

BUSH FIRE ASSESSMENT REPORT

INCLUDING PERFORMANCE SOLUTION FOR ASSET PROTECTION ZONES &
CONSTRUCTION STANDARDS

Lots 128 DP 1265934

33 Cockatoo Crescent Mullumbimby

2-lot Residential Subdivision including a Dual Occupancy and Single
Class 1a Dwelling (s100B)

Prepared for: Greg Tollis

Date: 4 November 2021

Ref: 21/276

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DOCUMENT CONTROL

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1.0 EXECUTIVE SUMMARY

This report has been prepared for the proposed 2-lot subdivision including a proposed dual occupancy on one lot and a single Class 1a dwelling on the second lot at Lot 128 DP 1265934, 33 Cockatoo Crescent Mullumbimby demonstrating compliance with Planning for Bushfire Protection 2019 (PBP2019) and to accompany an application for a Bush Fire Safety Authority.

The report has demonstrated compliance with each of the heads of consideration appropriate to the acceptable solutions criteria of Planning for Bushfire Protection 2019 except regarding asset protection zones and construction standards.

It is noted that a previous bushfire report was prepared for a similar development of the land in 2020 with a Bushfire Design Brief prepared by this office on 28 September 2020 as a preliminary consultation document for discussions with the NSW Rural Fire Service specifically regarding modelling of the hazard to the west/southwest of the property.

Concurrence with the methodology and asset protection zones and Bushfire Attack Level (BAL) constructions standards was received from NSW RFS on 24 November 2020. In this regard, the proposed dwellings will be set back the same distance and the same methodology has been utilised in this report, it being noted there have been no changes to legislation or PBP2019 since the previous brief.

The following table is provided as a summary of the recommendations and method of assessment for each consideration relating to Planning for Bushfire Protection 2019.

MEASURE	RECOMMENDATION	ASSESSMENT
Construction	BAL 29 & BAL 19 AS 3959-2018 + s.7.5 PBP2019	Performance Solution
APZ Required	Entire properties to be managed & maintained as IPA	Performance Solution
Water Supply	Street hydrants provide coverage in accordance with AS 2419.1-2005	Acceptable Solution
Electricity Supply	New electricity supply to be in accordance with s7.4 and Table 7.4a of PBP2019	Acceptable Solution
Gas Supply	Gas supply to comply with s7.4 and Table 7.4a of PBP2019	Acceptable Solution
Landscape	Landscaping is to comply with Appendix 4 of PBP2019	Acceptable Solution
Access	Standard driveways acceptable.	Acceptable Solution

The report makes the following recommendations for the development. The full report however is to be considered, including Section 2.2 that details the Significant Environmental Features that are not considered by this report.

1. The proposed dwellings are to be setback a minimum distance of 13 metres from the western, southwestern, and southern boundaries and be constructed to BAL 29 AS 3959-2018 + Section 7.5 Planning for Bushfire Protection 2019 (including the entire roofs and sub-

floors) except for the eastern elevations of the dwellings which can be constructed to BAL 19 AS 3959-2018 + Section 7.5 Planning for Bushfire Protection 2019.

Construction specification detailing compliance shall be shown on the plans submitted with the application for a construction certificate and certified by an accredited building certifier.

2. A 1.8m high non-combustible fence shall be constructed along the western and southern boundaries (part) as shown in Figure 5. The fence is to be in close contact to the ground and have no perforations within the 1.8m height.
3. At the commencement of works and in perpetuity the entire properties are to be managed and maintained as an Inner Protection Area (IPA) to prevent the spread of a fire towards the buildings in accordance with Appendix 4 of Planning for Bushfire Protection 2019 and the requirements of 'Standards for Asset Protection Zones' (RFS 2005) (see **attached** Appendix C & Appendix D).

Any future buildings/structures within the recommended APZ, including Class 10a and Class 5-8 buildings, must be specifically assessed by this office and concurred with by NSW RFS to ensure the asset protection zone recommended is not compromised due to additional fuels within the APZ or compromising defensible space. This may result in the requirement for the structure, even when greater than 6m from the subject building, requiring compliance with the construction standards relevant to the setback from the bushfire hazard in accordance with Table A1.12.6 PBP2019. It is noted the proposed water tanks and pool (including pavers, etc.) shown on the site plan are acceptable provided they are constructed completely of non-combustible materials.

4. Landscaping is to be undertaken in accordance with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 as detailed in Section 8 of this report and managed and maintained in perpetuity.
5. New fences and gates are to be made of either hardwood or non-combustible material. Where a fence or gate is constructed within 6m of the dwelling it is to be made of non-combustible material only.
6. Water, electricity, and gas are to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 and cl. 5.8 of AS3959-2018 as detailed in Section 6 of this report.
7. It is recommended that the property owner and occupants familiarise themselves with the relevant bushfire preparation and survival information located on the NSW Rural Fire Service website. This website should be accessed periodically to ensure the property owner and occupants are aware of the latest information. The RFS website is www.rfs.nsw.gov.au

2.0 INTRODUCTION

2.1 GENERAL

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed 2-lot subdivision including a proposed dual occupancy on proposed Lot 1 (southern lot) and a single Class 1a dwelling on proposed Lot 2 (northern lot) at Lot 128 DP 1265934, 33 Cockatoo Crescent Mullumbimby.

The recommendations within this report address the aims and objectives of Planning for Bushfire Protection 2019 to reduce the risk of ignition of the buildings in a bushfire event. It is noted however that bushfire is a natural phenomenon and there can never be any guarantee that a building or occupants will not be adversely affected by bushfire.

2.2 SIGNIFICANT ENVIRONMENTAL FEATURES

An assessment is to be undertaken, if applicable, regarding:

- State Environmental Planning Policy (Koala Habitat Protection) 2019
- Biodiversity Conservation Act 2016 (NSW)
- Local Land Services Act 2013 (NSW)
- Land Management (Native Vegetation) Code 2017 (NSW)
- National Parks and Wildlife Act 1974 (NSW)
- Environmental Protection and Biodiversity Conservation Act 1999 (Cwlth)

This report does not consider the above legislation and in this regard this report should be read in conjunction with the Statement of Environmental Effects submitted with the development application.

2.3 REPORT DETAILS

Report Reference No.:	21/276
Property Address:	Lot 128 DP 1265934, 33 Cockatoo Crescent Mullumbimby
Local Government Area:	Byron Shire Council
Proposal:	2-lot subdivision including a dual occupancy & single Class 1a dwelling
Drawings:	Attached in Appendix B
Client:	Greg Tollis

3.0 PROPOSED DEVELOPMENT

The owners are proposing a 2-lot subdivision at Lot 128 DP 1265934, 33 Cockatoo Crescent Mullumbimby as shown on the site plan in Figure 2. The development will create the following lots:

- Proposed Lot 1 (southern lot) supporting a proposed dual occupancy accessed from Cockatoo Crescent.
- Proposed Lot 2 (northern lot) supporting a single dwelling (and pool) accessed from Cockatoo Crescent.

