Planning For Bushfire Protection

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Reference: 1299-R
21/06/2020

Bushfire Risk Assessment

In relation to

Proposed Development at

No 45 Oxford Falls Road, Beacon Hill

This Assessment has been prepared and Certified by: Ronald Coffey
BPAD – A, Level 3, Certified Practitioner
FPAA Cert. No: BPD-PA 09328

This assessment confirms that the proposal conforms to the specifications and requirements, that are relevant to the development, of the version (as prescribed by the regulations) of the document entitled Planning for Bushfire Protection prepared by the NSW Fire Service in co-operation with the NSW Department of Planning.

Contents:

Introduction

The purpose of this report is to provide a bushfire risk assessment for the proposed development of a one into two lot subdivision at No 45 Oxford Falls Road, Beacon Hill.

In accordance with section 146 of the Environmental Assessment Legislation Amendment Act 2007 [EP&A Act] the subject site has been identified as bush fire prone land and the legislative requirements for building and development on bushfire prone lands are applicable.

This assessment will address each of the heads of consideration listed under Clause 44 of the Rural Fires Regulation 2008 to provide them with the necessary information to allow for the issue of a Bushfire Safety Authority pursuant to the provisions of Section 100B of the *Rural Fires Act 1997*.

This assessment includes an analysis of the hazard, threat and subsequent risk to the development proposal and provides recommendations that satisfy the Objectives and Performance requirements of the Building Code of Australia, Planning for Bushfire Protection and Australian Standard AS3959, 2009.

This report will demonstrate that the proposed development can comply with the Specific Objectives for Subdivision in accordance with the requirements of PBP and therefore qualifies for a Bushfire Safety Authority.

Additionally, this report will include a recommended construction level and consider bushfire mitigation measures in combination for the existing dwelling on proposed lot 1 and the proposed new dwelling on proposed lot 2.

1) Description of the Subject Property

a) Description

The development site is an existing residential lot facing north onto Oxford Falls Road and is accessed by way of an access driveway off Dareen Street, Beacon Hill.

The total site area is 1.126m^2.

	**Figure 1** The adjacent image is of the subject site viewed from Oxford Falls Road. The image gives the impression the site is overgrown with vegetation; however, a site inspection confirmed only the verge and escarpment require some maintenance.
	**Figure 2** The adjacent image is the access driveway to the subject site off Dareen Street.

b) Location

No 45 Oxford Falls Road, Beacon Hill

Lot 1, DP 206 629

LGA – Northern Beaches Council

b) Zoning of Proposed Development Site and Adjoining Properties

The site is zoned R2 – Low Density Residential

Properties adjoining south, east and west boundaries of the subject site are similarly zoned R2 – Low Density Residential. Across Oxford Falls Road to the north properties are zoned DM [Zone Description – Deferred Matter]

c) Development Proposal and Building Classifications

The proposal is for a one into two lot subdivision of No 45 Oxford Falls Road. Beacon Hill. The proposal includes some alterations and additions to the existing class 1a dwelling on proposed lot 1 and a new class 1a dwelling and class 10a carport on proposed lot 2.

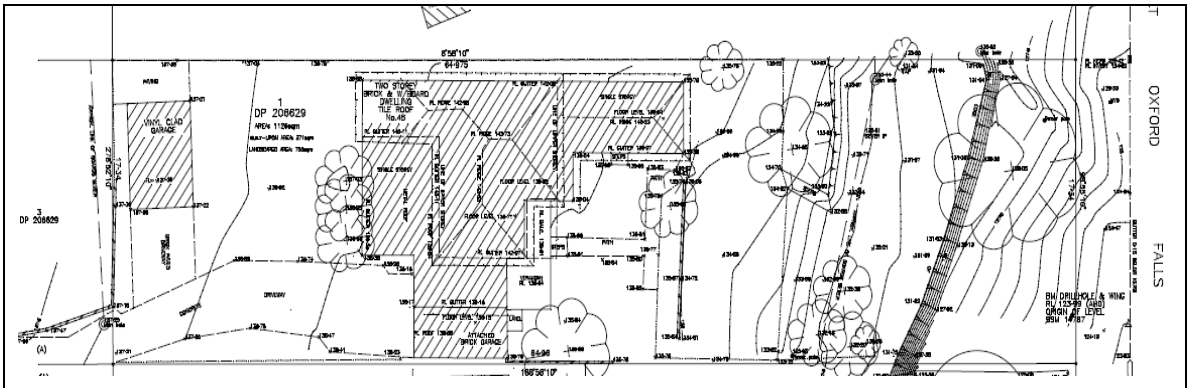

Figure 3 The above image is a recent survey plan. The proposal includes the removal of a section of the existing Class 1a dwelling to provide site coverage and boundary setbacks in accordance with council requirements.

