BUSHFIRE THREAT ASSESSMENT

FOR
A PROPOSED DWELLING

AT

LOT 13, 2091-2259 MONKERAI ROAD,

MONKERAI NSW 2415

Prepared by:

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Site Details:	Lot 13, 2091-2259 Monkerai Road, Monkerai NSW 2415
Prepared by:	***Sarah Jones B.Env.Sc.,G.Dip.DBPA (Design in Bushfire Prone Areas)*** ***Firebird ecoSultants Pty Ltd*** ABN – 16 105 985 993 PO Box 354, Newcastle NSW 2300 M: 0414 465 990 Email: sarah@firebirdeco.com.au T: 02 4910 3939 Fax: 02 4929 2727
Prepared for:	Christine Abrera
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Reviewer 2	Sarah Jones

Disclaimer

Notwithstanding the precautions adopted within this report, it should always be remembered that bushfires burn under a wide range of conditions. 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.

Executive Summary

A Bushfire Threat Assessment Report (BTA) has been prepared by Firebird ecoSultants Pty Ltd at the request of Christine Abrera for a proposed dwelling at Lot 13, 2091-2259 Monkerai Road, Monkerai NSW 2415. The report forms part of the supporting documentation for a DA to be submitted to Mid-Coast Council (MDC).

The report demonstrates compliance with Planning for Bushfire Protection 2019 (NSW RFS, 2019) and AS3959-2018 Construction of Buildings in Bush Fire Prone Areas.

This assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to the proposal. Recommendations are provided with regard to fuel management, access, provision of emergency services, building protection and construction standards to facilitate an acceptable level of bushfire protection.

In summary, the following is recommended to enable the proposal to meet the relevant legislative requirements:

1. **Asset Protection Zone (APZ) - The APZ provides space and reduced fuel loads to ensure radiant heat levels at the buildings are below critical limits and to prevent direct flame contact.**

    - To achieve a Bushfire Attack Level (BAL) of BAL-29, the following land is to be managed as an APZ, which is made up of an Inner Protection Area (IPA)
        - North for a distance of 38m
        - East for a distance of 38m
        - South for a distance of 31m
        - West for a distance of 31m

    These distances are to be managed as described under 'Planning for Bushfire Protection (Appendix 4 – Asset Protect Zone Requirements)' and the document titled 'Standards for Asset Protection Zones'.

    - Based on the APZs provided above, the proposed dwelling may be sited to achieve 19kW/m^2. However, the dwelling is to be constructed to BAL-29.

2. **Property Access – Firefighting Vehicles can access the dwelling and exit the property safely.**

    Access is provided in accordance with the property access requirements of Table 5.3b.

    - minimum 4m carriageway width;
    - 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;
    - a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;

- 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.

Four-wheel drive roads occur for 100m due to a creek crossing this is maintained by Council. The remaining part of the road (Anderson creek Road) is two wheeled drive Council maintained road.

Due to no alternative access, larger APZs are being incorporated in order to achieve radiant heat calculations 19kW/m2 or less. However, the dwelling is to be built to BAL-29.

3. Water Supplies – A water supply is required for firefighting operations

- A 20,000L water tank is to be installed for firefighting purposes. The static water supply is to be installed with 65mm metal Storz outlet with a gate or ball valve.

1. Construction Standards – Construction standards seek to increase the protection of the habitable buildings from bushfire. The shorter the APZ (distance between the external wall of the habitable building and the unmanaged vegetation), then the higher the construction standard, which is referred to as the BAL

Based on the APZs provided above, the proposed dwelling may be sited to achieve 19kW/m^2. However, the dwelling is to be constructed to BAL-29.

2. Landscaping – The type, location and ongoing maintenance of landscaping is considered a necessary BPM

- The identified APZs are to be managed in accordance with accordance with PBP (Appendix 4);
- A clear area of low-cut lawn or pavement is maintained adjacent to the dwellings; and
- Fencing details in accordance with PBP (7.6 – Fences and gates)

I certify the development conforms to the relevant specifications and requirements of Planning for Bushfire Protection 2019

Sarah Jones
B.Env.Sc., G.Dip.DBPA (Design for Bushfire Prone Areas)
FPA BPAD-A Certified Practitioner (Certification Number BPD-26512)
Ecologist / Bushfire Planner

Terms & Abbreviations

Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419 -2017	Australian Standard – Fire Hydrant Installations
AS3959-2018	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BCA	Building Code of Australia
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BFPL Map	Bush Fire Prone Land Map
BPMs	Bush Fire Protection Measures
BFSA	Bush Fire Safety Authority
CC	Construction Certificate
EPA Act	*NSW Environmental Planning and Assessment Act 1979*
FFDI	Forest Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LGA	Local Government Area
MDC	Mid-Coast Council
PBP	Planning for Bushfire Protection 2019
PoM	Plan of Management
OPA	Outer Protection Area
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation

CONTENTS

TABLES

FIGURES

1 INTRODUCTION

A Bushfire Threat Assessment Report (BTA) has been prepared by Firebird ecoSultants Pty Ltd at the request of Christine Abrera for a proposed dwelling at Lot 13, 2091-2259 Monkerai Road, Monkerai NSW 2415, hereafter referred to as the "site" (refer to Figure 1-1 for site locality). Refer to Appendix A for Proposed Site Plans.