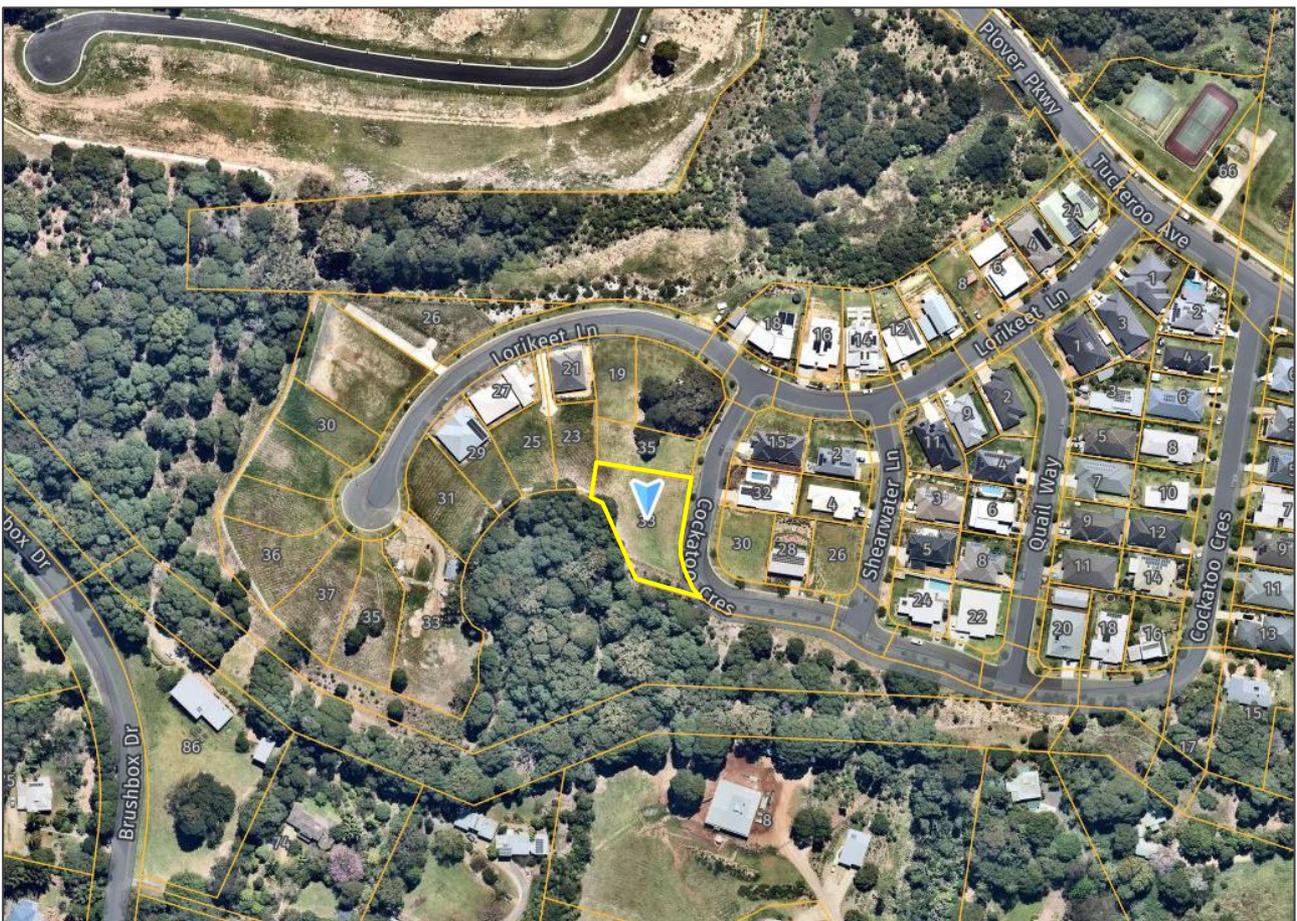


Figure 1: Location of the subject property

Source: Nearmap

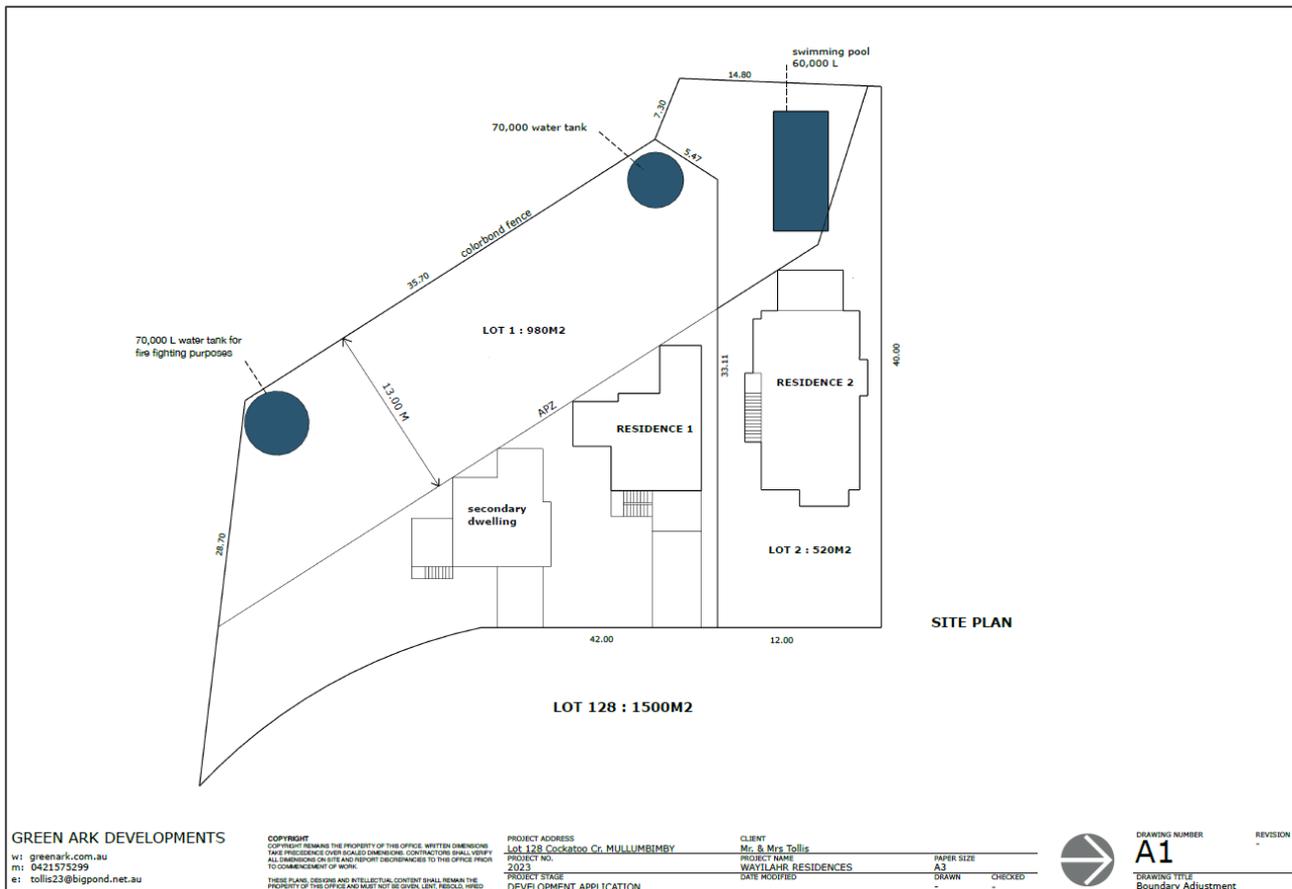


Figure 2: Plan of subdivision and proposed dwellings (larger image in Appendix B)

4.0 BUSHFIRE THREAT ASSESSMENT

4.1 OVERVIEW

The bushfire threat assessment to determine the BAL and asset protection zone comprises the identification of the vegetation formations for each aspect within 140 metres of the dwellings and the effective slope of the ground under the hazard as required by PBP2019 (Appendix 1).

For the purposes of determining a Bushfire Attack Level for the dwellings the assessment has been made over 100m in accordance with Table A1.12.6 PBP2019.

4.2 BUSHFIRE PRONE LAND MAP

The bushfire prone mapping identifies the subject allotment as being bushfire prone (Figure 3). Aerial mapping and inspection of the site reveals that the bushfire prone land map is considered reasonably accurate with respect to the current bushfire hazard except the mapped hazard on the subject lot and lots further to the west has been cleared.

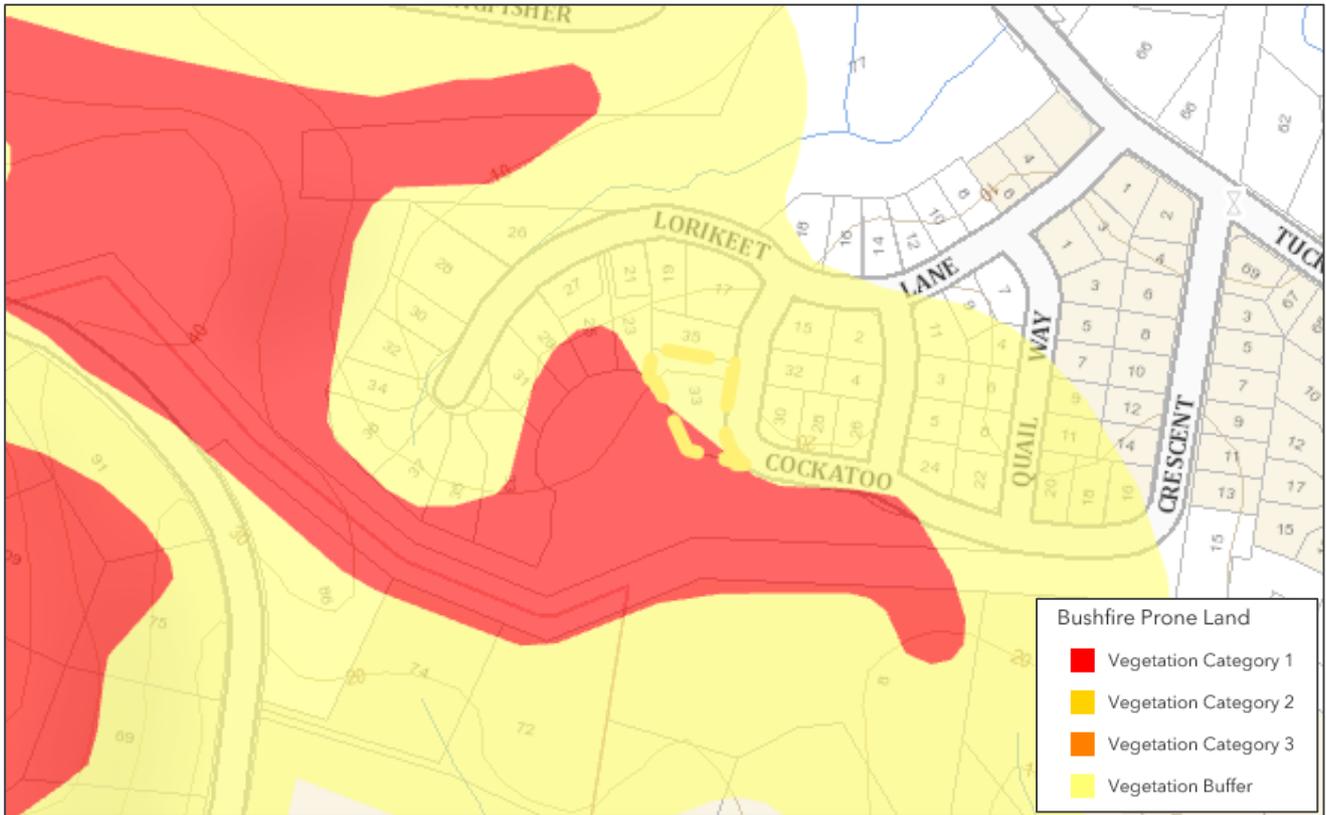


Figure 3: Bushfire prone land map

Source: planningportal.nsw.gov.au

4.3 VEGETATION CLASSIFICATION AND SLOPE ANALYSIS

Identification of the vegetation formations for each aspect within 140 metres of the proposed dwellings as per Keith (2004) classifications was undertaken and is detailed as follows. The slope was measured onsite with a 'Tru Pulse 3600 R' laser range finder and inclinometer with the assessment undertaken.

