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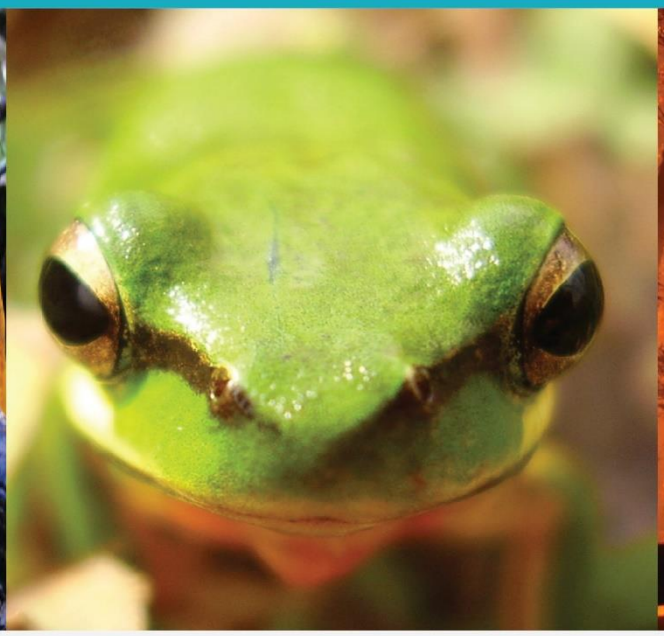

BUSHFIRE PROTECTION ASSESSMENT

Proposed Development

Lot 1, DP 1246952

264 Mount Vernon Road

MOUNT VERNON

Under Section 4.14 of the EP&A Act (1979)

19 October 2021

(REF: 18BATH61)

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BUSHFIRE PROTECTION ASSESSMENT

Proposed infill development

Lot 1, DP 1246952 264 Mount Vernon Road, MOUNT VERNON

Report Authors:	John Travers B. App. Sc., Ass. Dip., Grad. Dip., BPAD-L3 15195, Michael Sheather Reid, Caitlin Williams B. Sc.
Plans prepared:	Sandy Cardow B. Sc.
Checked by:	John Travers B. App. Sc., Ass. Dip., Grad. Dip., BPAD-L3 15195
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BPAD Bushfire Planning & Design Accredited Practitioner Level 3

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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

EXECUTIVE SUMMARY

This bushfire protection assessment has been undertaken for the Construction of a two-storey dwelling and a secondary dwelling including roads, landscaping stormwater drainage and associated site works within Lot 1, DP 1246952 located at 264 Mount Vernon Road, Mount Vernon.

The proposal is categorised by the NSW Rural Fire Service (NSW RFS) as infill development and must be assessed in accordance with *Planning for Bush Fire Protection (PBP 2019). PBP 2019* dictates that the subsequent extent of bushfire attack that can potentially emanate from a bushfire should not exceed a radiant heat flux of 40kW/m^2 in order to comply with the deemed to satisfy provisions of the *Building Code of Australia (BCA)* (NSW variation).

This assessment has found that bushfire can potentially affect the proposed development from the bushland vegetation surrounding the development, resulting in future buildings being exposed to potential radiant heat and ember attack.

In recognition of the bushfire risk posed to the site by the surrounding bushland, *Travers bushfire & ecology* propose the following combination of bushfire measures;

- Defendable space in accordance with the performance requirements of *PBP 2019*
- APZs in accordance with the minimum setbacks outlined within *PBP 2019* (Table A1.12.2 FFDI 100) for most aspects*;*
- Use of an alternative solution to determine minimum APZ and bushfire attack level (BAL) setbacks for [protection of important vegetation.
- Provision of access in accordance with the acceptable solutions outlined in *PBP 2019*;
- Water, electricity and gas supply in compliance with the acceptable solutions outlined in *PBP 2019;*
- Construction of the residential building in accordance with *Australian Standard AS3959 Construction of buildings in bushfire-prone areas 2018 (AS3959)*, and *PBP 2019*.

The alternate solution proposed within this report has provided a practical and safer outcome based on the performance requirements. The aims and objectives of *PBP 2019* and the performance requirements of the *National Construction Code (NCC)* have been met and an improved outcome has been achieved for the redevelopment site.

Document Set ID: 9801156
Version: 1, Version Date: 09/11/2021

GLOSSARY OF TERMS

AHIMS	Aboriginal Heritage Information System
APZ	asset protection zone
AS1596	*Australian Standard – The storage and handling of LP Gas*
AS2419	*Australian Standard – Fire hydrant installations*
AS3745	*Australian Standard – Planning for emergencies in facilities*
AS3959	*Australian Standard – Construction of buildings in bushfire-prone areas 2018*
BAL	*bushfire attack level*
BCA	*Building Code of Australia*
BSA	bushfire safety authority
DA	development application
DLUP	Development Land Use Plan
EEC	Endangered ecological community
EP&A Act	*Environmental Planning & Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
FFDI	forest fire danger index
IPA	inner protection area
LEP	Local Environmental Plan
LGA	local government area
m	metres
NCC	*National Construction Code*
OPA	outer protection area
PBP 2019	*Planning for Bush Fire Protection 2019*
RF Act	*Rural Fires Act 1997*
RFS	NSW Rural Fire Service
SFR	short fire run
SFPP	special fire protection purpose
TBE	*Travers bushfire & ecology*