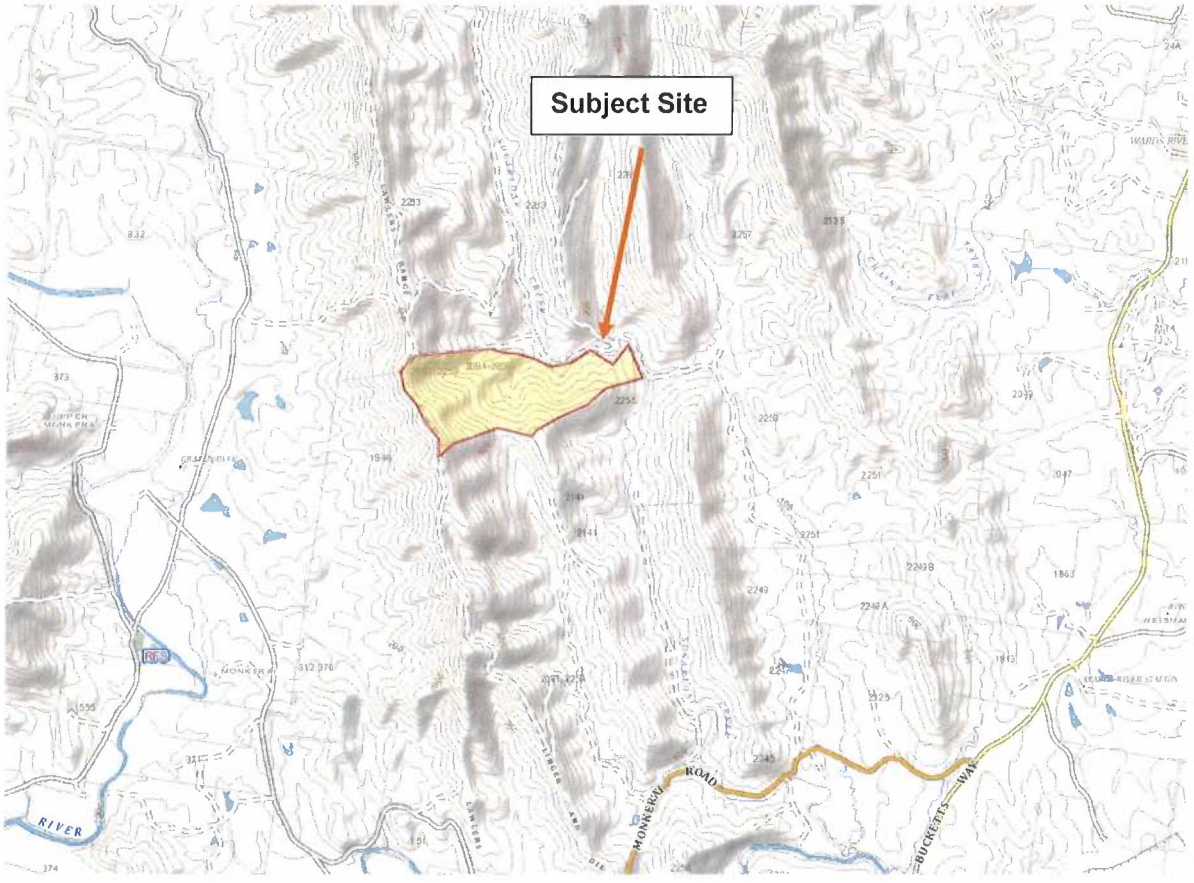
This BTA is suitable for submission with a Development Application (DA) and provides information on measures that will enable the development to comply with 'Planning for Bushfire Protection' (NSW RFS, 2019), hereafter referred to as PBP (RFS, 2019).

This assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to such a proposal, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the Environmental Planning and Assessment Amendment (Planning for Bushfire Protection) Regulation 2007 and the Rural Fires Amendment Regulation 2007 (RF Amendment Regulation 2007).

1.1 Site Particulars

Locality:	Lot 13, 2091-2259 Monkerai Road, Monkerai NSW 2415
LGA:	Mid-Coast Council
Lot/DP:	Lot 13 in DP805504
Current Land Use:	Vacant lot
Forest Danger Index:	80 FFDI

Figure 1-1: Site Location



1.2 Description of the Proposal

This DA relates to the proposal for a dwelling at Lot 13, 2091-2259 Monkerai Road, Monkerai NSW 2415. Refer to Appendix A for proposed plans.

1.3 Legislative Requirements

The Site has been mapped as Bush Fire Prone Land Map (BFPLM) by MDC.

This report forms part of the supporting documentation for a Development Application (DA) to be submitted to MDC.

This BTA has been prepared using current legislative requirements and associated guidelines for assessment of bushfire protection, these being:

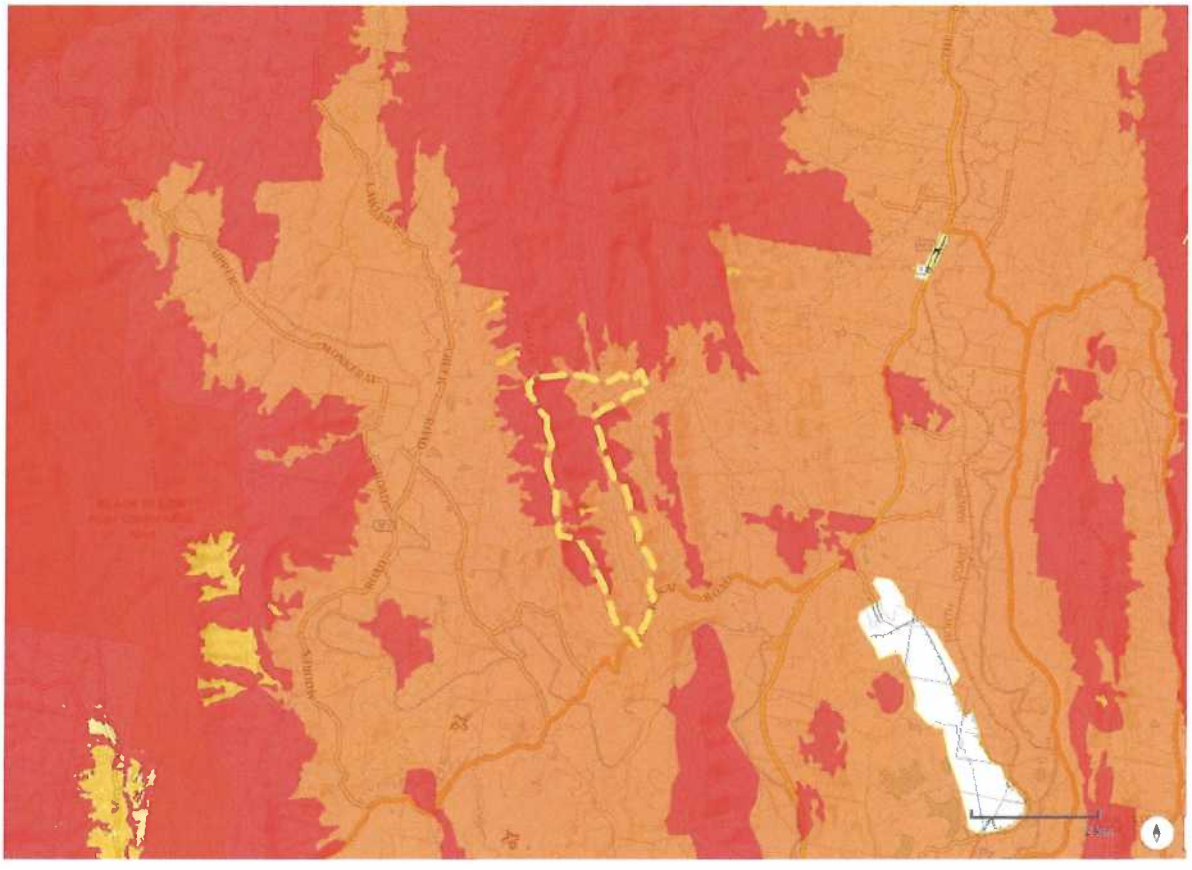
- PBP (RFS, 2019); and
- AS3959-2018 Construction of Buildings in Bushfire Prone Area.

