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BUSHFIRE THREAT ASSESSMENT REPORT

Special Fire Protection Purpose (SFPP)
Proposed Class 9a Hospital
Byron Bay Central Hospital

Lot 100 DP 1140936
54 Ewingsdale Road Ewingsdale

Peter Thornton
BPAD – A Certified Practitioner
5th August 2014

Prepared by:

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DOCUMENT CONTROL

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A	21.07.2014	Draft	Scott Sewell	PJT	Peter Thornton
B	23.07.2014	Amended Draft	Peter Thornton	SS	Peter Thornton
C	29.07.2014	Final Draft	Peter Thornton	SS	Peter Thornton
D	05.08.2014	Final	Peter Thornton	SS	Peter Thornton

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1.0 EXECUTIVE SUMMARY

The proposed Byron Bay Central Hospital is classified as a Class 9a Health Care Building pursuant to Part A3.2 of the Building Code of Australia 2014. The development is classified as a Special Fire Protection Purpose (SFPP) development as defined by Planning for Bushfire Protection 2006 (PBP2006).

The site however is not currently mapped as designated bushfire prone land and a specific exceptional circumstance section has been included in this report with regard to future adjoining development uses and outlining that it may be reasonable not to provide a Bushfire Attack Level (BAL) to the proposed buildings on this basis.

However as requested, this bushfire threat assessment will address the items in Clause 44 of the Rural Fires Regulation 2013 but is not provided for an application for a Bush Fire Safety Authority. Reference is also made to the recommendations of the NSW Rural Fire Service in their correspondence to NSW Planning and Environment dated 4 July 2014.

The proposed hospital will be capable of complying with the 10kW/m^2 threshold as required by the performance criteria for Planning for Bushfire Protection 2006 in relation to grasslands.

The following table and summary of recommendations are provided identifying each head of consideration and the method of assessment used within the report.

MEASURE	RECOMMENDATION	ASSESSMENT METHOD
APZ Required	The property surrounding the hospital for a distance of 50 metres or to boundary whichever the lesser, is to be maintained as an inner protection area (IPA)	Acceptable Solution
Water Supply	Onsite static water supply to comply with 2419.1-2005	Acceptable Solution
Electricity Supply	Proposed electricity supply is to be located below ground level	Acceptable Solution
Gas Supply	Gas supply to comply with PBP2006.	Acceptable Solution
Construction Standards (AS 3959-2009)	See exceptional circumstance response for alternative to BAL 12.5	Acceptable Solution Exceptional circumstance
Landscape	Landscaping is to comply with Appendix 5 of PBP2006	Acceptable Solution
Access	Access to comply with s4.2.7 PBP 2006	Acceptable Solution
Design & Siting	Design and siting consistent with the intent of PBP2006.	Acceptable Solution

The report provides the following recommendations:

1. The proposed hospital would require construction to BAL-12.5 AS-3959 2009 + Appendix 3 Addendum PBP 2006; **alternatively**

   No level of construction required with concurrence from the NSW RFS that, with the proposed future uses and current commercial agricultural uses to the north, there is strong likelihood in the near future of managed land within 50m of the proposed hospital.

2. At the commencement of construction and in perpetuity the property surrounding the hospital for a distance of 50 metres or to the property boundary, whichever the lesser is to be maintained as an inner protection area (IPA) as outlined within section 4.1.3 and Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for Asset Protection Zones. It is noted that APZs must be contained wholly within the subject property boundary although the managed public road reserve may be included as part of an APZ.

3. Water, gas and electricity are to comply with section 4.2.7 Planning for Bushfire Protection 2006. A fire hydrant system complying with AS 2419.1-2005 will satisfy the water requirements relating to s4.2.7 PBP2006.

4. The internal property access road is to comply with section 4.2.7 (Internal Roads) Planning for Bushfire Protection 2006 with exception to the perimeter road being required to comply with PBP2006 Table 4.1 rather than 8m width for the entirety of the access road. It is noted that at the curves, Table 4.1 will supersede the requirement of 6m between inner and outer curves if it requires a greater width.

5. An emergency evacuation procedure and detailed plans of all Emergency Assembly Areas (onsite and offsite) are to be prepared in accordance with the RFS Guidelines for the Preparation of Emergency/Evacuation Plan.

6. Landscaping is to be undertaken in accordance Appendix 5 of Planning for Bushfire Protection 2006 and managed and maintained in perpetuity.

2.0 INTRODUCTION

2.1 GENERAL

This report has been prepared to address the requirements of Special Fire Protection Purpose Development as detailed in Planning for Bushfire Protection 2006 guidelines and clause 44 of the *Rural Fires Regulation.*

The subject site is not mapped as designated bushfire prone land as identified in Figure 4, Byron Shire Council bushfire prone land map. Notwithstanding this, the request has been made for this report to be prepared in this format.