TABLE OF CONTENTS

TABLE

FIGURES

ATTACHMENTS

1. INTRODUCTION

Travers bushfire & ecology has been engaged to undertake a bushfire protection assessment for the proposed construction of a two-storey dwelling and a secondary dwelling including roads, landscaping stormwater drainage and associated site works located at Lot 1, DP 1246952 264 Mount Vernon Road Mount Vernon. The proposed development is identified as bushfire prone on the *Penrith City Council* bushfire prone land map (refer Figure 1-1). This triggers a formal assessment by Council in respect of the NSW Rural Fire Service (RFS) policy against the provisions of *Planning for Bush Fire Protection (PBP).*

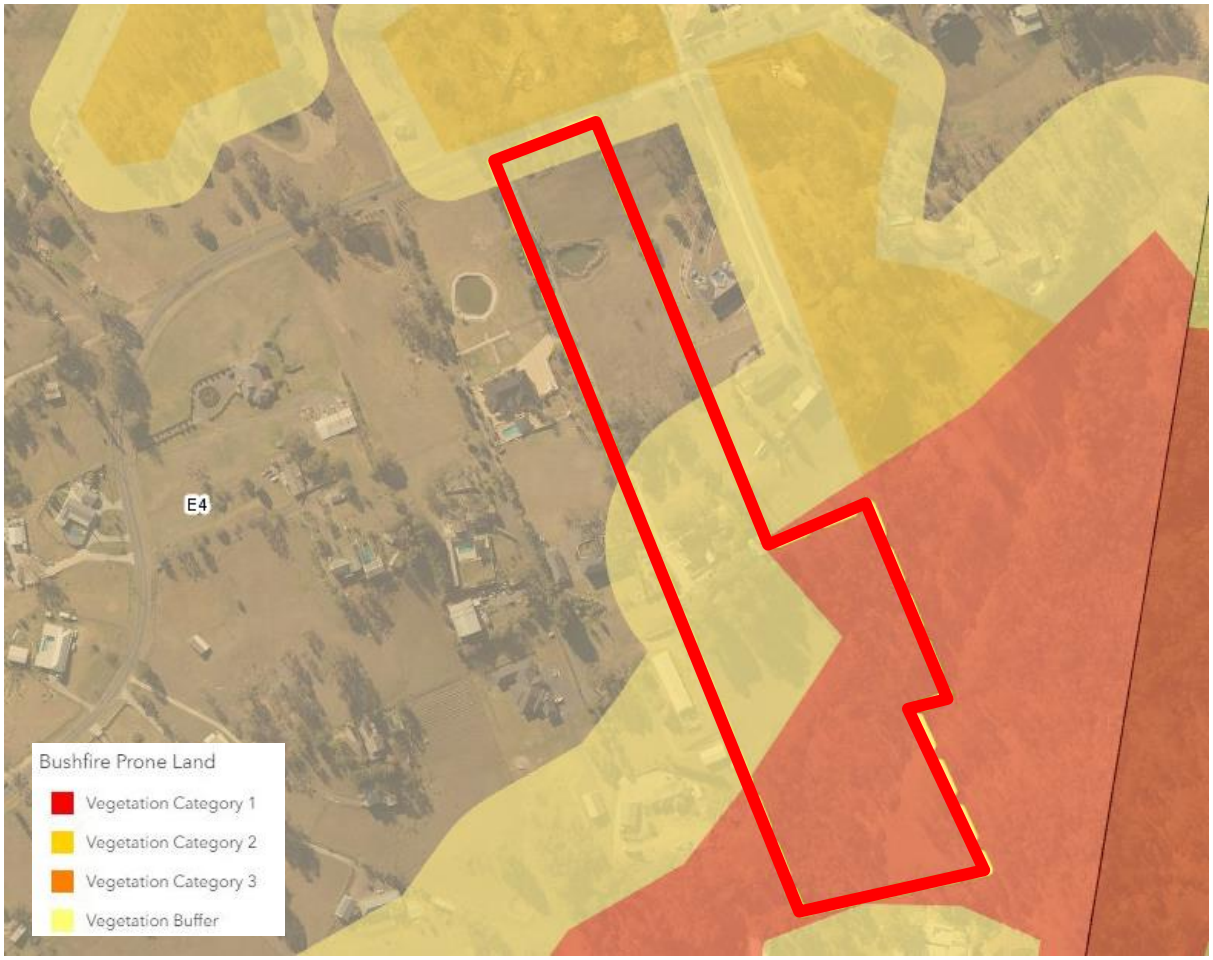

Figure 1-1 – Bushfire Prone Land Map
(source: Planning Portal, 2020)

1.1 Aims of the assessment

The aims of the bushfire protection assessment are to:

- review the bushfire threat to the landscape
- undertake a bushfire attack assessment in accordance with *PBP 2019*
- provide advice on mitigation measures, including the provision of asset protection zones (APZs), construction standards and other specific fire management issues
- review the potential to carry out hazard management over the landscape.

Document Set ID: 9801156
Version: 1, Version Date: 09/11/2021

1.2 Proposed development

The application seeks development consent involving the construction of a two-storey dwelling and a secondary dwelling including roads, landscaping stormwater drainage and associated site works.

