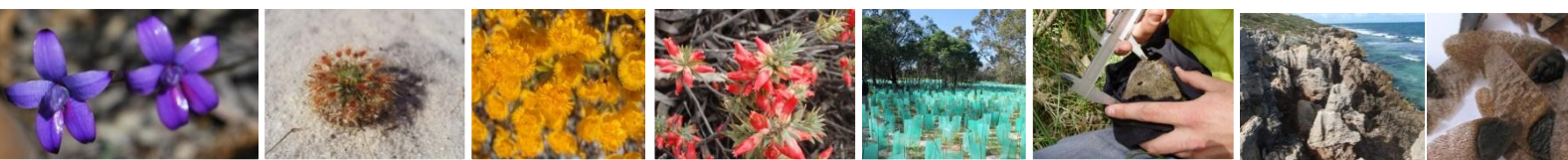


# **Peet Alkimos Pty Ltd**

## **Fire Management Plan – Shorehaven Stage 5, Alkimos**

**Version 1 – 07 July 2015**

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## Disclaimer

Natural Area Holdings Pty Ltd, trading as Natural Area Consulting Management Services (Natural Area), has prepared this Fire Management Plan for use by:

- Peet Alkimos Ltd
- City of Wanneroo
- Purchasers of Lots in designated fire prone areas.

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## 1.0 Introduction

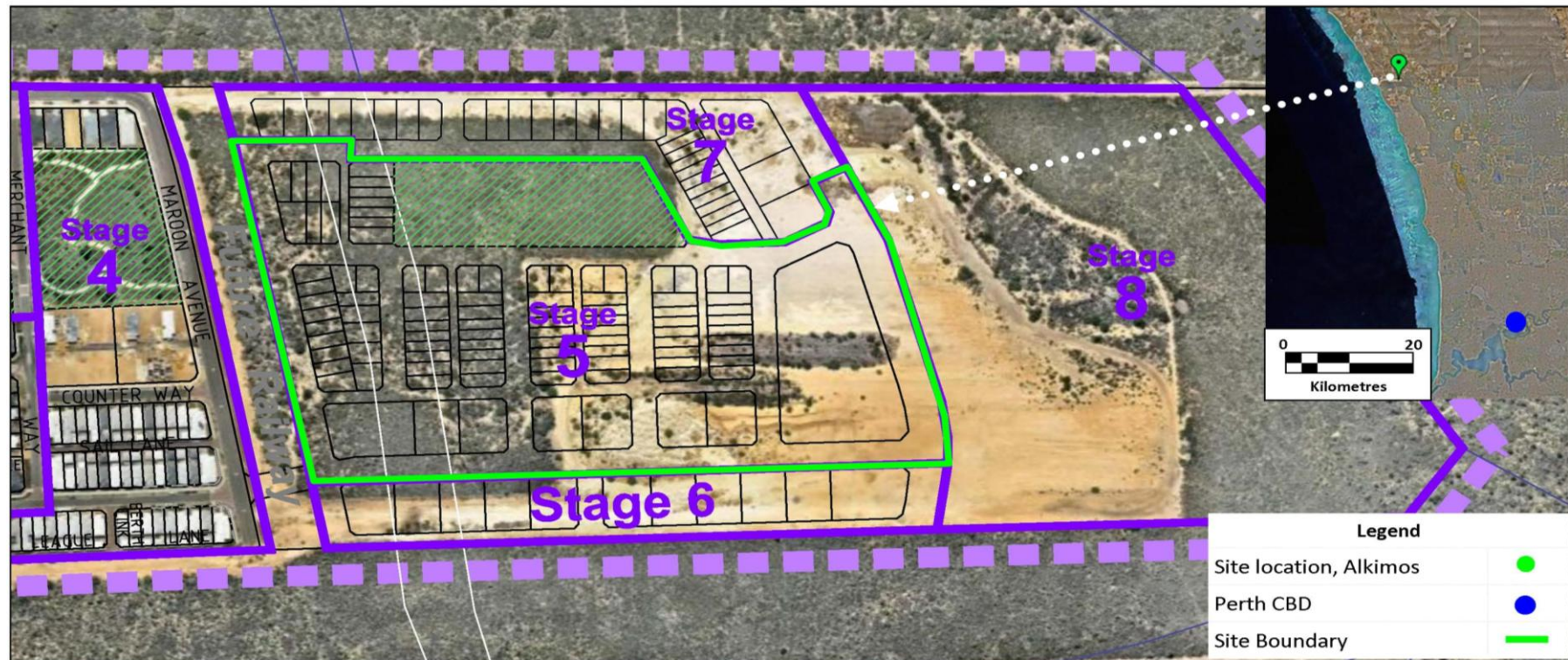
Peet Alkimos Pty Ltd commissioned Natural Area Holdings Pty Ltd, trading as Natural Area Consulting Management Services (Natural Area), to prepare a fire management plan for Stage 5 of Shorehaven Central 5 – 9, which is a portion of Lot 9006 Shorehaven Alkimos. The site is located approximately 43 km north of the Perth Central Business District and covers approximately 11 ha. Maroon Road and a railway reserve bound the Shorehaven Stage 5 site to the west, and private property to the north, east and south; Stage 5 is bounded by the railway reserve to the west, Stage 7 to north, Stage 6 to the south and Stage 8 to the east (Figure 1). The site is partially vegetated, with offsite vegetation present on private property to the north, east and south.

Many Australian ecosystems require bushfire at regular intervals as part of their natural lifecycle. Vegetation within these ecosystems have developed characteristics which promote the spread of fire, such as flammable bark, dry coarse leaf litter and leaves which contain flammable oils (CSIRO, 2008). Accordingly, residential areas in proximity to remnant native vegetation are at risk from bushfire impacts such as smoke, ember attack and radiant heat. In knowing the risks, it is possible to identify varying mitigation strategies that allow urban development to occur in proximity to remnant bushland areas. Note that individual landowners will need to protect their property in line with this fire management plan, and that despite the management measurements outlined, fire appliances may not be available to protect each house during a fire event.

The Bushfire Management Plan has been prepared to support the City of Wanneroo and Western Australian Planning Commission (WAPC) planning approvals process. It provides fire risk mitigation options that will be applied as development at the site proceeds. When preparing the Plan, Natural Area has considered the requirements outlined in the *Planning for Bushfire Protection Guidelines* prepared by the Western Australian Planning Commission, the Department of Planning and the Fire and Emergency Services Authority (2010, Edition 2), and *AS 3959 – 2009 Construction of Buildings in Bushfire Prone Areas*. Activities involved with the plan preparation process included:

- assessing the vegetation types present within and adjacent to the proposed development site using the second edition of *Planning for Bush Fire Protection Guidelines* (Western Australian Planning Commission, Department of Planning and Fire and Emergency Services Authority, 2010, Edition 2)
- assigning hazard ratings based on the vegetation types present
- determining projected BAL ratings and suggest likely management strategies that could be implemented based on current and projected site considerations
- preparation of the management plan.

Note that this Fire Management Plan will need to be reviewed periodically, with a minimum review period of five years. In addition, it is recognised that changes to Lot layout, site conditions, or other factors can result in changes to the fire management measures documented, and are discussed further in Section 6.8.2.



**Figure 1:**  
**Location, Stage 5 Shorehaven Central, Alkimos**



Client: Peet Ltd  
Project: Stage 5 Shorehaven Central, Alkimos  
Image Source: Tabec  
Image Date: 2015  
Datum: GDA 94  
Projection: MGA Zone 50



## 2.0 Management Plan Aim

The aim of the Fire Management Plan (FMP) is to outline the fire management methods and requirements that will be implemented within the proposed development site. Accordingly, broad aims include:

- reduce the threat of fire to the life and property of future residents and the environment
- allow easy access of fire-fighters if a fire does occur in surrounding areas
- protect the landscape within the site as far as is possible.