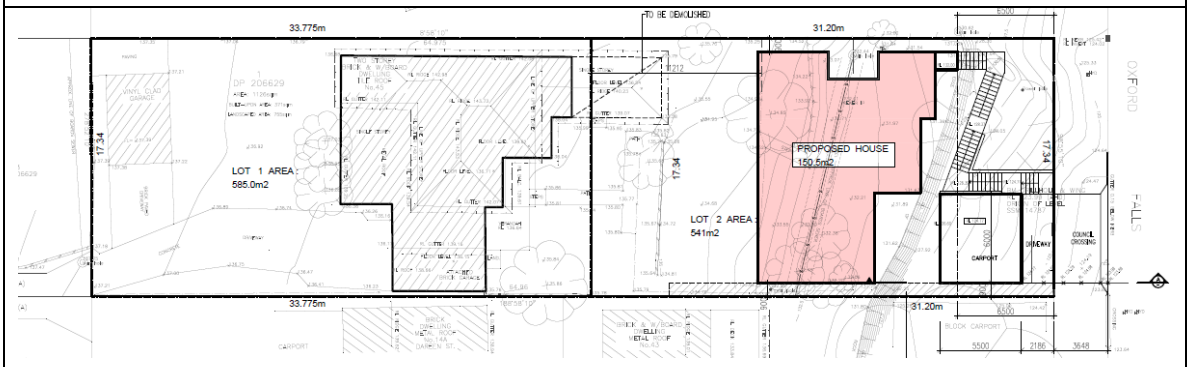

Figure 4 The above image is the proposed plan of the two newly created lots.
The siting and dimensions of the proposed new dwelling [highlighted], the new access driveway and carport are detailed on this plan.

2) Classification of the Vegetation on and surrounding the Site

The site is developed and maintained.

Figure 5
Aerial and BFPLM

South, East and West: Properties south east and west of the subject site for more than 100m are developed and maintained.

North: 90m north of the subject site, along the either side of Oxford falls Road, is an area of vegetation considered a hazard. With reference to PBP and the bushfire prone land map for the area, the vegetation structure is forest.

3) Assessment of Slope on and surrounding the Site

The site slopes downslope from north to south and is generally level across the site from east to west.

Slope away from the development site:

- North: Effective slope - 0-5 degrees upslope
- South: upslope
- East: 0-5 degrees downslope
- West: upslope

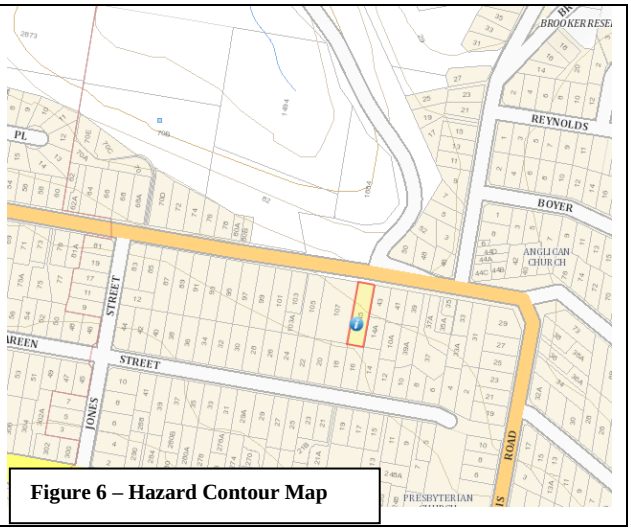

Figure 6 – Hazard Contour Map

4) Identification of Significant Environment Features

A statement of environmental effects has been provided and no significant environmental features have been identified.

5) Threatened Species Identification

The statement of environmental effects concludes there are no environmental instruments applying to the site.

6) Aboriginal Relic or Place detail and Location known to exist on the property

There has been no Aboriginal Relic or Place detail identified on the site.