The requirements of clause 44 of the *Rural Fires Regulation* are as follows;

- description (including the address) of the property on which the development the subject of the application is to be carried out;
- classification of the vegetation on and surrounding the property (out to a distance of 140 metres from the boundaries of the property) in accordance with the system for classification of vegetation contained in *Planning for Bush Fire Protection*;
- an assessment of the slope of the land on and surrounding the property (out to a distance of 100 metres from the boundaries of the property);
- a bush fire assessment for the proposed development (including the methodology used in the assessment) that addresses the following matters:
    - the extent to which the development is to provide for setbacks, including asset protection zones;
    - the siting and adequacy of water supplies for fire fighting;
    - the capacity of public roads in the vicinity to handle increased volumes of traffic in the event of a bush fire emergency;
    - whether or not public roads in the vicinity that link with the fire trail network have two-way access;
    - the adequacy of arrangements for access to and egress from the development site for the purposes of an emergency response;
    - the adequacy of bush fire maintenance plans and fire emergency procedures for the development site;

- the construction standards to be used for building elements in the development;
- the adequacy of sprinkler systems and other fire protection measures to be incorporated into the development;

- an assessment of the extent to which the proposed development conforms with or deviates from the standards, specific objectives and performance criteria set out in Chapter 4 (Performance Based Controls) of *Planning for Bush Fire Protection*.

This report however does not specifically address the following heads of consideration of *clause 44 of the Rural Fires Regulation.* These items are to be considered by consultants with these fields of expertise, provided under separate cover and assessed by the relevant authority in conjunction with this report. No clearing is required for the APZ to the proposed building works.

- identification of any significant environmental features on the property,
- the details of any threatened species, population or ecological community identified under the *Threatened Species Conservation Act 1995* that is known to the applicant to exist on the property,
- the details and location of any Aboriginal relic (being a relic within the meaning of the *National Parks and Wildlife Act 1974*) or Aboriginal place (within the meaning of that Act) that is known to the applicant to be situated on the property.

The recommendations within this report will detail general compliance with Chapter 4 and the aim and objectives of Planning for Bushfire Protection 2006. 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 affect by bushfire.

2.3 REPORT DETAILS

Report Reference No.:	14/184
Property Address:	Byron Bay Central Hospital, 54 Ewingsdale Road Ewingsdale
Local Government Area:	Byron Shire Council
Proposal:	New hospital Class 9a
Drawings:	Woods Bagot, dated 04.07.2014
Report Prepared By:	Peter Thornton, MFireSafeEng, Building Surveyor (MAIBS) BPAD – A Certified Practitioner

3.0 PROPOSED DEVELOPMENT

The applicant is proposing a new hospital as identified in the following site plans (see Figure 2). The proposed building works for the new hospital will be capable of achieving a minimum of 30m distance to the existing grassland hazard thereby complying with the 10kW/m^2 threshold. The property is vacant except for the recently constructed ambulance station to the east of the proposed hospital.

