Bushfire Protection Assessment

Residential Infill Development

99 Merinda Street, Hargraves

Tommy Cassidy

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DOCUMENT TRACKING

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LIMITATIONS

The bushfire protection measures recommended in this report do not completely remove the risk to life and property, and they do not guarantee that a development will not be impacted by a bushfire event. This is substantially due to the degree of vegetation management, the unpredictable nature and behaviour of fire, and extreme weather conditions.

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Scope Architects.

Template 2.8.1

Contents

List of Figures

List of Tables

Abbreviations

Abbreviation	Description
AS 3959	Australian Standard AS 3959-2018 *Construction of buildings in bushfire prone areas*
APZ	Asset protection zone
BAL	Bushfire attack level
BFPL	Bush fire prone land
BPM	Bushfire protection measures
DtS	Deemed-to-Satisfy
FDI	Fire danger index
IPA	Inner protection area
NASH	National Association of Steel-framed Housing
NCC	National Construction Code
PBP	Planning for Bush fire Protection 2019
RFS	NSW Rural Fire Service

1. Property and Proposal

Table 1 identifies the subject property and outlines the type of development proposed.

Table 1: Subject site and development proposal summary

Street address:	99 Merinda Street, Hargraves
Postcode:	2850
Lot/DP no:	Lot 4 Section 4 DP 758501
Local Government Area:	Mid-Western Regional Council
Fire Danger Index (FDI)	80
Current land zoning:	RU5 - Village
Type of development proposed:	New dwelling

1.1 Description of Proposal

The proposal is for construction of a two storey dwelling and pool within an existing rural-residential allotment (Figure 1).

The proposed development is located on land identified as bush fire prone land (BFPL) on the Bushfire Prone Land layer within the ePlanning Spatial Viewer[1].

1.2 Assessment Process

The proposal was assessed in accordance with Section 4.14 of the *Environmental Planning and Assessment Act 1979* and *Planning for Bush Fire Protection* (RFS 2019), herein referred to as PBP.

This assessment is based on the following information sources:

- Background documentation provided by Tommy Cassidy;
- Information contained within the site plan from Scope Architects, Project No. 02112, Drawing A02 Rev 1, 8 November 2021; and
- GIS analysis including online spatial resources (i.e. Google Earth, SIX Maps, Nearmap and the NSW Government Planning Portal).

Table 2 identifies the bushfire protection measures assessed and whether an acceptable or performance-based solution is proposed.

[1] https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address

Table 2: Summary of bushfire protection measures assessed

Bushfire Protection Measure	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	☑	☑	3.1
Access	☑	☐	3.2
Water supply	☑	☐	3.3
Electrical services	☑	☐	3.4
Gas services	☑	☐	3.5
Construction standard	☑	☐	3.6
Landscaping	☑	☐	3.7

1.3 Significant Environmental Features

An assessment of significant environmental features, threatened species, populations or ecological communities under the *Biodiversity Conservation Act 2016* that may potentially be affected by the proposed bushfire protection measures has not been undertaken in this report as it is covered by other parts of the Development Application (DA) process.

The impact footprint of the bushfire protection measures (e.g. Asset Protection Zone [APZ]) is identified within this report and therefore capable of being assessed by a suitably qualified person. Mid-Western Regional Council is the determining authority for this development; they will assess more thoroughly any potential environmental issues.

