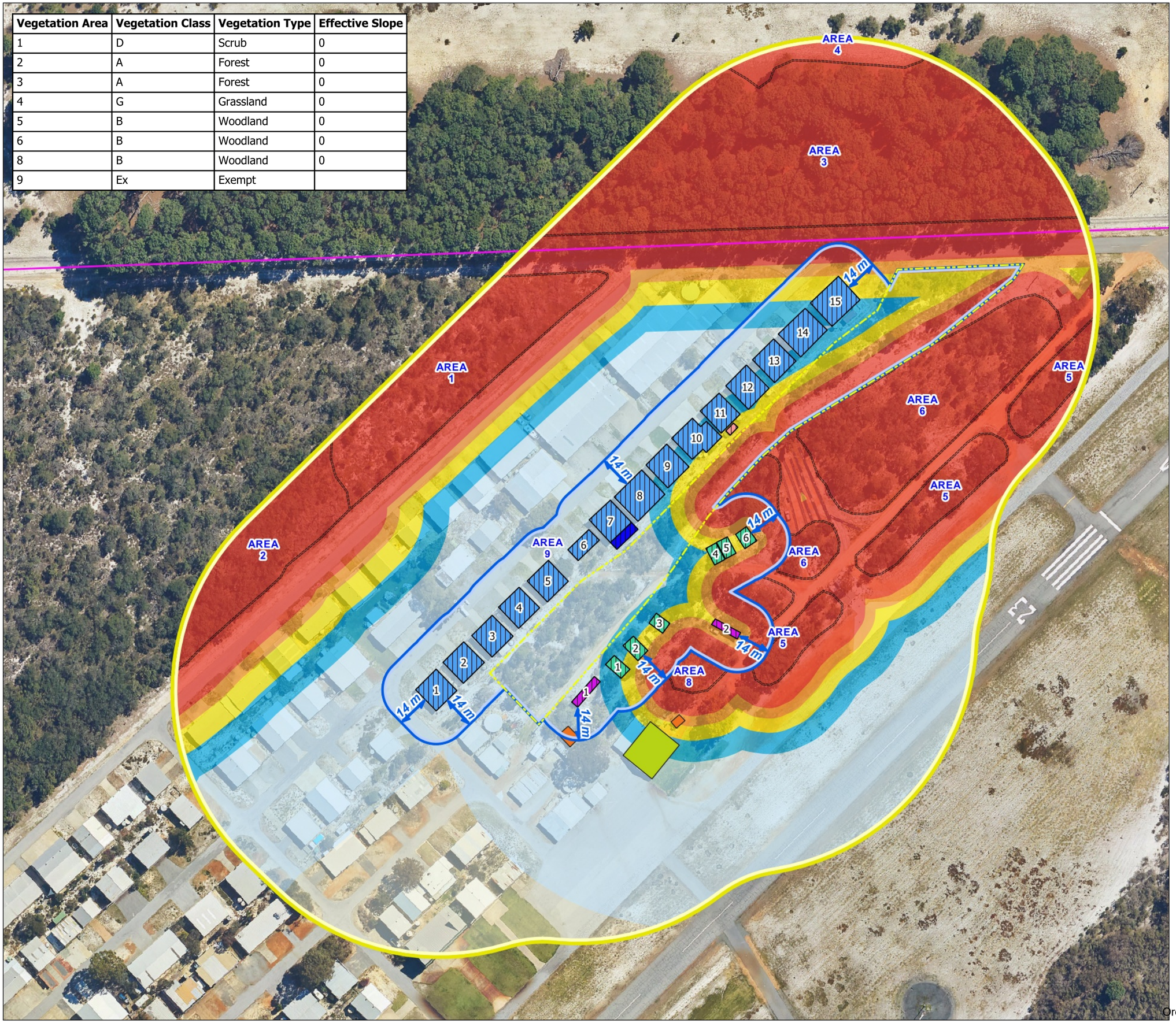



*Figure 3* 10.1.6 - Attachment 2

# Asset Protection Zones BAL Contour Map

Lot 164 on Plan 202726
286 Yangedi Road
HOPELAND
SHIRE OF SERPENTINE JARRAHDALE

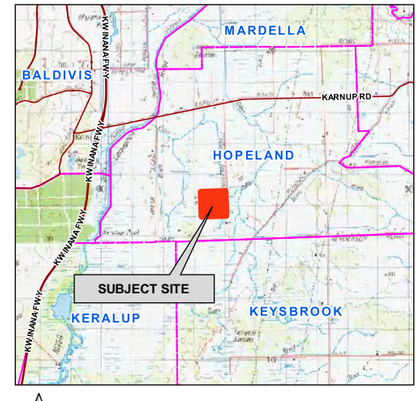
**------ LEGEND ------**

**Buildings**
- Hangar
- Proposed Extension
- Accommodation Units
- Caravan Site
- Shed
- Clubrooms
- Toilets
- Buffer Zone
- Asset Protection Zone
- APZ Distance (m)
- Subject Site
- 100m BAL Buffer
- Vegetation Outline