The proposal seeks consent for the following:

- Demolition of Existing Structures
- Construction of a two-storey dwelling house inclusive of basement garage, attached guest bedroom rooms, home office, indoor pool, gym and related landscaping;
- Construction of a secondary dwelling proposed to be utilized as staff quarters;
- Construction of ancillary structures including at grade parking, driveway and hardstand areas including tennis court and associated pavilion structures;
- Construction of private road; and
- Stormwater drainage and associated site works.

Schedule 1 shows the proposed development and bushfire protection measures, including APZs, incorporating the surrounding land uses.

Document Set ID: 9801156
Version: 1, Version Date: 09/11/2021

Figure 1-2 – Site plan

(source: The Bathla Group, Dwg. Ref – 0593-DA102, Revision C-WIP – SUB - 1000 , dated 02/09/2021)

Figure 1-3 - Floor plan

(source: The Bathla Group, Dwg. Ref – 0593-DA101 –Revision C - WIP , dated 02/09/2021)

1.3 Information collation

Information sources reviewed for the preparation of this report include the following:

- Site Plan DA No. 2 prepared by The Bathla Group, Dwg. Ref – 0593-DA101 –Revision C - WIP, dated 02/09/2021
- Vegetation mapping prepared by Travers bushfire & ecology October 2021
- *NearMap* aerial photography
- *Mecone Mosaic* aerial GIS resource
- Topographical maps DLPI of NSW 1:25,000
- *Australian Standard 3959 Construction of buildings in bushfire-prone areas (2018)*
- *Planning for Bush Fire Protection 2019 (PBP)*

An inspection of the proposed development site and surrounds was undertaken by Heath Fitzsimmons on 7th April 2021 and John Travers (previously in 2019) to assess the topography, slopes, aspect, drainage, vegetation and adjoining land use. The identification of existing bushfire measures and a visual appraisal of bushfire hazard and risk were also undertaken.

1.4 Site description

The development site is located within the local government area (LGA) of Penrith City Council, to the north of Elizabeth Drive (see Figure 1-4).

The site supports an existing dwelling, which will be maintained as part of the proposal with the additional new dwelling and associated facilities.

The property is surrounded by large rural residential allotments to the north, south, east and west (refer Figure 1.3). The land to the east of the site is woodland forest intersected by a watercourse while the remainder of the site is surrounded by Grassland Remnant vegetation.

Figure 1-4 – Aerial appraisal

(source: SixMaps, 2021)

Document Set ID: 9801156
Version: 1, Version Date: 09/11/2021

1.5 Legislation and planning instruments

Is the site mapped as bushfire prone?	Yes
Proposed development type	Residential
Is the dwelling provided with a minimum of 10m APZ (defendable space)	Yes
Zoning	R2 – Low Density Residential
Significant environmental features	Cumberland Plain Woodland trees
Details of any Aboriginal heritage	No
Does the proposal rely on an alternative solution?	No
Does DA need to be referred to RFS District / Team / Zone office?	Yes, due to alternative solution.