### 3.0 Management Plan Objectives

The objectives of this Bushfire Management Plan are to:

- define land use areas within the subdivision, including urban, areas of public open space, and areas of bushland to be retained
- define and rank fire hazard areas according to the vegetation type and fire fuels present
- outline the roles and responsibilities of individuals and organisations in relation to fire management within the subdivision
- propose fire management strategies for the subdivision, taking into consideration:
  - vegetation to be retained onsite and bushland areas in proximity to the site including those areas to the east and south
  - the need for building construction standards where vegetated areas interface with the urban development
  - identify access for fire-fighting operations and daily maintenance in and around vegetated areas and stages of development
- define an assessment procedure that will evaluate the effectiveness and impact of existing and proposed fire prevention activities and strategies
- document the performance criteria and acceptable solutions adopted for the site.

## 4.0 Description of the Area

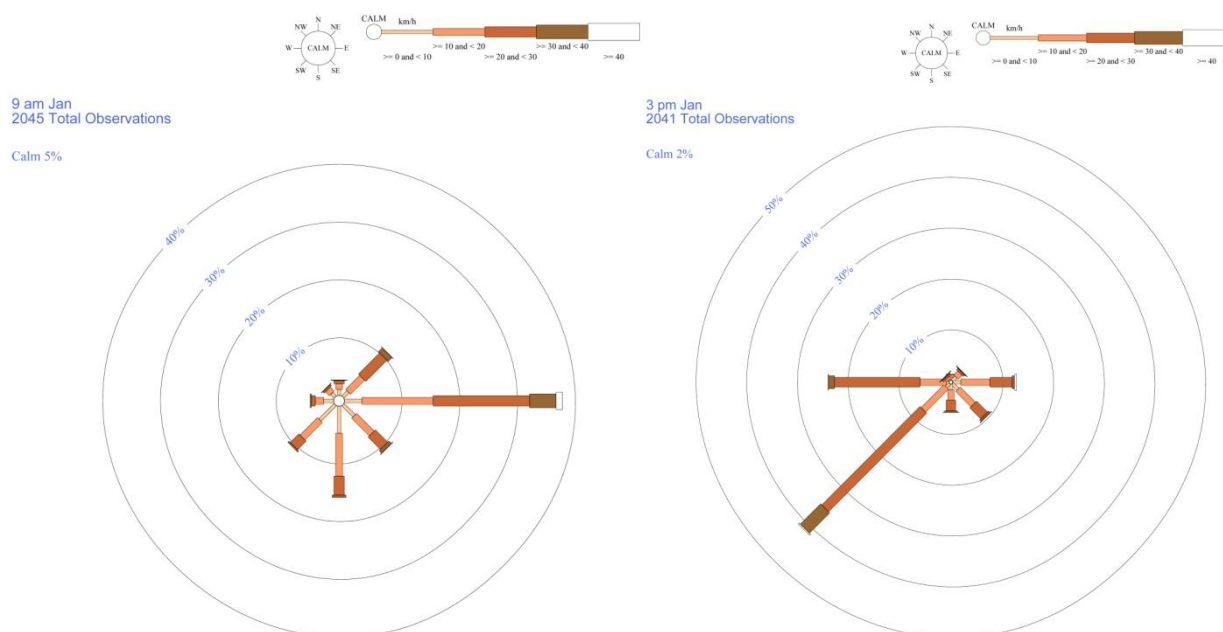
### 4.1 General Context

Perth is located within the Swan Coastal Plain region of the Interim Biogeographical Regionalisation of Australia (IBRA). The Swan Coastal Plain comprises of two major divisions, namely Swan Coastal Plain 1 – Dandaragan Plateau and Swan Coastal Plain 2 – Perth Coastal Plain. The site is located in the Perth subregion, which is broadly characterised as including areas of Jarrah and Banksia woodlands on sandy soils in a series of sand dunes, along with wetland areas, often within the interdunal swales (Mitchell, Williams and Desmond, 2002). The site includes a range of social and cultural values to the local community, including recreational opportunities, bushland and parkland areas.

### 4.2 Climate

The climate experienced in the area is Mediterranean, with dry, hot summers and cool, wet winters. The Bureau of Meteorology describes the climate at the Perth Airport (Station 009021, 2015) as:

- average rainfall is 771.6 mm pa, with the majority falling between May and August;
- average maximum temperature ranges from 17.9 °C in winter to 31.9 °C in summer, with the highest recorded maximum being 46.7 °C;
- average minimum temperatures range from 8.0 °C in winter to 17.5 °C in summer, with the lowest recorded minimum being -1.3 °C; and
- predominant wind directions include morning easterlies and south-westerly sea breezes during summer months (Figure 2), with an average wind speed of 23.8 km/h and gusts of more than 100 km/h, particularly during storm events.



**Figure 2:** Average summer wind direction

Source: Bureau of Meteorology, 2015

Note also that summer weather conditions also contribute to the fire threat through mid-level disturbances bringing unstable atmospheric conditions from the north or north-west that result in thunderstorms and the potential for lightning strike as a fire ignition source.

### 4.3 Topography

Topography across the site is typical of dune formations occurring on the western fringe of the Swan Coastal Plain. The average elevation across the site is between 30 – 40 m AHD, with the lowest point being 27.6 m AHD in the west, and the highest 42 m AHD in the south-east (Figure 3).

### 4.4 Bushfire Fuels

The amount and type of vegetation and flora present at the Stage 5 Shorehaven directly contributes to the risks associated with fire, its spread, and impacts on property, the environment and people. Vegetation on and around the site is characterised by Banksia Woodland dominated by *Banksia sessilis* (Parrot Bush), with scattered *Eucalyptus gomphocephala* (Tuart) and *Eucalyptus marginata* (Jarrah) with a dense shrub layer. Much of the vegetation onsite will be cleared to accommodate the development, with some to be retained in a POS area.

#### 4.4.1 Offsite Vegetation

Vegetation is also present offsite to the west, north, east, and south. The area to the north of Stage 7 and south of Stage 6 are designated urban development, and are likely to be cleared at some future stage. Vegetation within Stages 6 and 7 adjacent to Stage 5 will be cleared to assist with the development process. Clearing of vegetation within Stage 8 to the east will occur at some future point in time. The vegetation to the west in Maroon Avenue has been retained as a bushland POS area during a previous stage of the development and is expected to be retained in its current format.

#### 4.4.2 Landscaping and Revegetation

At present, an area of bushland is expected to be retained within the designated POS area within the northern portion of the site, with the balance including parkland cleared areas, play spaces, paving and similar. Vegetated areas will impact on the number of Lots within the development area that will be subject to a BAL rating, and will be refined as the development progresses. When the vegetated areas are developed, the requirement to retain low fuel zones identified within this Fire Management Plan will need to be considered. It is expected that nominated low fuel zones will largely be parkland cleared areas, with the occasional tree, and be maintained in a manner consistent with building protection zone requirements. BAL ratings will be reviewed as further information becomes available.

### 4.5 Land Use

That portion of Lot 9006 that will become Stage 5 Shorehaven is currently vacant land that is either vegetated or bare soil.

## **4.6 Assets**

As the site is vegetated, there are currently no assets or infrastructure present on site. Vacant land is present to the north, east and south. Maroon Avenue, the proposed railway reserve and existing development is present to the west.

## **4.7 Access**

At present, the site is accessible from Maroon Ave via two limestone tracks, one of which occurs along the northern boundary of the site and the other to the south. During the development process, access will be formalised through the creation of an internal road network with two entries to Maroon Ave (Figure 1). It is expected that additional entries will be provided as development to the north and south occurs at some future point.

## **4.8 Water Supply**

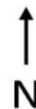
As the subdivision proceeds, the site will be connected to scheme water with fire hydrants required approximately every 200 m within the built up area. Clearance on the placement of hydrants will be required from the Department of Fire and Emergency Services (DFES), the Water Corporation and the City of Wanneroo. Hydrants will need to be clearly identifiable, with markings installed by the developer prior to sign off. Hydrants will be marked via the following:

- a blue 'cats eye' reflective indicator to the left of the centre line of the road
- a small blue 'H' painted on the curbing
- a white and red stripe around the power pole nearest to the hydrant.

Note that contractors or others carrying out building or other works at the site must not cover hydrants and/or the markings indicating their location. In the event activities occur that do result in hydrants or markings being covered, damaged, or removed, it will be the responsibility of the relevant contractor to rectify the situation.