The primary bushfire hazard is to the west, southwest and south of the primary and secondary dwelling on proposed Lot 1 and to the southwest and south of the proposed dwelling on proposed Lot 2 being forest vegetation located generally on an upslope as shown in Figure 4.

To the west of the proposed dwelling on proposed Lot 2 is managed land as part of the residential subdivision.

To the north are managed lots, with a large tree within the managed reserve which does not pose a significant bushfire hazard and then rainforest at approximately 70 metres from the closest proposed dwelling.

To the east are managed lots.



Figure 4: Bushfire threat analysis

Source: Nearmap, image dated 03.10.2021

Boundary & dwellings approximate location, not to scale or design, for illustrative purposes only

5.0 ASSET PROTECTION ZONES AND CONSTRUCTION STANDARDS

Asset Protection Zones are areas established and maintained to ensure that bushfire fuels are progressively reduced between the development and the bushfire hazard. The asset protection zone incorporates an Inner Protection Area (IPA) having reduced fuel loadings of approximately 3t/ha.

The proposed residential subdivision will be required to comply with the asset protection zone (APZ) criteria for subdivisions as set out in Section 5.3.1 and Table 5.3a of PBP2019 which states:

- APZs are provided in accordance with Table A1.12.2 or A1.12.3 based on the FFDI.
- APZs are to be managed in accordance with the requirements of Appendix 4 (of PBP).
- APZs are wholly within the boundaries of the development site.
- APZ are located on lands with a slope less than 18 degrees.

It is noted that a previous bushfire report was prepared for a similar development of the land in 2020 with a Bushfire Design Brief prepared by this office on 28 September 2020 as a preliminary consultation document for discussions with the NSW Rural Fire Service specifically in regard to modelling of the hazard to the west/southwest of the property with concurrence with the methodology and asset protection zones and Bushfire Attack Level (BAL) constructions standards

being achieved with the NSW RFS on 24 November 2020 (see **attached** Appendix A). In this regard, the proposed dwellings will be set back the same distance and the same methodology as set out below has been utilised in this report.

5.1 PERFORMANCE SOLUTION

5.1.1 ACCEPTABLE SOLUTION RELATING TO ASSET PROTECTION ZONES

APZ - Acceptable Solution

APZs are provided in accordance with Table A1.12.2 or A1.12.3 based on the FFDI.

5.1.2 SCOPE

The scope of the performance solution is limited to the departure from the acceptable solution requirements identified in this report regarding asset protection zones and construction standards.

5.1.3 LIMITATIONS

The report provides recommendations that will reduce the risk of ignition of the buildings while the fire front passes however as documented:

'The goal of absolute safety during a bush fire event is not attainable and despite best effort there is the ever-present risk of personal injury or damage to property. Ultimately, it is the responsibility of the owner/occupier to comply with conditions of consent and to maintain systems designed to mitigate the impacts of bush fire'.

The performance solution relies on the owner/occupier to comply with the recommendations in this report and the consent conditions and to maintain in perpetuity systems designed to mitigate the impacts of bush fire. The report is not considered to be a compliance report for any other aspects other than that specified in the scope.

5.1.4 ASSUMPTIONS

The dwellings, once constructed, is compliant with the acceptable solutions of Planning for Bushfire Protection 2019 and the recommendations within this report relating to the performance criteria.

The buildings and asset protection zones, water, access, and landscaping will be managed and maintained in perpetuity in accordance with Planning for Bushfire Protection 2019.

5.1.5 METHODOLOGY

The assessment method for the performance solution is identified in Part A2.2(2) – Assessment Methods in the Housing Provisions of the Building Code of Australia 2019. The report will be assessed in accordance with BCA Part A2.2(2)(b)(ii) by using a qualitative and quantitative analysis consistent with Planning for Bushfire Protection 2019 and NSW RFS accepted methodology for the asset protection zones and a comparative analysis BCA Part A2.2(d) for construction consistent with AS 3959-2018 + s7.5 PBP2019.

In this regard, the radiant heat flux established within the performance solution will identify the Bushfire Attack Level to be constructed in accordance with AS 3959-2018 and Section 7.5 of Planning for Bushfire Protection 2019. Ember protection is considered and will be addressed by complying AS 3959-2018 for the relevant Bushfire Attack Level (BAL). Flame behaviour qualification is also provided.

The methodology adopted in formulating the performance solution is based on that described in the *International Fire Engineering Guidelines 2005*, RFS Practice Note 03/06 and AS 3959-2018. The Guidelines provide guidance for the design of performance solutions for the BCA to establish an acceptable level of compliance with the relevant performance requirement.

5.1.6 PERFORMANCE SOLUTION FOR ASSET PROTECTION ZONES

APZ - Performance Criteria

Potential building footprints must not be exposed to radiant heat levels exceeding 29 kW/m² on each proposed lot.

The following design fires have been undertaken to model a 1.8m high non-combustible fence to be provided along the western and southern boundaries (part) of the subject property as shown in Figure 5.

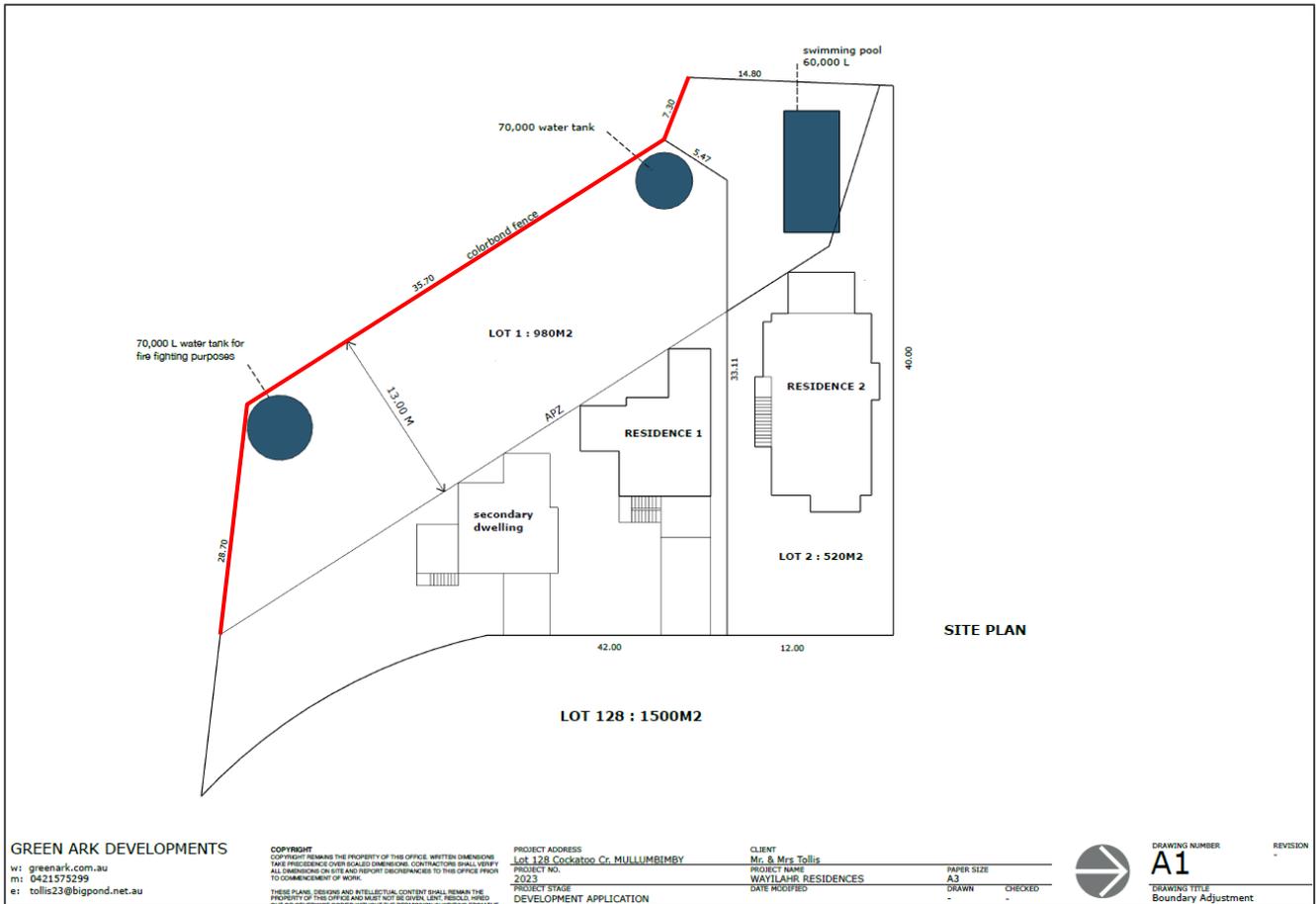


Figure 5: Location of proposed fence marked in red

DESIGN FIRE

Undertake modelling of the bushfire hazard to the south / southwest. The modelling will be set at 10 degrees. The accepted method of establishing the reduced radiant heat flux due to proposed shielding by a 1.8m high non-combustible fence will be adopted. In this regard the view factor of the shielding calculation has been subtracted from the view factor when calculated without the radiant heat shield. The flame length is reduced by the height of the proposed radiant heat shield, and this will also determine whether there will be any flame contact on the building.