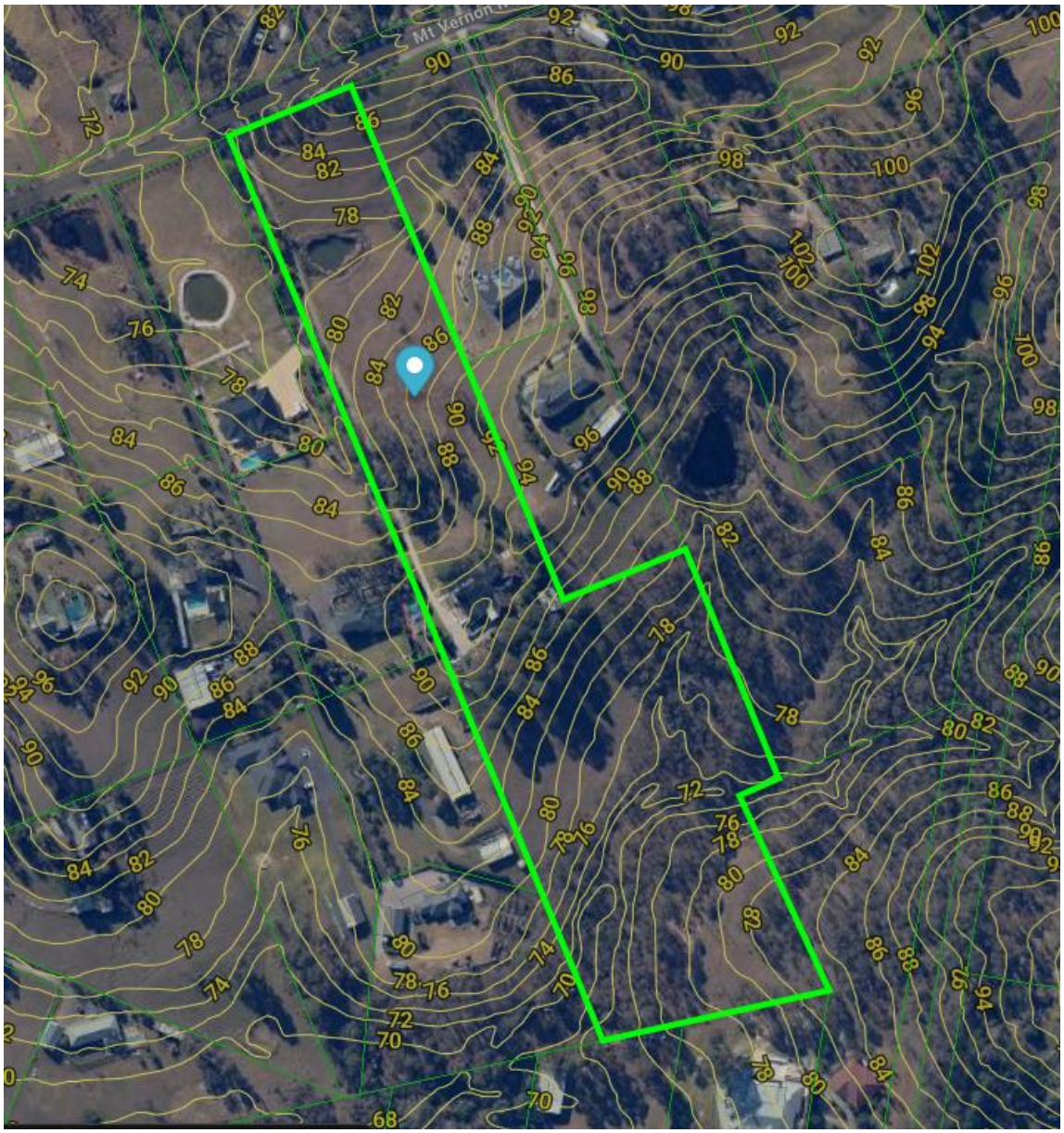

Figure 1-5 - Slope affectation *(Souce: Mecone mozaic 2021)*

Document Set ID: 9801156
Version: 1, Version Date: 09/11/2021

2. BUSHFIRE THREAT ASSESSMENT

To assess the bushfire threat and to determine the required width of an APZ for a development, an assessment of the potential hazardous vegetation and the effective slope within the vegetation is required. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation.

2.1 Hazardous fuels

PBP 2019 guidelines require the identification of the predominant vegetation formation in accordance with David Keith (2004) if using the simplified acceptable solutions in PBP 2019, or alternatively the vegetation class if adopting the comprehensive vegetation fuel loads (as allowable when undertaking an assessment under Method 2 of AS3959). The hazardous vegetation is calculated for a distance of at least 140m from a proposed building envelope.

The vegetation posing a bushfire threat to the proposed development includes:

Table 2-1 - Vegetation

Vegetation community	*Vegetation formation*	*Vegetation classification*	*Comprehensive fuel loads (t/ha) Alternative solution*	*DTS fuel loads (t/ha)* (PBP 2019)
North	Managed grass	Grass	Not applied	Yes
East	Managed grass	Grass	Not applied	Yes
South	Woodland trees, Woodland and grassland	Coastal Valley Grassy Woodland	10 / 18.07 t/ha	Not applied
West	Managed grass	Grass	Not applied	Yes

2.2 Effective Slope

The effective slope (post earthworks) has been assessed for up to 100m from the development site. Effective slope refers to that slope which provides the most effect upon likely fire behaviour. A mean average slope may not in all cases provide sufficient information such that an appropriate assessment can be determined. The effective slope is described within Table 2-2.

2.3 Bushfire attack assessment

The following assessment has determined the APZ and BAL levels via the following approaches;

- Table A1.12.2 & A1.12.5 of *PBP 2019*;
- Appendix B Method 2 (alternative solution) of *AS3959 Construction of buildings in bushfire prone areas* (2009); and

A fire danger index (FDI) of 100 has been used to calculate bushfire behaviour on the site based on its location within the Greater Sydney region. Table 2-2 provides a summary of the bushfire attack assessment based on residential development and the methodologies identified above.

Table 2-2 - Bushfire attack assessment

Aspect	*Vegetation Formation*	*Effective Slope (degrees)*	*Minimum APZ required (m)*	*APZ provided (m)*	*BAL Rating (AS3959)*
North	Remnant woodland	9° downslope	24	148m	BAL 19 (26 - <37m) BAL 12.5 (37 - <100m)
East	Managed grassland	10° upslope	8	73	BAL 19 (15 - <22m) BAL 12.5 (22 - <50m)
West	Manage grassland	<5° downslope	12	>100	BAL 19 (17 - <25m) BAL 12.5 (25 - <50m)
South	Remnant	Level	24	16	BAL 19 (16 - <23m) BAL 12.5 (23 - <100m)
	Managed grassland (south of remnant)	7° upslope	10	16	BAL 19 (15 - <22m) BAL 12.5 (22 - <50m)

Slope is either 'U' meaning up slope or 'C' meaning cross slope or 'D' meaning down slope

Note 2: A performance-based assessment using Appendix B of *AS3959* was undertaken to determine the required BAL level based on the comprehensive fuel loads associated with *Coastal Valley Grassy Woodlands* (forest) on a level slope– see Figure 1.5. Actual flame width is 35m but has been modelled at 100m. The results of the assessments above are provided below and were prepared using the bushfire attack level calculator developed by *Flamesol.*

Note: *PBP* describes remnant vegetation as a parcel of vegetation with a size of less than 1ha or a shape that provides a potential fire run directly towards a building not exceeding 50m. The threat posed is therefore considered low and APZ setbacks for this aspect are the same as for the rainforest category outlined in *PBP*.