1.4 Objectives of Assessment

This report has been prepared to address the requirements of Clause 44 of the Rural Fires Regulation. This BTA also addresses the six key Bush Fire Protection Measures (BFRMs) in a development assessment context being:

- The provision of clear separation of buildings and bush fire hazards, in the form of fuel-reduced APZ (and their components being Inner Protection Areas (IPA's) and Outer Protection Areas (OPA's);
- Sitting and design of the proposal;
- Construction standards;
- Appropriate access standards for residents, fire-fighters, emergency workers and those involved in evacuation;
- Adequate water supply and pressure, and utility services; and
- Suitable landscaping, to limit fire spreading to a building.

Figure 1-2: Bushfire Prone Land Map



2 METHODOLOGY

2.1 Vegetation Assessment

Vegetation surveys and vegetation mapping carried out on the site has been undertaken as follows:

- Aerial Photograph Interpretation to map vegetation cover and extent
- Confirmation of the vegetation assemblage typology present.

2.2 Slope Assessment

Slope assessment has been undertaken as follows:

- Aerial Photograph Interpretation in conjunction with analysis of electronic contour maps with a contour interval of 2m.

3 SITE ASSESSMENT

The following assessment has been undertaken in accordance with the requirements of PBP (RFS, 2019).

3.1 Vegetation & Slope Assessment

In accordance with PBP (RFS 2019), an assessment of the vegetation over a distance of 140m in all directions from the site was undertaken. Vegetation that may be considered a bushfire hazard was identified in all directions from the site. This assessment is depicted in Table 3-1.

In accordance with PBP (RFS 2019), an assessment of the slope underneath the vegetation considered a bushfire hazard was undertaken and the results are presented in Table 3-1 and Figure 3-1 below.

Table 3-1: Vegetation Classification

Proposed Dwelling		
Direction	**Vegetation Type**	**Slope**
North	Woodland Vegetation	Downslope (>20°)
East	Woodland Vegetation	Downslope (>20°)
South	Woodland Vegetation	Downslope (10-15°)
West	Woodland Vegetation	Downslope (10-15°)