Elevation to receiver

The elevation to receiver has been confirmed with the proposed plans. The elevation is shown to be approximately 2.5-3m with an additional 800mm varied height for the sub-floor and ground level to the rear. Therefore, the elevation to receiver will be set at 4m.

Site Street Address:	128 and 129 Cockatoo Crescent, Mullumbimby		
Assessor:	Please Enter Your Name; Please Enter Company Name		
Local Government Area:	Byron	Alpine Area:	No
Equations Used			
Transmissivity: Fuss and Hammins, 2002			
Flame Length: RFS PBP, 2001/Vesta/Catchpole			
Rate of Fire Spread: Noble et al., 1980			
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005			
Peak Elevation of Receiver: Tan et al., 2005			
Peak Flame Angle: Tan et al., 2005			
<hr/>			
Run Description:	Design Fire 1		
<hr/>			
<u>Vegetation Information</u>			
Vegetation Type:	North Coast WSF (Shrubby)		
Vegetation Group:	Wet Sclerophyll Forests (Shrubby)		
Vegetation Slope:	10 Degrees	Vegetation Slope Type:	Upslope
Surface Fuel Load(t/ha):	22	Overall Fuel Load(t/ha):	35.98
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta	
<hr/>			
<u>Site Information</u>			
Site Slope:	10 Degrees	Site Slope Type:	Upslope
Elevation of Receiver(m):	4	APZ/Separation(m):	13
<hr/>			
<u>Fire Inputs</u>			
Veg./Flame Width(m):	100	Flame Temp(K):	1090
<hr/>			
<u>Radiant Heat Shielding Inputs</u>			
Shield Height(m):	1.8	Shield Width(m):	15
<hr/>			
<u>Calculation Parameters</u>			
Flame Emissivity:	95	Relative Humidity(%):	25
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308
Moisture Factor:	5	FDI:	80
<hr/>			
<u>Program Outputs</u>			
Category of Attack:	HIGH	Peak Elevation of Receiver(m):	6.88
Level of Construction:	BAL 29	Fire Intensity(kW/m):	19693
Radiant Heat(kW/m2):	26.33	Flame Angle (degrees):	48
Flame Length(m):	11.2	Maximum View Factor:	0.4
Shielded View Factor:	0.032	Inner Protection Area(m):	13
Rate Of Spread (km/h):	1.06	Outer Protection Area(m):	0
Transmissivity:	0.867		

Figure 6: Modelling of the upslope to the west/southwest with a 1.8 metre radiant heat shield

The modelling establishes that with a 13-metre setback from the west/southwest/south boundaries the dwellings will receive radiant heat levels forecast at 26.33 kW/m² which will be within the threshold of 29kW/m² as required by the performance criteria. The building will not receive forecast flame contact.

The following table summarises the category of bushfire attack pursuant to Planning for Bushfire Protection 2019.

Table 1: Summary Bushfire Threat Assessment, APZs & Construction Standards					
ASPECT	SLOPE	VEG. CLASS Figure A1.2 PBP2019	APZ REQUIRED Table A1.12.3 PBP2019	APZ RECOMMENDED	CONSTRUCTION LEVEL AS 3959-2018
North	0-5 ^{0 d/s}	Rainforest	12m	Entire property as an IPA	Dictated by south / southwest
East	n/a	Managed land	n/a	Entire property as an IPA	BAL 19 + s.7.5 PBP 2019
South, Southwest & West	Upslope	Forest	20m (note – 13m modelled in Section 5.1)	Entire property as an IPA (min. 13m setback required – see Performance Solution)	BAL 29 + s.7.5 PBP 2019

*d/s = downslope

The proposed dwellings are to be setback a minimum distance of 13 metres from the western, southwestern, and southern boundaries and be constructed to BAL 29 AS 3959-2018 + Section 7.5 Planning for Bushfire Protection 2019 (including the entire roofs and sub-floors) except for the eastern elevations of the dwellings which can be constructed to BAL 19 AS 3959-2018 + Section 7.5 Planning for Bushfire Protection 2019.

At the commencement of works and in perpetuity the entire properties are to be managed and maintained as an Inner Protection Area (IPA) to prevent the spread of a fire towards the buildings in accordance with Appendix 4 of Planning for Bushfire Protection 2019 and the requirements of 'Standards for Asset Protection Zones' (RFS 2005) (see **attached** Appendix C & Appendix D).

Any future buildings/structures within the recommended APZ, including Class 10a and Class 5-8 buildings, must be specifically assessed by this office and concurred with by NSW RFS to ensure the asset protection zone recommended is not compromised due to additional fuels within the APZ or compromising defensible space.

This may result in the requirement for the structure, even when greater than 6m from the subject building, requiring compliance with the construction standards relevant to the setback from the bushfire hazard in accordance with Table A1.12.6 PBP2019. It is noted the proposed water tanks and pool (including pavers, etc.) shown on the site plan are acceptable provided they are constructed completely of non-combustible materials.

6.0 WATER AND UTILITY SERVICES

6.1 WATER SERVICES

A reticulated water supply and street hydrants in Cockatoo Crescent provide coverage of the development in accordance with AS 2419.1 – 2005. It is noted that hydrant pressures and flows have not been tested as part of this report.

6.2 ELECTRICITY SERVICES

New electrical transmission lines if required are to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 as follows:

- where practicable, electrical transmission lines are underground; and
- where overhead, electrical transmission lines are proposed as follows:
 - lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and
 - no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.

6.3 GAS SERVICES

The following aspects are to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 should a gas service be considered:

- 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
- above-ground gas service pipes are metal, including and up to any outlets.

Additionally, gas installations are to comply with Clause 5.8 of AS 3959-2018. External gas pipes and fittings above ground shall be of steel or copper construction having a minimum wall thickness in accordance with gas regulations or 0.9mm whichever is the greater. The metal pipe shall extend a minimum of 400mm within the building and 100mm below ground.

7.0 ACCESS

The property access is provided by way of Cockatoo Crescent providing access from the public road system giving fire fighters access to the proposed dwellings.

The access table in Section 7.4 of Planning for Bushfire Protection 2019 does not require specific access requirements where the access from the public road supporting hydrants to the most distant part of a building has an unobstructed path of 70m. In this respect it is considered standard driveways will be acceptable.

8.0 LANDSCAPING

The majority of buildings adversely impacted upon in a bushfire event happen through ember attack and in this regard combustible material surrounding the building e.g. landscaping can play a significant part during the event. Adequate management of landscaping is critical to the survivability of an asset and for occupant safety during a bushfire.

It is recommended that landscaping is undertaken in accordance with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 as follows and managed and maintained for the life of the development.

- compliance with the NSW RFS 'Asset protection zone standards' (see Appendix 4 of PBP 2019);
- a clear area of low-cut lawn or pavement is maintained adjacent to the house;
- fencing is constructed in accordance with section 7.6; and
- trees and shrubs are located so that:
 - the branches will not overhang the roof;
 - the tree canopy is not continuous; and
 - any proposed windbreak is located on the elevation from which fires are likely to approach.

It is recommended that landscaping plans be assessed by the consent authority for compliance or in the absence of landscaping plans confirmation of compliance undertaken by the Principal Certifying Authority.

9.0 CONCLUSION

This assessment demonstrates that the proposed development will be compliant with all aspects of *Planning for Bushfire Protection 2019* based on the recommendations contained in Section 1 of this report, and other considerations contained within the report considering the performance solution for asset protection zones and construction standards provided in Section 5.

DISCLAIMER

This report was prepared for the purposes and exclusive use of the stated client to accompany an application to Byron Shire Council specifically relating to the proposed 2-lot residential subdivision and three dwellings and is not to be used for any other purpose or by any other person or Corporation. BCA Check Pty Ltd accepts no responsibility for any loss or damage suffered howsoever arising to any person or Corporation who may use or rely on this report in contravention of the terms of this clause. This report is not intended for or to be used where aluminium composite panels or intumescent paints are proposed. The report is not to be construed as an assessment of the building materials or compliance with the recommended bushfire attack level/s.