Table 2-3 – modelling of southern aspect by Flamesol

Calculated October 17, 2021, 7:10 am (BALc v.4.9)

246 Mounty Vernon Rd Mount Vernon

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	1.2 km/h
Vegetation classification	Forest	Flame length	9.960000000000001 m
Understorey fuel load	10 t/ha	Flame angle	71 °
Total fuel load	18.07 t/ha	Panel height	9.42 m
Vegetation height	n/a	Elevation of receiver	4.71 m
Effective slope	0 °	Fire intensity	11,203 kW/m
Site slope	0 °	Transmissivity	0.84
Distance to vegetation	16 m	Viewfactor	0.3084
Flame width	100 m	Radiant heat flux	19.71 kW/m²
Windspeed	n/a	Bushfire Attack Level	BAL-29
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,090 K		

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

3. SPECIFIC PROTECTION ISSUES

3.1 Asset protection zones (APZs)

Table 3.1 outlines the proposal's compliance with the performance criteria for APZs.

Table 3-1 – Performance criteria for asset protection zones (PBP 2019 guidelines pg. 65)

Performance criteria	*Acceptable solutions*	*Acceptable solution*	*Performance solution*	*Comment*
APZs are provided commensurate with the construction of the building; and A defendable space is provided.	APZs are provided in accordance with Tables A1.12.2 and A1.12.4 based on the FFDI	☑	☑	Refer Section 2.3 for southern aspect. DTS APZ's on north, west and eastern aspects
APZs are managed and maintained to prevent the spread of a fire towards the building	APZs are managed in accordance with the requirements of Appendix 4	☑	☐	The APZ consists of landscaped areas, roads and turfed areas.
The APZ is provided in perpetuity	APZs are wholly within the boundaries of the development site	☑	☐	Complies – can be made a condition of consent.
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised	The APZ is located on lands with a slope of less than 18^{o}	☑	☐	Complies. All slopes are less than 18 degrees.

3.2 Building protection

Building construction standards for the proposed dwelling are to be applied in accordance with *AS3959 Construction of buildings in bushfire prone areas (2018)* and Section 7.5 of *Planning for Bush Fire Protection 2019*.

Building construction standards have been outlined within Table 2.2 and are depicted in Schedule 1 attached.

Table 3.2 outlines the proposal's compliance with the performance criteria for construction standards.

Table 3-2 – Performance criteria for building construction (PBP 2019 guidelines pg. 68)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
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 Construction provided in accordance with the As3959/ *N CC* and as modified by Section 7.6 of PBP (refer Note 1 below)	☑	☐	Complies. Main building is partly rammed earth construction is non-combustible material
Proposed fences and gates are designed to minimise the spread of bush fires.	Fencing and gates are constructed in accordance with Section 7.6 (refer Note 2)	☑	☐	Can be made a condition of consent – any fencing is to be made of hardwood or non-combustible material only.
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 (refer Note 3)	☐	☐	Not applicable
Note1 – Section 7.6 of *PBP 2019* states that all fences in bushfire prone areas should be made of either hardwood or non-combustible material.				

3.3 Hazard management

The owner of the lot will be required to manage the entire property as an IPA in accordance with NSW RFS guidelines *Standards for Asset Protection Zones* (RFS, 2005) with landscaping to comply with Appendix 4 of *PBP 2019*.

A summary of the guidelines for managing APZs is attached as Appendix 1 to this report. Table 3.3 outlines the proposal's compliance with the performance criteria for landscaping.

Table 3-3 – Performance criteria for landscaping (PBP 2019 guidelines pg. 6)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Landscaping is designed and managed to minimise	Landscaping is in accordance with Appendix 4	☑	☐	Can be a condition of consent

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions	Fencing is constructed in accordance with section 7.6	☑	☐	Can be a condition of consent (see Note 1 below).
	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.	☑	☐	Can be a condition of consent.

3.4 Access for firefighting operations

Access will be provided to the proposed development via an existing driveway extending from Mount Vernon Road to the south.

The proposal's compliance with the acceptable solutions outlined in *PBP 2019* is detailed within Table 3-4 below.

Table 3-4 – Performance criteria for access within Residential Subdivisions (PBP 2019) Guidelines pg. 66)

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
ACCESS (GENERAL REQUIREMENTS)	Firefighting vehicles are provided with safe, all weather access to structures.	Property access roads are two-wheel drive, all-weather roads	☑	☐	Complies.
	The capacity of access roads is adequate for firefighting vehicles.	The capacity of perimeter and non-perimeter road surfaces and any bridges / causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges / causeways are to clearly indicate load rating.	N/A	N/A	N/A
	There is appropriate	Hydrants are provided in accordance with *AS 2419.1:2005.*	☑	☐	Can be a condition of consent.