Figure 3-1 Vegetation Map

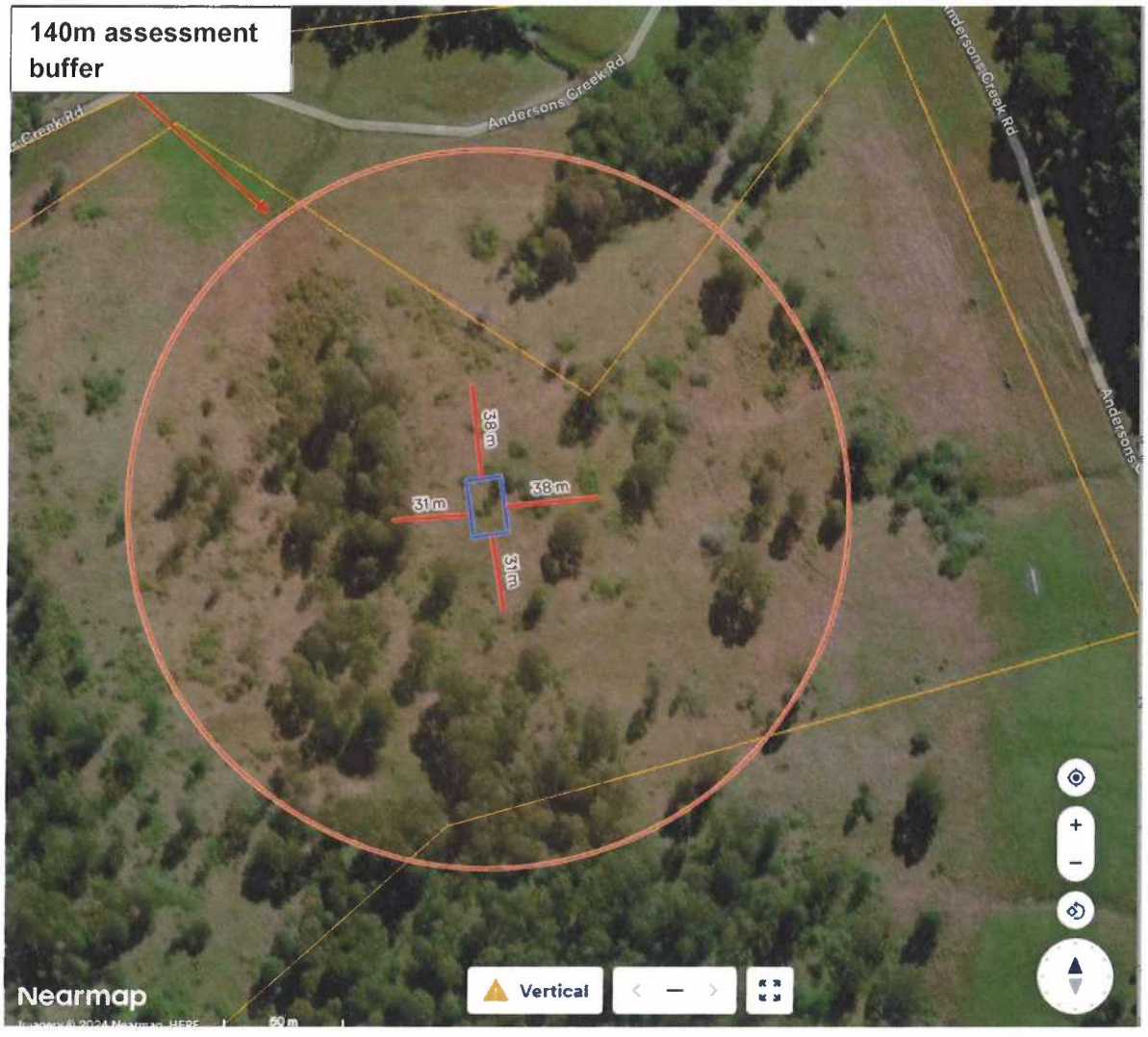
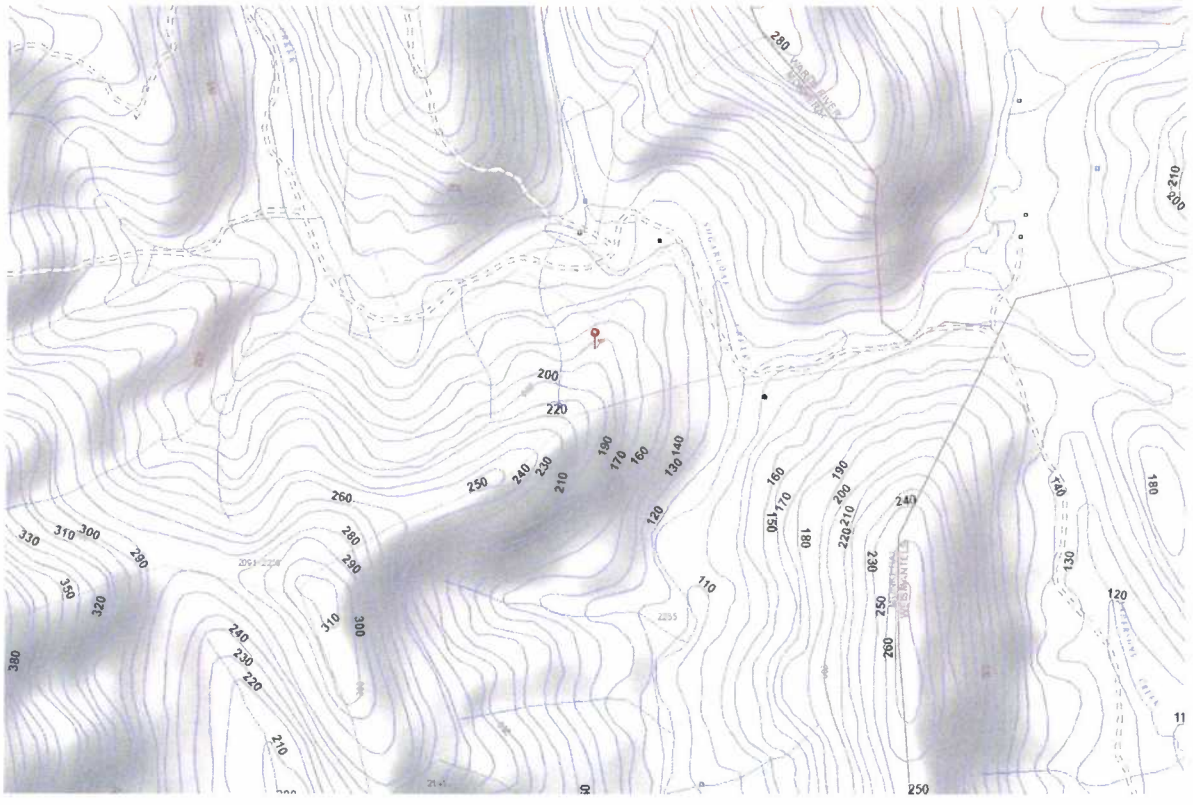


Figure 3-2 Slope Assessment



4 BUSHFIRE PROTECTION ASSESSMENT

4.1 Asset Protection Zones (APZ)

The PBP (RFS, 2019) guidelines have been used to determine the widths of the APZs required for habitable buildings within the site using the vegetation and slope data identified in Section 3-1 of this report.

The site lies within Mid-Coast Local Government Area and therefore is assessed under an FDI rating of 100. Using the results from the Site Assessment (section 3.1 of this report) the deemed to satisfy APZ requirements for the proposed buildings within the site were determined using Table A1.12.2 in PBP (RFS, 2019). Refer to Table 4-1 for the required APZs for the proposed habitable buildings.

Table 4-1: recommended APZs for Proposed Dwelling

Direction from Development	Vegetation classified within 140m	Effective Slope (within 100m)	APZ to be provided
North	Woodland Vegetation	Downslope (>20°)	An APZ of >38m has been implemented to the North.
East	Woodland Vegetation	Downslope (>20°)	An APZ of >38m has been implemented to the North.
South	Woodland Vegetation	Downslope (10-15°)	An APZ of >31m has been implemented to the North.
West	Woodland Vegetation	Downslope (10-15°)	An APZ of >31m has been implemented to the North.

Figure 4-1 APZ Map

5 BUSHFIRE ATTACK ASSESSMENT

Building design and the materials used for construction of future dwellings should be chosen based on the information contained within AS3959-2018, and accordingly the designer / architect should be made aware of this recommendation. It may be necessary to have dwelling plans checked by the architect involved to ensure that the proposed dwellings meet the relevant Bushfire Attack Level (BAL) as detailed in AS3959-2018.

The determinations of the appropriate BAL are based upon parameters such as weather modelling, fire-line intensity, flame length calculations, as well as vegetation and fuel load analysis. The determination of the construction level is derived by assessing the:

- Relevant FFDI = 80
- Flame temperature
- Slope
- Vegetation classification; and
- Building location.

The following BAL, based on heat flux exposure thresholds, are used in the standard:

(a) **BAL – LOW** The risk is considered to be **VERY LOW**

There is insufficient risk to warrant any specific construction requirements but there are still some risks.

(b) **BAL – 12.5** The risk is considered to be **LOW**

There is a risk of ember attack.

The construction elements are expected to be exposed to a heat flux not greater than 12.5 k/m2.

(c) **BAL – 19** The risk is considered to be **MODERATE**

There is a risk of ember attack and burning debris ignited by wind borne embers and a likelihood of exposure to radiant heat.

The construction elements are expected to be exposed to a heat flux not greater than 19 kW/m2.

(d) **BAL-29** The risk is considered to be **HIGH**

There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level of radiant heat.

The construction elements are expected to be exposed to a heat flux no greater than 29 kW/m2.

(e) **BAL-40** The risk is considered to be **VERY HIGH**

There is much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front.