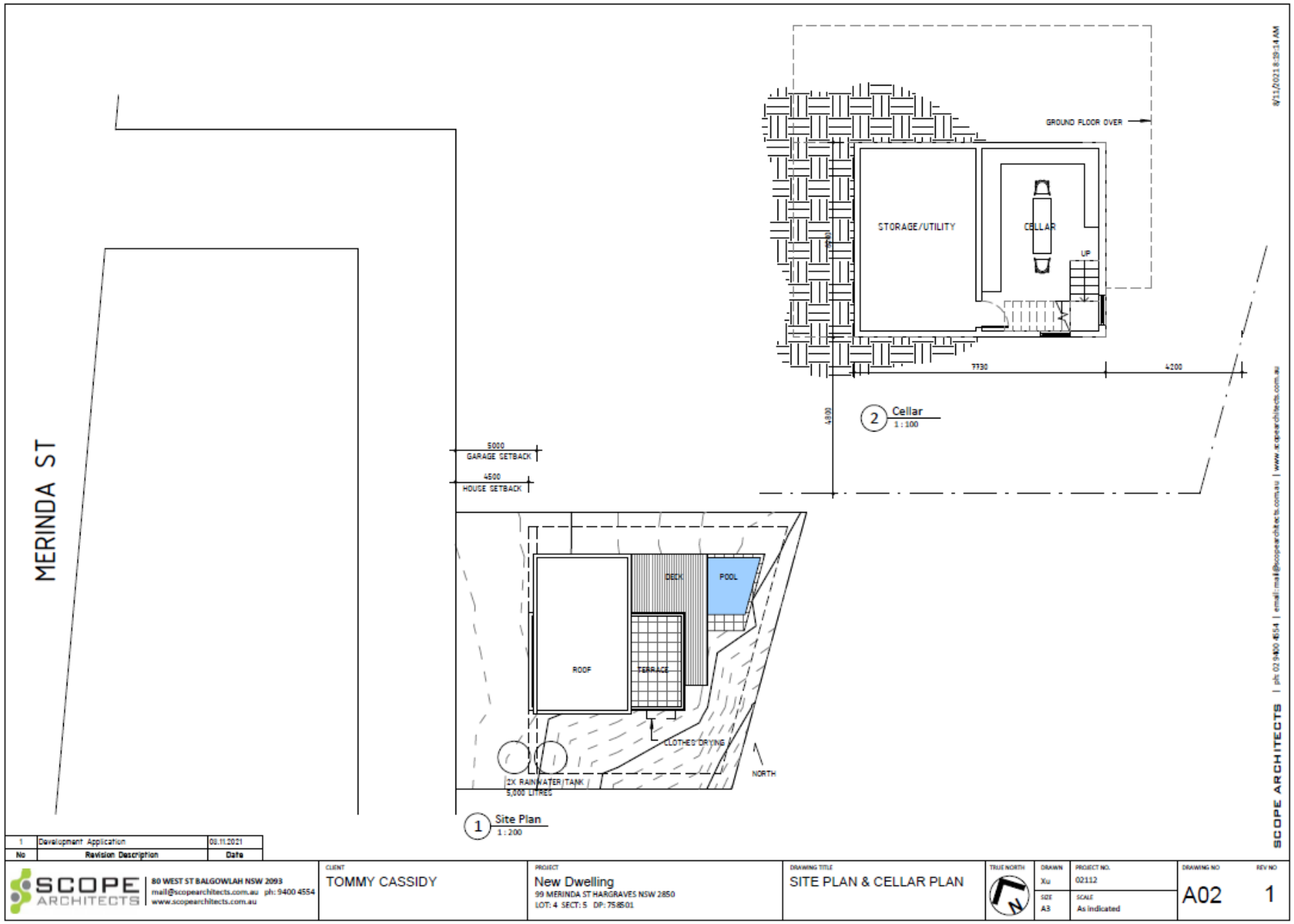

Figure 1: Proposed Development

2. Bushfire Hazard Assessment

2.1 Process

The site assessment methodology from Appendix 1 of PBP has been applied in this assessment to determine the required APZ and construction requirements.

Figure 2 and Table 3 show the effective slope and predominant vegetation representing the highest bushfire threat potentially posed to the proposed development from various directions.

2.2 Vegetation Assessment

In accordance with PBP, the predominant vegetation formation has been assessed for a distance of at least 140 m from the subject land in all directions.

The predominant vegetation has been determined from site data (images and video) provided by Tommy Cassidy and satellite data (SixMaps).

2.3 Slope Assessment

In accordance with PBP, the slope that would most significantly influence fire behaviour was determined over a distance of 100 m from the boundary of the proposed development under the classified vegetation.

The effective slope has been determined from 5 m contour data.

2.4 Summary of Assessment

The bushfire prone vegetation affecting the proposed development is the forest corridor to the north-east and is classified as 'forest' under PBP. The effective slope under the vegetation falls into the slope category of 'all upslope and flat land'.

The area between the forest vegetation and proposed development consists of creek line and heavily grazed land with existing pastoral land use.