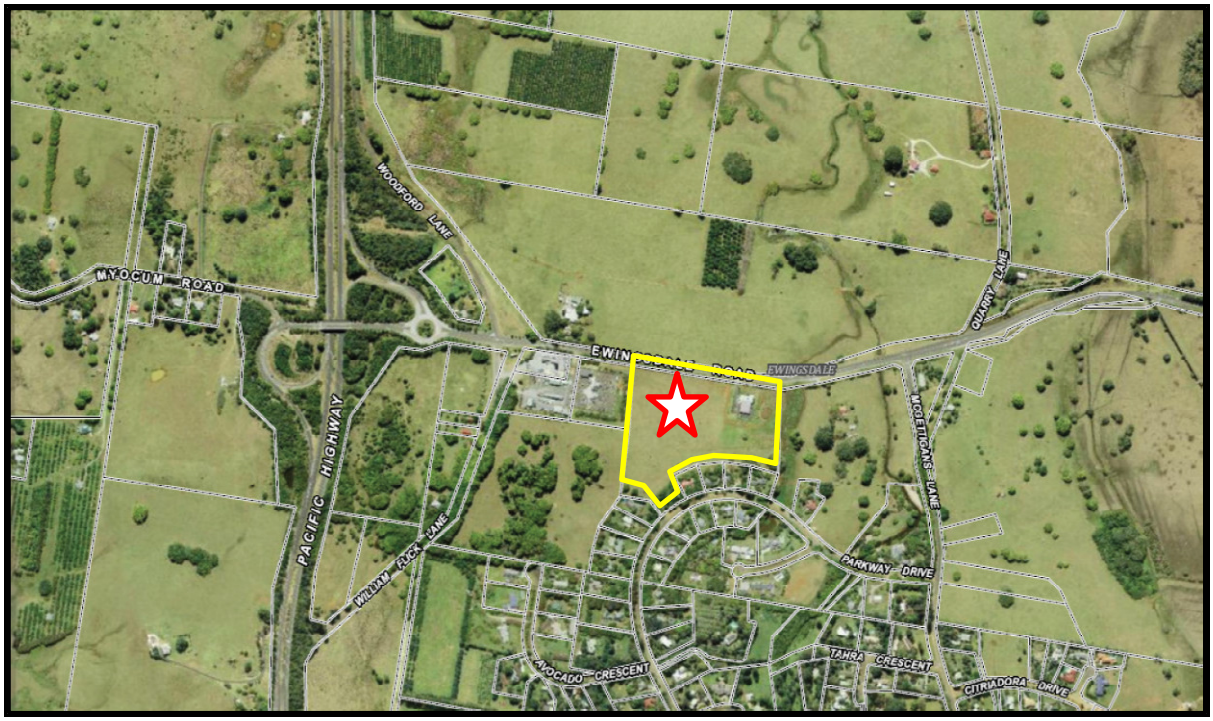


Figure 1 – Location of subject property

Photo 1- Location of proposed hospital

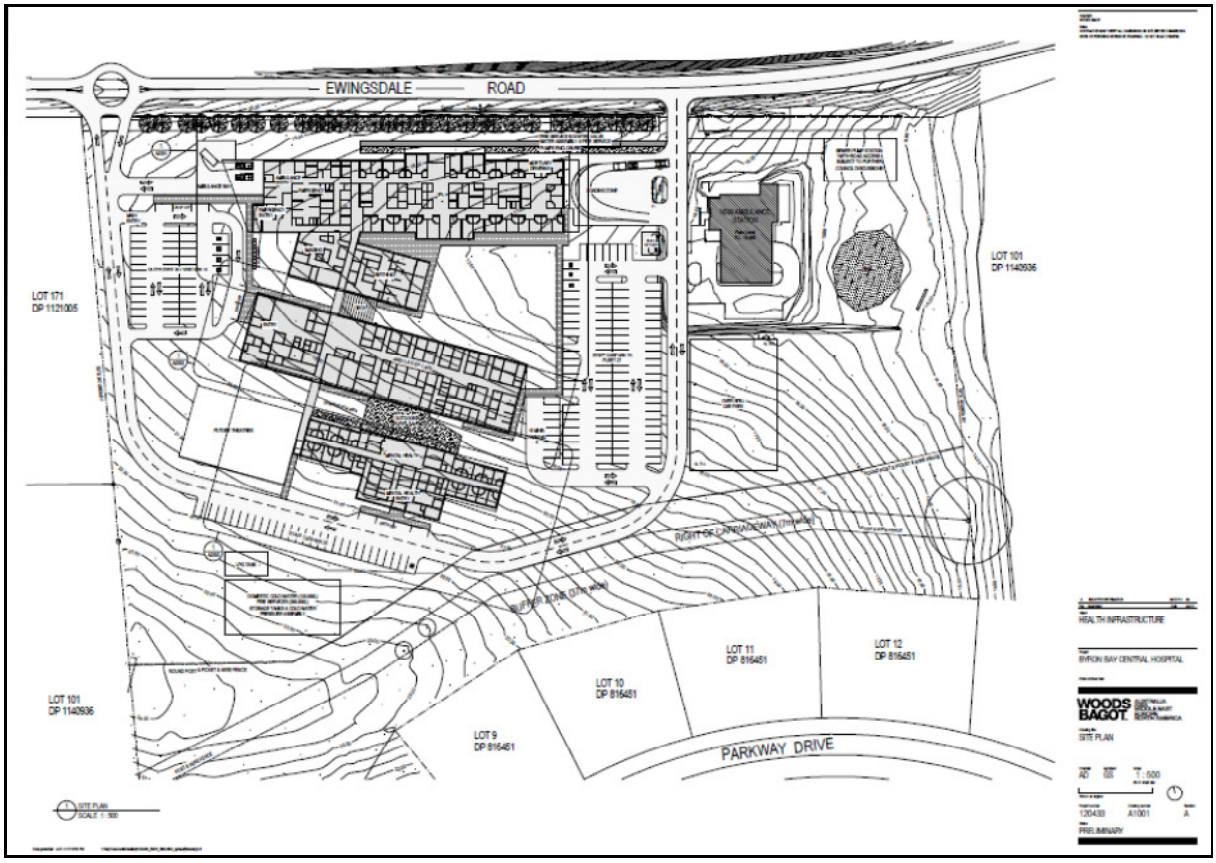


Figure 2 – Site plan showing location of the proposed hospital (larger image in Appendix A)