The construction elements are expected to be exposed to a heat flux no greater than 40 kW/m^2.

(f) **BAL-FZ** The risk is considered to be **EXTREME**

There is an extremely high risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front.

The construction elements are expected to be exposed to a heat flux greater than 40 kW/m^2.

5.1 Determination of Bushfire Attack Levels

As the site lies within an LGA designated an FFDI of 80, the information relating to vegetation and slope was applied to Table A1.12.5 of PBP 2019 to determine the appropriate BAL rating. The results from this bush fire risk assessment are detailed below in Table 5-1–Bush Fire Attack Assessment.

Table 5-1: Determination of BALs for the proposed dwelling

Direction	Vegetation Type	Slope	Separation Distance from Vegetation	Bushfire Attack Level (BAL)
North	Woodland Vegetation	Downslope (>20°)	>38m	BAL-29
East	Woodland Vegetation	Downslope (>20°)	>38m	BAL-29
South	Woodland Vegetation	Downslope (10-15°)	>31m	BAL-29
West	Woodland Vegetation	Downslope (10-15°)	>31m	BAL-29

Given the information in Table 4-1, the proposed dwelling has been assessed as **BAL-29** This BAL rating is based on the management of APZs provided in section 4.

6 COMPLIANCE

The proposal is for a dwelling and therefore development standards apply. Table 6-1 details the proposed dwelling compliance with Development Standards for Infill development.

Table 6-1: Proposed Dwelling Compliance with Development Standards

Acceptable Solutions	Performance Criteria	Compliance
ASSET PROTECTION ZONES		
〉 an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.	〉 APZs are provided commensurate with the construction of the building; and 〉 A defendable space is provided.	**Complies with Acceptable Solution –** An APZ of >38m has been implemented to the North. An APZ of >38m has been implemented to the East. An APZ of >31m has been implemented to the South. An APZ of >31m has been implemented to the West.
〉 APZs are managed in accordance with the requirements of Appendix 4 of PBP.	〉 APZs are managed and maintained to prevent the spread of a fire to the building.	**Complies with Acceptable Solution –** the site is to be managed to the requirements of PBP Appendix 4 (summarised in Appendix B here)
〉 APZs are wholly within the boundaries of the development site. 〉 APZ are located on lands with a slope less than 18 degrees.	〉 the APZ is provided in perpetuity. 〉 APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	**Complies with Performance –** An APZ of >38m has been implemented to the North. An APZ of >38m has been implemented to the East. An APZ of >31m has been implemented to the South. An APZ of >31m has been implemented to the West.

〉 property access roads are two-wheel drive, all-weather roads.	〉 firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	**Does not comply –** Four-wheel drive roads occur for 100m due to a creek crossing this is maintained by Council. The remaining part of the road (Anderson creek Road) is two wheeled drive Council maintained road.
〉 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.	〉 the capacity of access roads is adequate for firefighting vehicles.	**Complies with Acceptable Solution –** Road access is adequate for emergency vehicles.
〉 hydrants are provided in accordance with the relevant clauses of AS 2419.1:2017; 〉 There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	〉 there is appropriate access to water supply.	**Complies with Acceptable Solution –** A 20,000L water tank is to be installed for firefighting purposes.
〉 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.	〉 firefighting vehicles can access the dwelling and exit the property safely.	**Complies with Acceptable Solution Except Secondary Access –** 〉 minimum 4m carriageway width; 〉 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; 〉 a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; 〉 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; and 〉 maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads Due to no alternative access, larger APZs are being incorporated in order to achieve radiant heat calculations 19kW/m2 or less. However, the dwelling is to be built to BAL-29.
WATER SUPPLIES		
〉 reticulated water is to be provided to the development, where available; and 〉 a static water supply is provided where no reticulated water is available.	〉 an adequate water supply is provided for firefighting purposes.	**Complies with Acceptable Solution –** A 20,000L water tank is to be installed for firefighting purposes.
〉 fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2017; 〉 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.	〉 water supplies are located at regular intervals; and 〉 the water supply is accessible and reliable for firefighting operations.	**Complies with Acceptable Solution** – A 20,000L water tank is to be installed for firefighting purposes.

› fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2017.	› flows and pressure are appropriate.	**Complies with Acceptable Solution –** Flow and pressure assumed compliant
› all above-ground water service pipes external to the building are metal, including and up to any taps.	› the integrity of the water supply is maintained.	**Complies with Acceptable Solution –** All above ground pipes will meet the specifications of the acceptable solution
› where no reticulated water supply is available, water for firefighting purposes is provided in accordance with Table 5.3d.	› a static water supply is provided for firefighting purposes in areas where reticulated water is not available.	**N/A** - A 20,000L water tank is to be installed for firefighting purposes.
ELECTRICTY SERVICES		
› where practicable, electrical transmission lines are underground; and › where overhead, electrical transmission lines are proposed as follows: o lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and o 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.	› location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	**Complies with Acceptable Solution –** Electrical services to the site will meet the requirements of the acceptable solution

GAS SERVICES		
〉 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.	〉 location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	**Complies with Acceptable Solution** – Gas services to the site will meet the requirements of the acceptable solution
CONSTRUCTION STANDARDS		
〉 BAL is determined in accordance with Tables A1.12.5 to A1.12.7; and 〉 construction provided in accordance with the MDC and as modified by section 7.5 (please see advice on construction in the flame zone).	〉 the proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.	**Complies with Acceptable Solution** – the site has been assessed as BAL-29
〉 fencing and gates are constructed in accordance with section 7.6.	〉 proposed fences and gates are designed to minimise the spread of bush fire.	**Can Comply –** Fencing on site will meet the requirements of the acceptable solution
〉 Class 10a buildings are constructed in accordance with section 8.3.2.	〉 proposed Class 10a buildings are designed to minimise the spread of bush fire.	**N/A** – the proposed dwelling is not classed as 10a.
LANDSCAPING		

〉 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: o the branches will not overhang the roof; o the tree canopy is not continuous; and o any proposed windbreak is located on the elevation from which fires are likely to approach.	〉 landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	**Complies with Acceptable Solution –** the site is to be managed to the requirements of PBP Appendix 4 (summarised in Appendix B here)

7 CONCLUSION & RECOMMENDATIONS

In summary, a Bushfire Risk Assessment has been undertaken for a proposed dwelling at Lot 13, 2091-2259 Monkerai Road, Monkerai NSW 2415. The report forms part of the supporting documentation for a Development Application (DA) to be submitted to MDC.