**Bushfire Attack Levels**
- BAL-FZ
- BAL-40
- BAL-29
- BAL-19
- BAL-12.5
- BAL-LOW

0 20 40 60 80 100
Metres

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




AERIAL IMAGERY: Landgate/SLIP

Coordinate System: GDA 1994 MGA Zone 50
Projection: Universal Transverse Merctaor Units: Metre
Map by: Ian Macleod 02-02-2022
Scale (A3): 1 : 1500

## BUSHFIRE ATTACK LEVEL RESULTS – DERIVED FROM THE BAL CONTOUR MAP

Table 3: Indicative BAL(s) for existing and proposed accommodation structures.

| BUSHFIRE ATTACK LEVEL FOR EXISTING STRUCTURES | |
|---|---|
| BAL Determination Methodology Applied[1] | Method 1 as per AS 3959:2018 s2.2.6 and Table 2.5. |
| Building/Structure Description | Indicative BAL |
| Existing Hangers (1 to 7) | BAL-12.5 |
| Existing Hangers (8, 9, 12, 13, 14) | BAL-19 |
| Existing Hangers (10, 11, 15) | BAL-29 |
| Proposed Hanger Extension | BAL-29 |
| Existing Accommodation Unit 1 | BAL-12.5 |
| Existing Accommodation Unit 2 | BAL-29 |
| Existing Caravan Sites (1 to 6) | BAL-29 |
| Existing Shed | BAL-29 |

## THE ASSET PROTECTION ZONE

To achieve a BAL rating of BAL-29 for the subject buildings, a minimum 14 metre wide Asset Protection Zone is required.

The greater portion of land within the proposed Asset Protection Zones is currently subject to some form of management and appears to be of degraded environmental value. Vegetation continuity is fractured by driveways and firebreaks leaving relatively narrow isolated strips of flora in these areas.

It is expected that APZ requirements can be met along the rear of the hangers by removal of scrub, shrubs and some smaller banksias, maintaining grasses to less than 100mm, and underpruning trees to 2 metres above ground level. Groups of smaller trees approximating the canopy cover of a mature tree of the same species can be retained.

Areas in the caravan parking site, where introduced eucalypts have adjacent or adjoining canopies may require pruning of branches or removal of some of these trees to provide canopy separation. Once again trees should be underpruned to 2 metres and grasses kept below 100mm.

Within both the APZs, any scrub or shrubs greater than 500mm in height should be removed from under trees or from within 3 metres of buildings. Any retained scrub or shrubs should not be left in clumps greater than 5m$^2$ or be within 10 metres of each other, or vulnerable portions of buildings (windows, doors). Leaf litter, including twigs and branches, should be raked and removed to maintain low fuel loads within the APZs. Clear separation should be achieved between tree canopies.

See Schedule 1: Standards for APZs in "REQUIREMENTS ESTABLISHED BY THE GUIDELINES – THE APZ" below for further information.

| ADDITIONAL LANDOWNER INFORMATION: EXPLANATION OF BUSHFIRE ATTACK LEVELS AND REFERENCES FOR CONSTRUCTION REQUIREMENTS | | | |
|---|---|---|---|
| AS 3959:2018 *Construction of buildings in bushfire prone areas,* defines a Bushfire Attack Level (BAL) as a "means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat flux expressed in kW/m$^2$, and is the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire." | | | |
| **Bushfire Attack Level** | **Explanation of BAL Levels** | **References for Construction Requirements** | |
| | | **AS 3959:2018 Construction of Buildings in Bushfire Prone Areas** | **The Nash Standard – Steel Framed Construction in Bushfire Areas** |
| | | Referenced by the Building Code of Australia for Building Classes 1, 2, 3 & 10a | Referenced by the Building Code of Australia for Building Classes 1 & 10a |
| **BAL – LOW** | There is insufficient risk to warrant specific construction requirements but there is still some risk.<br>*(Note: DFES recommend that ember attack protection features be incorporated in the design where practicable).* | Section 4.<br>No Requirements | No Requirements |
| **BAL – 12.5** | There is a risk of ember attack. Construction elements are expected to be exposed to heat flux not greater than 12.5 kW/m$^2$ | Sections 3 & 5. | All construction requirements for BAL-12.5 to BAL-40 are the same except for windows and external doors, which must comply with AS 3959.<br>The construction requirements are set out as essentially non-combustible construction systems for each of the following building elements:<br>Section 1.4: General Requirements<br>Section 2: Roof and Ceiling System<br>Section 3: External Wall System<br>Section 4: Floor System<br>Section 5: Carports Verandahs and Decks. |
| **BAL – 19** | There is a risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to radiant heat. The construction elements are expected to be exposed to a heat flux not greater than 19 kW/m$^2$. | Sections 3 & 6 | |
| **BAL – 29** | There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level radiant heat. The construction elements are expected to be exposed to a heat flux not greater than 29 kW/m$^2$. | Sections 3 & 7. | |
| **BAL – 40** | There is a much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front. The construction elements are expected to be exposed to a heat flux not greater than 40kW/m$^2$. | Sections 3 & 8. | |
| **BAL – FZ (Flame Zone)** | There is an extremely high risk of ember attack and burning debris ignited by windborne embers, and a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front. The construction elements are expected to be exposed to a heat flux greater than 40 kW/m$^2$. | Sections 3 & 9. | The construction requirements are set out in Sections 1-5 and differ from the requirements for all other BAL ratings. |