**Figure 3:**  
Contours and Slope, Stage 5 Shorehaven Central, Alkimos



Client: Peet Ltd  
Project: Stage 5 Shorehaven Central, Alkimos  
Image Source: City of Wanneroo Intramaps  
Image Date: 2014  
Datum: GDA 94  
Projection: MGA Zone 50



## 5.0 Fire Problem

In order to identify the potential fire risks and mitigation strategies, it is necessary to describe the fire problem associated with the site. The assessment takes into consideration the:

- type and classification of vegetation present at the site
- distance between the dominant vegetation classification and the walls of existing or proposed buildings across from the classified vegetation
- the topography and slope of the land between proposed buildings and the classified vegetation
- land use.

### 5.1 Fire History

A review of historical aerial imagery dating back to 1965 indicates there has been no fires within the proposed subdivision boundaries (Landgate, 2015). Imagery is available at a frequency of at least twice per year from 2010 onwards, annually from 2000 – 2008, and sporadically from 1965 – 1995. There are no images available for the years 1996 – 1999 and 2009.

### 5.2 Bushfire Risk

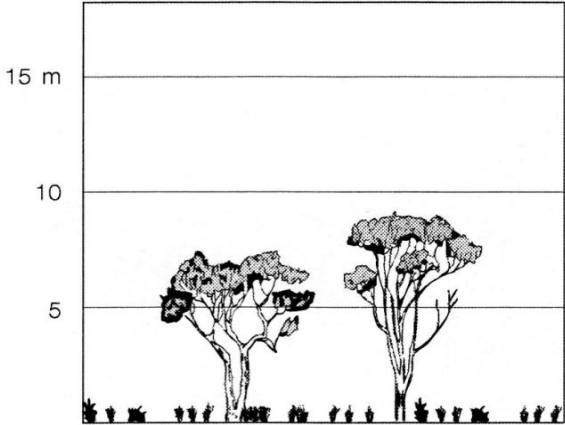
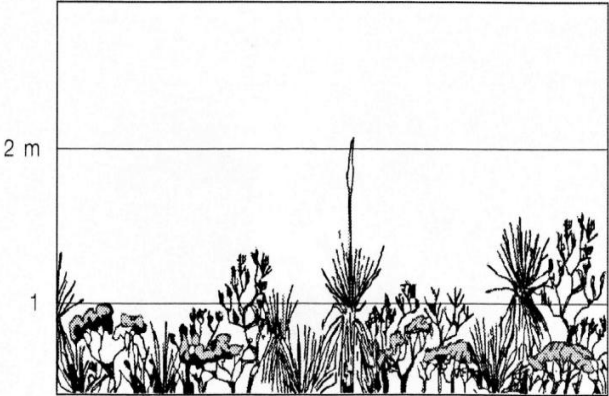
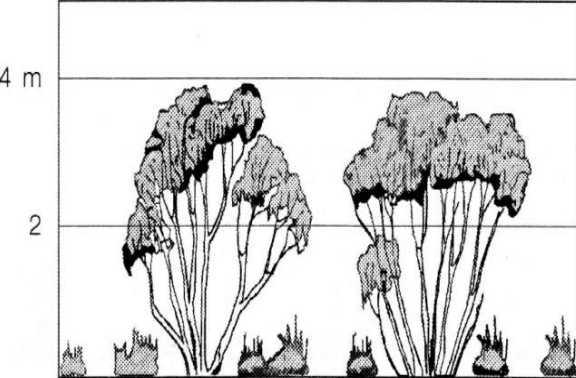



The Planning for Bush Fire Protection Guidelines (Western Australian Planning Commission, Department of Planning, and Fire and Emergency Services Authority, 2010, Edition 2), describes three hazard levels relating to bush fire risks. These are:

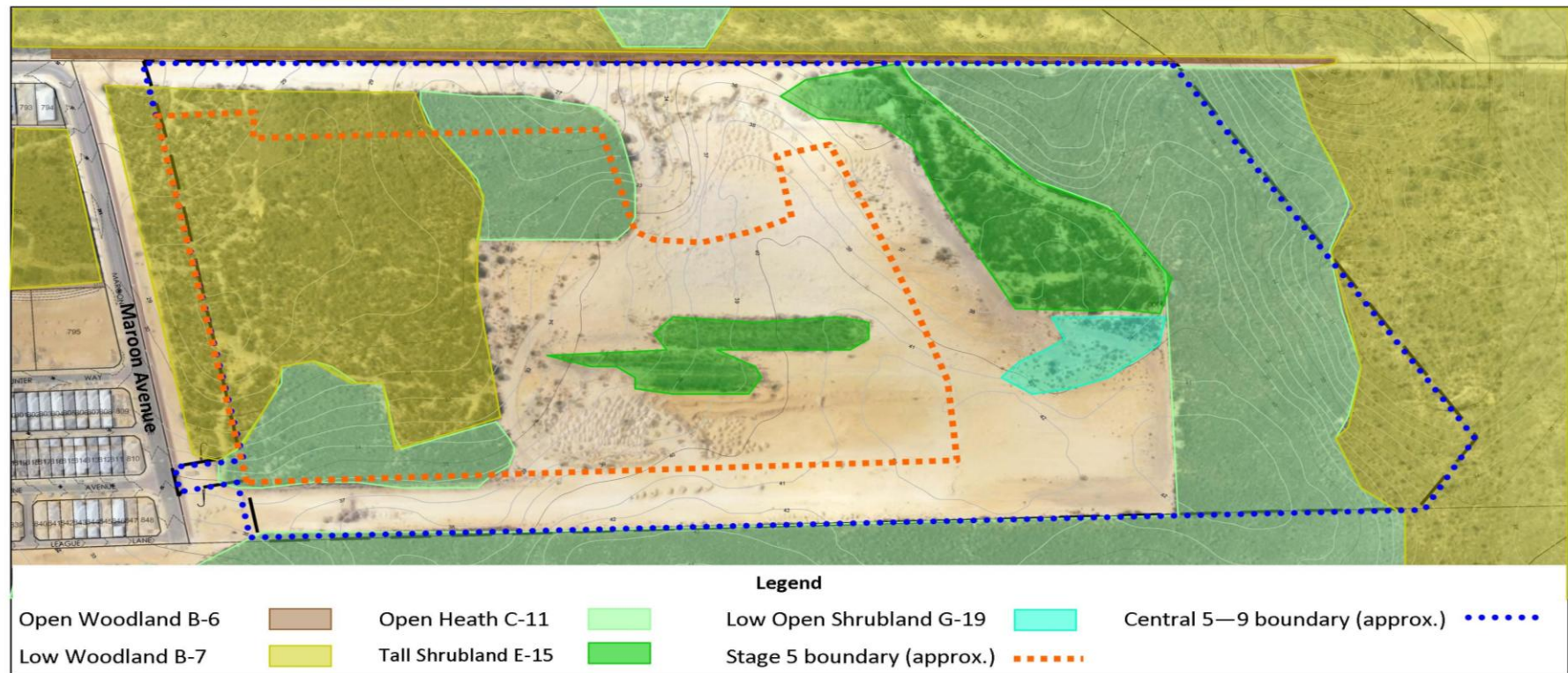
- **Low** – primarily areas of no standing native vegetation, pasture or cropping areas with limited vegetation or suburban areas with maintained gardens and < 0.25 ha of standing vegetation
- **Moderate** – open woodlands and shrublands, low shrubs with slopes < 10° or flat land, suburban areas with some native tree cover, pasture or cropped areas with slopes > 10°
- **Extreme** – forests, woodlands and/or tall shrubs.

Using assessment criteria published in the 2<sup>nd</sup> edition of *Planning for Bush Fire Protection Guidelines* (WAPC *et al*, 2010) the hazard is considered to be **moderate – extreme** across most of the site because of the presence of Type B woodland and Type C shrubland vegetation (Figure 4; Table 1).