In all other directions, there are managed lands in the form of residential allotments and road reserves.

Photos of the site and adjoining land can be found in Section 7 of this report.

Table 3: Bushfire hazard assessment, APZ requirements and BALs

Transect #	Slope	Vegetation Formation	Required APZ	Proposed APZ	Bushfire Attack Level (BAL)	Comments
1 (North-east)	All upslope and flat land	Forest	20 m	≥34 m	BAL-19	APZ provided by residential setback and heavily grazed land.
All other directions	Managed Land					

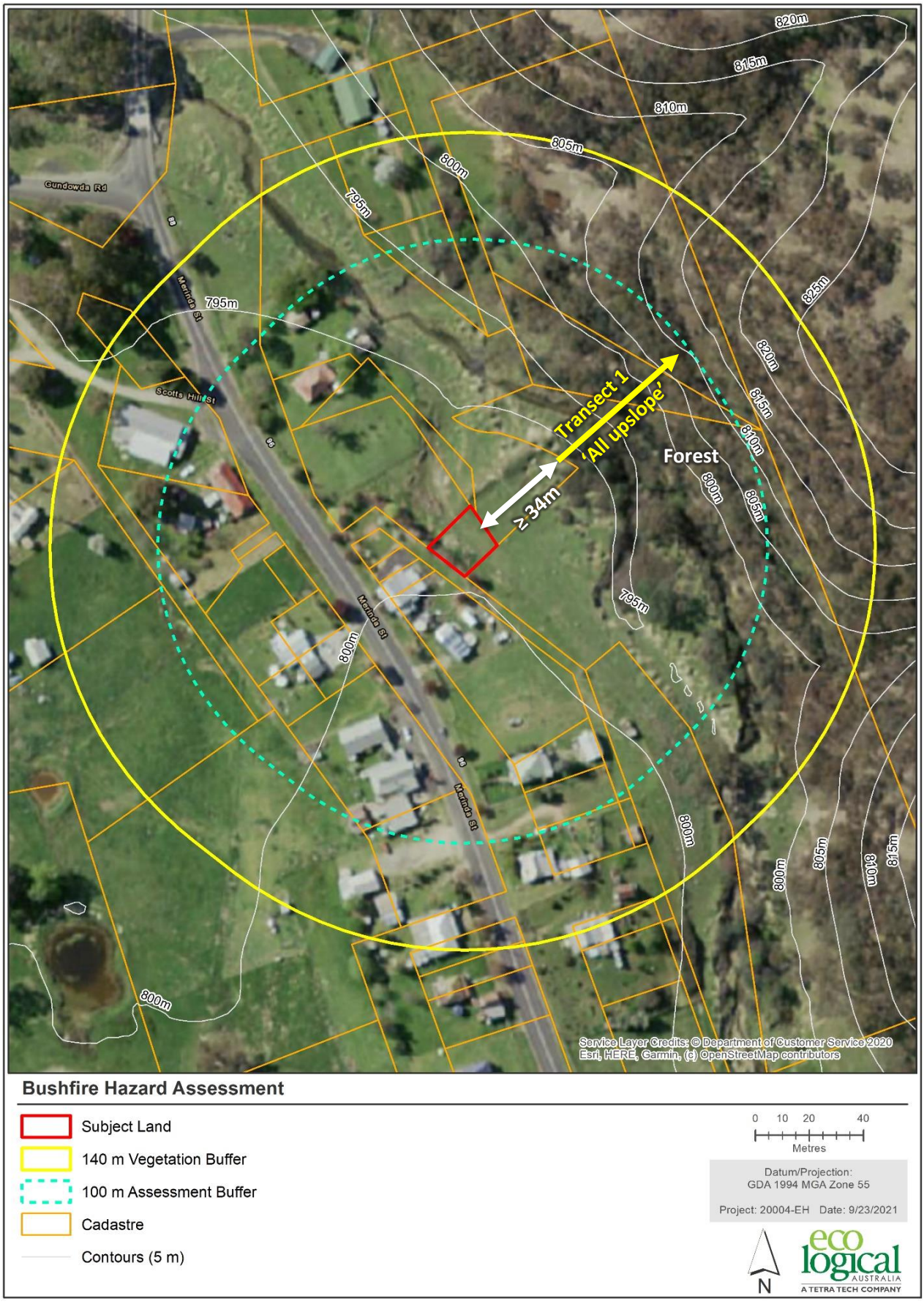

Figure 2: Bushfire Hazard Assessment

3. Bushfire Protection Measures

3.1 Asset Protection Zones

Table 3 shows the dimensions of the required APZ and where relevant, information on how the APZ is to be provided is included. The footprint of the APZ is also shown on Figure 2.