| ADDITIONAL LANDOWNER INFORMATION: MAINTAINING THE ASSET PROTECTION ZONE (APZ) |
|---|
| The determined BAL for the subject building works and/or use (or the Conditional BAL if the conditions are met and it is applied), establishes the bushfire construction requirements that will be applied to the proposed building works.<br><br>Consequently, it is important that the required minimum standards and dimensions of the APZ are maintained into the future to ensure the proposed building works remains subject to the BAL to which the building is constructed (so that it will continue to better withstand the potential bushfire impact). The minimum dimensions (vegetation separation distances) are stated below. These may differ from the distances that currently exist (i.e. existing distances may exceed the minimum required).<br><br>The minimum distances may also differ from those established by the Firebreak and Fuel Load Notice issued by the local government. Refer to the relevant information on the following pages as to the implications. |

MINIMUM VEGETATION SEPARATION DISTANCES REQUIRED TO ENSURE THE BUILDING WORKS REMAIN SUBJECT TO THE ASSESSED BAL (DETERMINED OR CONDITIONAL)

| Existing or Proposed Building (Works) as delineated on Figures 1 to 3 | Vegetation Area | Vegetation Classification | Assessed Bushfire Attack Level | Minimum Required Vegetation Separation Distance (metres) |
|---|---|---|---|---|
| Hangers<br>Proposed Extension<br>Accommodation Units<br>Caravan Sites<br>Shed | 1 | Class D Scrub | The Conditional BAL<br>BAL-29 | 13 |
| | 2 | Class A Forest | | 21 |
| | 3 | Class A Forest | | 21 |
| | 4 | Class G Grassland | | 8 |
| | 5 | Class B Woodland | | 14 |
| | 6 | Class B Woodland | | 14 |
| | 7 | Class B Woodland | | 14 |
| | 8 | Class B Woodland | | 14 |

## REQUIREMENTS ESTABLISHED BYTHE GUIDELINES – THE APZ

*(Source: Guidelines for Planning in Bushfire Prone Areas - WAPC 2017 v1.3 Appendix 4, Element 2, Schedule 1 and Explanatory Note E2.1)*

**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.]*

### Schedule 1: Standards for APZ

**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.

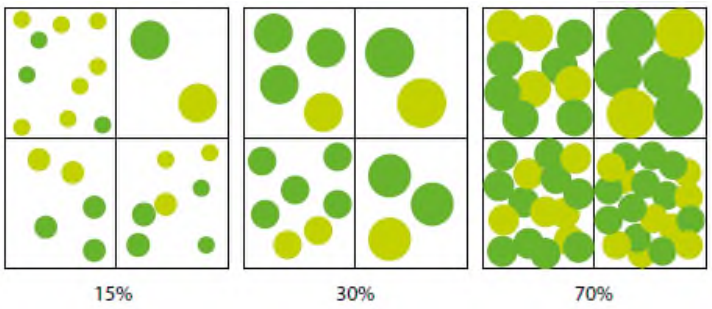
**Objects:** within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e. windows and doors.

**Fine Fuel Load:** combustible dead vegetation matter less than 6 mm in thickness reduced to and maintained at an average of two tonnes per hectare (example below).

Example: Fine fuel load of 2 t/ha
(Image source: Shire of Augusta Margaret River's Firebreak and Fuel Reduction Hazard Notice)

**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. Diagram below represents tree canopy cover at maturity.

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



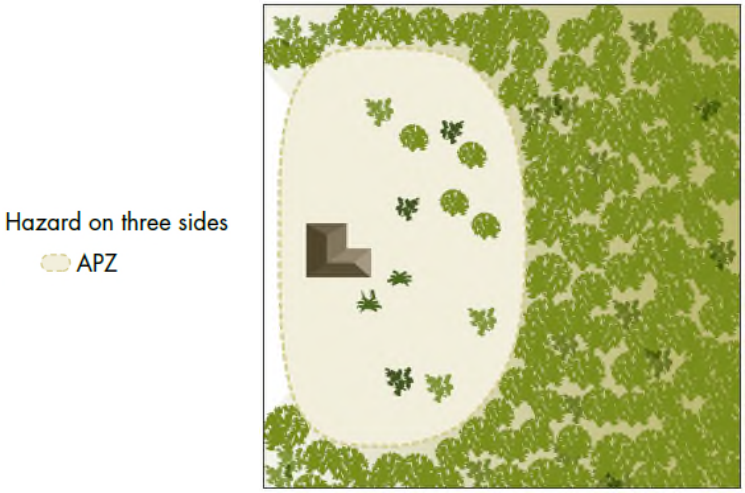

(Source: Guidelines for Planning in Bushfire Prone Areas 2017, Appendix 4)

**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 mm 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 mm or less.

The following example diagrams illustrate how the required dimensions of the APZ will be determined by the type and location of the vegetation.

## 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)."*