**Table 1:** Vegetation types

Low Woodland (B-7)	Open Heath (C-11)	Tall Shrubland (E-15)
		
		



**Figure 4:**  
Classified vegetation types as per AS 3959 – 2009,  
Stage 5 Shorehaven Central, Alkimos



Client: Peet Ltd  
Project: Stage 5 Shorehaven Central, Alkimos  
Image Source: CLE, NearMap  
Image Date: 2014  
Datum: GDA 94  
Projection: MGA Zone 50





## 5.3 Bushfire Hazard

Bushfire hazard assessments considers existing site conditions (Table 2) including:

- topography, in particular, the slope or gradient of the land
- vegetation cover and associated fuel loads
- relationship to surrounding development.

**Table 2:** Bush Fire Hazard Assessment Levels

Predominant Vegetation Class and Type	*Fire Hazard in relation to distance of the site from Predominant Vegetation Class and Slope							
	< 15m		15m–40m		>40m–100m		>100m	
	>10°	10° or less	> 10°	10° or less	>10°	10° or less	>10°	10° or less
<b>A Forest</b>	Extreme	Extreme	High	High	Medium	Medium	Low	Low
<b>B Woodland</b>	Extreme	Extreme	High	High	Medium	Low	Low	Low
<b>C Tall Shrubs</b>	Extreme	Extreme	High	High	Medium	Low	Low	Low
<b>D Low Shrubs</b>	High	Medium	Medium	Low	Low	Low	Low	Low
<b>E Open Woodland and Open Shrubland</b>	Medium	Medium	Low	Low	Low	Low	Low	Low
<b>F Grassland</b>	Medium	Low	Low	Low	Low	Low	Low	Low

Source: WAPC *et al*, 2010

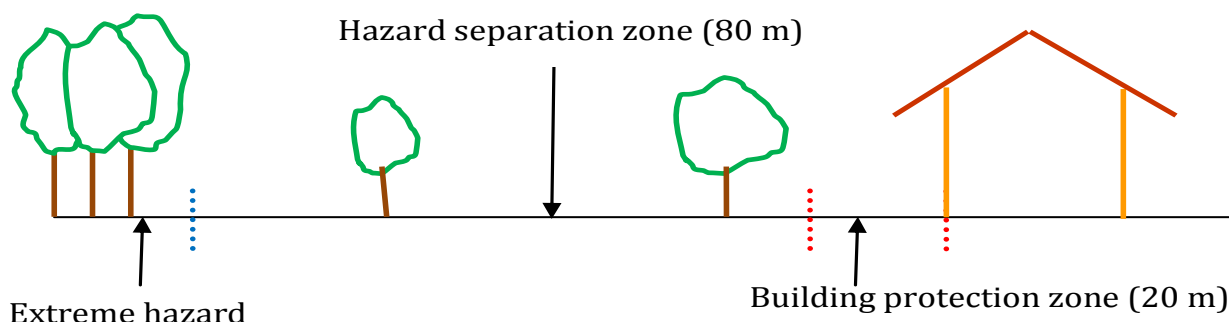
\* Fire hazard in relation to distance from the site from predominant vegetation class and slope refers to the distance between dwellings or buildings from the vegetation within the internal zone.

As the site is located within the Spearwood Dune System, it is currently undulating and will require fill to provide a flat, stable surface for the construction of dwellings on the Lots. Expected fill levels will mean an average height above sea level at the site of around 30 – 38 m, with slightly higher levels towards the south eastern portion of the site. Overall, the majority of the vegetation or bushfire hazard is considered to be on flat land or upslope of the proposed dwellings, with a portion of the vegetation to the north downslope < 5° (Figure 3). The areas of downslope vegetation are not located within 100 m of any of the Lots located in Stage 5.

The pre-development fire hazard is provided in Figure 7. As the development proceeds and clearing of the vegetation on site occurs, the risk associated with the onsite vegetation will decrease. The indicative post-development hazard assessment is provided in Figure 8, which takes into consideration vegetation to be cleared for housing Lots, roads, areas of public open space (POS) and areas of vegetation to be retained within the broader POS area. Note that the hazard level in proximity to vegetated areas may decrease in the future due to landscaping and clearing for other purposes.

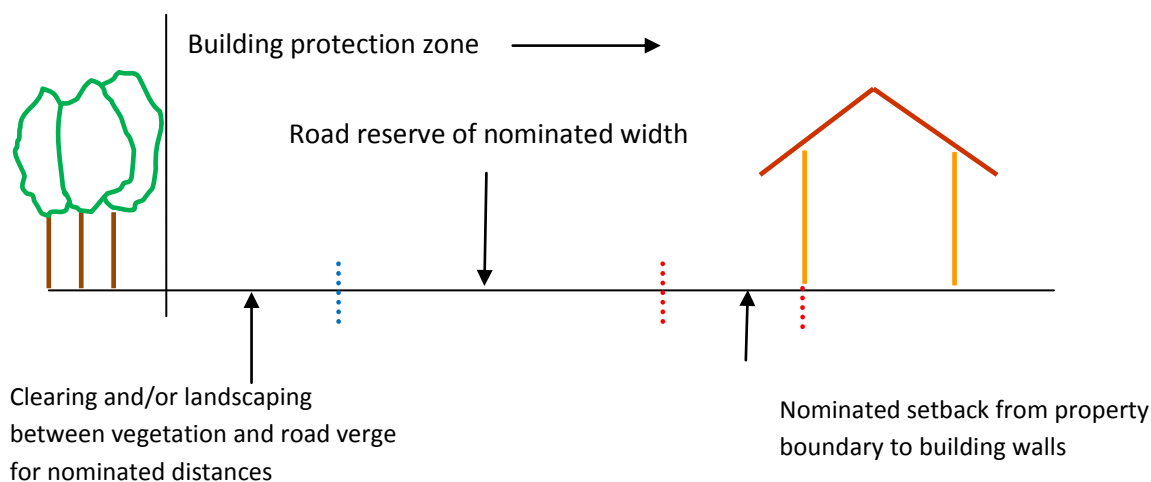
### 5.3.1 BAL Assessment

For buildings within fire prone areas, an ideal hazard separation zone of at least 100 m between vegetation and building walls that includes a 20 m building protection zone is preferred (Figure 5). Where that is not possible, the requirements of AS 3959-2009 *Construction of Buildings in Bushfire Prone Areas* can be applied as an acceptable solution, as is the case for buildings proposed within the vicinity of the vegetated areas on and off site within Stage 5 Shorehaven.



**Figure 5:** Ideal hazard separation zone between vegetation and buildings

Stage 5 Shorehaven has been designed to provide appropriate hazard separation and building protection zones between the vegetation in the public open space areas and offsite vegetation and building walls that incorporate the assigned BALs determined in accordance with Amendment 2 of AS 3959 – 2009 (February, 2011) (Figure 8), and provide a minimum 20 m building protection zone.



**Figure 6:** Reduced Hazard Separation Zone and Building Protection Zone in accordance with AS 3959 - 2009

The BAL assessment for all Lots within 100 m of classified vegetation at the Stage 5 Shorehaven Site takes into consideration:

- current Lot layout for the subdivision application site
- projected fill requirements required to provide an even surface to build on
- projected location of vegetation to be retained in public open space areas (POS).

Outcomes of the BAL assessment process are shown in Figure 9, noting that the actual number of Lots assigned a BAL rating is dependent on later detailed design and survey activities. Note also that BAL ratings are valid for three months and will be subject to review as the development proceeds. The City of Wanneroo will become responsible for ongoing management of the landscaped and vegetated POS area.

#### **Area 1: Vegetation in Proximity to Maroon Avenue and Offsite to the North**

Area 1 incorporates 21 Lots located within 100 m of vegetation within a reserve to the west on Maroon Avenue and that to the north in a land holding held by a different land holder that is zoned urban development. Based on present conditions, all Lots will be assigned a BAL-12.5 rating as they are upslope or on flat land and a minimum of 55 m from the edge of bushfire prone vegetation. Vegetation within the Maroon Avenue Reserve is expected to be retained in its present form. If development occurs in the short – medium term within the land holding to the north, clearing of vegetation in that area will occur, reducing the number of Lots that require a BAL-rating.

#### **Area 2: Offsite Vegetation within the Land Holding to the South**

Seven larger residential Lots planned for the southern portion of Stage 5 are located a minimum distance of 65 m from the edge of bushfire prone vegetation to the south, and will be assigned a BAL-12.5 rating. The southern land holding is the subject of a current planning approval application, and if approved, the probability of vegetation being cleared is high, meaning that none of the seven Lots will require a BAL-rating.

