
BUSH FIRE ASSESSMENT REPORT

**Lot 6 DP 701105,
13 Palm Avenue, Mullumbimby**

Proposed 2 lot Subdivision s100B.

Prepared for: Chris Bridger

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BPAD-L3 Accredited Practitioner

Reference: 23/233

Date: 17 October 2023

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1.0 EXECUTIVE SUMMARY

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed 2-lot residential subdivision at Lot 6 DP 701105, 13 Palm Avenue, Mullumbimby, providing recommendations to comply with Planning for Bushfire Protection 2019 (PBP2019) and to accompany an application for a Bush Fire Safety Authority.

The proposed subdivision will create one additional allotment; noting the northern residual lot (Figure 2) supports the existing dwelling. The proposed allotments are located on bushfire prone land and are able to comply with the acceptable solutions of PBP2019. This report is to be assessed by the consent authority pursuant to s100B Rural Fires Act 1997.

The proposed subdivision does not increase the bushfire risk to the existing dwelling on the proposed northern lot. The existing dwelling has no formal bushfire protection measures, therefore asset protection zones (APZs) are recommended to create a better outcome than currently exists. Additionally, there will be adequate APZ on the northern lot for a future rebuild to meet the 29kw/m² radiant heat flux threshold.

The report has demonstrated compliance with each of the heads of consideration appropriate to the acceptable solutions and performance criteria of PBP 2019. 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	METHOD OF ASSESSMENT
Construction Standards	To be assessed at DA stage for future dwelling. The bushfire hazard to the existing approved dwelling will remain unchanged, therefore no upgrade measures proposed.	Acceptable Solution
	Existing dwelling – no ember upgrade required – APZ provided.	Better bushfire outcome
APZ Required	Proposed allotments to comply with Table A1.12.3 PBP2019. The following APZ distances to future dwellings are to be managed and maintained as an Inner Protection Area (IPA) in perpetuity- <ul style="list-style-type: none">• North, south and west – To the allotment boundaries;• East – Minimum 9m. APZ to be applied to the existing dwelling to the allotment boundaries in all directions.	Acceptable Solution

Water Supply	Reticulated water supply. Street hydrants provide coverage in accordance with AS 2419.1-2021 or standard applicable at the time of installation.	Acceptable Solution
Electricity Supply	Existing electricity supply. New electricity supply to comply with Section 5.3.3 and Table 5.3c PBP2019.	Acceptable Solution
Gas Supply	To be assessed at DA stage for future dwelling. No upgrades required to existing dwelling.	Acceptable Solution
Landscaping	Landscaping to comply with Appendix 4 of Planning for Bushfire Protection 2019 and managed and maintained in perpetuity. To be assessed at DA stage for future dwelling.	Acceptable Solution
Access	Standard access suitable. No upgrade required to existing dwelling.	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. Future dwellings are to be assessed pursuant to s4.14 or s4.15 of the Environmental Planning and Assessment Act 1979.
2. At the commencement of works and in perpetuity the following APZ distances from the proposed building envelope and existing dwelling 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 (as attached in Appendix B & Appendix C of this report) –
 - North, south and west – To the allotment boundary;
 - East – Minimum 9m.

APZ to be applied to the existing dwelling to the allotment boundaries in all directions.

3. Landscaping on the proposed allotments to comply with Appendix 4 of Planning for Bushfire Protection 2019 and managed and maintained in perpetuity.
4. New fencing to comply with section 7.6 of Planning for Bushfire Protection 2019.

2.0 INTRODUCTION

2.1 General

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed 2 lot subdivision. The report has been prepared to address the requirements of Planning for Bushfire Protection 2019 to accompany an application for a Bush Fire Safety Authority.

The recommendations within this report address the aims and objectives of Planning for Bushfire Protection 2019 to reduce the risk of ignition of the building/s 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:

- SEPP (Biodiversity and Conservation) 2021
- SEPP (Resilience and Hazards) 2021
- 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 should be read in conjunction with the Statement of Environmental Effects submitted with the development application.