The compliance of the proposed APZ with Section 7.4 of PBP is documented in Table 4.

Table 4: APZ requirements and compliance (adapted from Table 7.4a of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
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 or A1.12.3 in Appendix 1.	**Complies** APZ provided in accordance with table A1.12.3 as shown in Table 3 and Figure 2.
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 of PBP.	**To comply** APZ to be managed in accordance with PBP. Fuel management specifications provided in Appendix A.
The APZ is provided in perpetuity.	APZs are wholly within the boundaries of the development site.	**Complies** APZ complies with performance criterion and provided by surrounding managed residential allotments.
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	APZs are located on lands with a slope less than 18 degrees.	**Complies** APZ is not located on slopes greater than 18°.

3.2 Access

The proposed development is accessed via driveway off Merinda Street and shown in Figure 2. The compliance of the proposed access with Section 7.4 of PBP is documented in Table 5.

Table 5: Property access requirements (adapted from Table 7.4a of PBP)

Performance Criteria	Acceptable Solutions	Compliance notes
The intent may be achieved where:		
firefighting vehicles are provided withsafe, all-weather access to structuresand hazard vegetation.	firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	**To comply** Firefighting vehicles provided safe, all weather access from the private driveway off Merinda Street.

Performance Criteria	Acceptable Solutions	Compliance notes
the capacity of access roads isadequate 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 andcauseways are to clearly indicate load rating.	**To comply** The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and table 7.4a of PBP.
there is appropriate access to water supply.	hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005;	**Not applicable**
	There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	**To comply** Proposed water tanks will be accessible to Category 1 fire tankers.
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 applicable** Driveway < 200 m in length.
	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:	**Not applicable**
	Minimum 4 m carriageway width;	**To comply** The sections of property access within the subject land exceed 4 m.
	In forest, woodland and heath situations, rural property access roads have passing bays every 200 m that are 20 m long by 2 m wide, making a minimum trafficable width of 6 m at the passing bay;	**No applicable** Access traverses managed residential allotments and grassland.
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;	**To comply** Proposed development is to ensure minimum vertical clearance of 4 m.
	Provide a suitable turning area in accordance with Appendix 3 of PBP;	**To comply** Proposed development will provide turning area compliant with options provided in Appendix B.

Performance Criteria	Acceptable Solutions	Compliance notes
	Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress;	**To comply** The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and Table 7.4a of PBP.
	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;	
	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 the minimum (3.5 m), 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.	**Not Applicable**

3.3 Water Supplies

The proposed development is serviced by a static water supply.

The compliance assessment of the proposed water supply with Section 7.4 of PBP is documented in Table 6.

Table 6: Water supply requirements (adapted from Table 7.4a of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
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.	**Complies** Proposal serviced by a static water supply.
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 Australian Standard AS 2419.1 (SA 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.	**Not applicable** Static water supply.
Flows and pressure are appropriate	Fire hydrant flows and pressures comply with AS 2419.1 (SA 2005).	**Not applicable** Static water supply.
The integrity of the water supply is maintained	All above-ground water service pipes are metal, including and up to any taps; and Above-ground water storage tanks shall be of concrete or metal.	**To comply**
A static water supply is provided for firefighting purposes in areas where	where no reticulated water supply is available, water for firefighting purposes is provided in accordance with table 5.3d.	**To comply** Proposal serviced by a static water supply with a