#### **Area 3: Bushland Vegetation to be Retained with POS to the North**

All Lots within 100 m of the edge of bushfire prone vegetation that is expected to be retained within the POS are have been highlighted and assigned a BAL-12.5 rating. At present, it is unknown as to the amount of vegetation to be retained and the level of landscaping that will occur. As detailed landscape plans become available, the BAL-ratings will be reviewed and refined where appropriate.

#### **Area 4: Aged Care Facility**

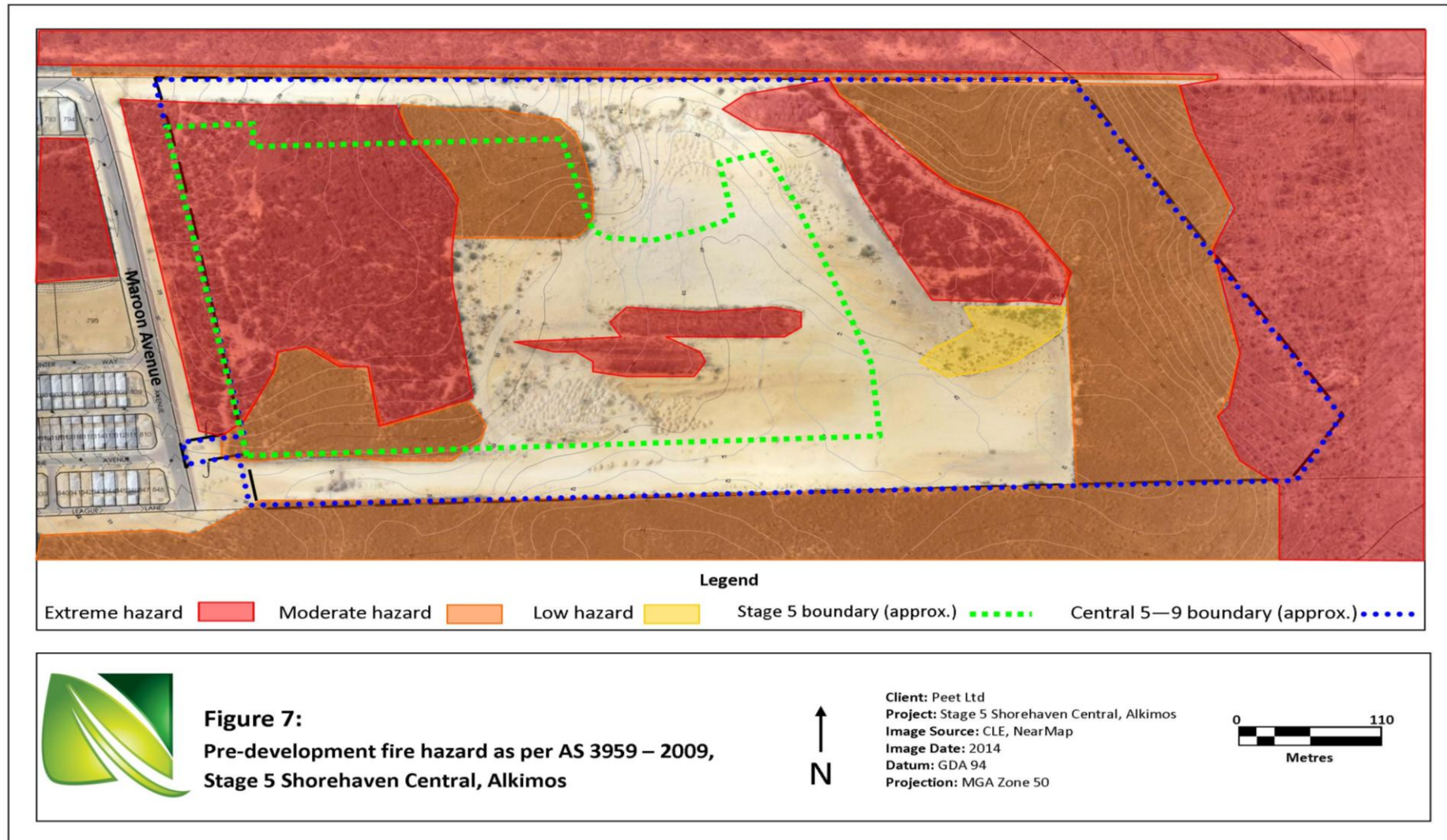
Area 4 is designated an aged care facility and will be subject to the requirements of the Building Code of Australia rather than having a BAL-assessment assigned.

### **5.4 Bush Fire Threat**

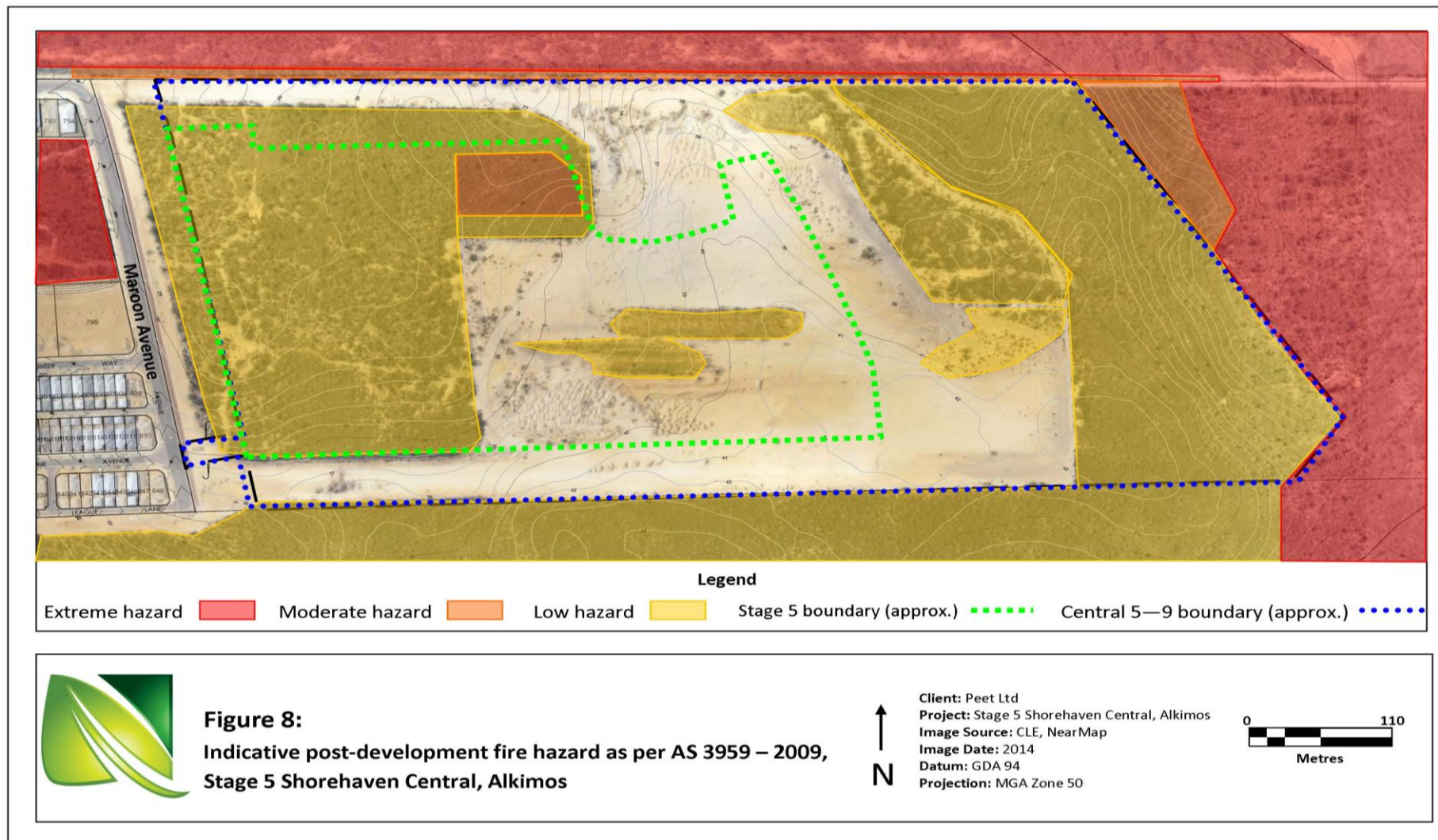
At present, the vegetated nature of the site means the threat of bush fire is high. However, as the site is developed and the majority of the vegetation cleared, the threat will diminish. The presence of retained vegetation on site, along with that to the north and south of Peet Ltd's land holding within Lot 9006 will mean a moderate – high bush fire threat, with a low threat around the rest of the site. A separation distance of more than 75 m to the vegetation retained within the Maroon Avenue Reserve will mean a low bush fire threat.