4.0 BUSHFIRE THREAT ASSESSMENT

Council bushfire prone mapping does not identify the subject site as being bushfire prone (see Figure 4) however the request has been made by the consent authority for this report to be prepared pursuant to clause 44 Rural Fires Regulation. The proposed development is however subject to grassland hazard which is not mapped as bushfire prone land. Whilst the Building Code of Australia may not specifically require a Bushfire Attack Level, Planning for Bushfire Protection 2006 requires grassland to be assessed pursuant to AS 3959-2009. Further, confirmation from the NSW RFS was received stating that this was the intention of their correspondence to NSW Planning and Environment dated 4 July 2014.

The hazard is located to the north, southwest and east of the proposed hospital facility. The bushfire hazard is classified as grassland vegetation and is generally located on flat to upslope terrain. The grass is heavily grazed however there is no guarantee it will remain so. To the southwest there is a small pocket of rainforest/Camphor Laurel vegetation greater

than 100 metres to the current proposed hospital buildings. It is noted that significant future development to the east and southwest is earmarked and in turn these grassland areas may not be classified as a hazard to the current proposed development in the future which will leave the north aspect as being the primary hazard. At the time of reporting however the grassland requirements apply to the development. To the north the APZ includes Ewingsdale Road. The proposed hospital complies with the 30 metre APZ to the southwest.

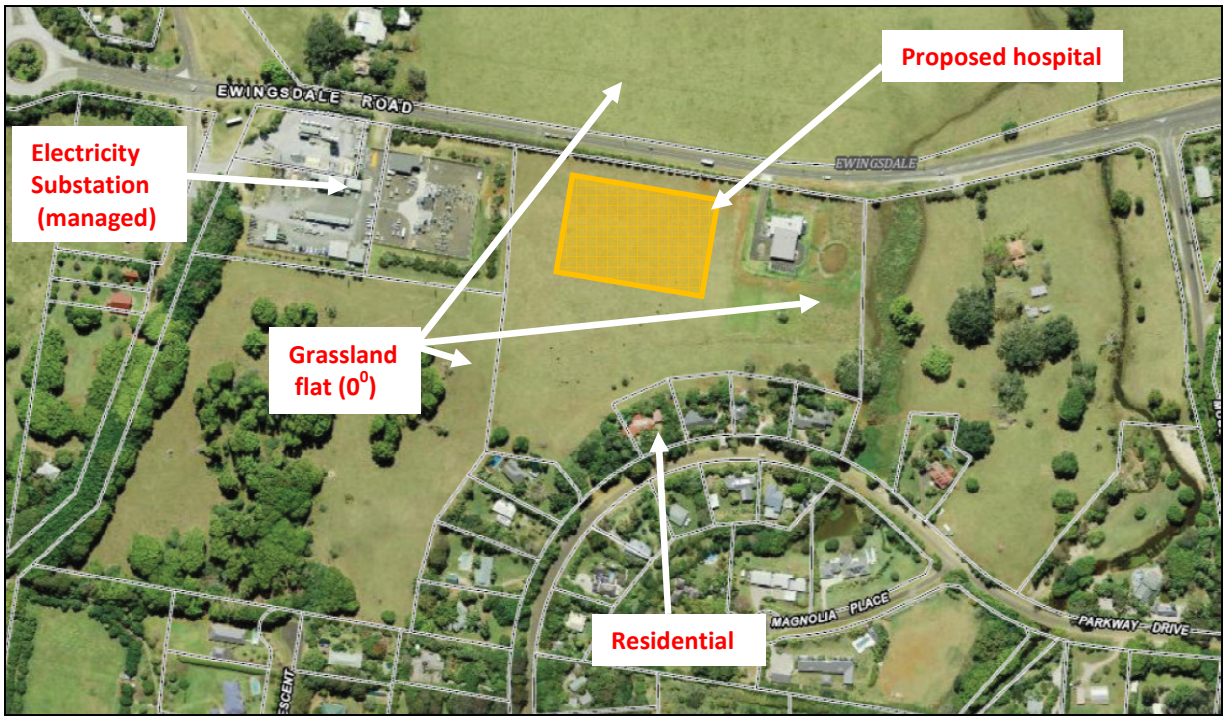


Figure 3 – Bushfire threat analysis


Photo 2 and 3 - Grassland to the southwest and north

Photo 4 - Existing ambulance station on the site

Table 1: Bushfire Threat Assessment for Proposed Class 9a Hospital

Aspect	Slope	vegetation	Distance to Building	Table A2.6 PBP 2006
North	flat	Grassland	Approx. 33 metres	30m see Fig. 5 p.12
East	flat	Grassland	30 metres	30m see Fig. 5 p.12
South	n/a	Residential	n/a	n/a
Southwest	upslope	Grassland	50m	30m see Fig. 5 p.12
West	n/a	Electricity sub-station	n/a	n/a