If the recommendations contained within this report are duly considered and incorporated, it is considered that the fire hazard present is containable to a level necessary to provide an adequate level of protection to life and property on the lot. In summary, the following is recommended to enable the proposal to meet the relevant legislative requirements for the proposed dwelling:

1. **Asset Protection Zone (APZ) - The APZ provides space and reduced fuel loads to ensure radiant heat levels at the buildings are below critical limits and to prevent direct flame contact.**

- To achieve a Bushfire Attack Level (BAL) of BAL-29, the following land is to be managed as an APZ, which is made up of an Inner Protection Area (IPA)
  - North for a distance of 38m
  - East for a distance of 38m
  - South for a distance of 31m
  - West for a distance of 31m

These distances are to be managed as described under 'Planning for Bushfire Protection (Appendix 4 – Asset Protect Zone Requirements)' and the document titled 'Standards for Asset Protection Zones'.

- Based on the APZs provided above, the proposed dwelling may be sited to achieve 19kW/m^2. However, the dwelling is to be constructed to BAL-29.

2. **Property Access – Firefighting Vehicles can access the dwelling and exit the property safely.**

Access is provided in accordance with the property access requirements of Table 5.3b.

- minimum 4m carriageway width;
- 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;
- a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;
- 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.

Four-wheel drive roads occur for 100m due to a creek crossing this is maintained by Council. The remaining part of the road (Anderson creek Road) is two wheeled drive Council maintained road.

Due to no alternative access, larger APZs are being incorporated in order to achieve radiant heat calculations 19kW/m2 or less. However, the dwelling is to be built to BAL-29.

3. **Water Supplies – A water supply is required for firefighting operations**

    - A 20,000L water tank is to be installed for firefighting purposes. The static water supply is to be installed with 65mm metal Storz outlet with a gate or ball valve.

4. **Construction Standards – Construction standards seek to increase the protection of the habitable buildings from bushfire. The shorter the APZ (distance between the external wall of the habitable building and the unmanaged vegetation), then the higher the construction standard, which is referred to as the BAL**

Based on the APZs provided above, the proposed dwelling may be sited to achieve 19kW/m^2. However, the dwelling is to be constructed to BAL-29.

5. **Landscaping – The type, location and ongoing maintenance of landscaping is considered a necessary BPM**

- The identified APZs are to be managed in accordance with accordance with PBP (Appendix 4);
- A clear area of low-cut lawn or pavement is maintained adjacent to the dwellings; and
- Fencing details in accordance with PBP (7.6 – Fences and gates)

8 BIBLIOGRAPHY

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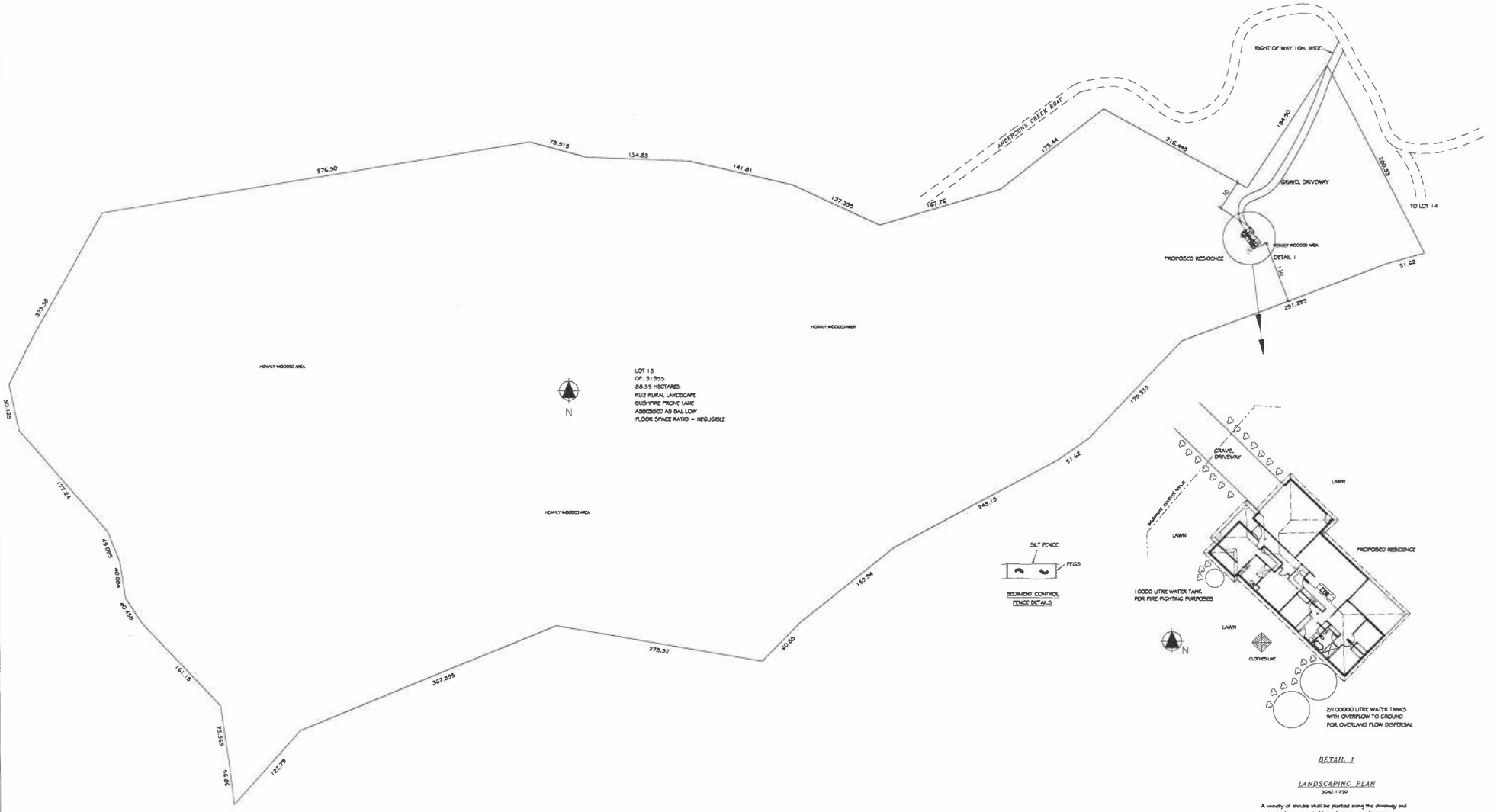
APPENDIX A PROPOSED SITE PLANS



SITE PLAN
SCALE 1:2500
SUBJECT TO SURVEY
ALL DIMENSIONS ARE IN METRES

DETAIL 1

LANDSCAPING PLAN
SCALE 1:1250

A variety of shrubs shall be planted along the driveway and water tanks surrounded by selected ground coverings.

