

BUSHFIRE & EVACUATION SOLUTIONS

SYDNEY - ILLAWARRA - SHOALHAVEN



Bush Fire Assessment Report

Planning Proposal – Proposed Dwelling Entitlement

Lot 2 DP 854905

Park Avenue

ALYMERTON NSW

9 October 2018

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Document Certification

This report has been developed based on agreed requirements as understood by Bushfire and Evacuation Solutions at the time of investigation. It applies only to a specific task on the nominated lands.

Any recommendations or findings of this report are based on an honest appraisal of the constraints that existed at the site at the time of investigation, subject to the scope, resources and information available and provided at the time. Within the confines of the above statements and to the best of my knowledge, this report does not contain any incomplete or misleading information.



Principal Consultant

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Version:	Date/ amendments	Authorised by
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Disclaimer: Any recommendation or advice expressed in this document is made in good faith and in accordance with the relevant legislation for bushfire prone development in NSW. It should be borne in mind that the measures recommended in this report cannot guarantee that a building will survive a bushfire event on every occasion. This is due to the degree of vegetation management, the unpredictable behaviour of bushfires and extreme weather conditions. The author of this report accepts no responsibility for any loss or damage, whether direct or consequential, suffered by any person as the result of or arising from the reliance on the statements, information or recommendations of this document.

Executive Summary

Wingecarribee Shire Council (WSC) have requested that a bushfire assessment be undertaken to assist in the determination of a Planning Proposal which is proposed to permit a dwelling entitlement on Lot 2 DP 854905 Park Avenue Aylmerton.

The subject property is primarily pastoral land containing scattered/ remnant vegetation, principally across the southern portion of the site. The property is mapped by WSC as bushfire prone land, constrained by Category 1 Vegetation.

The primary purpose of this report is to identify the asset protection zone (APZ) setback distances relevant to two (2) potential dwelling locations on the site. The dwelling site and associated APZ with least impact on vegetation on the property will be favoured in terms of Council's final determination. APZ's based on 29kW/m² (BAL-29) are recommended (as a minimum) to mitigate the potential for direct flame impact to a future dwelling on the site. This measure is consistent with the objectives of the NSW Rural Fire Service document *Planning for Bush Fire Protection 2006* (PBP) which include:

'provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition'

The relevant dwelling site's (herewith referred to as 'Dwelling Envelope 1' and 'Dwelling Envelope 2') are illustrated in Figure 2 of this report. This assessment demonstrates that APZ's based on 29kW/m² can be suitably provided for each dwelling location on the site. The site having the least impact on existing vegetation is determined to be Dwelling Site 1 (i.e. that located above the property dam in the northwest portion of the subject property).

This report has determined that based on the characteristics of the subject site (i.e. existing landuse and proposed development on the site in combination with the recommended bushfire protection measures), the planning proposal is suitable in terms of addressing the specifications and requirements of PBP.

Terms/ Abbreviations

Term/ Abbreviation	Meaning
APZ	Asset Protection Zone
AS 2419 - 2005	Australian Standard – Fire hydrant installations
AS 3959 - 2009	Australian Standard – Construction of buildings in bushfire prone areas
BAL	Bushfire Attack Level
BFRMP	Bushfire Risk Management Plan
BPL Map	Bushfire prone land map
BPMs	Bushfire Protection Measures
EP & A Act	Environmental Planning & Assessment Act 1979
FDI	Fire Danger Index
IPA	Inner Protection Area
LGA	Local Government Area
NCC	National Construction Code
NSW RFS	New South Wales Rural Fire Service
OPA	Outer Protection Area
PBP 2006	Planning for Bush Fire Protection 2006
RF Act	Rural Fires Act 1997
WSC	Wingecarribee Shire Council

Definitions

Asset Protection Zone:

An area surrounding a development managed to reduce the bushfire hazard to an acceptable level. The width of the required asset protection zone varies with slope, vegetation and Fire Danger Index (FDI). The asset protection zone ensures there is no fire path between the hazard and the building.