7) Bushfire Risk Assessment

7a) the extent to which the development is to provide for setbacks, including Asset Protection Zones

This Bushfire Assessment includes Table 1, 2 and 3 which summarize the extent to which the development is to provide for setbacks, including asset protection zones and minimum construction standards.

Table 1: Reference to 'Planning for Bushfire Protection 2019' Table A1.12.2 Minimum Specifications for Asset Protection Zones for residential developments in bushfire prone areas.

Direction	Distance of asset protection zone from subject site	Vegetation classification	Effective slope away from the development	Required asset protection zone with reference to Table A2.4
North	90m	Forest	upslope	24m
South	>140m	Developed sites	upslope	n/a
East	>140m	Developed sites	downslope	n/a
West	>140m	Developed sites	upslope	n/a
Summary: Asset protection zones can be provided in excess of the requirements of Table A1.12.2 Planning for Bushfire Protection 2019				

Table 2: Construction Standard Lot 1: Reference PBP Table A1.12.5

Determination of Category of Bushfire Attack for the site and subsequent required building standards for proposed Lot 1.

Direction	Distance of APZ from proposed lot 1	Vegetation Classification	Assessment of Effective Slope	Anticipated Radiant heat	Bushfire Attack Level (BAL)
North	>100m	Developed sites	Upslope	Low	BAL Low
South	>140m	Developed sites	upslope	n/a	Low
East	>140m	Developed sites	0-5 degrees downslope	n/a	Low
West	>140m	Developed sites	upslope	n/a	Low
The entire site and existing building are not within the 100m buffer zone, the bushfire attack level is 'Low' and in accordance with section 2.2.3.2 and Table 3.1 of AS3959, 2018, and A1.12.5 of PBP 2019 there is insufficient risk to warrant specific construction requirements.					

Table 3: Construction Standard Lot 2: Reference PBP Table A1.12.5

Determination of Category of Bushfire Attack for the site and subsequent required building standards for proposed Lot 2.

Direction	Distance of APZ from proposed lot 2	Vegetation Classification	Assessment of Effective Slope	Anticipated Radiant heat	Bushfire Attack Level (BAL)
North	90m	Forest	Upslope	<12.5 kw/m2	BAL 12.5
South	>140m	Developed sites	upslope	n/a	Low
East	>140m	Developed sites	$0\text{-}5^0$ downslope	n/a	Low
West	>140m	Developed sites	upslope	n/a	Low
Summary: Based upon the relevant provisions of PBP the anticipated radiant heat attack for the site is <12.5 kw/m2 and the subsequent minimum construction standard is BAL 12.5 AS3959, 2018.					

7b) Siting and adequacy of water supplies for fire fighting

The area has a reticulated water supply; however, the closest hydrant is >70m from the most distant part of proposed lot 1. This assessment will include a recommendation that a minimum dedicated water supply required for firefighting purposes shall be provided for proposed lot 1 in accordance with Table 5.3d of PBP.

7c) the capacity of public roads in the vicinity to handle increased volume of traffic in an emergency

The public roads in the vicinity of the subject site are all two way, with no restrictions to impede the flow of traffic and appear to be adequate to handle increased traffic in an emergency.

7d) Whether or not public roads in the vicinity that link with the fire trail network have two-way access

The are no known fire trails in the immediate vicinity; however, this is not an issue as the proposed development has direct access to public roads.

7e) the adequacy of arrangements for access to and egress from the development site for the purpose of an emergency response

The proposed development has direct access to adjoining public roads and access and egress for emergency vehicles and evacuation appears adequate. The exiting driveway to lot1 from Dareen Street has provided effective access and egress for more than 50 years and proposed lot 2 will have a new access provided directly off Oxford Falls Road.

7f) the adequacy of bushfire maintenance plans and fire emergency procedures for the development site

Bushfire maintenance plans: The entire of the both newly created lots shall be landscaped and managed in accordance with asset protection zone requirements of PBP. A bushland management & maintenance plan have not been recommended.

Fire emergency procedures for the site consist of passive fire protection measures that provide a safe refuge, defendable space, asset protection zones and adequate access and egress paths for occupants and fire-fighting authorities. The need to formulate an emergency evacuation plan has been discussed and it is advised that the residents should complete a *Bush Fire Survival Plan* as formulated by the NSW Rural Fire Service. An emergency evacuation plan is not recommended as a condition of consent.