As identified in Planning for Bushfire Protection 2019 and the Building Code of Australia the report is to provide recommendations to reduce the risk of ignition and does not guarantee the complete protection of the building in the event of bush fire or that the building will not be adversely impacted upon.

Reporting has been based on the relevant Council and Rural Fire Service Guidelines however recommendations or suggestions given in this report are based on our site investigation at the time of reporting. In some cases site conditions may change dramatically within a few years due to rapid vegetation re-growth and invading weed species.

REFERENCES

NSW Rural Fire Service and Planning NSW (2019), *Planning for bushfire protection, A guide for councils, planners, fire authorities and developers*. Rural Fire Service NSW Australia.
Standards Australia, (2018), *AS3959 Construction of buildings in bushfire prone areas*, Australian Standards, Sydney.

LEGISLATION

Environmental Planning and Assessment Act 1979 and Regulations 2000. *New South Wales*. Parliamentary Counsel's Office, NSW Government Information Service.
Rural Fires Act 1997. *New South Wales*. Parliamentary Counsel's Office, NSW Government Information Service.
Rural Fires Regulation. *New South Wales*. Parliamentary Counsel's Office, NSW Government Information Service.

APPENDIX A: Email Correspondence - NSW Rural Fire Service dated 24.11.2020

From: Alan Bawden [<mailto:Alan.Bawden@rfs.nsw.gov.au>]
Sent: Tuesday, 24 November 2020 9:30 AM
To: 'Peter Thornton - BCA Check' <peter@bcacheck.com.au>
Subject: FW: 34 & 35 Cockatoo Crescent Mullumbimby

Peter

Following from our meeting today, the NSW RFS agrees with the proposed methodology for this development proposal.

Regards



Alan Bawden

Team Leader - Development Assessment and Planning

Planning and Environment Services (North)

NSW RURAL FIRE SERVICE

51 Moonee Street Coffs Harbour

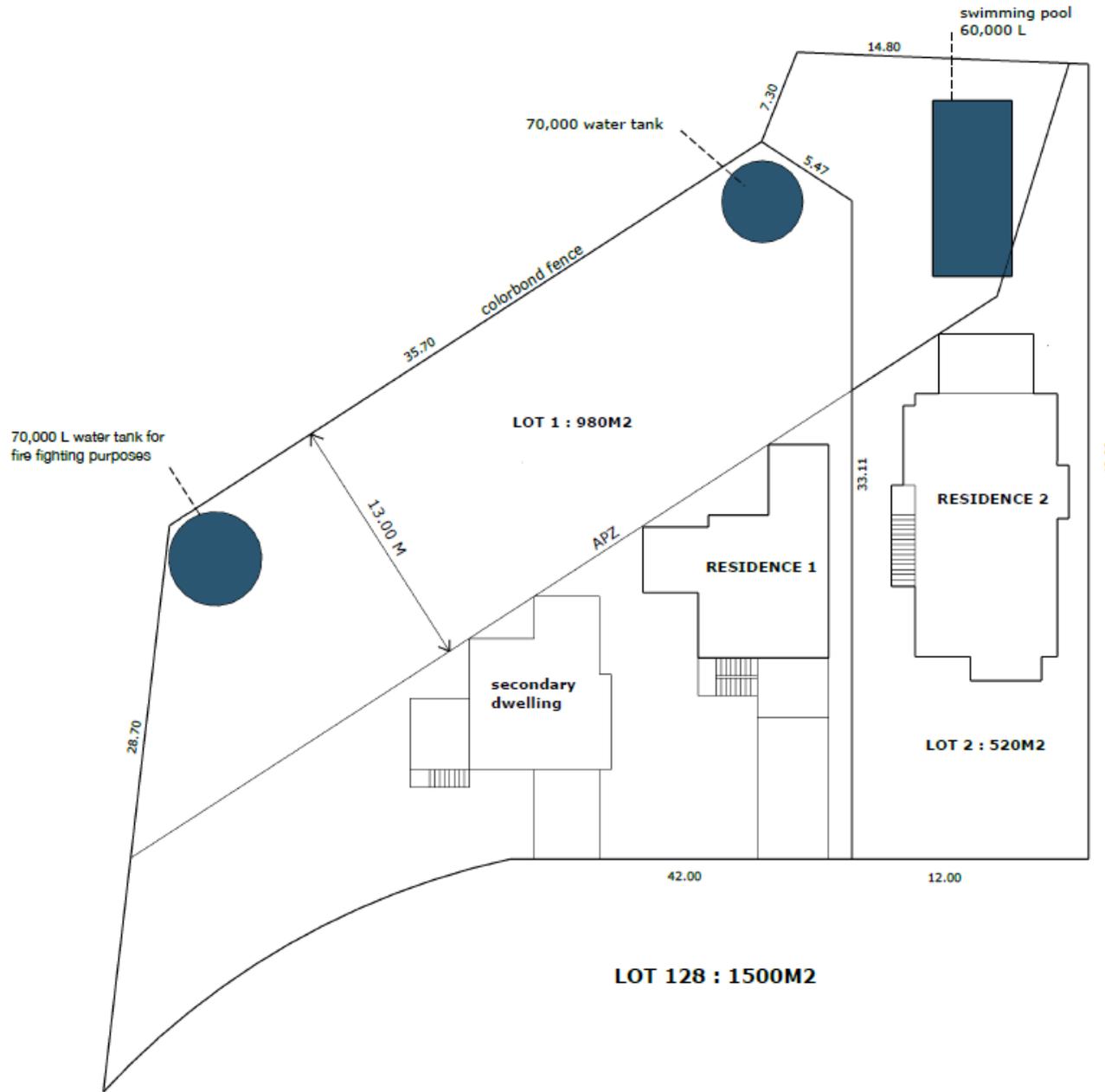
Locked Bag 17 GRANVILLE NSW 2142

p 02 66910400 e pes@rfs.nsw.gov.au

www.rfs.nsw.gov.au www.facebook.com/nswrfs www.twitter.com/nswrfs

PREPARE.ACT.SURVIVE

APPENDIX B: Site plan



SITE PLAN

GREEN ARK DEVELOPMENTS

w: greenark.com.au
 m: 0421575299
 e: tollis23@bigpond.net.au

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PROJECT ADDRESS
 Lot 128 Cockatoo Cr. MULLUMBIMBY
PROJECT NO.
 2023
PROJECT STAGE
 DEVELOPMENT APPLICATION

CLIENT
 Mr. & Mrs Tollis
PROJECT NAME
 WAYILAH RESIDENCES
DATE MODIFIED

PAPER SIZE
 A3
DRAWN
 -
CHECKED
 -



DRAWING NUMBER
A1
DRAWING TITLE
 Boundary Adjustment
REVISION
 -

APPENDIX C: Asset Protection Zone Requirements - Appendix 4 PBP 2019

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).

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 defensible 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.