AS 3959-2009 Construction of buildings in bushfire-prone areas:

The relevant Australian Standard for bushfire prone construction detailing the deemed to satisfy construction provisions for building development in NSW assessed as BAL-12.5 to BAL-40.

Bushfire Attack:

Attack by burning embers, radiant heat or flame generated by a bushfire, which might result in ignition and subsequent damage to, or destruction of a building.

Bushfire Prone Land:

An area that is subject to, or likely to be subject to bushfire attack. In general, a bushfire prone area is an area mapped for a local government area that identifies the vegetation types and associated buffer zones. Bushfire prone land maps are prepared by local councils and certified by the Commissioner of the NSW RFS.

Bushfire Attack Level (BAL):

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 expressed in kilowatts per metre squared (kW/m²), and the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire.

Bush Fire Safety Authority

An approval of the Commissioner of the NSW RFS required for subdivision for residential or rural residential purpose or for a special fire protection purpose listed under section 100B (6) of the *Rural Fires Act*. This form of development is considered to be integrated development.

Fire Danger Index:

An index providing a determination of the chance of a fire starting, its rate of spread, its intensity and the difficulty of its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long and short-term drought effects.

Planning for Bush Fire Protection 2006:

Legislative planning guideline produced by the NSW Rural Fire Service detailing the specifications and requirements for bushfire prone development in NSW.

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PART 1. INTRODUCTION

1.1 *General Introduction*

Bushfire & Evacuation Solutions have been commissioned to provide a bushfire assessment report for a planning proposal to allow a dwelling entitlement on Lot 2 DP 854905 Park Avenue Aylmerton NSW (herein the '*subject property*').

This assessment considers the planning proposal based on the following;

- A site inspection of the subject property and study area undertaken September 2018;
- A review of the *Wingecarribee LEP 2010*;
- A review of the potential dwelling sites as provided by Lee Environmental Planning (refer Figure 2).

The subject property has been identified as being within (and bounded by), bushfire prone land. In this regard, the legislative requirements for development on bushfire prone lands are applicable.

The planning proposal is considered against the statutory requirements of the Environmental Planning and Assessment Act 1979 (EP & A Act) and specifically, the aim and objectives (specifications and requirements) provided within the NSW Rural Fire Service document '*Planning for Bushfire Protection, 2006*' (PBP).

1.2 *Aim and Objectives*

With reference to the statutory requirements of the EP & A Act and aim and objectives of PBP, this report seeks to:

- Determine whether future development of the site is capable of compliance with NSW statutory requirements for rural residential development on bushfire prone land;
- Assess the subject site in accordance with the site assessment methodology detailed in Appendix 2 and Addendum: Appendix 3 of PBP;
- Assess and identify the bushfire hazard and bushfire risk relevant to future/ proposed rural-residential development on the site;
- Determine the APZ/ separation distances relevant to each dwelling site and make recommendations on the most appropriate site in terms of minimizing disturbance to native vegetation;
- Prepare a Bush Fire Assessment Report which gives due consideration to the ecological and biodiversity values of the site;
- Determine whether the planning proposal is suitable in terms of meeting the aim and objectives of PBP.

PART 2. COMPLIANCE WITH THE RELEVANT LEGISLATION & PLANNING POLICIES

The legislation and statutory planning documents relevant to the planning proposal include the following:

2.1 *Compliance with Planning for Bush Fire Protection 2006*

PBP is the principal planning guideline relevant to bushfire planning for the development of bushfire prone land within NSW. It is referenced in the *Environmental Planning and Assessment Act 1979*, the *Ministerial Direction No. 4.4* and the *Rural Fires Act 1997*.