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
	access to water supply	There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	☑	☐	Reticulated water is provided.
	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.	☑	☐	Not required
		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.	☑	☐	Mount Vernon Road has a speed limit of 60km/hr

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
PROPERTY ACCESS	Firefighting vehicles can access the dwelling and exit the property safely.	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	☑	☐	

Performance criteria	Acceptable solution	Acceptable solution	Performance solution	Comment
	use of emergency firefighting vehicles.			
	In circumstances where this cannot occur, the following requirements apply: (Assess if the subdivision has a battle axe block. If so make an assessment against the following. If not delete the table below.			
	minimum 4m carriageway width;	☑	☐	Can be a condition of consent.
	in forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay;	☑	☐	Not required as less than 200m
	a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;	☑	☐	Can be a condition of consent.
	provide a suitable turning area in accordance with Appendix 3;	☑	☐	Can be a condition of consent.
	curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress;	☐	☐	Not applicable
	the minimum distance between inner and outer curves is 6m;	☐	☐	Not applicable
	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	☑	☐	Can be a condition of consent.
	a development comprising more than three dwellings has access by dedication of a road and not by right of way.	☑	☐	Not applicable
	Note: Some short constrictions in the access may be accepted where they are not less than	☑	☐	Not applicable

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
		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.			

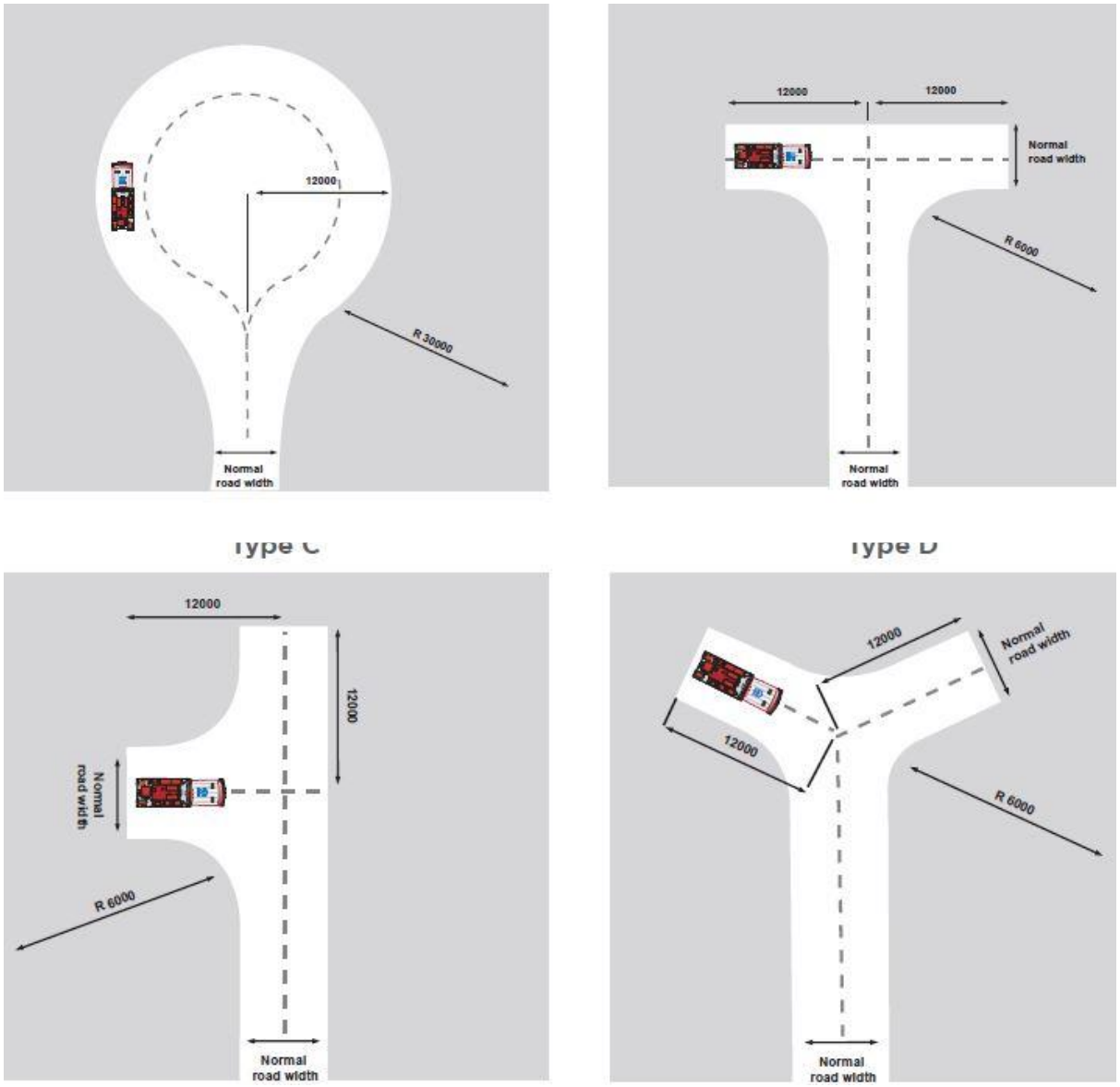

Figure 3-1 – Turning head dimensions

3.5 Water supplies

The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of bushfire. Table 3-5 outlines the proposal's compliance with the acceptable solutions for reticulated water supply.