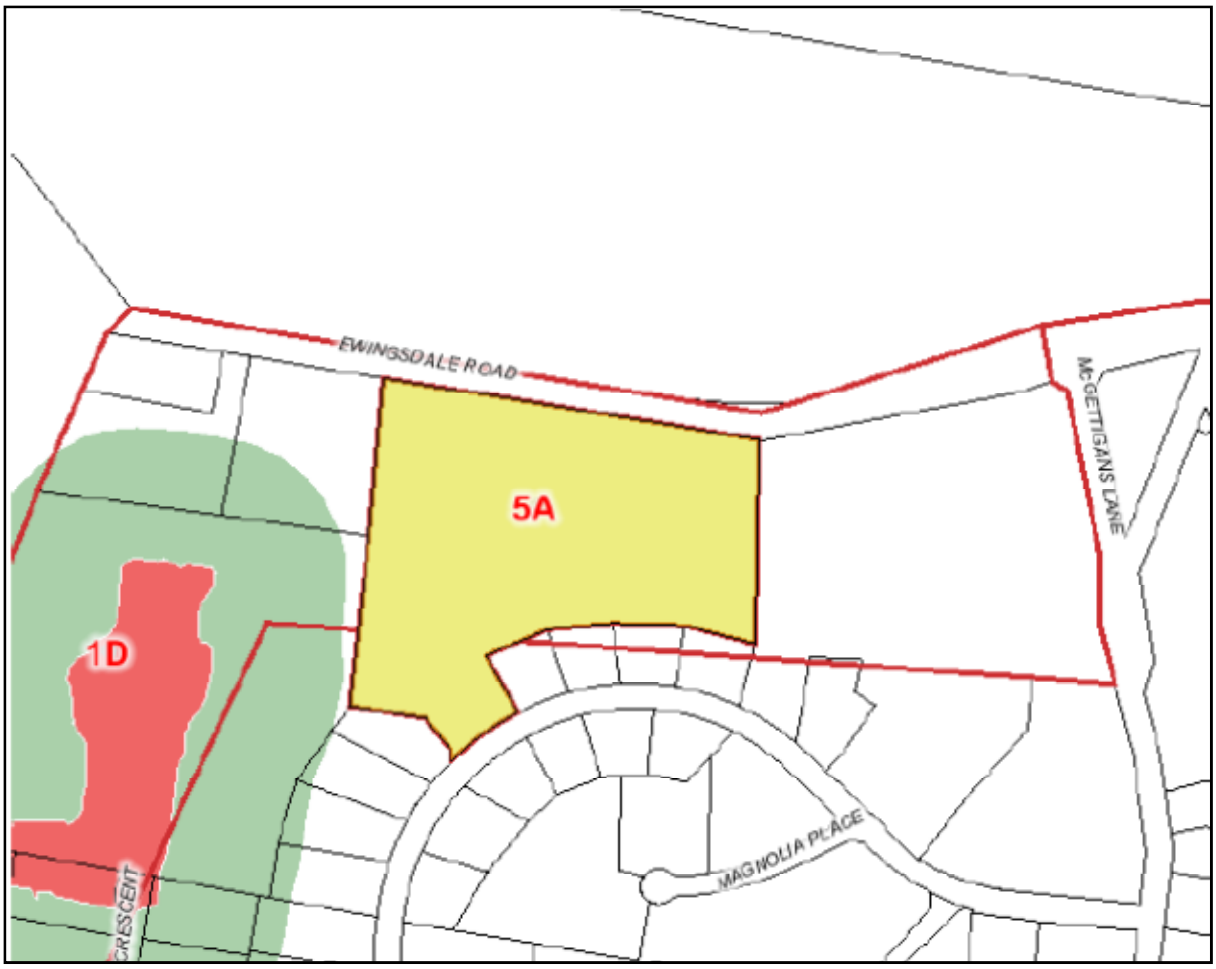
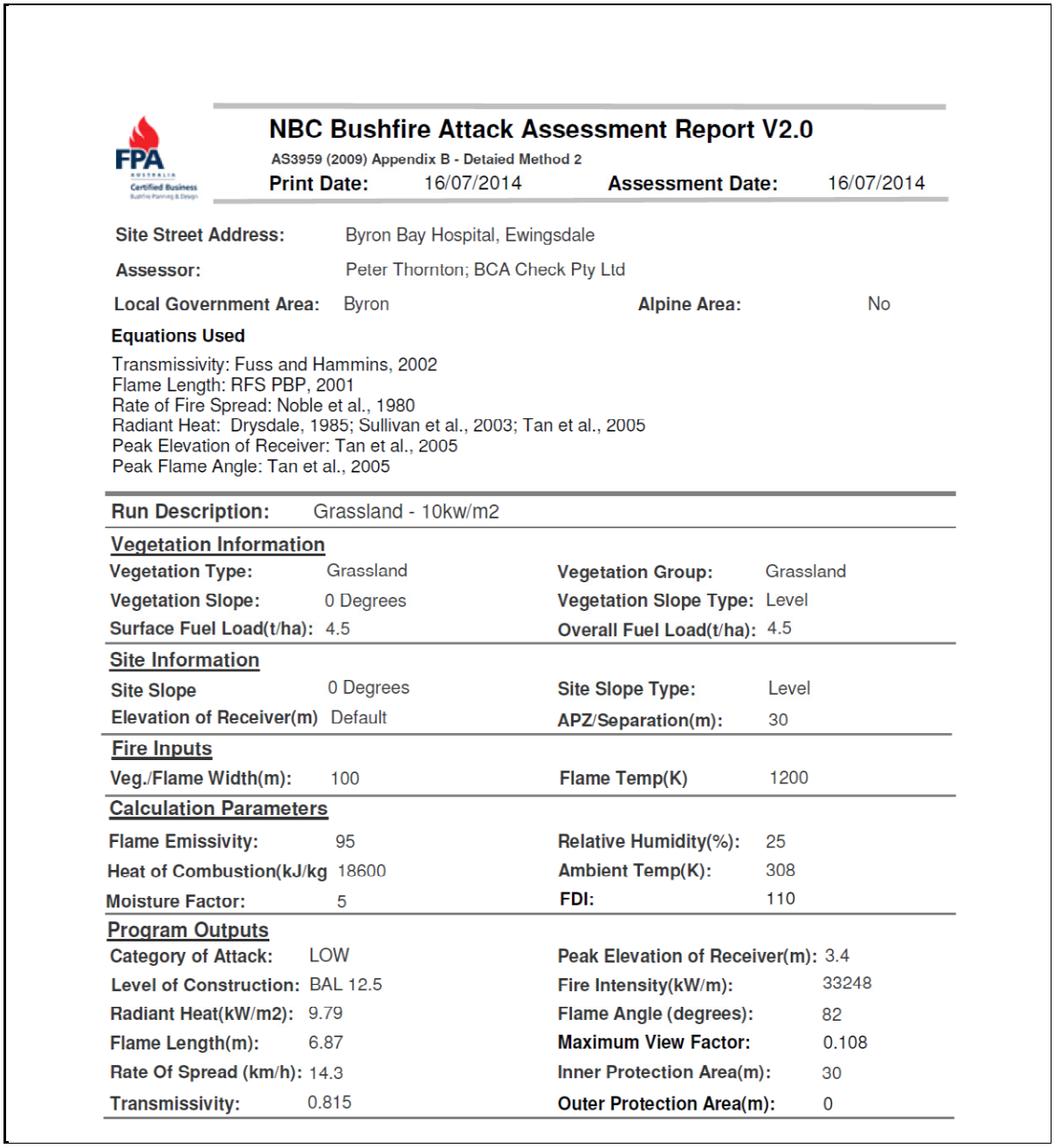