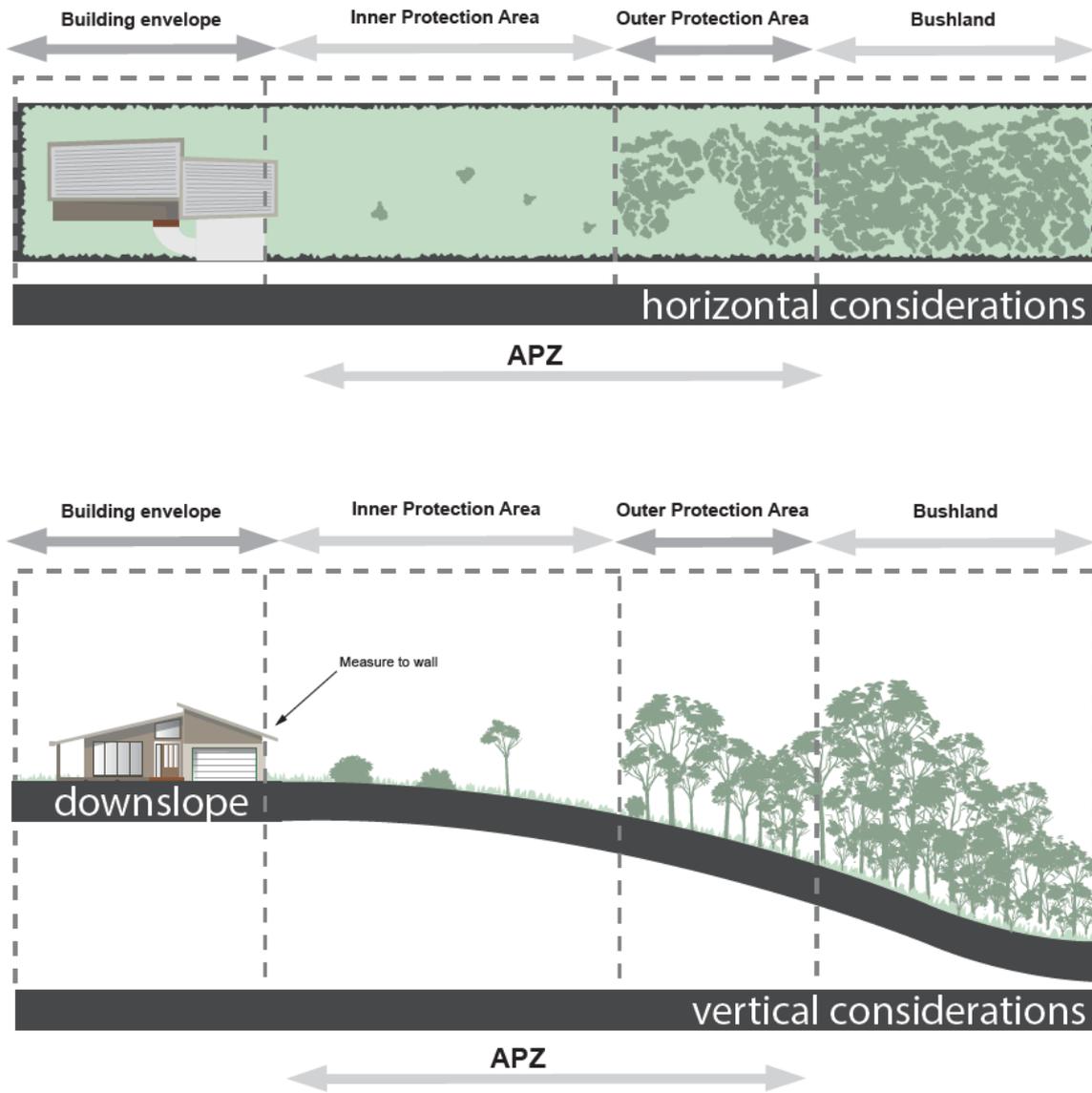
Grass

- 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.

Figure A4.1

Typical Inner and Outer Protection Areas.



APPENDIX D: Standards for Asset Protection Zones (RFS 2005)

STANDARDS FOR ASSET PROTECTION ZONES

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INTRODUCTION

For thousands of years bush fires have been a natural part of the Australian landscape. They are inevitable and essential, as many Australian plants and animals have adapted to fire as part of their life cycle.

In recent years developments in bushland areas have increased the risk of bush fires harming people and their homes and property. But landowners can significantly reduce the impact of bush fires on their property by identifying and minimising bush fire hazards. There are a number of ways to reduce the level of hazard to your property, but one of the most important is the creation and maintenance of an Asset Protection Zone (APZ).

A well located and maintained APZ should be used in conjunction with other preparations such as good property maintenance, appropriate building materials and developing a family action plan.

WHAT IS AN ASSET PROTECTION ZONE?

An Asset Protection Zone (APZ) is a fuel reduced area surrounding a built asset or structure. This can include any residential building or major building such as farm and machinery sheds, or industrial, commercial or heritage buildings.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset;
- an area of reduced bush fire fuel that allows suppression of fire;
- an area from which backburning may 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.

Potential bush fire fuels should be minimised within an APZ. This is so that the vegetation within the planned zone does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy.

WHAT WILL THE APZ DO?

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

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

WHERE SHOULD I PUT AN APZ?

An APZ is located between an asset and a bush fire hazard.

The APZ should be located wholly within your land. You cannot undertake any clearing of vegetation on a neighbour's property, including National Park estate, Crown land or land under the management of your local council, unless you have written approval.

If you believe that the land adjacent to your property is a bush fire hazard and should be part of an APZ, you can have the matter investigated by contacting the NSW Rural Fire Service (RFS).

There are six steps to creating and maintaining an APZ. These are:

1. Determine if an APZ is required;
2. Determine what approvals are required for constructing your APZ;
3. Determine the APZ width required;
4. Determine what hazard reduction method is required to reduce bush fire fuel in your APZ;
5. Take measures to prevent soil erosion in your APZ; and
6. Landscape and regularly monitor in your APZ for fuel regrowth.

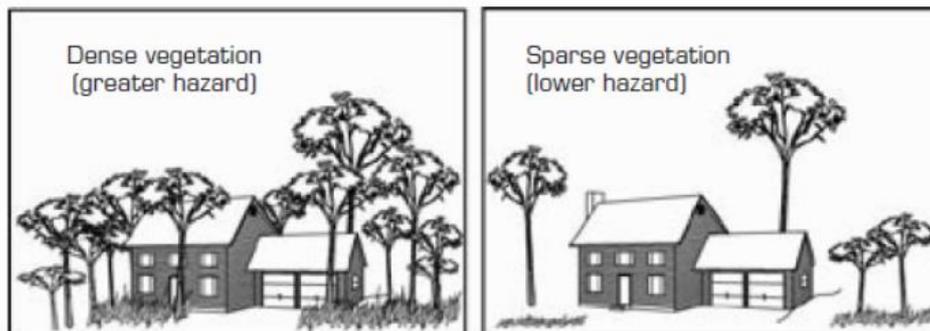
STEP 1. DETERMINE IF AN APZ IS REQUIRED

Recognising that a bush fire hazard exists is the first step in developing an APZ for your property.

If you have vegetation close to your asset and you live in a bush fire prone or high risk area, you should consider creating and maintaining an APZ.

Generally, the more flammable and dense the vegetation, the greater the hazard will be. However, the hazard potential is also influenced by factors such as slope.

- A large area of continuous vegetation on sloping land may increase the potential bush fire hazard.
- The amount of vegetation around a house will influence the intensity and severity of a bush fire.
- The higher the available fuel the more intense a fire will be.



Isolated areas of vegetation are generally not a bush fire hazard, as they are not large enough to produce fire of an intensity that will threaten dwellings.

This includes:

- bushland areas of less than one hectare that are isolated from large bushland areas; and
- narrow strips of vegetation along road and river corridors.

If you are not sure if there is a bush fire hazard in or around your property, contact your local NSW Rural Fire Service Fire Control Centre or your local council for advice.

STEP 2. DETERMINE WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING YOUR APZ

If you intend to undertake bush fire hazard reduction works to create or maintain an APZ you must gain the written consent of the landowner.

Subdivided land or construction of a new dwelling

If you are constructing an APZ for a new dwelling you will need to comply with the requirements in *Planning for Bushfire Protection*. Any approvals required will have to be obtained as part of the Development Application process.

Existing asset

If you wish to create or maintain an APZ for an existing structure you may need to obtain an environmental approval. The RFS offers a free environmental assessment and certificate issuing service for essential hazard reduction works. For more information see the RFS document *Application Instructions for a Bush Fire Hazard Reduction Certificate* or contact your local RFS Fire Control Centre to determine if you can use this approval process.

Bear in mind that all work undertaken must be consistent with any existing land management agreements (e.g. a conservation agreement, or property vegetation plan) entered into by the property owner.

If your current development consent provides for an APZ, you do not need further approvals for works that are consistent with this consent.

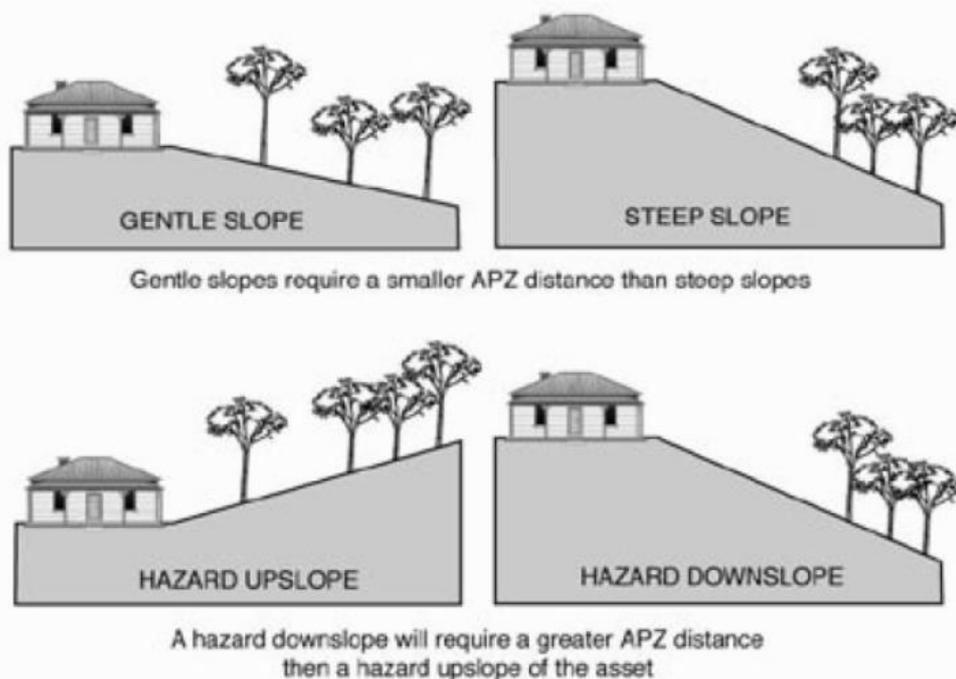
If you intend to burn off to reduce fuel levels on your property you may also need to obtain a Fire Permit through the RFS or NSW Fire Brigades. See the RFS document *Before You Light That Fire* for an explanation of when a permit is required.