No trees are required for removal to achieve the asset protection zones, it being noted the asset protection zones have been established on the basis there are no requirements to revegetate any parts of the subject site, as advised by the applicant.

2.3 Report details

Report Reference No.:	23/233
Property Address:	Lot 6 DP 701105, 13 Palm Avenue, Mullumbimby.
Local Government Area:	Byron Shire Council.
Proposal:	2-Lot subdivision.
Drawings:	Preliminary subdivision sketch provided by client.
Report Prepared By:	Peter Thornton MFireSafeEng BPAD – L3 Accredited Practitioner.

3.0 PROPOSED DEVELOPMENT

3.1 General

The applicant is proposing a 2-lot residential subdivision as shown in the Locality Plan in Figure 1. The proposed allotment layout shown in Figure 2 indicates the proposed northern lot supporting the existing dwelling and the proposed southern lot which will be vacant and will support a future dwelling.

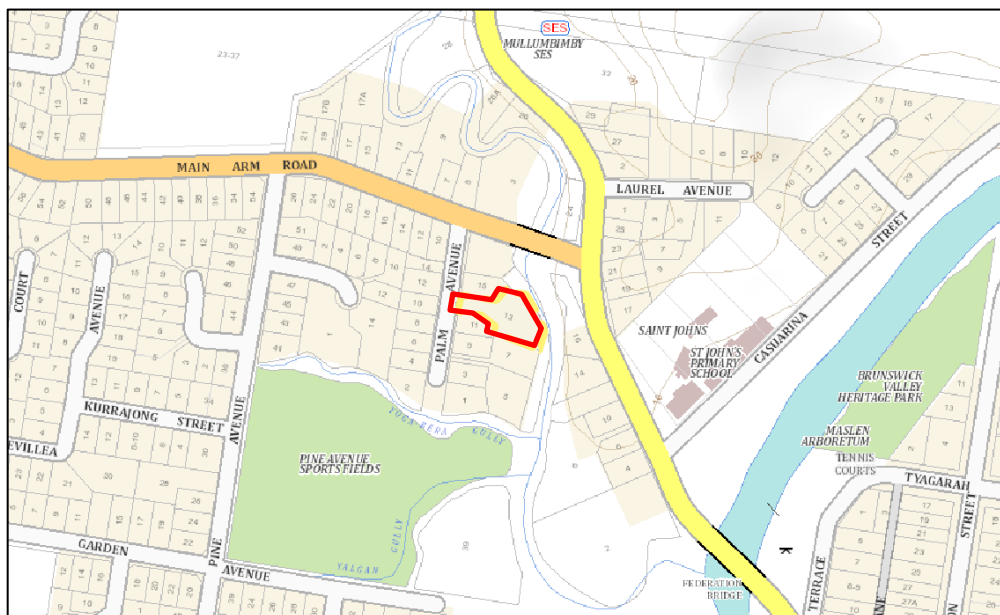


Figure 1 – Location map

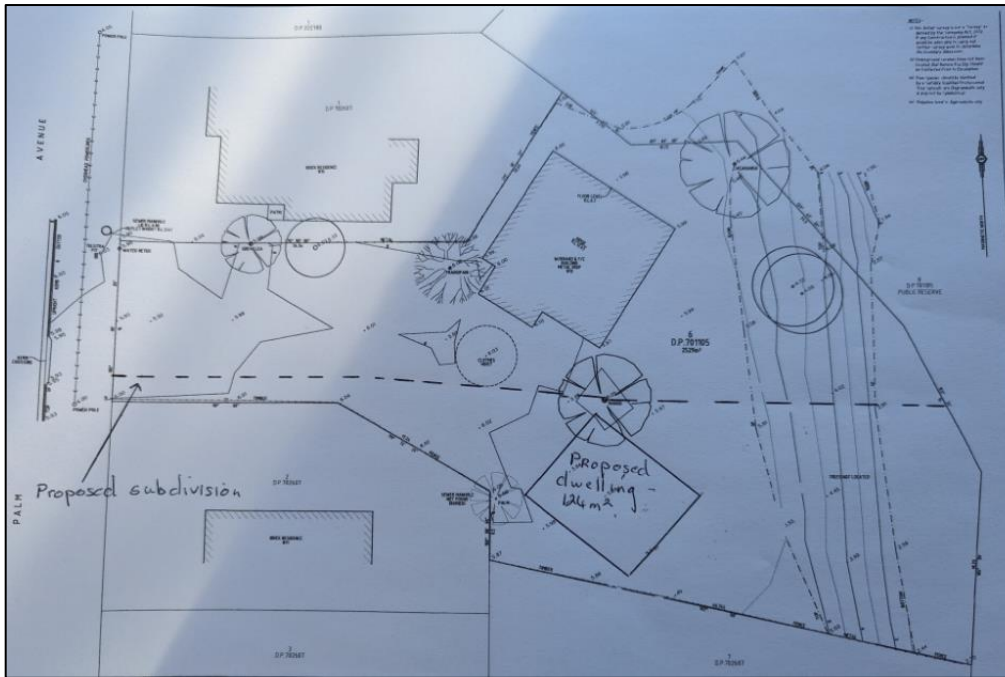


Figure 2 – indicative plan of subdivision (proposed dwelling not included in this report).

4.0 BUSHFIRE THREAT ASSESSMENT

Bushfire prone land mapping as shown in Figure 3 indicates the subject site as being within the buffer to Category 1 bushfire prone land. Aerial mapping and inspection of the site reveals the bushfire prone land map is inaccurate with respect to the current bushfire hazard.

Site inspection revealed **rainforest** vegetation is the predominant vegetation class to the north, east, and south. The mapped Category 1 forest vegetation has therefore been determined as Category 2 rainforest.



Figure 3: Bushfire prone land map

Source: NSW Planning Portal

The rainforest vegetation to the north is located around a large body of water significantly reducing the fuel load in that area, as shown in Photo 1. The vegetation to the north is therefore considered low threat as shown in Figure 5.

Rainforest vegetation to the east and south is located along a creek with moderately steep slopes on either side of the creek, as shown in Photo 3 however there are over minimum distances (short runs). For the purpose of determining the effective slope most likely to influence bushfire behaviour, the slope has been measured across the creek bank. Therefore, the slopes to the east and south are flat/upslope as shown in Figure 4.



Photo 1: Low threat area to the north including body of water. Peg indicating allotment boundary.



Photo 2: Rainforest vegetation to the east.



Photo 3: Rainforest vegetation and waterway to the east.