Figure 4 – Byron Shire Council bushfire prone land map showing the site outside the buffer

The proposed hospital will be compliant with Table A2.6 of Planning for Bushfire Protection 2006 and AS 3959-2009 however as grassland, is not in table A2.6 it has been modelled to establish that the radiant heat received by the building is not greater than 10KW/m^2 in order to satisfy the 'performance based controls' of Chapter 4 PBP2006 and RFS correspondence.



NBC Bushfire Attack Assessment Report V2.0

AS3959 (2009) Appendix B - Detaied Method 2

Print Date: 16/07/2014 **Assessment Date:** 16/07/2014

Site Street Address: Byron Bay Hospital, Ewingsdale

Assessor: Peter Thornton; BCA Check Pty Ltd

Local Government Area: Byron **Alpine Area:** No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001
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

Run Description: Grassland - 10kw/m2

Vegetation Information

Vegetation Type:	Grassland	**Vegetation Group:**	Grassland
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	4.5	**Overall Fuel Load(t/ha):**	4.5

Site Information

Site Slope	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	30

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K)**	1200

Calculation Parameters

Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	110

Program Outputs

Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	3.4
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	33248
Radiant Heat(kW/m2):	9.79	**Flame Angle (degrees):**	82
Flame Length(m):	6.87	**Maximum View Factor:**	0.108
Rate Of Spread (km/h):	14.3	**Inner Protection Area(m):**	30
Transmissivity:	0.815	**Outer Protection Area(m):**	0