STEP 3. DETERMINE THE APZ WIDTH

The size of the APZ required around your asset depends on the nature of the asset, the slope of the area, the type and structure of nearby vegetation and whether the vegetation is managed.

Fires burn faster uphill than downhill, so the APZ will need to be larger if the hazard is downslope of the asset.

5



Different types of vegetation (for example, forests, rainforests, woodlands, grasslands) behave differently during a bush fire. For example, a forest with shrubby understorey is likely to result in a higher intensity fire than a woodland with a grassy understorey and would therefore require a greater APZ width.

A key benefit of an APZ is that it reduces radiant heat and the potential for direct flame contact on homes and other buildings. Residential dwellings require a wider APZ than sheds or stockyards because the dwelling is more likely to be used as a refuge during bush fire.

Subdivided land or construction of a new dwelling

If you are constructing a new asset, the principles of *Planning for Bushfire Protection* should be applied. Your Development Application approval will detail the exact APZ distance required.

Existing asset

If you wish to create an APZ around an existing asset and you require environmental approval, the Bush Fire Environmental Assessment Code provides a streamlined assessment process. Your Bush Fire Hazard Reduction Certificate (or alternate environmental approval) will specify the maximum APZ width allowed.

For further information on APZ widths see *Planning for Bushfire Protection* or the *Bush Fire Environmental Assessment Code* (available on the RFS website), or contact your local RFS Fire Control Centre.

STEP 4. DETERMINE WHAT HAZARD REDUCTION METHOD IS REQUIRED TO REDUCE BUSH FIRE FUEL IN YOUR APZ

The intensity of bush fires can be greatly reduced where there is little to no available fuel for burning. In order to control bush fire fuels you can reduce, remove or change the state of the fuel through several means.

Reduction of fuel does not require removal of all vegetation, which would cause environmental damage. Also, trees and plants can provide you with some bush fire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns. Some ground cover is also needed to prevent soil erosion.

Fuels can be controlled by:

1. raking or manual removal of fine fuels

Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark should be removed on a regular basis. This is fuel that burns quickly and increases the intensity of a fire.

Fine fuels can be removed by hand or with tools such as rakes, hoes and shovels.

2. mowing or grazing of grass

Grass needs to be kept short and, where possible, green.

3. removal or pruning of trees, shrubs and understorey

The control of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation.

Prune or remove trees so that you do not have a continuous tree canopy leading from the hazard to the asset. Separate tree crowns by two to five metres. A canopy should not overhang within two to five metres of a dwelling.

Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

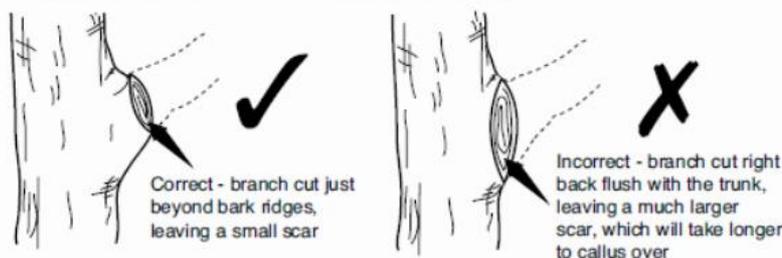
When choosing plants for removal, the following basic rules should be followed:

1. Remove noxious and environmental weeds first. Your local council can provide you with a list of environmental weeds or 'undesirable species'. Alternatively, a list of noxious weeds can be obtained at www.agric.nsw.gov.au/noxweed/;
2. Remove more flammable species such as those with rough, flaky or stringy bark; and
3. Remove or thin understorey plants, trees and shrubs less than three metres in height

The removal of significant native species should be avoided.

Prune in accordance with the following standards:

- Use sharp tools. These will enable clean cuts and will minimise damage to the tree.
- Decide which branches are to be removed before commencing work. Ensure that you maintain a balanced, natural distribution of foliage and branches.
- Remove only what is necessary.
- Cut branches just beyond bark ridges, leaving a small scar.
- Remove smaller branches and deadwood first.



There are three primary methods of pruning trees in APZs:

1. Crown lifting (skirting)

Remove the lowest branches (up to two metres from the ground). Crown lifting may inhibit the transfer of fire between the ground fuel and the tree canopy.

2. Thinning

Remove smaller secondary branches whilst retaining the main structural branches of the tree. Thinning may minimise the intensity of a fire.

3. Selective pruning

Remove branches that are specifically identified as creating a bush fire hazard (such as those overhanging assets or those which create a continuous tree canopy). Selective pruning can be used to prevent direct flame contact between trees and assets.

Your Bush Fire Hazard Reduction Certificate or local council may restrict the amount or method of pruning allowed in your APZ.

See the *Australian Standard 4373 (Pruning of Amenity Trees)* for more information on tree pruning.

4. Slashing and trittering

Slashing and trittering are economical methods of fuel reduction for large APZs that have good access. However, these methods may leave large amounts of slashed fuels (grass clippings etc) which, when dry, may become a fire hazard. For slashing or trittering to be effective, the cut material must be removed or allowed to decompose well before summer starts.

If clippings are removed, dispose of them in a green waste bin if available or compost on site (dumping clippings in the bush is illegal and it increases the bush fire hazard on your or your neighbour's property).

Although slashing and trittering are effective in inhibiting the growth of weeds, it is preferable that weeds are completely removed.

Care must be taken not to leave sharp stakes and stumps that may be a safety hazard.

5. Ploughing and grading

Ploughing and grading can produce effective firebreaks. However, in areas where this method is applied, frequent maintenance may be required to minimise the potential for erosion. Loose soil from ploughed or graded ground may erode in steep areas, particularly where there is high rainfall and strong winds.

6. Burning (hazard reduction burning)

Hazard reduction burning is a method of removing ground litter and fine fuels by fire. Hazard reduction burning of vegetation is often used by land management agencies for broad area bush fire control, or to provide a fuel reduced buffer around urban areas.

Any hazard reduction burning, including pile burns, must be planned carefully and carried out with extreme caution under correct weather conditions. Otherwise there is a real danger that the fire will become out of control. More bush fires result from escaped burning off work than from any other single cause.

It is YOUR responsibility to contain any fire lit on your property. If the fire escapes your property boundaries you may be liable for the damage it causes.

Hazard reduction burns must therefore be carefully planned to ensure that they are safe, controlled, effective and environmentally sound. There are many factors that need to be considered in a burn plan. These include smoke control, scorch height, frequency of burning and cut off points (or control lines) for the fire. For further information see the RFS document *Standards for Low Intensity Bush Fire Hazard Reduction Burning*, or contact your local RFS for advice.

7. Burning (pile burning)

In some cases, where fuel removal is impractical due to the terrain, or where material cannot be disposed of by the normal garbage collection or composted on site, you may use pile burning to dispose of material that has been removed in creating or maintaining an APZ.

For further information on pile burning, see the RFS document *Standards for Pile Burning*.

In areas where smoke regulations control burning in the open, you will need to obtain a Bush Fire Hazard Reduction Certificate or written approval from Council for burning. During the bush fire danger period a Fire Permit will also be required. See the RFS document *Before You Light that Fire* for further details.

STEP 5. TAKE MEASURES TO PREVENT SOIL EROSION

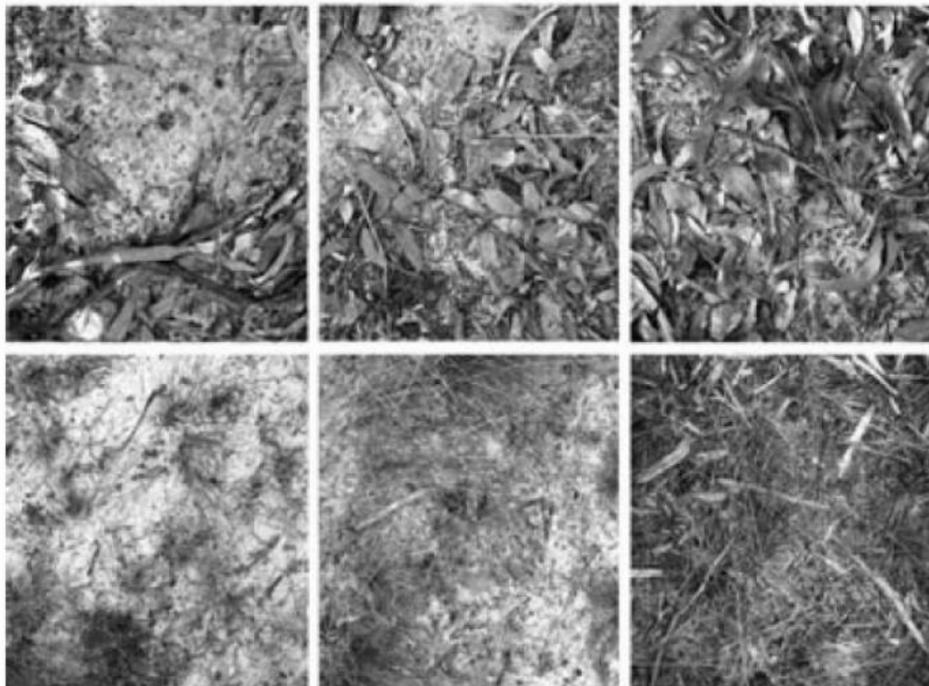
While the removal of fuel is necessary to reduce a bush fire hazard, you also need to consider soil stability, particularly on sloping areas.