Figure 4: Slope analysis



Figure 5: Bushfire threat analysis

Source: Nearmap image

5.0 ASSET PROTECTION ZONES AND CONSTRUCTION STANDARDS

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

It is recommended an APZ be provided around the existing dwelling on the proposed northern lot to provide a better bushfire outcome in accordance with s5.1.3 PBP2019 upgrade provisions and ensure the site does not become a hazard to the adjoining allotment.

The existing dwelling is not recommended to be upgraded for ember attack as part of this assessment. Section 4 of this report establishes that each proposed allotment will be capable of supporting APZs in accordance with section 5.3.1 and Table A1.12.3 of PBP2019 as detailed in Table 1.

Table 1 – Asset Protection Zones – Acceptable Solutions Table 5.3a PBP2019

Performance Criteria and Acceptable Solution	Comment	Capable of Compliance
Potential building footprints must not be exposed to radiant heat levels exceeding 29kW/m ² on each proposed lot. APZs are provided in accordance with Appendix 1 PBP 2019 Table A1.12.3.	<p>A future dwelling on each proposed lot is capable of achieving compliance with acceptable solutions. APZ to be applied to the existing dwelling to achieve a better bushfire outcome.</p> <p>It has also been assessed that the residual allotment will be capable of supporting a future replacement dwelling within the 29kW/m² threshold if required i.e. the proposed subdivision will not compromise future compliance requirements pursuant to current legislation.</p>	Yes
APZ's are to be managed and maintained to prevent the spread of a fire towards the building. APZs are managed in accordance with the requirements of Appendix 4 PBP 2019.	APZ's are capable of being provided in accordance with Appendix 4 PBP2019 and the requirements of Standards for Asset Protection Zones RFS 2005. APZ's recommended for the existing dwelling.	Yes
APZ's are provided in perpetuity. APZs are wholly within the boundaries of the development site.	Required APZ's must be provided within the boundaries of the site. Capable of achieving compliance.	Yes
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.	Recommended APZs will be located on lands with a slope less than 18°	Yes
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions. Landscaping is in accordance with Appendix 4 PBP 2019.	Applicant to ensure compliance. Landscaping plans have not been assessed.	Yes
Fencing is constructed in accordance with s7.6 PBP2019.	Applicant to ensure compliance. Fencing has not been assessed.	Yes