Table 3-5 – Performance criteria for reticulated water supplies (PBP guidelines pg. 67)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Adequate water supplies is provided for firefighting purposes.	Reticulated water is to be provided to the development, where available.	☑	☐	Reticulated water is available to the development.
	A static water supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed	☑	☐	Reticulated water is available to the development.
	Static water supplies shall comply with Table 5.3d.	☑	☐	Can be made a condition of consent
Water supplies are located at regular intervals. The water supply is accessible and reliable for firefighting operations.	Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard *AS 2419.1:2005.*	☑	☐	Can be made a condition of consent.
	Hydrants are not located within any road carriageway.	☑	☐	Can be made a condition of consent.
	Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	☑	☐	Can be made a condition of consent.
Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of *AS 2419.1:2005.*	☑	☐	Can be made a condition of consent.
The integrity of the water supply is maintained.	All above-ground water service pipes are metal, including and up to any taps.	☑	☐	Can be made a condition of consent.
	Above ground water storage tank shall be of concrete or metal	☑	☐	Can be made a condition of consent

3.6 Gas

The intent of measures is to locate gas so as not to contribute to the risk of fire to a building. Table 3-6 outlines the required acceptable solutions for gas supply.

Table 3-6 – Performance criteria for gas supplies (PBP Guidelines pg. 68)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Location of gas services will not lead to the ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas bottles are to be installed and maintained in accordance with *AS/NZS 1596 (2014)*, the requirements of relevant authorities and metal piping is to be used.	☑	☐	Can be made a condition of consent.
	All fixed gas cylinders are to be kept clear of flammable materials to a distance of 10m and shielded on the hazard side.	☑	☐	Can be made a condition of consent.
	Connections to and from gas cylinders are metal.	☑	☐	Can be made a condition of consent.
	Polymer sheathed flexible gas supply lines are not used.	☑	☐	Can be made a condition of consent.
	Above ground gas service pipes are metal, including and up to any outlets.	☑	☐	Can be made a condition of consent.

3.7 Electricity

The intent of measures is to locate electricity so as not to contribute to the risk of fire to a building. Table 3-7 outlines the required acceptable solutions for the subdivision's electricity supply.

Table 3-7 – performance criteria for electricity services (PBP guidelines pg. 68)

Performance criteria	Acceptable Solutions	Acceptable solution	Performance solution	Comment
Location of electricity services limit the possibility of ignition of	Where practicable, electrical transmission lines are underground.	☑	☐	The majority of electrical lines will be underground

Performance criteria	Acceptable Solutions	Acceptable solution	Performance solution	Comment
surrounding bushland or the fabric of buildings.	Where overhead electrical transmission lines are proposed: 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 ISSC3 Guideline for Managing Vegetation Near Power Lines.	☑	☐	None proposed.

4. CONCLUSION & RECOMMENDATIONS

4.1 Conclusion

This bushfire protection assessment has been undertaken for the proposed residential development at 264 Mount Vernon Road, Mount Vernon. The development is proposed for the construction of a two-storey dwelling and a secondary dwelling including roads, landscaping stormwater drainage and associated site works.

In recognition of the bushfire risk posed to the site by the surrounding bushland, *Travers bushfire & ecology* propose the following combination of bushfire measures;

- APZs in accordance with the minimum setbacks outlined within *PBP 2019* for most aspects and the use of an alternative solution to determine minimum APZ and bushfire attack level (BAL) setbacks for the southern aspect.
- Provision of access in accordance with the acceptable solutions outlined in *PBP 2019*;
- Water, electricity and gas supply in compliance with the acceptable solutions outlined in *PBP 2019;* Future dwelling construction in compliance with the appropriate construction sections of *AS3959-2009*, and *PBP 2019*.

The following recommendations are provided to ensure that the development is in accordance with, or greater than, the requirements of *PBP.*

4.2 Recommendations

Recommendation 1 - The development is as generally indicated on the attached SCHEDULE 1 - Plan of Bushfire Protection Measures .

Recommendation 2 - APZs are to be provided to the proposed development as outlined in Table 2-2 and as generally depicted within SCHEDULE 1.

Recommendation 3 - Access is to comply with the acceptable solutions outlined in Section 5.3.2 of *Planning for Bush Fire Protection 2019.*

Recommendation 4 - Building construction standards for the proposed future buildings to be in accordance with *AS3959 Construction of buildings in bushfire prone areas (2018)*, and *Planning for Bush Fire Protection 2019.*

Recommendation 5 - Water, electricity and gas supply is to comply with Section 5.3.3 of *Planning for Bush Fire Protection 2019.*

Recommendation 6 – Fencing, if proposed, is to comply with Section 7.6 of PBP. All fences in bush fire prone areas should be made of either hardwood or non-combustible material. However, in circumstances where the fence is within 6m of a building or in areas of BAL 29 or greater, they should be made of non-combustible material only.