Performance Criteria	Acceptable Solution	Compliance Notes
reticulated water is not available		minimum capacity of 10,000 L. Static water supply, associated fittings and pumps to meet the acceptable solutions of PBP.
	a connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure; 65 mm Storz outlet with a ball valve is fitted to the outlet.	**To comply**
	ball valve and pipes are adequate for water flow and are metal.	**To comply**
	supply pipes from tank to ball valve have the same bore size to ensure flow volume.	**To comply**
	underground tanks have an access hole of 200 mm to allow tankers to refill direct from the tank.	**To comply**
	a hardened ground surface for truck access is supplied within 4 m.	**To comply**
	above-ground tanks are manufactured from concrete or metal.	**To comply**
	raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F AS 3959).	**To comply**
	unobstructed access can be provided at all times.	**To comply**
	underground tanks are clearly marked.	**To comply**
	tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters.	**To comply**
	all exposed water pipes external to the building are metal, including any fittings.	**To comply**
	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).	**To comply**

3.4 Electricity Services

The compliance assessment of the proposed supply of electricity services with Section 7.4 of PBP is documented in Table 7.

Table 7: Assessment of requirements for the supply of Electricity services (adapted from Table 7.4a of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Location of electricity services limits the possibility of ignition of	Where practicable, electrical transmission lines are underground; Where overhead, electrical transmission lines are proposed as follows:	Electricity services to the subject site are located aboveground. **Can comply**

Performance Criteria	Acceptable Solution	Compliance Notes
surrounding bush land or the fabric of buildings.	Lines are installed with short pole spacing (30 m), 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 Guide for the Management of Vegetation in the Vicinity of Electricity Assets (ISSC3 2016).	The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and table 5.3c of PBP.

3.5 Gas Services

The compliance assessment of the proposed supply of gas services (reticulated or bottle gas) with Section 7.4 of PBP is documented in Table 8.

Table 8: Assessment of requirements for the supply of gas services (adapted from Table 7.4a of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
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 – The Storage and handling of LP gas, 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 10 m 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.	**To comply** The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and table 7.4a of PBP.

3.6 Construction Standards

The building construction standard for the proposed dwellings is determined by their Bushfire Attack Level (BAL) and then applying the appropriate construction specifications. The separation distances for different BALs are provided in Table 3.

The compliance of the proposed construction of dwellings with Section 7.4 of PBP is documented in Table 9.

Table 9: Construction requirements (adapted from Table 7.4a of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
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 of PBP.	**Complies** BAL determined using table A1.12.6 of PBP.
	Construction provided in accordance with the National Construction Code (NCC) and as modified Section 7.5 of PBP.	**To comply** Construction in accordance with AS 3959 and NASH standard as modified by Section 7.5 of PBP is required.

Performance Criteria	Acceptable Solutions	Compliance Notes
Proposed fences and gates are designed to minimise the spread of bush fire.	Fencing and gates are constructed in accordance with Section 7.6 of PBP.	**To comply** Specification detailed in Section 3.6.4 of this report.
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 of PBP.	**To comply** Specification detailed in Section 3.6.5 of this report.

3.6.1 Bushfire Attack Level (BAL)

The building construction standard is based on the determination of the BAL in accordance with Appendix 1 of PBP. The BAL is based on known vegetation type, effective slope and managed separation distance between the development and the bushfire hazard.

The proposal is exposed to a combination of **BAL-19** and BAL-12.5 as identified in Table 3 and Section 3.6.2 below.

3.6.2 Construction Requirements

The Deemed-to-Satisfy (DtS) provisions of the NCC for construction requirements for buildings in designated bush fire prone areas are specified in:

- AS 3959:2018 Construction of buildings in bushfire prone areas (SA 2018); and
- NASH Standard: Steel Framed Construction in Bushfire Areas 2014 (NASH 2014).

Construction shall comply with Sections 3 (General requirements) and 6 (BAL-19) of AS 3959:2018 (SA 2018) or NASH Standard 1.7.14 (NASH 2014) as appropriate:

- Roof and sub floor= **BAL-19** (Section 6);
- Southern, eastern and northern elevations = **BAL-19** (Section 6); and
- Western elevation = **BAL-12.5** (Section 5).

3.6.3 Additional Construction Requirements

Additional construction measures over and above that required under AS 3959:2018 and NASH, including ember protection provisions, are identified in Section 7.5 of PBP, and may apply.