7g) the construction standards to be used for building elements in the development

Construction standards have been determined [Ref. Table 2 and 3 of this report] in accordance with the requirements of PBP.

The proposed construction standard for the existing dwelling on lot 1 is BAL Low and BAL 12.5 for proposed Lot 2.

7h) the adequacy of sprinkler systems and other fire protection measures to be incorporated into the development

A sprinkler system is not required and not recommended.

Bushfire specific fire protection measures that have been addressed include:

- Asset protection zones that satisfy the requirements of chapter 5 of PBP and provide appropriate defendable space for fire-fighting authorities.
- Construction standards that do not deviate from the requirements of PBP.
- Access and egress paths designed, established, and maintained that are adequate to provide safe and effective evacuation from the site.
- Preparation of a Bushfire Survival Plan in accordance with the NSW RFS Guidelines.
- Water and utility services that shall comply with the requirements of 5.3d of PBP.

8) Assessment of the extent to which the development proposal conforms or deviates from the specifications set out in Chapter 5 of Planning for Bushfire Protection 2019

Performance Criteria	Acceptable Solutions	Meets Performance Criteria
The intent may be achieved where:		
In relation to APZ's: - Defendable space is provided - An APZ is provided and maintained for the life of the building. - The separation provided by the APZ is such that radiant heat levels at any point on a proposed building will not exceed 29kw/m2	Defendable space is provided on all sides of existing and proposed buildings Asset protection zones are provided partially on site and by adjoining development and public roads. The separation between the hazard and proposed development is in excess of the requirements of Table A1.12.2 of PBP	Yes

In relation to siting and design: Buildings are sited and designed to minimise the risk of bushfire attack	The siting of the buildings shall be determined in accordance with local council requirements and no advantage could be gained by recommending a re-siting.	Yes
In relation to construction standards: It is demonstrated that the proposed building can withstand bushfire attack in the form of wind, smoke, embers, radiant heat and flame contact.	Construction standards have been recommended in accordance with the requirements of PBP	Yes
In relation to access requirements: Safe operational access is provided [and maintained] for emergency services personnel in suppressing a bushfire while residents are seeking to relocate, in advance of a bushfire.	The access and egress requirements have been designed to provide safe and effective evacuation from the subject site and appear to be adequate for fire brigade personnel and firefighting equipment.	Yes
In relation to water and utility services: - Adequate water and electricity services are provided for fire-fighting operations - gas and electricity services are located so as to not contribute to the risk to a building	The area has reticulated water supply and the nearest street hydrant is within the minimum required distance from the most distant point of lot 2 in accordance with the requirements of PBP and AS2419.1 2005. Additional water supplies are recommended for Lot 1. This report shall recommend compliance with PBP 7.4a for services including electricity and gas.	Yes
In relation to landscaping: It is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind driven embers to cause ignitions	The development application shall include recommendations that the entire site is managed in accordance with Inner Protection Area requirements of PBP. This will ensure the landscaping on the entire site complies with the principles of Appendix 4 of PBP.	Yes
In relation to Emergency and Evacuation Planning: The intent of emergency and evacuation planning is to ensure occupants are aware of the need to prepare adequately for any bushfire emergency.	The need to formulate an emergency evacuation plan has been discussed; however, an emergency evacuation plan is not recommended as a condition of consent.	Yes

9) Recommendations

The following recommendations are made for the bushfire protection measures for the Proposed Residential Development of a one into two lot subdivision at No 45 Oxford Falls Road, Beacon Hill. The proposal includes some alterations and additions to the existing Class 1a dwelling on proposed lot 1 and a new Class 1a dwelling and Class 10a carport on proposed lot 2. The recommendations are based upon the relevant provisions of the NSW Rural Fire Service guideline entitled *Planning for Bushfire Protection 2019.*