The aim of PBP is '*to use the NSW development assessment system to provide for the protection of human life (including firefighters) and to minimize impacts on property from the threat of bush fire, while having due regard to development potential, on-site amenity and protection of the environment*'

More specifically, the broad 'Objectives' of PBP are stated as follows:

- I) Afford occupants of any building adequate protection from exposure to a bush fire;
- II) Provide for adequate defensible space to be located around buildings;
- III) Provide appropriate separation between a hazard and buildings, which in combination with other measures, prevent direct flame contact and material ignition;
- IV) Ensure that safe operational access and egress for emergency services personnel and residents is available.
- V) Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in the APZ areas; and
- VI) Ensure that utility services are adequate to meet the needs of fire-fighters (and others assisting in bush fire-fighting).

Specific assessment of the sites ability to comply with the provisions of PBP is included in Sections 4.0, 5.0 and 7.0 of this report.

2.2 *Strategic Planning Guidelines*

Council's responsibilities include the mapping of 'bushfire prone land' (i.e. required under section 146 of the EP & A Act).

The subject property has already been mapped as 'bushfire prone land' (refer Section 4.1 – Bushfire Prone land map). Any future DA (beyond the planning proposal application) will be subject to the

standard development application process for development on bushfire prone land, including assessment under section 4.14 EP & A Act for infill development on bushfire prone land.

2.3 Wingecarribee Local Environmental Plan 2010

The objectives of Zone E3 (Environmental Management) as specified under WLEP 2010 are:

- To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values;
- To provide for a limited range of development that does not have adverse effect on those values;
- To encourage the retention of the remaining evidence of significant historic and social values expressed in existing landscape and land use patterns;
- To minimise the proliferation of buildings and other structures in these sensitive landscape areas;
- To provide for a restricted range of development and land use activities that provide for rural settlement, sustainable agriculture, other types of economic and employment development, recreation and community amenity in identified drinking water catchment areas;
- To protect significant agricultural resources (soil, water and vegetation) in recognition of their value to Wingecarribee's longer term economic sustainability.

Specific assessment of the sites ability to satisfy these objectives (in terms of future/ proposed development on bushfire prone land) is included in Section 4.0 and Section 5.0 of this report.

PART 3. DESCRIPTION OF THE PROPERTY

3.1 Property Details

3.1.1 Lot and deposited plan (DP) number of the subject property

Lots 2 DP 854905

3.1.2 Street address and locality map

Lot 2 Park Avenue Aylmerton



Figure 1: Site location/ context

3.1.3 Zoning of the subject land and any adjoining lands

The subject property and adjacent land is zoned E3 (Environmental Management) under Wollondilly Shire Council Local Environmental Plan (2010).

3.1.4 Description of the Subject Site & Planning Proposal

Lot 2 occupies approximately four (4) hectares of pastoral land located along the eastern margins of Aylmerton within the Wingecarribee LGA.

The site is vacant in terms of any existing building development and primarily contains pasture with scattered, remnant vegetation located principally within the southern portion of the property. Adjacent land to the south, west and north comprises established rural-residential development. The site is bordered to the east by Park Avenue and the Main Southern Railway line.

As advised by Lee Environmental Planning, Council are considering a planning proposal for the property that would allow a dwelling entitlement under its current zoning (i.e. E3). The dwelling sites considered for this assessment are based on a building envelope measuring 20 x 20 metres in area. These envelopes and are denoted in Figure 2 and Figure 6 as DE 1 and DE 2.

As part of its consideration, Council have requested that a bushfire assessment be undertaken to determine the most appropriate dwelling envelope in terms of having the least impact on existing vegetation on the site.

This assessment seeks to determine the minimum APZ extent surrounding each dwelling envelope as required to address the objectives of PBP for residential development (i.e. APZ based on 29kW/m²).



Figure 2: Dwelling sites under consideration (Source: Lee Environmental Planning)

Part 4 Bushfire Hazard Assessment

The following assessment is made in accordance with the assessment methodology outlined in Appendix 2 of PBP.