3.6.4 Fences and Gates

To comply with Section 7.6 of PBP, all fencing and gates are to be constructed of hardwood or non-combustible material. Where fencing is within 6 m of a building or in areas of BAL-29 or greater, they should be made of non-combustible material only.

3.6.5 Class 10a Buildings (sheds etc.)

To comply with section 8.3.2 of PBP, proposed Class 10a structures within 6 m of any proposed dwelling must be constructed in accordance with the NCC. Where the structure is greater than 6 m, no bushfire requirements apply.

3.7 Landscaping

The compliance of the proposed landscaping with Section 7.4 of PBP is documented in Table 10.

Table 10: Landscaping requirements and compliance (adopted from Table 7.4a of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
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 of PBP);	**To comply** To be managed in accordance with PBP. Fuel management specifications provided in Appendix A
	A clear area of low-cut lawn or pavement is maintained adjacent to the house;	**To comply**
	Fencing and retaining walls are constructed in accordance with section 7.6; and	**To comply** Specification detailed in Section 3.6.4 of this report
	Trees and shrubs are planted such that: • the branches will not overhang the roof; • the tree canopy is not continuous; and • if proposed, a windbreak is located on the elevation from which fires are likely to approach.	**To comply**

4. Conclusion

The proposed development has been assessed against the specifications and requirements of '*Planning for Bush Fire Protection 2019*', as outlined in Table 11.

Table 11: Development Bushfire Protection Solutions and Recommendations

Bushfire Protection Measures	Recommendations	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	APZ dimensions are detailed in Table 3 and shown in Figure 2. Entire property to be maintained in perpetuity to the specifications detailed in Appendix A.	☑	☑	3.1
Access	Access to meet standards summarised in Table 7.	☑	☐	3.2
Water supply	Non-reticulated water supply to meet PBP acceptable solutions specifications.	☑	☐	3.3
Electricity service	Electricity supply located aboveground and to comply with the PBP specification.	☑	☐	3.4
Gas service	Gas services are to be installed and maintained in accordance with AS/NZS 1596:2014.	☑	☐	3.5
Construction standard	The proposed development is exposed to **BAL-19**.	☑	☐	3.6
Landscaping	Any future landscaping meets the requirements of PBP listed in Appendix A.	☑	☐	3.7

5. Recommendations

It is recommended that the proposed development be approved with consent conditions based on the findings in Table 11.

Kate Mannell
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6. References

Industry Safety Steering Committee 3 (ISSC3). 2016. *ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets*. November 2016. NSW.

National Association of Steel Framed Housing (NASH). 2014. *Steel Framed Construction in Bush Fire Prone Areas*. NASH

NSW Rural Fire Service (RFS). 2019. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Homeowners - issued December 2019*. Australian Government Publishing Service, Canberra.

Standards Australia (SA). 2014. *The storage and handling of LP Gas*, AS/NZS 1596:2014. SAI Global, Sydney.

Standards Australia (SA). 2018. *Construction of buildings in bushfire-prone areas,* AS 3959:2018. SAI Global, Sydney.

7. Photos

Figure 4: Photo representative of managed neighbouring allotment to the north-west

Figure 3: Livestock actively grazing along the rear boundary to the east

Figure 6: Panoramic image representative of heavily grazed land along north-eastern boundary and forest vegetation beyond

Figure 5: Photo representative of heavily and actively grazed grassland along the eastern boundary

Appendix A - Asset Protection Zone and Landscaping Standards

The following APZ management specifications in apply to the APZs specified in Table 3 and shown in Figure 2. The identified APZ are to be maintained in perpetuity and management undertaken on an annual basis (as a minimum) and prior to the commencement of the fire season.

These APZ management specifications should be considered for any future landscaping and maintenance.