1) Bushfire Safety Authority: The proposed development complies with the Specific Objectives for subdivision in accordance with the requirements of PBP and therefore qualifies for a Bushfire Safety Authority.
2) Construction Standard Lot 1: The entire of the existing building and the proposed alterations and additions are not within the 100m buffer zone, the bushfire attack level is 'Low' and in accordance with section 2.2.3.2 of AS3959, 2018 and A1.12.5 of PBP 2019 there is insufficient risk to warrant specific construction requirements.
3) Construction Standard Lot 2:The proposed development shall be constructed to a minimum standard of Section 3 [construction general] and Section 5 [BAL 12.5] of AS3959, 2018 *'Construction of Buildings in Bushfire Prone Areas'* and the additional construction requirements contained within section 7.5, 7.51, 7.52, 7.53 and 7.54 [where applicable] of Planning for Bushfire Protection 2019.
4) Sarking: To comply with the NSW State variation any sarking used for BAL 12.5 shall be Non-combustible or Comply with AS/NZ 4200.1, be installed on the outside of the frame and have a flammability index of not more than 5 as determined by AS1530.2
5) Electricity and Gas Supplies: As far as practical, new electricity and gas supplies shall be installed in accordance with the requirements of 7.4a of PBP. Note: 7.4a of PBP requires that '*where practical, electrical transmission lines should be underground.'* and '*the location of gas services will not lead to ignition of surrounding bushland or the fabric of the building'*
6) PBP 2019 - 8.3.2 Class 10a and 10b structures: *The NCC defines a Class 10 building as a non-habitable building or structure such as:*

a) *Class 10a – a non-habitable building being a private garage, carport, shed or the like; or*

b) *Class 10b – a structure being a fence, mast antenna, retaining wall or free-standing, swimming pool. Or the like; or*

c) *Class 10c – a private bushfire shelter*. There is no bushfire protection requirement for Class 10a and 10b structures located more than 6m from a dwelling in bushfire areas. Where a Class 10a and 10b structure is located within 6m of a dwelling it must be constructed in accordance with the NCC. In this instance the proposed carport is within 6m of the main building and shall be constructed to BAL 12.5 AS3959, 2018.

This assessment recommends that all 10b structures within 6m of a dwelling shall be constructed of non-combustible materials

7) Fences and Gates: All fences in bushfire prone areas shall be constructed of hardwood or non-combustible material; however, where a fence is within 6m of a building or in areas of BAL29 or greater, they shall be of non-combustible material only.

8) Asset Protection Zones: At the commencement of building works and in perpetuity, the entire property shall be managed as an inner protection area as outlined within PBP and the NSW RFS document 'Standards for asset protection zones.'

The following points are a guide to Inner Protection area requirements.

The Inner Protection Area should comprise of the following:

- Minimal fine fuel on the ground.
- Vegetation that does not provide a continuous path to the building for the transfer of fire.
- Shrubs and trees that do not form a continuous canopy and vegetation is planted in clumps rather than continuous rows.
- Species that retain dead material or deposit excessive quantities of ground fuel are avoided.

- Shrubs and trees are pruned so that they do not touch or overhang the building; and
- Vegetation is located far enough away from the building so that plants will not ignite the building by direct flame contact or radiant heat emission.

9) Emergency and Evacuation Planning: The need to formulate an emergency evacuation plan has been discussed and it is advised that the residents should complete a *Bush Fire Survival Plan* as formulated by the NSW Rural Fire Service.

   An emergency evacuation plan is not recommended as a condition of consent.

10) Water Supplies Lot 2: Reticulated water supply is located on the adjoining road at regular intervals and is easily accessible. No additional water supplies have been recommended.

11) Water Supplies Lot 1: In recognition that reticulated water supply exists, but the closest hydrant is >70m from the most distant part of the existing dwelling, a 5,000 litre water supply tank and a minimum of 3kW (5hp) petrol or diesel-powered pump shall be provided. A 65mm Storz fitting and ball or gate valve shall be installed in the tank. The water supply tank, if located externally, shall be constructed of non-combustible material [metal or masonry]. There is no requirement for the tank to be a dedicated water supply.

10) Summary

This report consists of a bushfire risk assessment for the proposed development of a one into two lot subdivision at No 45 Oxford Falls Road, Beacon Hill. The proposal includes some alterations and additions to the existing Class 1a dwelling on proposed lot 1 and a new Class 1a dwelling and Class 10a carport on proposed lot 2.

The report concludes that the development is on bushfire prone land and the legislative requirements for development in bushfire prone areas are applicable.

This report has demonstrated that the proposed development can comply with the Specific Objectives for Subdivision in accordance with the requirements of PBP and therefore qualifies for a Bushfire Safety Authority.