Soil erosion can greatly reduce the quality of your land through:

- loss of top soil, nutrients, vegetation and seeds
- reduced soil structure, stability and quality
- blocking and polluting water courses and drainage lines

A small amount of ground cover can greatly improve soil stability and does not constitute a significant bush fire hazard. Ground cover includes any material which directly covers the soil surface such as vegetation, twigs, leaf litter, clippings or rocks. A permanent ground cover should be established (for example, short grass). This will provide an area that is easy to maintain and prevent soil erosion.

When using mechanical hazard reduction methods, you should retain a ground cover of at least 75% to prevent soil erosion. However, if your area is particularly susceptible to soil erosion, your Hazard Reduction Certificate may require that 90% ground cover be retained.



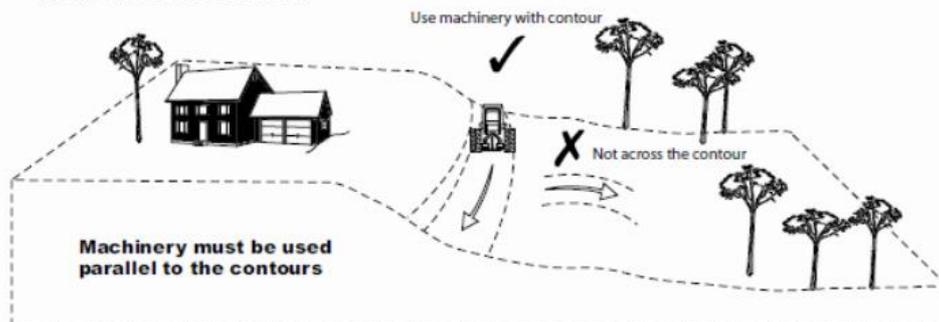
50%

75%

100%

Ground Cover

To reduce the incidence of soil erosion caused by the use of heavy machinery such as ploughs, dozers and graders, machinery must be used parallel to the contours. Vegetation should be allowed to regenerate, but be managed to maintain a low fuel load.



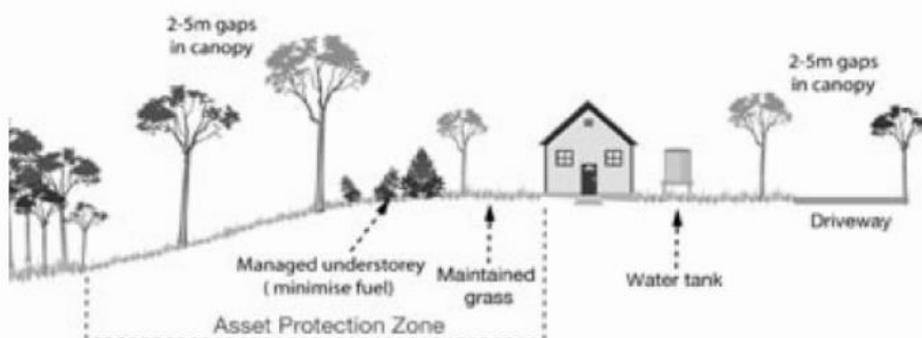
STEP 6. ONGOING MANAGEMENT AND LANDSCAPING

Your home and garden can blend with the natural environment and be landscaped to minimise the impact of fire at the same time. To provide an effective APZ, you need to plan the layout of your garden to include features such as fire resistant plants, radiant heat barriers and windbreaks.

Layout of gardens in an APZ

When creating and maintaining a garden that is part of an APZ you should:

- ensure that vegetation does not provide a continuous path to the house;
- remove all noxious and environmental weeds;
- plant or clear vegetation into clumps rather than continuous rows;
- prune low branches two metres from the ground to prevent a ground fire from spreading into trees;
- locate vegetation far enough away from the asset so that plants will not ignite the asset by direct flame contact or radiant heat emission;
- plant and maintain short green grass around the house as this will slow the fire and reduce fire intensity. Alternatively, provide non-flammable pathways directly around the dwelling;
- ensure that shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low-flammability plants and non flammable ground cover such as pebbles and crush tile; and
- avoid erecting brush type fencing and planting "pencil pine" type trees next to buildings, as these are highly flammable.



Removal of other materials

Woodpiles, wooden sheds, combustible material, storage areas, large quantities of garden mulch, stacked flammable building materials etc. should be located away from the house. These items should preferably be located in a designated cleared location with no direct contact with bush fire hazard vegetation.

Other protective features

You can also take advantage of existing or proposed protective features such as fire trails, gravel paths, rows of trees, dams, creeks, swimming pools, tennis courts and vegetable gardens as part of the property's APZ.

PLANTS FOR BUSH FIRE PRONE GARDENS

When designing your garden it is important to consider the type of plant species and their flammability as well as their placement and arrangement.

Given the right conditions, all plants will burn. However, some plants are less flammable than others.

Trees with loose, fibrous or stringy bark should be avoided. These trees can easily ignite and encourage the ground fire to spread up to, and then through, the crown of the trees.

- Plants that are less flammable, have the following features:
- high moisture content
 - high levels of salt
 - low volatile oil content of leaves
 - smooth barks without "ribbons" hanging from branches or trunks; and
 - dense crown and elevated branches.

When choosing less flammable plants, be sure not to introduce noxious or environmental weed species into your garden that can cause greater long-term environmental damage.

For further information on appropriate plant species for your locality, contact your local council, plant nurseries or plant society.

If you require information on how to care for fire damaged trees, refer to the Firewise brochure *Trees and Fire Resistance; Regeneration and care of fire damaged trees*.

WIND BREAKS

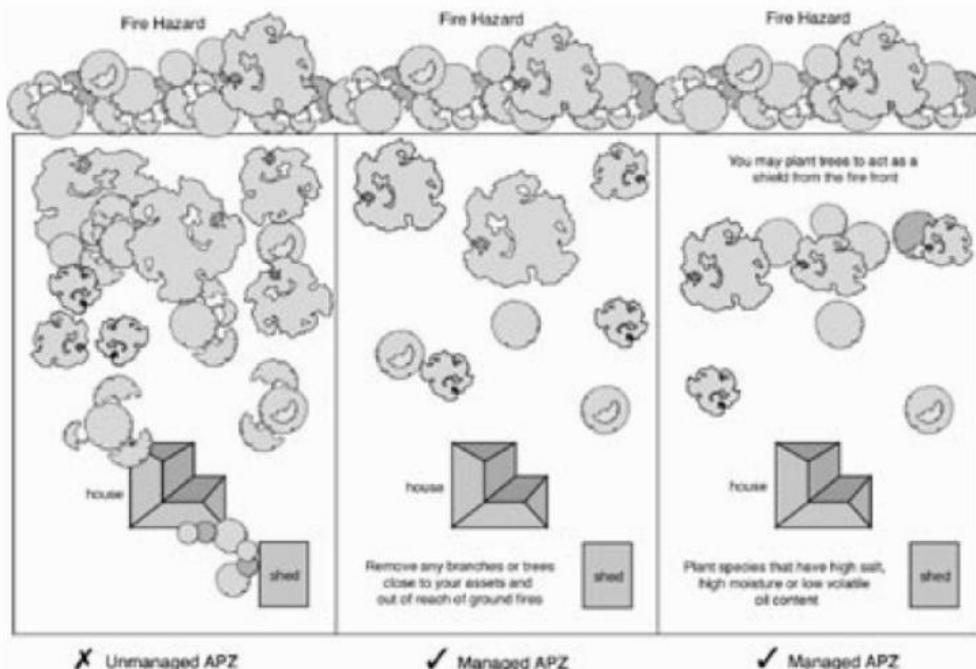
Rows of trees can provide a wind break to trap embers and flying debris that could otherwise reach the house or asset.

You need to be aware of local wind conditions associated with bush fires and position the wind break accordingly. Your local RFS Fire Control Centre can provide you with further advice.

When choosing trees and shrubs, make sure you seek advice as to their maximum height. Their height may vary depending on location of planting and local conditions. As a general rule, plant trees at the same distance away from the asset as their maximum height.

When creating a wind break, remember that the object is to slow the wind and to catch embers rather than trying to block the wind. In trying to block the wind, turbulence is created on both sides of the wind break making fire behaviour erratic.

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HOW CAN I FIND OUT MORE?

The following documents are available from your local Fire Control Centre and from the NSW RFS website at www.rfs.nsw.gov.au.

- Before You Light That Fire
- Standards for Low Intensity Bush Fire Hazard Reduction Burning
- Standards for Pile Burning
- Application Instructions for a Bush Fire Hazard Reduction Certificate

If you require any further information please contact:

- your local NSW Rural Fire Service Fire Control Centre. Location details are available on the RFS website or
- call the NSW RFS Enquiry Line 1800 679 737 (Monday to Friday, 9am to 5pm), or
- the NSW RFS website at www.rfs.nsw.gov.au.

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