PBP Addendum: Appendix 3 (Section A3.5) specifies the following procedure for determining the level of bushfire attack:

- a). Determine the vegetation formations as follows:
 - I. Identify all vegetation types within 140 metres of the site using Keith. D. (2004 formations);
 - II. Classify the vegetation formations as set out in Table A2.1 in Appendix 2; and
 - III. Convert Keith to Specht classifications using Table A3.5.1.
- b). Determine the distance between each vegetation formation identified (from the edge of the foliage cover) and the building;
- c). Determine the effective slope of the ground for each vegetation group (slope classes are detailed on page 7 – PBP Addendum: Appendix 3).
- d). Determine the appropriate fire (weather) area in Table A2.3 and note the relevant Fire Danger Index (FDI).
- e). Match the relevant FDI, vegetation, distance and effective slope classes to determine the bushfire attack levels using the relevant tables of AS 3959-2009.

4.1 *Classification of vegetation in accordance with Keith. D (2004 Formations) out to 140m from the development*

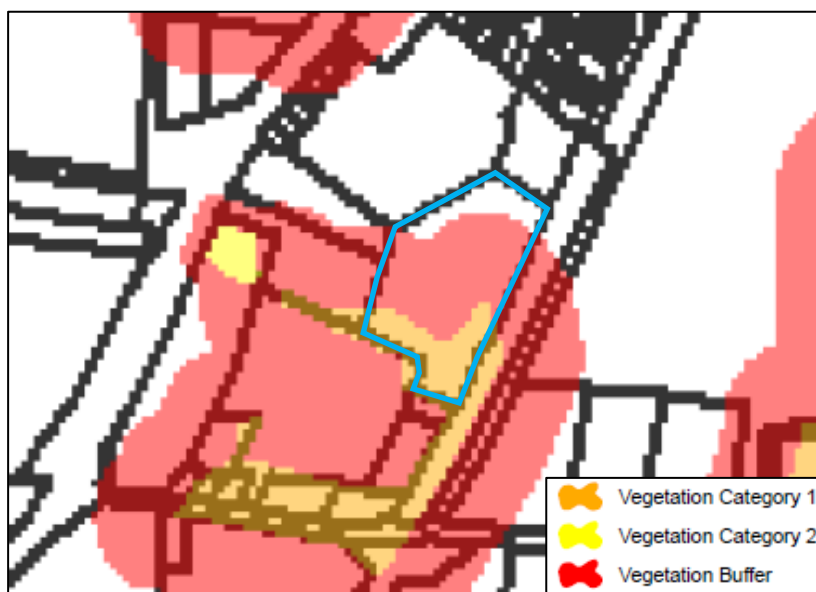


Figure 3: Extract: WSC bushfire prone land map

Vegetation extent (bushfire hazard) within the study area is derived from aerial photo interpretation (API) and an inspection of the subject property and surrounds. The area/s of vegetation considered as a hazard and subsequent threat to the site is summarised as follows:

Table 1.0: Vegetation (hazard) located within the study area

Direction from dwelling sites	Primary Vegetation (hazard) Formation (Keith 2004 Formations)	Comment
South	Grassy woodlands (Woodlands)	The primary hazard affecting the proposal is that located within the southern portion of the site. This area is consistent with the description given in PBP (Table A2.1 – Keith formations) for Grassy woodlands (Woodlands).
North/ Northeast	‘Remnant’ vegetation (modelled as ‘rainforest’ in terms of relevant fuel loads under PBP)	Remnant parcels of woodland vegetation (i.e. <0.5 hectares) remain within the northeast corner of the site and adjacent property to the north. These parcels satisfy the criteria of PBP (Section A2.3) for remnant vegetation in terms of either measuring <1 Ha in area and/ or supporting a fire run of <50 metres in a direction towards the development site.
Remainder of subject property outside the hazard areas identified above	Grassland	The remainder of the site is predominantly pasture (with a few/ scattered individual trees). In recognition of the potential for grassfire spread, the remainder of the site is assessed as a ‘grassland’ hazard.