This report has considered all the elements of bushfire attack and provided new buildings are constructed in accordance with the recommendations included in section 9 of this report, the development is considered to satisfy the Objectives and Performance requirements of the Building Code of Australia, Planning for Bushfire Protection 2019 and Australian Standard AS3959, 2018.

Notwithstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small always remains, and although the standard is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.

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Grad I Fire E [Institute of Fire Engineers - 1973]
Grad Cert Fire Safety Eng [UWS - 2003]
Grad Dip Building in Bushfire Prone Areas [UWS – 2005]
Ass Prof Cert in Expert Evidence in the Land & Environment Court [UTS – 2005]
Corporate Member - Institute of Fire Engineers
Member - Fire Protection Association Australia

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Planning for Bushfire Protection
Fire Protection Association of Australia
BPAD-A Certified Practitioner/Certified Business Certification No BPD-PA09328
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14) References

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Report Version 1.1
11th February 2002

Appendix 1: Performance criteria and acceptable solutions PBP Part 7.4a

ACCESS

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
The intent may be achieved where:	
firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	property access roads are two-wheel drive, all-weather roads.
the capacity of access roads is adequate for firefighting vehicles.	the capacity of road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes), bridges and causeways are to clearly indicate load rating.
there is appropriate access to water supply.	hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005; There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.
firefighting vehicles can access the dwelling and exit the property safely.	at least one alternative property access road is provided for individual dwellings or groups of dwellings that are located more than 200 metres from a public through road; There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. In circumstances where this cannot occur, the following requirements apply: minimum 4m carriageway width; in forest, woodland and heath situations, rural property roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m, at the passing bay; a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; property access must provide a suitable turning area in accordance with Appendix 3; curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; the minimum distance between inner and outer curves is 6m; the crossfall is not more than 10 degrees; maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and a development comprising more than three dwellings has formalised access by dedication of a road and not by right of way. Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.

WATER SUPPLIES

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
The intent may be achieved where:	
an adequate water supply is provided for firefighting purposes.	reticulated water is to be provided to the development, where available; and a static water supply is provided where no reticulated water is available.
water supplies are located at regular intervals; and the water supply is accessible and reliable for firefighting operations.	fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005; hydrants are not located within any road carriageway; and reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.
flows and pressure are appropriate.	fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
the integrity of the water supply is maintained.	all above-ground water service pipes external to the building are metal, including and up to any taps.
a static water supply is provided for firefighting purposes in areas where reticulated water is not available.	where no reticulated water supply is available, water for firefighting purposes is provided in accordance with Table 5.3d; a connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure; 65mm Storz outlet with a ball valve is fitted to the outlet; ball valve and pipes are adequate for water flow and are metal; supply pipes from tank to ball valve have the same bore size to ensure flow volume; underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank; a hardened ground surface for truck access is supplied within 4m; above-ground tanks are manufactured from concrete or metal; raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F of AS 3959); unobstructed access can be provided at all times; underground tanks are clearly marked; tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters; all exposed water pipes external to the building are metal, including any fittings; where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bush fire attack; any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and fire hose reels are constructed in accordance with AS/NZS 1221:1997, and installed in accordance with the relevant clauses of AS 2441:2005.

ASSET PROTECTION ZONES

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
The intent may be achieved where:	
APZs are provided commensurate with the construction of the building; and A defendable space is provided.	an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.
APZs are managed and maintained to prevent the spread of a fire to the building.	APZs are managed in accordance with the requirements of Appendix 4 of PBP.
the APZ is provided in perpetuity. APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	APZs are wholly within the boundaries of the development site. APZ are located on lands with a slope less than 18 degrees.
Home-based child care: the building must not be exposed to radiant heat levels exceeding 29kW/m² (1090K).	an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.

LANDSCAPING

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
The intent may be achieved where:	
landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	compliance with the NSW RFS *'Asset protection zone standards'* (see Appendix 4); a clear area of low-cut lawn or pavement is maintained adjacent to the house; fencing is constructed in accordance with section 7.6; and trees and shrubs are located so that: the branches will not overhang the roof; the tree canopy is not continuous; and any proposed windbreak is located on the elevation from which fires are likely to approach.

EMERGENCY MANAGEMENT

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
Home-based child care: a bush fire emergency and evacuation management plan is prepared.	a Bush Fire Emergency Management and Evacuation Plan is prepared by the operator consistent with the NSW RFS publication: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan*, and the AS 3745:2010.