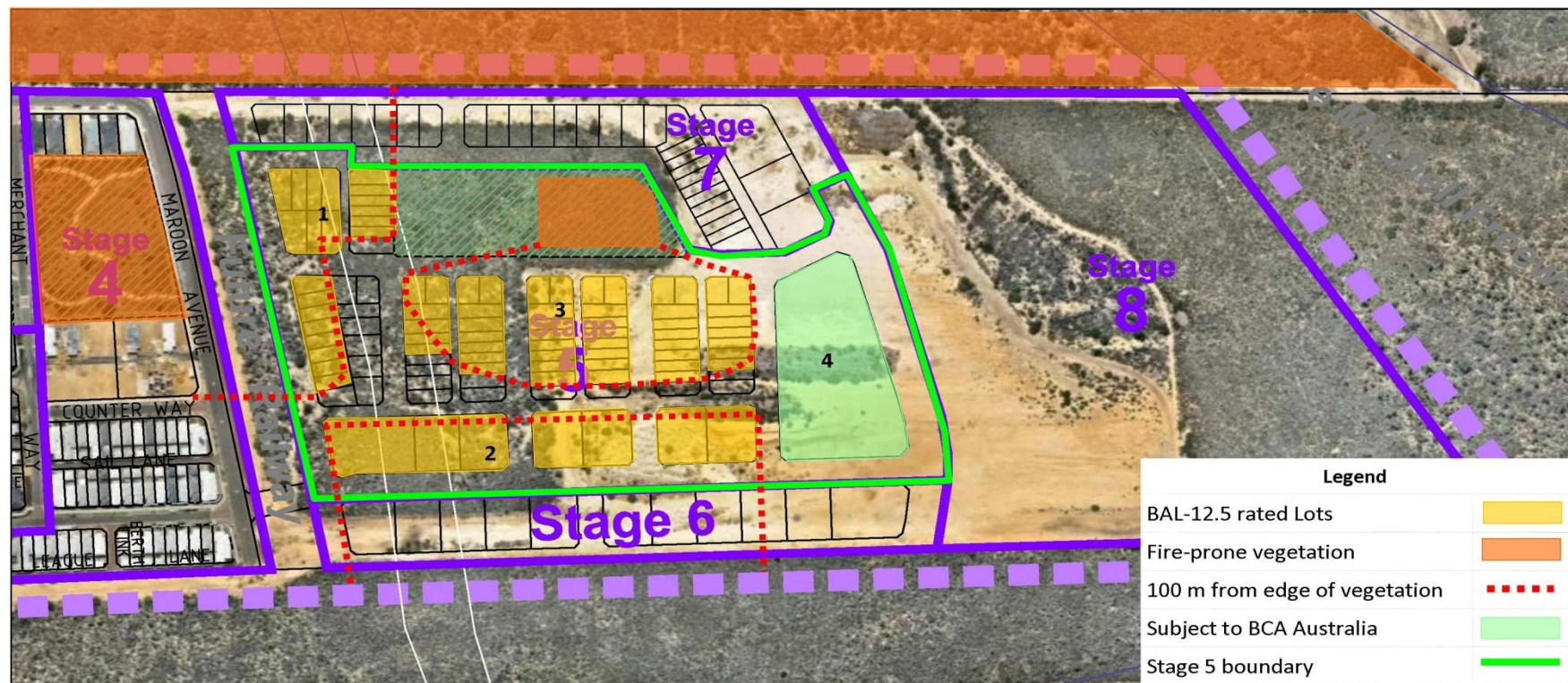
### **5.5 Summary of Bushfire Potential Issues**

The potential bushfire issues that are present at the site will include the presence of bushland vegetation that will be retained within the nominated public open space area and in vegetated areas to the west, north and south of Peet Ltd's land holding within Lot 9006. Fire in any of these locations has the potential to result in smoke, ember attack and/or heat from flames.









**Figure 9:**  
**BAL Assessment, Stage 5 Shorehaven Central, Alkimos**



Client: Peet Ltd  
Project: Stage 5 Shorehaven Central, Alkimos  
Image Source: Tabec  
Image Date: 2015  
Datum: GDA 94  
Projection: MGA Zone 50





## **6.0 Fire Mitigation Strategies**

As development proceeds, all sites within 100 m of bushland areas will need to meet the criteria associated with an extreme bushfire hazard rating through the adoption of performance criteria and acceptable solutions as described in the bushfire protection guidelines. However, the site will also need to be managed during the staging of development activities.

### **6.1 Hazard Management**

The proposed development site will largely be cleared to facilitate the clearing of urban residential Lots. During the development process, vegetation to be retained with the nominated POS area will be maintained below 8 tonnes per hectare to reduce the potential for fire spread. This will occur through a combination of landscaping, irrigation, weed control and parkland maintenance activities. Weed control measures, such as chemical control and/or slashing of long grass to a maximum height of 50 mm (5 cm) is required in areas where understorey species are largely absent. Works will be carried out during the development process and be subject to inspection by the City of Wanneroo on an as required basis. In the longer term, the City of Wanneroo will assume responsibility for the ongoing management of POS area, as outlined in Section 6.8.

Dwellings to be constructed within 100 m of classified vegetation will have a BAL-rating assigned that nominates higher building construction requirements as defined in AS 3959 – 2009 Construction of Buildings in Bushfire Prone Areas. Roads, building setbacks and parkland cleared areas will contribute to low fuel building protection and hazard separation zones. All other Lots will be more than 100 m from classified vegetation, meeting minimum hazard separation requirements from classified vegetation.

### **6.2 Bushfire Risk Management**

The urban residential nature of the development site will require landowners and occupiers to comply with City of Wanneroo fire emergency information and fire advice issued by DFES. This will include but not be limited to complying with any firebreak notices, restricted and prohibited burning times, and fire danger notices such as restrictions on the use of vehicles and/or machinery in fire prone areas on very high fire danger days. Vegetation within the POS area will be maintained below 8 tonnes per hectare on an ongoing basis. This will occur through a combination of landscaping, irrigation, weed control and parkland maintenance activities.

### **6.3 Future Development**

Fire prone areas are nominated within the development, as have Lots that require construction in accordance with relevant sections of AS 3959 – 2009 Construction of Buildings in Fire Prone Areas. Each Lot within the development will be zoned urban residential with little retention of native vegetation, and which will ensure the future low risk is maintained. Once development within Stage 5 is completed, development within Stages 6, 7 and 8 will occur, and will be subject to separate bush fire assessment activities. Development is expected at some future point in separate land holdings to the north and south, which will further reduce the bush fire threat within the broader area.

While the fire management plan has the aim of ensuring the proposed development is designed with due consideration to the potential for ignition of fires and their spread, the Developer also needs to ensure the protection of property and the environment during the various stages of construction. Each stage will incorporate a series of fire protection requirements until the subdivision is completed, and will involve the clearing of vegetation in Stages 6 and 7.

#### **6.4 Access and Fire Breaks**

No specific access and fire breaks will be required as adequate access will be provided through the internal road network and POS area will include parkland cleared components. The Developer will be responsible for maintaining the POS area until they are ceded to the City of Wanneroo for ongoing management.

#### **6.5 Public Education and Community Awareness**

Owners of Lots in fire prone areas need to be aware of information provided by the following:

- the City of Wanneroo, such as the annual firebreak notice and local emergency management arrangements
- various educational materials available on the DFES website, including those relating to fire preparedness and survival, and evaporative air conditioners
- community bushfire ready action groups.