Document Set ID: 9801156
Version: 1, Version Date: 09/11/2021

5. REFERENCES

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Document Set ID: 9801156
Version: 1, Version Date: 09/11/2021

SCHEDULE 1. PLAN OF BUSHFIRE PROTECTION MEASURES

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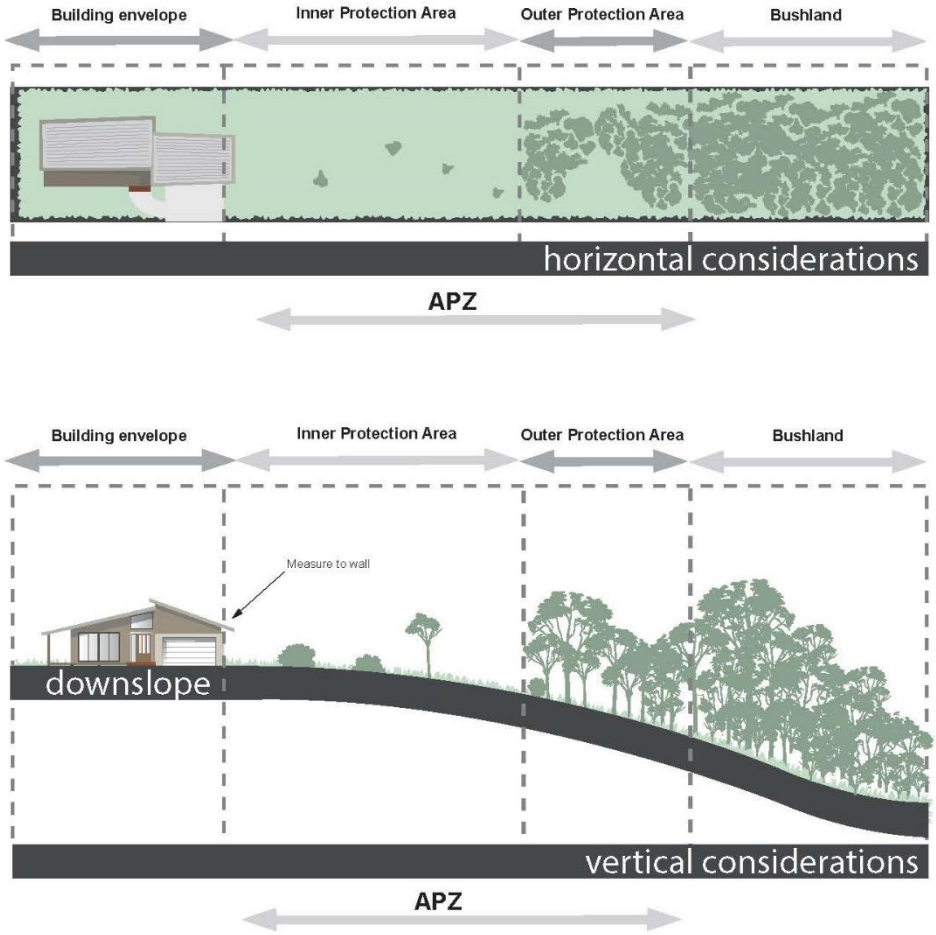
Version: 1, Version Date: 09/11/2021

APPENDIX 1. MANAGEMENT OF ASSET PROTECTION ZONES

The RFS provides basic advice in respect of managing APZs through documents such as, *Standards for Asset Protection Zones* (RFS, 2005), with landscaping to comply with Appendix 4 of *PBP*.

The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the dwellings. The property is to be managed to IPA standards only. A typical APZ is graphically represented below.



APZs and progressive reduction in fuel loads
(Source: PBP, 2019)

Note: Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought regarding vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

The following table adapted from *PBP 2019* provides maintenance advice for vegetation within the IPA and OPA. The APZ is to be maintained in perpetuity and maintenance should be undertaken regularly, particularly in advance of the bushfire season

Document Set ID: 9801156
Version: 1, Version Date: 09/11/2021

	Inner Protection Area	Outer Protection Area
Trees	➢ Tree canopy cover should be **less than 15%** at maturity; ➢ Trees at maturity should not touch or overhang the building; ➢ Lower limbs should be removed up to a height of **2m above the ground**; ➢ Tree canopies should be separated by **2 to 5m**; and ➢ Preference should be given to retaining smooth barked and evergreen trees.	➢ Tree canopy cover should be **less than 30%;** and ➢ Canopies should be separated by **2 to 5m**.
Shrubs	➢ Large discontinuities or gaps in the vegetation should be provided to slow down or break the progress of fire towards buildings; ➢ Shrubs should not be located under trees; ➢ Shrubs should form **less than 10%** ground cover; and ➢ Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.	➢ Shrubs should not form a continuous canopy; and ➢ Shrubs should **form less than 20%** of ground cover.
Grass and Leaf Litter	➢ Grass should be kept mown to a height of **less than 100mm**; and ➢ Leaves and other debris should be removed	➢ Grass should be kept mown to a height of **less than 100mm**; and ➢ Leaf and other debris should be removed.
	All Management Zones	
Weeds	➢ All weeds should be removed in accordance with best practice guidelines, and measures taken to prevent their further spread	
Landscaping	➢ Suitable impervious areas being provided immediately surrounding the building such as courtyards, paths and driveways; ➢ Restrict planting in the immediate vicinity of the building which may over time and if not properly maintained come into contact with the building; ➢ When considering landscape species consideration needs to be given to estimated size of the plant at maturity; ➢ Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies; ➢ Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown; ➢ Avoid planting of deciduous species that may increase fuel at surface / ground level (i.e. leaf litter); ➢ Avoid climbing species to walls and pergolas; ➢ Locate combustible materials such as woodchips / mulch, flammable fuel stores away from the building; ➢ Locate combustible structures such as garden sheds, pergolas and materials such timber garden furniture way from the building; and ➢ Use of low flammability vegetation species.	

Document Set ID: 9801156
Version: 1, Version Date: 09/11/2021