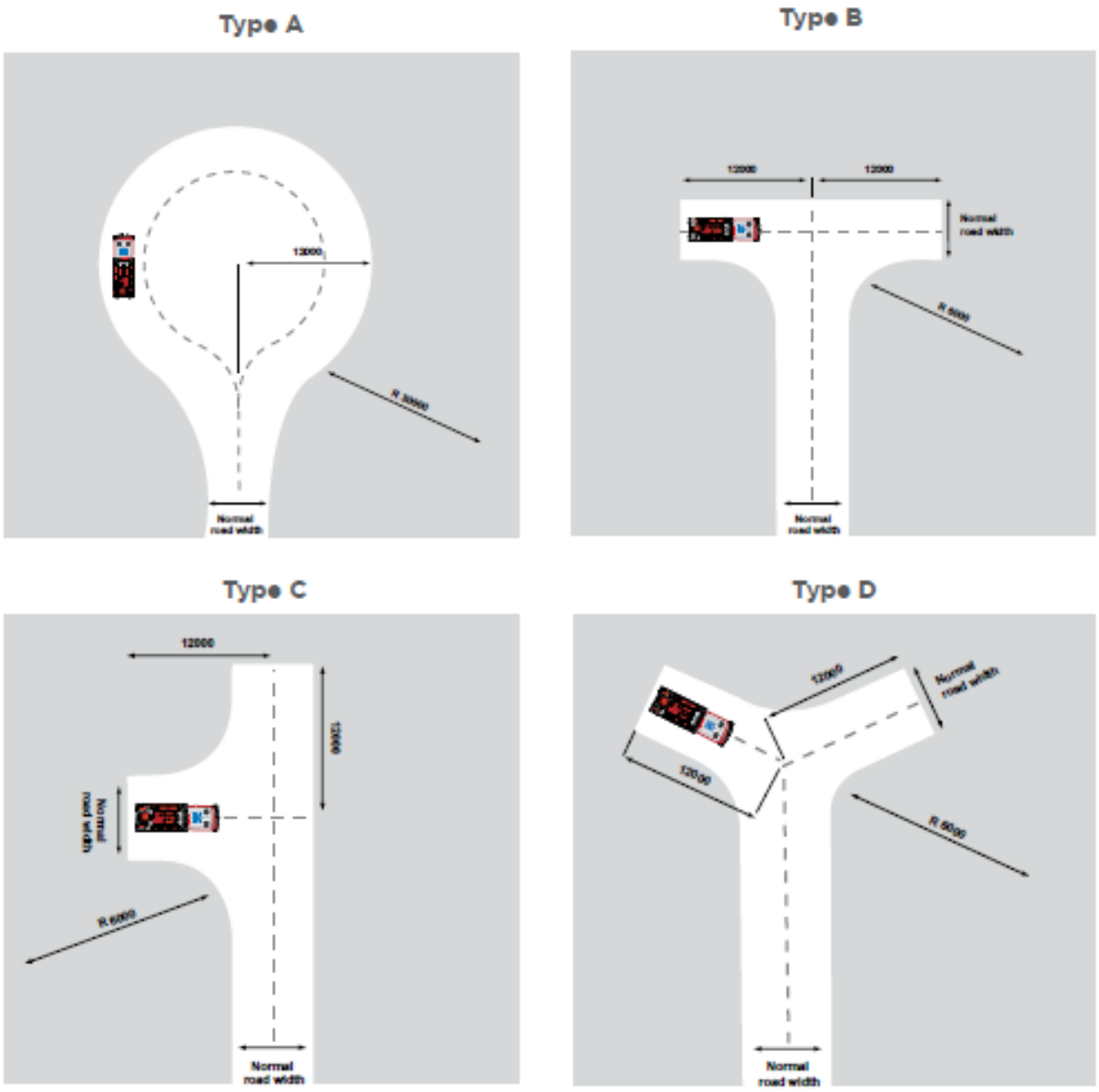
Further details on APZ implementation and management can be found on the NSW RFS website (https://www.rfs.nsw.gov.au/resources/publications).

Table 12: APZ management specifications

Vegetation Strata	Inner Protection Area (IPA)
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 2 m above ground; • Canopies should be separated by 2 to 5 m; and • Preference should be given to smooth barked and evergreen trees.
Shrubs	• Create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided; • Shrubs should not be located under trees; • Shrubs should not form more 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.
Grass	• Should be kept mown (as a guide grass should be kept to no more than 100 mm in height); and • Leaves and vegetation debris should be removed.

Appendix B – Vehicle Turning Specifications

Dead end roads that are greater than 200 m long must be provided with a turning head area that avoids multipoint turns. These must comply with the Appendix 3 of PBP and as illustrated below with Type A being the preferred option.



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