Housing in close proximity to the vegetated areas will always be subject to some risk from the effects of a fire, particularly smoke, radiant embers and potentially spot fires. It is recommended that Lot owners within 1 km of the vegetation, particularly those where a BAL rating has been determined, are made aware of the potential risks from fire and what to do in the event a fire is noticed, such as:

- informing DFES as soon as a fire is noticed
- if installed, turning off evaporative air conditioners, or if possible to do so, continue running water through the unit with the fan turned off
- if evaporative air conditioners haven't been used prior to smoke being detected, it is advisable to wet the filter pads with a garden hose or run the unit to wet the filter pads, then turn it off when smoke appears overhead
- ensuring accessibility is maintained to enable easy movement of emergency vehicles.

It is also recommended that they are made aware of the current edition of the FESA publication 'Survive – The Home Owner's Bush Fire Survival Manual' (2008) which is available on the DFES website.

#### **6.6 Fire Safer Areas**

Fire safer areas are not required for the proposed development.

#### **6.7 Assessment of Fire Management Strategies**

The development of the area will significantly reduce the potential for and risks associated with bushfire in and around the proposed subdivision. The area of bushland vegetation to be retained is small in area with limited potential of spreading to surrounding areas. Accordingly, the fire management strategies proposed



for the site will result in social and financial benefits associated with the reduced fire potential. Environmental benefits are associated with the retention of bushland vegetation.

## 6.8 Implementation

Implementation of this Plan will commence immediately and will be the responsibility of the Developer, the Peet Alkimos, until such time as relevant portions of the site are formerly handed over to the City of Wanneroo or the new owners of the Lots. Activities that will be involved with the implementation of this plan are described in Table 3.

**Table 3:** Implementation Schedule

Activity	Responsibility	Maintenance	Responsibility
Ensuring bushfire protection of land and property during the various stages of the development	Developer	Checking and maintaining firebreaks, low fuel zones and other protection mechanisms during staging activities	Developer
Assessing fire fuel loading in area of vegetation to be retained	Developer	Annually	Developer until hand over of POS areas to City of Wanneroo
Undertake slashing of long grass to 50 mm and other weed control to reduce fuel load	Developer	Annual, prior to summer, in accordance with information issued to ratepayers by the City of Wanneroo	Developer, until sale of individual lots or hand over of POS and conservation area to the City of Wanneroo
Assess fire management implications of proposed revegetation plans	Developer	As required, during revegetation design phase	Developer
Education	Developer and City of Wanneroo	Updating materials and information to reflect current policies, plans, knowledge, or accepted practice	Developer – during sale process  City – during normal administrative activities to residents and rate payers

Activity	Responsibility	Maintenance	Responsibility
FMP review	Developer in consultation with City of Wanneroo	Ensure continued suitability of FMP by reviewing contents in conjunction with current site conditions	Developer

### 6.8.1 Responsibilities

Responsibilities for bushfire preparedness and response within the development area at the Stage 5 Shorehaven site are shared by the City of Wanneroo, the Developer, DFES, and building owners.

#### Developer Responsibilities

The Developer is responsible for implementing key portions of this Fire Management Plan, including:

- reviewing bushfire hazards and risks associated with the landscape protection areas during the subdivision design process, and ensuring the risks are as low as required to meet the requirements of this FMP and AS 3959 - 2009
- providing appropriate information, including a copy of this fire management plan, to potential purchasers and owners of lots within the development that have a BAL of 12.5 or greater to inform them of the bushfire risks and minimum building construction requirements
- arrange for the Section 70A notification on the titles of lots subject to the requirements of this Fire Management Plan.

#### City of Wanneroo Responsibilities

The City of Wanneroo has the responsibility and powers under the Town Planning Scheme and the *Bush Fires Act 1954* to ensure that this Fire Management Plan, City of Wanneroo Fire Control notice and any Special orders issued under the *Bush Fires Act 1954* are complied with. The City of Wanneroo will be responsible for:

- maintaining District Fire Fighting Facilities
- maintaining any City equipment and apparatus for fire fighting purposes in good condition
- providing appropriate advice in relation to City requirements for firebreaks, hazard reduction, and similar to the Developer and property owners as required
- ensuring appropriate information is included on titles of lots with a BAL of 12.5 or greater.

#### DFES Responsibilities

DFES will be responsible for:

- maintaining fire fighting equipment in good condition and repair
- responding to fires within vegetated areas within the Stage 5 Shorehaven site in a timely manner in an effort to minimise the spread of fire and damage to nearby housing from ember attack.

#### Owner Responsibilities

It is the responsibility of individual property owners building houses within near the vegetated areas to comply with the requirements of this Fire Management Plan. They also have the responsibility of responding to advice from the City of Wanneroo, DFES, or the Developer in relation to maintaining properties in a manner that will reduce potential damage from ember attack.

In addition, it is recommended that Lot owners include ember shields on evaporative air conditioners and inform DFES or the local fire brigade as soon as practicable after a fire is noticed within bushland within the subdivision boundary.

### **6.8.2 Plan Review**

This fire management plan has been developed based on current conditions at the site, but recognises that changes can occur over time and may be subject to review based on detailed design processes. It is recommended that this plan also be reviewed twelve months after initial endorsement and implementation to ensure its continued suitability, and in the event any of the following occur:

- a fire occurs within the site boundary or a neighbouring property that spreads to the site
- during detailed design phases, particularly if expected fill levels change, resulting in altered slopes (both upward and downward slopes)
- any revegetation activities are likely to result in areas of classified vegetation greater than 0.25 ha (as defined by AS 3959-2009)
- if the vegetation to be retained on site is altered, and will or is likely to result in an area of classified vegetation greater than 0.25 ha
- on finalisation of the development when the landscape protection area and POS areas are handed over to the City of Wanneroo.

## 7.0 Appendices

### 7.1 Maps

Maps are included in relevant sections of this document.

### 7.2 Works Program

The nature of the proposed subdivision mean a works program identifying tasks to be performed is not required.

### 7.3 Guidelines, Specifications and Minimum Standards

#### 7.3.1 AS 3959 – 2009 Construction in Bushfire Prone Areas

The assigning of a BAL rating to Lots within a subdivision is an acceptable management strategy with the aim of providing an increased level of protection against radiant heat that could otherwise damage flammable portions of buildings in the event of a bushfire. Increased protection comes through increased construction standards and the setting of minimum distance requirements between building walls and vegetation in accordance with Australian Standard AS 3959 - 2009. Note that the assigning of a BAL rating does not guarantee the protection of homes from fire impacts; rather, it decreases the likelihood of impacts.

A BAL- low requires no additional building construction requirements and is the preferred rating, and applies to building Lots 100 m or more from classified vegetation. For those properties within 100 m of the classified vegetation, a BAL rating of 12.5 or higher will apply according to the vegetation type, slope and distance (Table 4). For those Lots within the Stage 5 Shorehaven site, two BAL ratings will apply, namely BAL low and BAL-12.5. Hazard separation distances for each BAL rating and slope class are calculated from the edge of the classified vegetation to building walls based on the projected area of vegetation to be retained within POS areas.

**Table 4:** BAL description – AS 3959 – 2009

BAL rating	Risk Level	Description	Applicable AS 3959 – 2009 Sections
Low	Very low	Insufficient risk to warrant any specific construction requirements but there is still some risk	4
12.5	Low	<ul style="list-style-type: none"><li>▪ risk of ember attack</li><li>▪ exposure to radiant heat</li></ul>	3 and 5
19	Moderate	<ul style="list-style-type: none"><li>▪ risk of ember attack</li><li>▪ burning debris ignited by wind embers</li><li>▪ likelihood of exposure to radiant heat</li></ul>	3 and 6
29	High	<ul style="list-style-type: none"><li>▪ increased risk of ember attack</li><li>▪ increased risk of burning debris ignited by windborne embers</li><li>▪ likelihood of exposure to a high level of radiant heat</li></ul>	3 and 7

Table 5 indicates the minimum distance from the hazard (vegetation) to building walls for BAL-rated Lots. Those Lots requiring construction that meets building requirements detailed in AS 3959 – 2009 Construction of Buildings in Bushfire Prone Areas (Standards Australia, 2009) could expect to add a minimum of 4 – 10% additional costs for housing, with the actual depending on the assigned BAL, materials chosen and the builder engaged to carry out the work. Potential owners of these Lots will be advised that there are additional building requirements to be met during the sales process.