PBP (A2.3) states the following regarding areas considered to be a non-hazard:

‘For the purposes of assessment, the following are not considered to be a hazard or as a predominant vegetation class/formation and can be included within an asset protection zone;

- *Non-vegetated areas including roads, footpaths, cycle ways, waterways, buildings, rocky outcrops and the like; and*
- *Reduced vegetation including maintained lawns, golf course fairways, playgrounds or sports fields, vineyards, orchards, cultivated ornamental gardens and commercial nurseries’.*

Outside of the hazard areas identified in Table 1.0, adjacent (developed) rural-residential properties to the south, west and north are considered as managed land in terms of this assessment.



Plate 1: Woodland across southern portion of site



Plate 2: Pasture/ scattered trees across centre of site



Figure 4: Bushfire hazard vegetation providing a risk to subject site

4.2 Assessment of the effective slope to a distance of 100m

The effective slope is the gradient within the hazard which will most significantly influence fire behaviour, determined over a distance of at least 100 metres from the development site. In this instance, the relevant gradient has been determined using Department of Lands SIX Mapping (displaying 10 metre contours) and via observations made during the site inspection. The effective slope influencing bushfire behaviour is assessed as:

Slope Transect 1 (south):

- >0 – 5 degrees down slope: underlying the woodland hazard.

Slope transect 2 (southeast):

- >10 – 15 degrees down slope: underlying the grassland hazard.

Slope transect 3 (east):

- >5 – 10 degrees down slope: underlying the remnant hazard.

Slope transect 4 (north/ west):

- Upslope/ flat 0 degrees: underlying the remnant and grassland hazard areas.

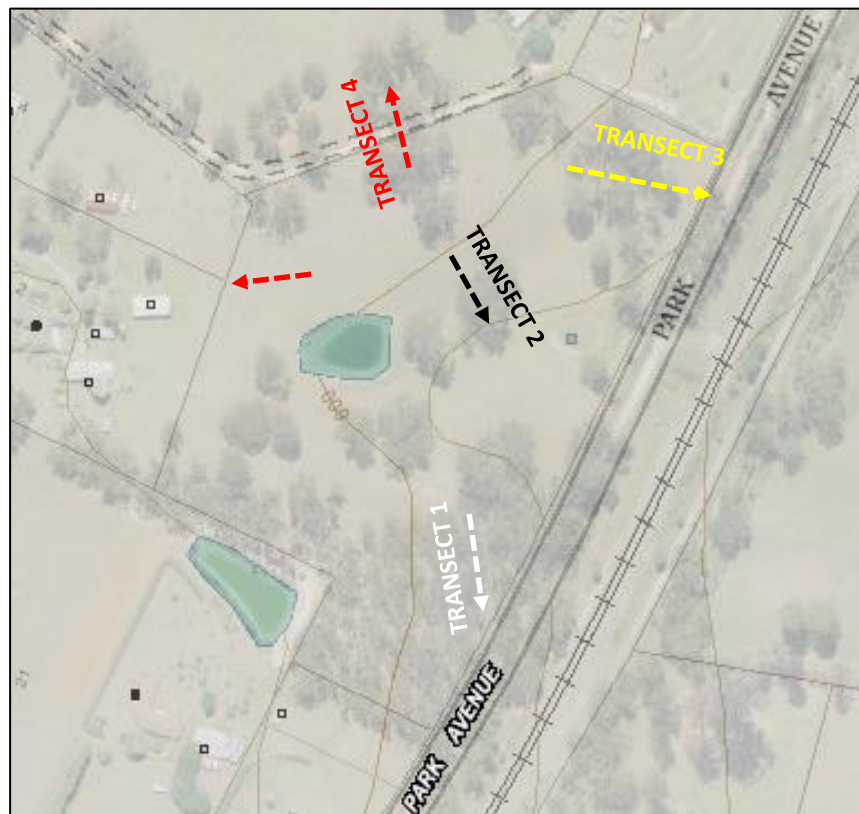


Figure 5: Effective slope relevant to each hazard area

4.3 Determination of Fire Weather (FDI) relevant to the Wollondilly LGA

Wingecarribee Shire Council LGA is designated as potentially having an **FDI of 100** as a 1:50 year event (PBP Appendices 2 – Table A2.3).