Figure 5 – Design fire for grassland

5.0 ASSET PROTECTION ZONES AND CONSTRUCTION STANDARDS

Performance Criteria	Acceptable Solutions	Comment
The intent may be achieved where:		
Radiant heat levels of greater than 10kW/m^2 will not be experienced by occupants or emergency services workers entering or exiting a building	An APZ is provided in accordance with the relevant tables and figures in Appendix 2 of PBP2006. Exits are located away from the hazard side of the building. The APZ is wholly within the boundaries of the development site.	Complies Complies Complies
Applicants demonstrate that issues relating to slope are addressed: maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.	Mechanisms are in place to provide for the maintenance of the APZ over the life of the development. The APZ is not located on lands with a slope exceeding 18 degrees	Can be conditioned Complies
APZs are managed and maintained to prevent the spread of a fire towards the building.	In accordance with the requirements of 'Standards for Asset Protection Zones (RFS 2005).	Capable of compliance. Can be conditioned.
Vegetation is managed to prevent flame contact and reduce radiant heat to buildings, minimise the potential for wind driven embers to cause ignition and reduce the effects of smoke on residents and fire fighters.	Compliance with Appendix 5 of PBP2006	Can be conditioned

Table 2: Summary Bushfire Threat Assessment for Proposed Class 9a Hospital

Aspect	Slope	Vegetation	Distance to hospital Buildings	PBP 2006 & AS 3959-2009
North	flat	Grassland	Approx. 33 metres	BAL 12.5 + Appx. 3 ADD PBP 2006
East	flat	Grassland	30 metres	" " " "
South	n/a	Residential	n/a	Dictated by other aspects
Southwest	upslope	Grassland	50m	Dictated by other aspects
West	n/a	Electricity sub-station	n/a	Dictated by other aspects

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). The Inner Protection Area is located adjacent to the development and becomes an area with significantly reduced fuel loadings. Reference to Planning for Bushfire Protection 2006 and the RFS Asset Protection Zone Standards 2005 (see Appendix B) should be made.

5.1 Exceptional Circumstances for APZs and Construction Standards

Section 3.3 – Exceptional circumstances for APZs Planning for Bushfire Protection 2006 permits the use of APZs on adjoining lands and specifically sites one example of an acceptable exceptional circumstance are being;

'Where it can be demonstrated that there is a strong likelihood of the adjoining land being developed for future residential or other compatible purposes (e.g. staged development or Urban Development Program or Strategies with supporting development control plans).'

In this regard, it is considered that the adjacent allotments being Lot 101 DP 1140936 (east and west) and Lot 5 DP 848222 (north) have proposed and existing uses that reasonably fall into this category. Figure 6 is provided showing the location of these allotments in relation to the subject property.

Figure 6 - Location of adjacent allotments in relation to the subject property

5.1.1 Proposed uses for Lot 101 DP 1140936

A planning proposal has been submitted and gateway determination received by NSW Planning and Infrastructure to permit seniors housing, business premises, restaurants and cafes, shops and medical centres on this allotment. Given the location of the proposed hospital and the demand for supporting uses there is a strong likelihood that these developments will occur. It is understood that the application is on public notification.

Once these developments proceed the current grassland will be managed land it being noted that NSW RFS consultation will be required and asset protection zone/landscaping conditions likely to be recommended. In turn, there is a strong likelihood that this site can be determined a future asset protection zone and the hospital building will be greater than 50m from grassland and greater than 100m from treed vegetation. On this basis there would be no requirement for a Bushfire Attack Level (BAL) pursuant to AS 3959-2009.

5.1.2 Existing use Lot 5 DP 848222

The property to the north is current an approved restaurant, cheese production farm known as 'The Farm'. The property is a well managed commercial/agricultural venture that is essentially a commercial/industrial operation with market gardens for vegetables and herbs etc.

Development Consent No. 10.2013.626.1 has been granted for a cheese making facility and farm cafe with ancillary structures and carparking etc. The Statement of Environmental Effects (SEE) submitted with the development application specifically acknowledges the establishment of the hospital, ambulance, potential aged housing and care facilities, medical centre and retail facilities as being part of the locality to which it will make a positive contribution. The SEE also indirectly attests to the management of the site in saying;

'The subject site provides some 1000 metres of road frontage on the northern side of the town's main entry road and the proposal is able to provide and maintain a positive contribution to the character and visual presentation of the town gateway'. (Balanced Systems Planning Consultants 2013)

The farm being a commercial/agricultural established development is not unlike a macadamia plantation or the like that is well managed and due to the commercial nature of the development is less likely to become unmanaged. Currently there are vegetable gardens and herb gardens further to the north approximately 100m from Ewingsdale Road. It is

understood that the future plans are to extend the market gardens to toward Ewingsdale Road. It is noted that the grounds currently are very well managed.
Further, section A2.3 PBP2006 acknowledges that vineyards, orchards and cultivated ornamental gardens can be included in APZs and are not considered a hazard. Currently the classification is grassland however it is currently well managed with the likelihood of further cropping increasing in this area with the progression of the approved use.