Note: the above specifications and requirements apply in relation to residential infill developments but may be used to guide the application of BPMs for 'other' developments (see Chapter 8).

ELECTRICITY SERVICES

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
The intent may be achieved where:	
location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	where practicable, electrical transmission lines are underground; and where overhead, electrical transmission lines are proposed as follows: lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 *Guideline for Managing Vegetation Near Power Lines.*

GAS SERVICES

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used; all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side; connections to and from gas cylinders are metal; polymer-sheathed flexible gas supply lines are not used; and above-ground gas service pipes are metal, including and up to any outlets.

CONSTRUCTION STANDARDS

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
the proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.	BAL is determined in accordance with Tables A1.12.5 to A1.12.7; and construction provided in accordance with the NCC and as modified by section 7.5 (please see advice on construction in the flame zone).
proposed fences and gates are designed to minimise the spread of bush fire.	fencing and gates are constructed in accordance with section 7.6.
proposed Class 10a buildings are designed to minimise the spread of bush fire.	Class 10a buildings are constructed in accordance with section 8.3.2.
Home-based child care: the proposed building can withstand bush fire attack in the form of wind, localised smoke, embers and expected levels of radiant heat.	an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1 of this document around the entire building or structure, and the existing dwelling is required to be upgraded to improve ember protection. This is to be achieved by enclosing or covering openings with a corrosion-resistant steel, bronze or aluminium mesh with a maximum aperture of 2mm. Where applicable this includes the openable portion of the windows, vents, weepholes and eaves, but does not include roof tile spaces. Weather strips, draught excluders or draught seals shall be installed at the base of side hung external doors as per AS 3959. The subfloor space must be enclosed.

Appendix 2: 7.5.2 NSW State Variations under G5.2(a)(i) and 3.10.5.0(c)(i) of the NCC
Certain provisions of AS 3959 are varied in NSW based on the findings of the Victorian Bush Fires Royal Commission and bush fire industry research.
The following variations to AS 3959 apply in NSW for the purposes of NSW G5.2(a)(i) of Volume One and NSW 3.10.5.0(c)(i) of Volume Two of the NCC; clause 3.10 of AS 3959 is deleted and any sarking used for BAL-12.5, BAL-19, BAL-29 or BAL-40 shall:

- be non-combustible; or
- comply with AS/NZS 4200.1, be installed on the outside of the frame and have a flammability index of not more than 5 as determined by AS 1530.2; and
- clause 5.2 and 6.2 of AS 3959 is replaced by clause 7.2 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and
- clause 5.7 and 6.7 of AS 3959 is replaced by clause 7.7 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and
- fascias and bargeboards, in BAL-40, shall comply with:
- clause 8.4.1(b) of AS 3959; or
- clause 8.6.6 of AS 3959.

The interpretation of this variation is:
Enclosed subfloors: For subfloor supports there are no requirements for supporting posts, columns, stumps, stringers piers and poles for subfloor supports for BAL 12.5 and BAL 19 when the subfloor space is enclosed with a wall that complies with the determined BAL level for the site.
Unenclosed subfloors: For unenclosed subfloor supporting posts, columns, stumps, stringers piers and poles the requirements are upgraded from BAL 12.5 and BAL 19 to BAL 29 level.
Enclosed verandas: There are no requirements for supporting posts, columns, stumps, stringers piers and poles for verandas, decks, steps and landings when the subfloor space is enclosed with a wall that complies with the determined BAL level for the site.
Unenclosed verandas: The requirements for supporting posts, columns, stumps, stringers piers and poles for verandas, decks, steps, and landings are upgraded from BAL 19 and BAL 12.5 to BAL 29 level.
For unenclosed subfloors of the main building or verandas, decks, steps and landings for BAL 12.5, 19 and BAL29 supporting posts, columns, stumps, stringers piers and poles shall be:

1. A non-combustible material; or
2. A Bushfire resistant timber; or
3. A combination of 1 and 2

Acceptable timber species:
Black-butt, Turpentine, Silver Top Ash, Spotted Gum, Red Iron Bark, Kwila, Red River Gum
Sarking: To comply with the NSW State variation any sarking used for BAL 12.5 shall:

- Be Non-combustible; or
- Comply with AS/NZ 4200.1 be installed on the outside of the frame and have a flammability index of not more than 5 as determined by AS1530.2