Subject to implementation of recommended APZ's a future dwelling on the proposed lots will not be exposed to radiant heat levels exceeding 29kW/m² and is to be assessed at DA stage in accordance with s4.14 of the *Environmental Planning and Assessment Act 1979*.

Table 2 summarises the category of bushfire attack pursuant to Planning for Bushfire Protection 2019.

Table 2: Summary Bushfire Threat Assessment, APZs - Proposed allotments					
ASPECT	SLOPE	VEGETATION CLASS Figure A1.2 PBP2019	DISTANCE TO VEGETATION	APZ <29kW/m² Table A1.12.3 PBP2019	Comment
North	n/a	Low threat	n/a	To the allotment boundary	Future buildings are capable of being sited to receive <29kW/m ² radiant heat flux and are to be assessed at DA stage. Existing dwelling - entire allotment to be managed and maintained as an IPA.
South	Flat	Rainforest	Approx. 76m of low threat land	To the allotment boundary	
East	Flat	Rainforest	Approx. 21m	9m	
West	n/a	Managed	n/a	To the allotment boundary	

At the commencement of works and in perpetuity the following APZ distances from future building envelopes and the existing dwelling are to be managed and maintained as an Inner Protection Area (IPA) to prevent the spread of a fire towards the future dwellings in accordance with Appendix 4 of Planning for Bushfire Protection 2019 and the requirements of 'Standards for Asset Protection Zones' RFS 2005 as attached in Appendix B & Appendix C –

- North, south and west – To the allotment boundary;
- East – Minimum 9m

6.0 WATER AND UTILITY SERVICES

6.1 Water services

Property access is provided by way of Palm Avenue giving fire fighters access to the proposed allotments. Existing street hydrants are provided in Palm Avenue. Pressure and flow of hydrants have not been tested to determine compliance with AS 2419.1-2005.

The access table in Section 5.3.2 of Planning for Bushfire Protection 2019 does not have specific requirements where the access from the public road supporting hydrants to the most distant part of an existing or future building has an unobstructed path of 70m. Street hydrants in Palm Avenue are located to provide coverage of the proposed allotments.

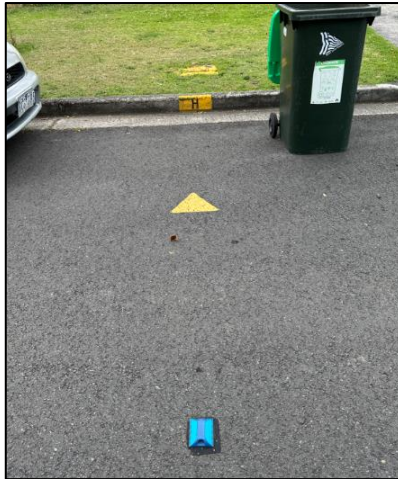


Photo 4: Street hydrant in Palm Avenue

6.2 Electricity services

New electrical transmission lines if required are to comply with Section 5.3.3 and Table 5.3c 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 of 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 5.3.3 and Table 5.3c of Planning for Bushfire Protection 2019 should new gas service be considered:

- 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 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.

7.0 ACCESS

Each proposed allotment has a frontage to the public road system being Palm Avenue providing fire fighters access to the allotments from the public road system directly to the private land. Standard access is suitable for the proposed allotments with no specific bushfire specification required.

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.