4.4 Determination of Asset Protection Zones

An asset protection zone (APZ) is a buffer zone located between a bushfire hazard and buildings. This area is managed to minimise fuel loads and reduce potential radiant heat levels, flame, ember and smoke attack at the building elevation.

The intent of measures of PBP for new residential building development includes provision of a minimum APZ based on 29kW/m². The APZ/ separation distances required to achieve this outcome are given in Table 2.0 (over page).

Table 2.0: Minimum/ Required APZ based on 29kW/m^2 (i.e. BAL-29 in accordance with AS 3959-2009 Table 2.4.2)

Vegetation Classification	Direction from Dwelling Sites	Effective Slope (under vegetation)	APZ/Separation (BAL-29 AS 3959-2009)
Woodland	South	$>0 - 5^\circ$ down slope	21m
Grassland	West	Upslope/ flat 0°	9m
	South/ Southeast	$>10 - 15^\circ$ down slope	13m
Remnant	North	Upslope/ flat 0°	11m
	East	$>5 - 10^\circ$ down slope	18m



Figure 6: Recommended APZ surrounding each dwelling site

Note: As a considered opinion (and with reference to the above assessment), DS 1 is most appropriate in terms of the required APZ having the least impact on existing vegetation on the site.

PART 5 BUSHFIRE PROTECTION ASSESSMENT

5.1 *Asset Protection Zones (APZ's)*

The assessment given in Section 4.4 of this report demonstrates the suitability of DS 1 in terms of addressing the APZ requirements of PBP and minimizing impact on vegetation in accordance with E3 zoning objectives under WLEP 2010.

The planning proposal is therefore considered suitable in terms of compliance with PBP APZ requirements.

5.2 *Access*

The subject property has road frontage to Park Avenue and the potential dwelling sites are within 150 metres of this road. As a considered opinion, the site is suitable in terms of being able to address the acceptable solutions of PBP (section 4.1.3 Access (2) – Property Access) which include:

- *At least one alternative property access road is provided for individual dwellings that are located more than 200 metres from a public through road.*
- *A minimum carriageway width of four meters for rural-residential areas or rural landholdings with a distance greater than 70 meters from the nearest hydrant point to the most external part of a proposed building (or footprint).*
- *The cross fall is not more than 10 degrees.*
- *A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches.*
- *Internal roads for rural properties provide a loop road around any dwelling or incorporate a turning circle with a minimum 12 metre outer radius.*
- *Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads.*
- *The minimum distance between inner and outer curves is six metres*
- *Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.*

5.3 *Construction Standards - Future Building Development*

The construction standards of 'AS3959–2009 Construction of buildings in Bushfire Prone Areas' will apply for future residential development of the site.

The APZ/separation distances determined by this report indicate that an APZ based on 29kW/m² can be suitably provided separating the dwelling site from the adjacent bushfire hazard.

Where this APZ is provided, the deemed-to-satisfy bushfire construction standards required for BAL-29 construction (i.e. AS 3959-2009 sections 3 and 7) will apply.

5.4 Water and Services

The subject property is located within a non-reticulated water supply area. Provision of a static water supply maintained for fire-fighting in accordance with the provisions of PBP (Section 4.3.5) will be required as a condition of consent for any new dwelling application on the site.

Power transmission lines external to the site are located above ground. As a considered opinion, the acceptable solutions of PBP relating to the safe installation of utilities (electricity and gas) can be suitably incorporated for any future development on the site.

5.5 Emergency Planning

The existing Emergency Management Plan for the Wingecarribee LGA would reasonably be expected to provide a suitable level of emergency response for future development on the subject site. This plan includes measures designed to ensure that the safety and evacuation of local residents can be undertaken in accordance with the emergency planning principles noted in PBP.