LANDSCAPING LEGEND

COMMON NAME	HEIGHT
Dwarf Health Myrtle	1m
Rich Park Fringed Myrtle	1m
Wedged Leafed Dampiera	0.3m
Honeyeater Heaven Grevillea	1m

No	Date	Revision	Chk	Date	Drg No	Reference Drawing

GBDS
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A1

Title
PROPOSED HEBEL CLAD RESIDENCE
2091-2259 (LOT 13) MONKERAI ROAD, MONKERAI
FOR: MS. CHRISTINE ABRERA

sheet 3 of 3

Scale	Date	Checked	Approved	Drawing No	Rev
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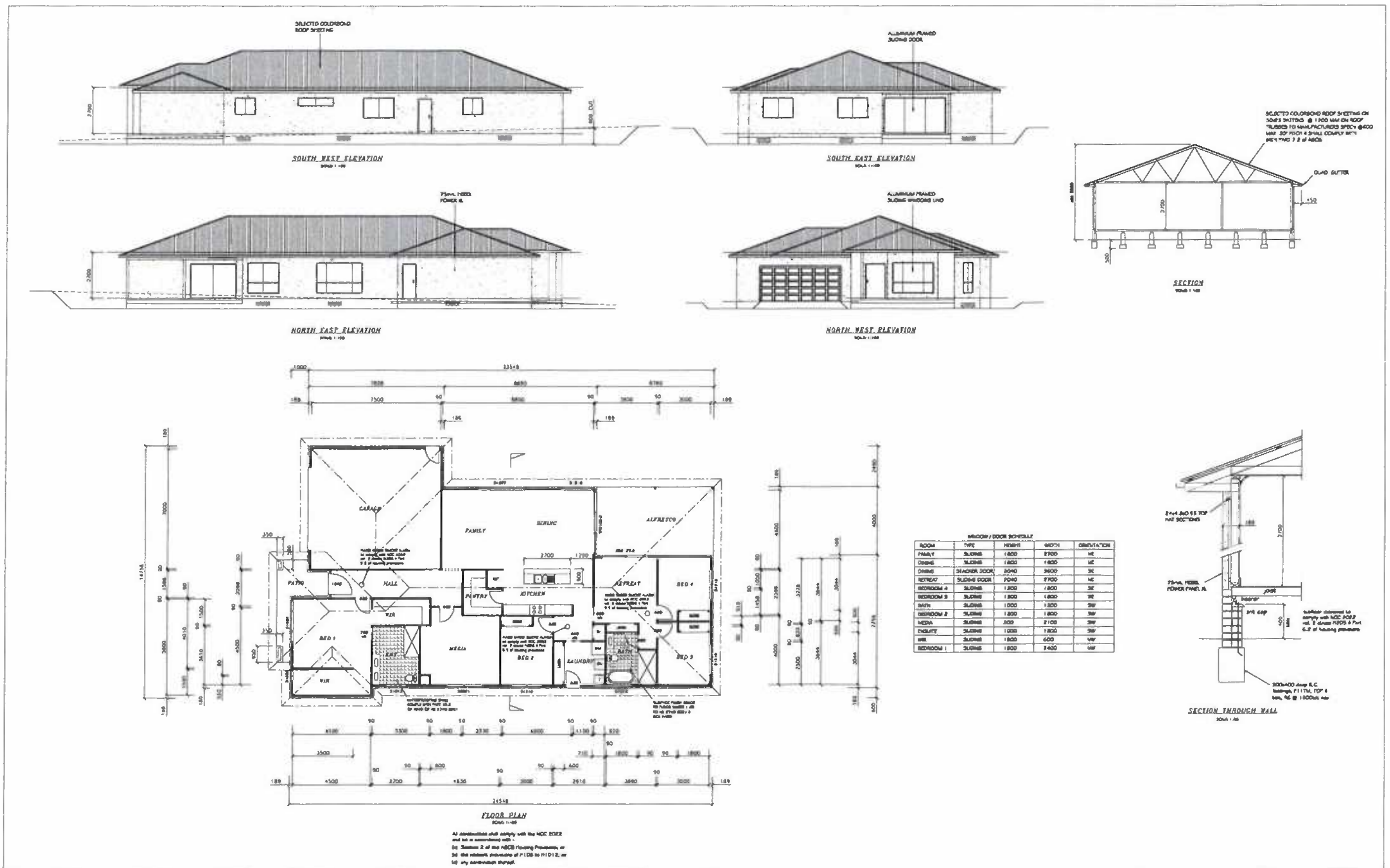

WINDOW / DOOR SCHEDULE

ROOM	TYPE	HEIGHT	WIDTH	ORIENTATION
FAMILY	SLIDING	1800	2700	NE
DINING	SLIDING	1800	1800	NE
DINING	STACKER DOOR	2040	3600	SE
RETREAT	SLIDING DOOR	2040	2700	NE
BEDROOM 4	SLIDING	1800	1800	SE
BEDROOM 3	SLIDING	1800	1800	SE
BATH	SLIDING	1000	1200	SW
BEDROOM 2	SLIDING	1800	1800	SW
MEDIA	SLIDING	800	2100	SW
ENSUITE	SLIDING	1000	1800	SW
WIR	SLIDING	1800	600	NW
BEDROOM 1	SLIDING	1800	2400	NW

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sheet 1 of 3

Scale 1:100
Drawing No 2024-010
Rev 01

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APPENDIX B – ASSET PROTECTION ZONES

APPENDIX 4

ASSET PROTECTION ZONE REQUIREMENTS

In combination with other BPMs, a bush fire hazard can be reduced by implementing simple steps to reduce vegetation levels. This can be done by designing and managing landscaping to implement an APZ around the property.

Careful attention should be paid to species selection, their location relative to their flammability, minimising continuity of vegetation (horizontally and vertically), and ongoing maintenance to remove flammable fuels (leaf litter, twigs and debris).