Landscaping is capable of complying with 5.3.1 APZ's and Table 5.3a PBP 2019 and will be assessed with individual development applications for future dwelling. An upgrade of landscaping is recommended within proposed APZ's surrounding the existing dwelling.

Landscaping must comply with Appendix 4 PBP 2019 and Standards for Asset Protection Zones RFS 2005 as attached in Appendix B and C of this report. Fencing to comply with Clause 7.6 PBP 2019.

9.0 CONCLUSION

The report establishes the subdivision, existing dwelling and any future dwellings will be capable of achieving compliance with Planning for Bushfire Protection 2019 based on the recommendations contained in Section 1 of this report. Recommendations for upgrading bushfire mitigation measures in relation to the existing dwelling have been provided.

DISCLAIMER

This report was prepared for the purposes and exclusive use of the stated client to accompany a two-lot subdivision development application to Byron Shire Council 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.

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 developers and homeowners*. 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 2021. *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 2022, *New South Wales*. Parliamentary Counsel's Office, NSW Government Information Service.

APPENDIX A

Preliminary subdivision plan

APPENDIX B

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.

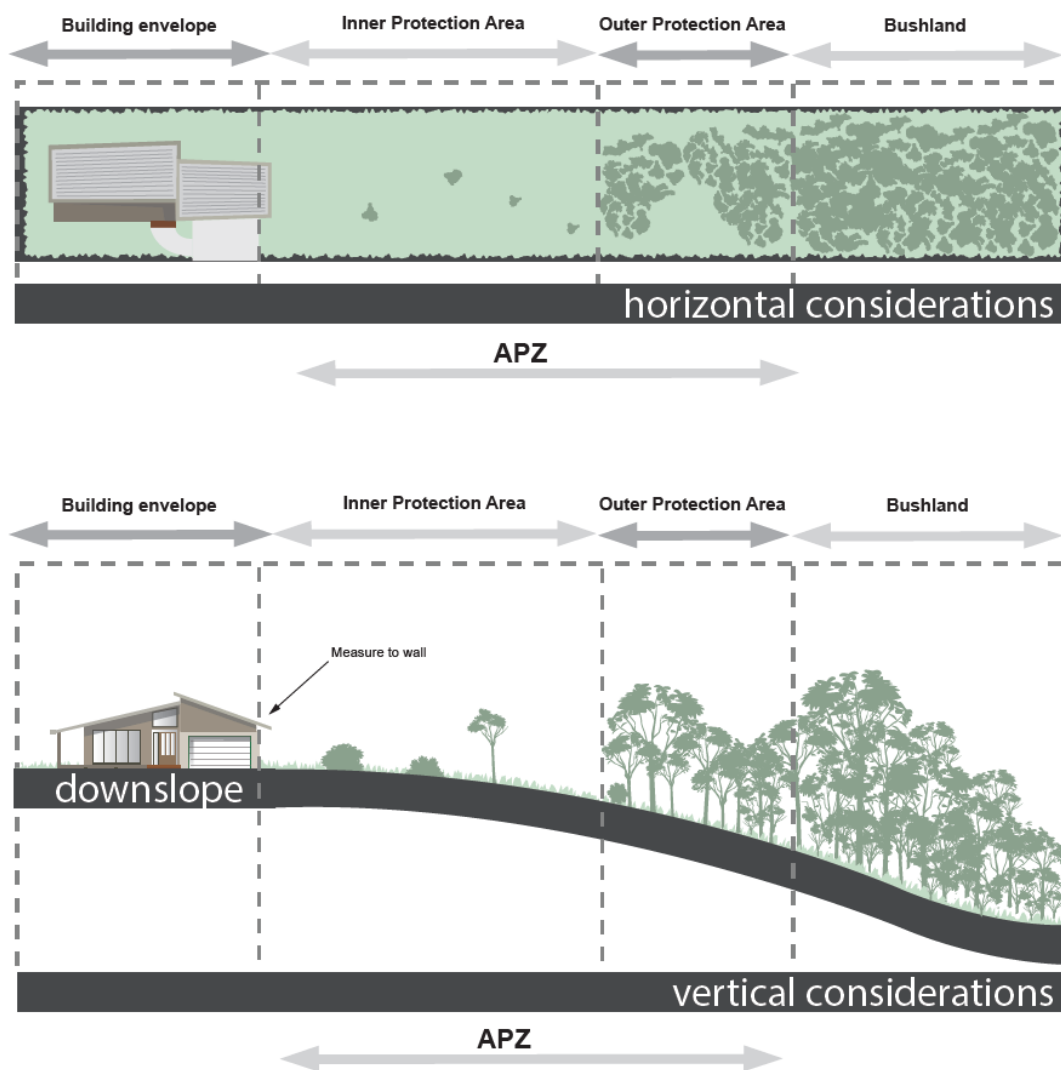
Grass

- 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 C

Standards for Asset Protection Zones RFS 2005

standards

for asset protection zones

protection

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NSW RURAL FIRE SERVICE



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.

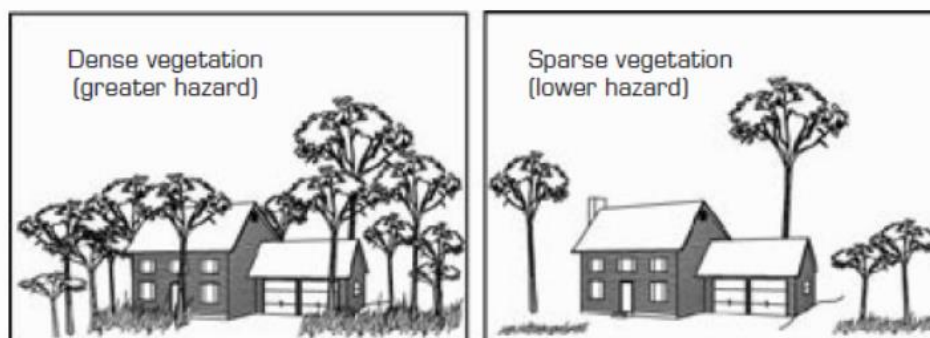
STEP 1. DETERMINE IF AN APZ IS REQUIRED

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.

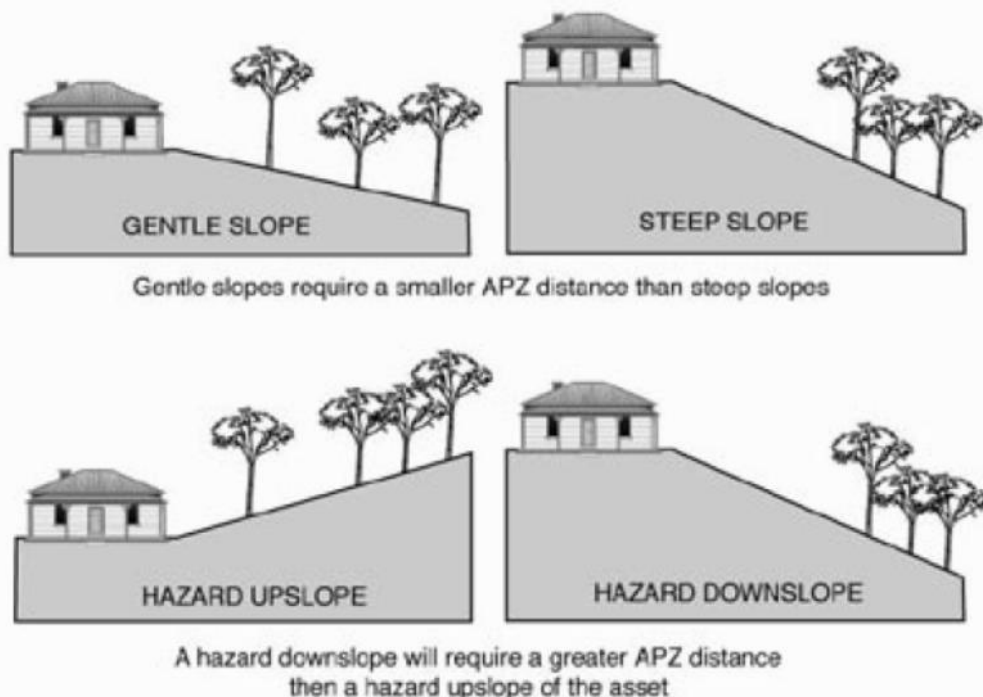
If your current development consent provides for an APZ, you do not need further approvals for works that are consistent with this consent.