5.6 Landscaping/ Vegetation Management

Section 4.4 of this report demonstrates that the required APZ's can be provided for within the subject property. In perpetuity management of the minimum/ required APZ will be subject to the conditions of consent granted for future residential dwelling development on the site.

As a considered opinion, the planning proposal is suitable in terms of compliance with PBP APZ requirements and on-going landscape/ vegetation management on the subject property.

5.7 Wollondilly/ Wingecarribee Bushfire Risk Management Plan (WBFRMP)

The WBFRMP (2017) was prepared by the Wollondilly/ Wingecarribee Bushfire Management Committee in accordance with the legislative requirements of Part 3 Division 4 of the RF Act. It is a strategic document that identifies community assets at risk and sets out a five-year program of coordinated multi-agency treatments designed to reduce the risk of bushfire to these assets.

The subject property is not identified under the WBFRMP as requiring specific treatments.

PART 6 **RECOMMENDATIONS**

- I. That Dwelling Site 1 (DS 1 as denoted in Figure 2 and Figure 6 of this report) is most appropriate in terms of the required APZ having the least impact on existing vegetation on the site.
 - II. That an APZ based on 29kWm^2 as determined in Section 4.4 of this report is incorporated (as a minimum) for any future dwelling development on the site.
-

PART 7 COMPLIANCE WITH PBP OBJECTIVES FOR SFPP DEVELOPMENT

The planning proposal has been assessed with reference to the objectives of PBP (Section 1.1) for development on bushfire prone land:

PBP 2006 Specific Objective	Assessment / Comment
<i>(i) afford occupants of any building adequate protection from exposure to a bush fire</i>	Where the APZ recommendations of this report are applied in combination with other (required) bushfire protection measures, future occupants of the site would be afforded the benefit of bushfire protection 'measures in combination'.
<i>(ii) provide for a defensible space to be located around buildings</i>	Where the APZ recommendations of this report are reasonably and adequately incorporated, a defensible space will be maintained surrounding any future dwelling envelope.
<i>(iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition</i>	This assessment has shown that an APZ based on 29kW/m ² is achievable on the subject property for the proposed dwelling site. Future building development can therefore be afforded appropriate separation to prevent direct flame contact and material ignition.
<i>(iv) ensure that safe operational access and egress for emergency service personnel and residents is available</i>	Provision of safe property access in accordance with the acceptable solutions of PBP will be applied as part of the development consent for a future application for dwelling approval on the subject property.
<i>(v) provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ)</i>	In perpetuity management of bushfire protection measures will be applied as part of the development consent for a future application for dwelling approval on the subject property.
<i>(vi) ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire-fighting)</i>	Provision of utility services in accordance with the acceptable solutions of PBP will be applied as part of the development consent for a future application for dwelling approval on the subject property.

PART 8 **CONCLUSION**

This assessment has considered the planning proposal application with due regard to the required legislation and policies relevant to a planning proposal on bushfire prone land.

The site plan provided by Lee Environmental Planning has been reviewed as the basis for this assessment and has been assessed with reference to the relevant bushfire planning policies and guidelines. More specifically, the site plan has been assessed in accordance with the site assessment methodology for the determination of asset protection zones as detailed in PBP and PBP Addendum: Appendix 3.

Based on this review, this assessment confirms that an APZ based on 29kW/m² can be suitably provided on the subject property. The dwelling site and associated APZ having the least impact on vegetation on the site is assessed as Dwelling Site 1 (DS 1).

It should be noted that future/ proposed rural-residential development on site will be subject to further assessment under *section 4.14 of the Environmental Planning and Assessment Act 1979*.

Should any of the above information require clarification or further discussion, please contact the undersigned.



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Addendum: Appendix 3 - Planning for Bushfire Protection. A guide for councils, planners, fire authorities and developers (2010) – NSW Rural Fire Service.

Standards for Asset Protection Zones – NSW Rural Fire Service

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