This Appendix sets the standards which need to be met within an APZ.

A4.1 Asset Protection Zones

An APZ is a fuel-reduced area surrounding a building or structure. It is located between the building or structure and the bush fire hazard.

For a complete guide to APZs and landscaping, download the NSW RFS document *Standards for Asset Protection Zones* at the NSW RFS Website www.rfs.nsw.gov.au.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset;
- an area of reduced bush fire fuel that allows for suppression of fire;
- an area from which backburning or hazard reduction can be conducted; and
- an area which allows emergency services access and provides a relatively safe area for firefighters and home owners to defend their property.

Bush fire fuels should be minimised within an APZ. This is so that the vegetation within the zone does not provide a path for the spread of fire to the building, either from the ground level or through the tree canopy.

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

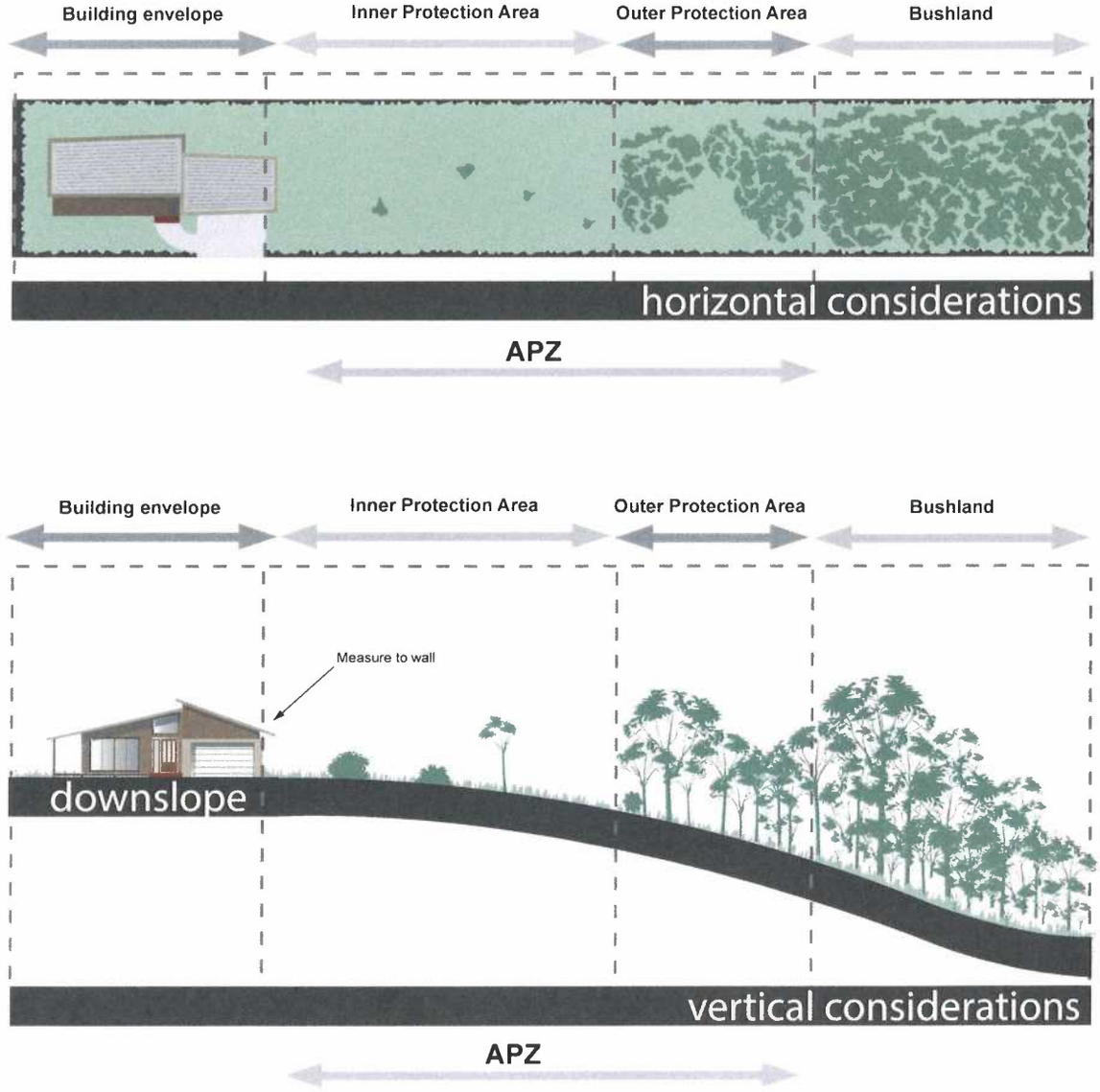
- direct flame contact on the building;
- damage to the building asset from intense radiant heat; and
- ember attack.

The methodology for calculating the required APZ distance is contained within Appendix 1. The width of the APZ required will depend upon the development type and bush fire threat. APZs for new development are set out within Chapters 5, 6 and 7 of this document.

In forest vegetation, the APZ can be made up of an Inner Protection Area (IPA) and an Outer Protection Area (OPA).

Figure A4.1

Typical Inner and Outer Protection Areas.



A4.1.1 Inner Protection Areas (IPAs)

The IPA is the area closest to the building and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and act as a defendable space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous.

In practical terms the IPA is typically the curtilage around the building, consisting of a mown lawn and well maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

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 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

- grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and
- leaves and vegetation debris should be removed.

A4.1.2 Outer Protection Areas (OPAs)

An OPA is located between the IPA and the unmanaged vegetation. It is an area where there is maintenance of the understorey and some separation in the canopy. The reduction of fuel in this area aims to decrease the intensity of an approaching fire and restricts the potential for fire spread from crowns; reducing the level of direct flame, radiant heat and ember attack on the IPA.

Because of the nature of an OPA, they are only applicable in forest vegetation.

When establishing and maintaining an OPA the following requirements apply:

Trees

- tree canopy cover should be less than 30%; and
- canopies should be separated by 2 to 5m.

Shrubs

- shrubs should not form a continuous canopy; and
- shrubs should form no more than 20% of ground cover.

Grass

- grass should be kept mown to a height of less than 100mm; and
- leaf and other debris should be removed.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA and OPA as described above should be undertaken regularly, particularly in advance of the bush fire season.