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.



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.

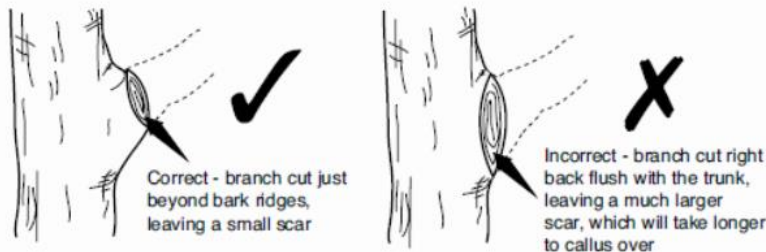
When choosing plants for removal, the following basic rules should be followed:

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

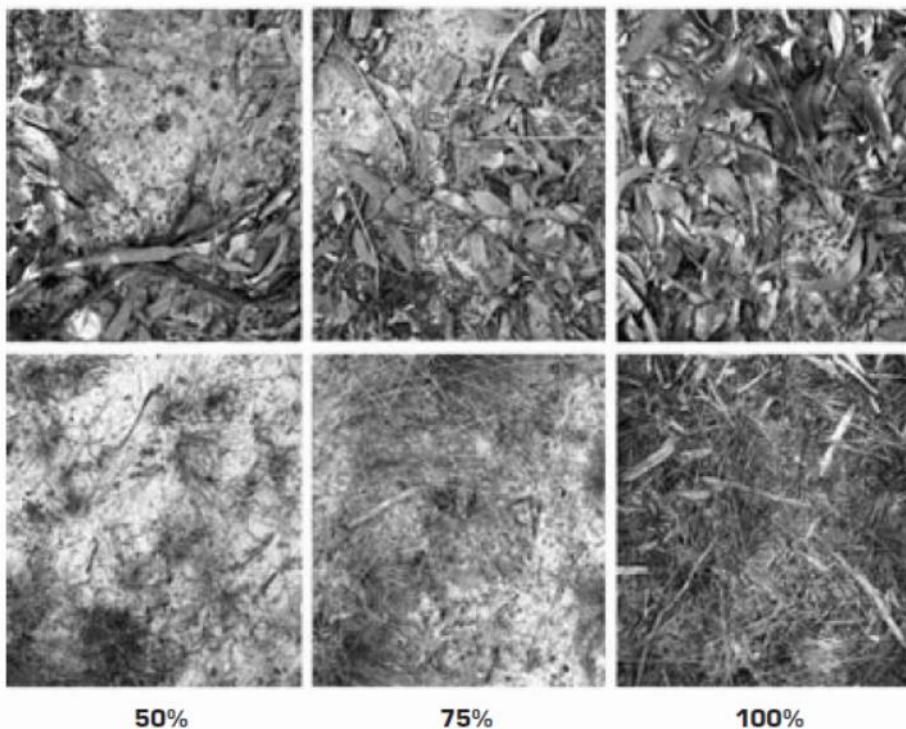
While the removal of fuel is necessary to reduce a bush fire hazard, you also need to consider soil stability, particularly on sloping areas.

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

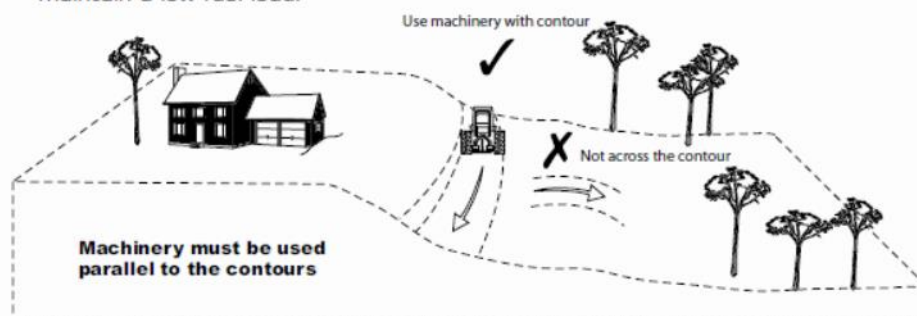
A small amount of ground cover can greatly improve soil stability and does not constitute a significant bush fire hazard. Ground cover includes any material which directly covers the soil surface such as vegetation, twigs, leaf litter, clippings or rocks. A permanent ground cover should be established (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.