**Table 5:** Minimum distance (metres) to vegetation for BAL ratings

Vegetation Type	BAL-Rating	Minimum Distance to Classified Vegetation - Upslope or flat land
Woodland B06, B07	12.5	29 – 100
Shrubland C11	12.5	19 – 100

All Lots within 100 m of classified vegetation will be assigned a BAL 12.5 rating. The aged care facility will comply with the Building Code of Australia, rather than being assigned a BAL-rating. Lots will need to have their final BAL-rating assessed at a later stage of the development process, when design phases and the location and amount of vegetation to be retained in the POS area is known. Other Lots in the development area will not require a BAL rating.

## 7.4 Glossary

AHD	Australian Height Datum
AS	Australian Standard
BAL	Bushfire Attack Level
Building protection zone	Low fuel area immediately surrounding buildings (20 m wide)
°C	Degrees Celsius
CoW	City of Wanneroo
DFES	Department of Fire and Emergency Services (previously FESA)
DoP	Department of Planning
FESA	Fire and Emergency Services Authority (now DFES)
FMP	Fire Management Plan
FZ	Fire zone, or area where property or similar is under threat from flames
ha	Hectare
Hazard separation zone	Area around buildings, including outbuildings, that has a reduced fire fuel loading as a means of reducing potential damage from bushfire, ideally 100 m from buildings to vegetation
km	Kilometres
kmh	Kilometres per hour
m	Metres
mm	Millimetres
pa	Per annum
POS	Public open space
WAPC	Western Australian Planning Commission

## 7.5 References

AS 3959 – 2009 *Construction of Buildings in Bushfire-Prone Areas*. Standards Australia. NSW.

AS 3959 – 2009 *Construction of Buildings in Bushfire-Prone Areas* (Amendment 2 – February 2011). Standards Australia. NSW.

Bureau of Meteorology. (2015). *Climate and Weather Statistics*. Retrieved from  
<http://www.bom.gov.au/climate/data/>.

Fire and Emergency Services Authority (FESA), (2008, 5<sup>th</sup> Edn), *Survive – the Homeowner's Bush Fire Survival Manual*, Government of Western Australia, Perth, Western Australia; also available at:  
[http://www.dfes.wa.gov.au/safetyinformation/fire/bushfire/BushfireManualsandGuides/FESA\\_Bushfire-Homeowners\\_Survival\\_Manual.pdf](http://www.dfes.wa.gov.au/safetyinformation/fire/bushfire/BushfireManualsandGuides/FESA_Bushfire-Homeowners_Survival_Manual.pdf).

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Mitchell, Williams and Desmond, (2002) *Swan Coastal Plain 2 (SWA2 – Swan Coastal Plain subregion)*, Department of Conservation and Land Management available World Wide Web URL:  
[http://www.dec.wa.gov.au/pdf/science/bio\\_audit/swan\\_coastal\\_plain02\\_p606-623.pdf](http://www.dec.wa.gov.au/pdf/science/bio_audit/swan_coastal_plain02_p606-623.pdf), accessed 2015.

Western Australian Planning Commission, Department of Planning and Fire and Emergency Services Authority. (2010). *Planning for Bushfire Protection Guidelines* (Edition 2). Government of Western Australia. Perth. Western Australia.

## 7.7 Compliance Criteria for Performance Criteria and Acceptable Solutions

Element		Compliance						Report Section(s)	Response (if required)
		If 'no' to any element or sub-element, explain in writing how the proposal satisfactorily complies with the performance criterion P1 for this area of non-compliance and provide with this checklist							
Compliance with Element 1: Location									
The subdivision/development is located in an area where the bush fire hazard is manageable									
A1.1	The subdivision/development is located on land that is not subject to either an extreme bush fire hazard land classification or requires construction standards to BAL-40 for BAL-FZ	Yes		No	✓	N/A		5.3	
Compliance with Element 2: Vehicular access									
The internal layout design and construction of public and private vehicular access in the subdivision/development allows emergency and other vehicles to move through it easily and safely at all times									
A2.1	Two access routes – two different vehicular access routes, both of which connect to the public road network, are available to all residents/the public at all times	Yes	✓	No		N/A		4.6, 5.3	
A2.2	Public roads must meet minimum requirements	Yes	✓	No		N/A			
A2.3	Cul-de-Sacs must meet minimum requirements	Yes		No		N/A	✓		No cul-de-sacs planned
A2.4	Battle axes must meet minimum requirements	Yes		No		N/A	✓		No battle-axe blocks planned
A2.5	Private driveways must meet minimum requirements	Yes		No		N/A	✓		No private driveways expected
A2.6	Emergency access ways must meet minimum requirements	Yes		No		N/A	✓		
A2.7	Fire service access routes must meet minimum requirements	Yes		No		N/A	✓		Access will be via gazetted roads within subdivision
A2.8	Gates must meet minimum requirements	Yes		No		N/A	✓		

<b>A2.9</b>	Firebreak widths must meet minimum requirements	Yes		No		N/A	✓		Urban residential properties planned, POS will be parkland cleared with some vegetation to be retained
<b>A2.10</b>	Signs must meet minimum requirements	Yes		No		N/A	✓		
<b>Compliance with Element 3: Water</b>									
<i>The development is provided with a permanent and secure water supply that is sufficient for fire fighting purposes</i>									
<b>A3.1</b>	Reticulated areas – the development is provided with a reticulated water supply, with fire hydrants in accordance with the specifications of the relevant water supply authority and FESA	Yes	✓	No		N/A		4.7	Subdivision will be connected to scheme water
<b>A3.2</b>	Non reticulated areas – water tanks with a hydrant or standpipe are provided and meet minimum requirements	Yes		No		N/A	✓		
<b>A3.3</b>	A dam or dams with permanent water all year is provided and meets minimum requirements	Yes		No		N/A	✓		
<b>Compliance with Element 4: Siting of Development</b>									
<i>The siting (including paths and landscaping) of the development minimises the bush fire risk to life and property</i>									
<b>A4.1</b>	Hazard separation – moderate to extreme - Every building is sited a minimum of 100 m from any classified vegetation or has its construction standard increased to align with the appropriate bush fire attack level for that location as per AS3959	Yes	✓	No		N/A		5.3	Construction standards as per AS 3959 – 2009 will apply to nominated areas
<b>A4.2</b>	Hazard separation – low bush fire hazard level – every building is a minimum of 20 m from any classified vegetation	Yes	✓	No		N/A		5.3	As above
<b>A4.3</b>	Building protection zone – every building is surrounded by a building protection zone that meets minimum	Yes	✓	No		N/A		5.3	As above




	requirements								
<b>A4.4</b>	Hazard separation zone – every building and its contiguous building protection zone is surrounded by a hazard separation zone that meets minimum requirements	Yes	✓	No		N/A		5.3	As above
<b>A4.5</b>	Shielding – a reduction in the bush fire attack level due to shielding from direct flame contact or radiant heat via a stand-alone non-combustible structure shall be given consideration when meeting nominated conditions	Yes		No		N/A	✓	7.3.1	
<b>Compliance with Element 5: Design of Development</b>									
<i>The design of the development is appropriate to the level of bush fire hazard that applies to the development site</i>									
<b>A5.1</b>	Compliant development – development that complies with acceptable solutions A4.1, A4.2, A4.3, and A4.4 require no further special design requirements	Yes	✓	No		N/A		5.3	Construction standards as per AS 3959 – 2009 will apply to nominated areas
<b>A5.2</b>	Non-compliant development – for development that does not comply with acceptable solutions there is no acceptable solution and must be assessed under performance criterion P5	Yes		No		N/A	✓		

## Applicant Declaration

I declare that the information provided is true and correct to the best of my knowledge.

**Full name:** Susan Catherine Brand

**Applicant signature:** 

**Date:** 07 July 2015