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.



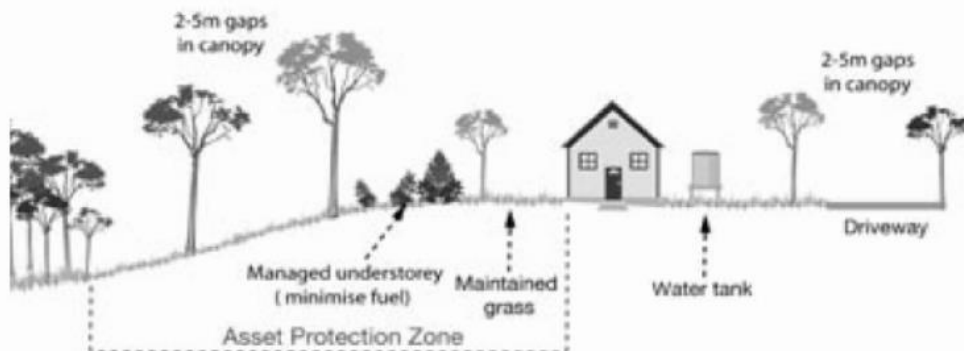
STEP 6. ONGOING MANAGEMENT AND LANDSCAPING

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

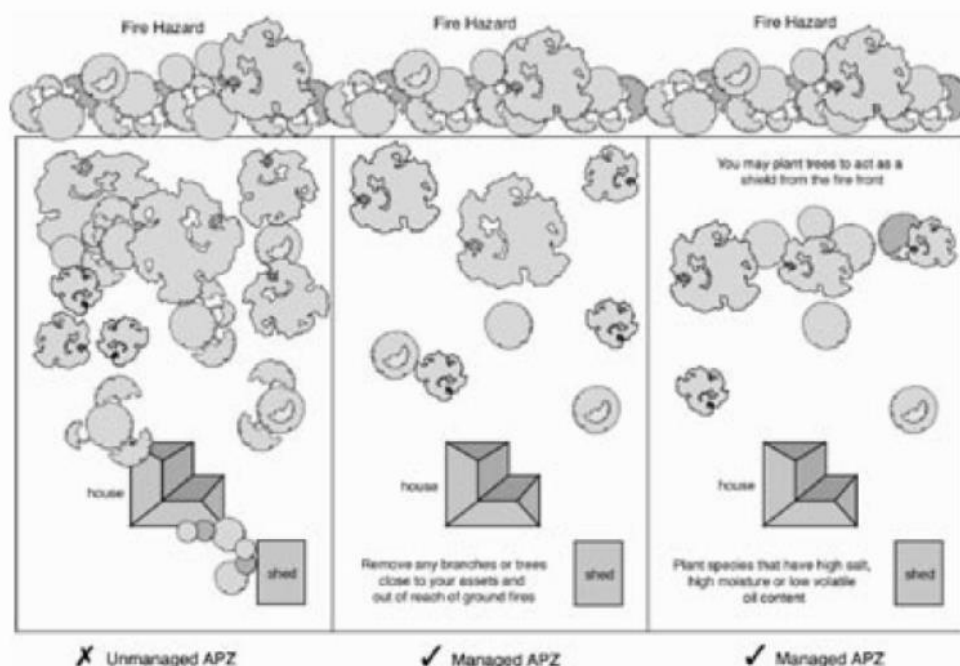
Rows of trees can provide a wind break to trap embers and flying debris that could otherwise reach the house or asset.

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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