5.1.3 Conclusion

As outlined in this report the assessment pursuant to AS 3959-2009 and Appendix 3 of Planning for Bushfire Protection 2006 is that the current hazard on adjoining land is 'grassland' and the BAL 12.5 AS 3959-2009 would apply. However, it is considered reasonable that there is a strong likelihood of development of the adjacent sites and removal of the grassland hazard within 50m of the development. In turn this report provides detail to the NSW RFS for consideration of exceptional circumstance to remove the requirement of BAL 12.5 AS 3959-2009 on the basis provided.

Should the NSW RFS concur with this assessment then it is recommended that at the commencement of construction and in perpetuity the property surrounding the hospital for a distance of 50 metres or to the boundary, whichever the lesser shall be maintained as an inner protection area (IPA) as outlined within section 4.1.3 and Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for Asset Protection Zones.

6.0 WATER, GAS AND ELECTRICITY

Adequate water supply is a critical requirement for fire-fighting purposes in the event of a bushfire. Electrical and gas supply can also have an impact in a bushfire event by increasing the risk of ignition to a building and to personal safety during suppression or evacuation stages. Electrical supply is to be placed underground.

Section E1.3 of the Building Code of Australia 2014 is likely to require a fire hydrant system to comply with AS 2419.1-2005. Given this area does not have a reticulated water supply, the system is likely to be a static supply which will significantly exceed the 20,000L static supply required by Planning for Bushfire Protection 2006.

It is therefore recommended that the building be provided with a fire hydrant system that complies with BCA E1.3 – Fire Hydrants.

Should a gas service be installed the following aspects will require consideration:

- Reticulated or bottled gas installed and maintained in accordance with AS 1596 with metal piping used.
- Fixed gas cylinders to be kept clear of flammable material by a distance of 10m and shielded on the hazard side of the installation.
- Gas cylinders close to the dwelling are to have the release valves directed away from the building and at least 2m from flammable material with connections to and from the gas cylinder being of metal.
- Polymer sheathed flexible gas supply lines to gas meters adjacent to the buildings are not used.

7.0 ACCESS

The hospital is accessed directly from Ewingsdale Road and provides for two entry/egress points which will allow the fire brigade to entry and exit in the forward direction. Ewingsdale road will be capable of supporting evacuation and fire brigade intervention.

The internal property access road is to comply with section 4.2.7 (Internal Roads) Planning for Bushfire Protection 2006 with exception to the perimeter road being required to comply with PBP2006 Table 4.1 rather than 8m width for the entirety of the access road.

Table 4.1 provides the minimum widths for public roads that are not perimeter roads for the safe access of fire fighting vehicles in urban areas.

Curve radius (inside edge) (metres)	Swept Path (metres width)	Single lane (metres width)	Two way (metres width)
<40	3.5	4.5	8.0
40-69	3.0	3.9	7.5
70-100	2.7	3.6	6.9
>100	2.5	3.5	6.5

Source: AS 2890.2 – 2002.

Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle)

Figure 7 - Table 4.1 PBP2006

Performance Criteria	Acceptable solutions
The intent may be achieved where:	
• internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle.	• internal roads are two-wheel drive, sealed, all-weather roads; • internal perimeter roads are provided with at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb) and shoulders clear of obstructions, allowing traffic to pass in opposite directions; • roads are **through** roads. Dead end roads are not more than 100 metres in length from a through road, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end; • traffic management devices are constructed to facilitate access by emergency services vehicles. • a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches, is provided. • curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress. • the minimum distance between inner and outer curves is six metres. • maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees. • crossfall of the pavement is not more than 10 degrees. • roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge). • roads are clearly sign-posted and bridges clearly indicate load ratings. • the internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).

NOT APPLICABLE - REFER TO TABLE 4.1 PBP 2006

REFER TO TABLE 4.1 PBP 2006

The performance criteria for internal roads pursuant to s4.2.7 PBP2006 states;

'Internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle'

Compliance with PBP2006 Table 4.1 for the perimeter road is considered to comply with the performance criteria based on the following reasoning;

1. The site is not mapped as bushfire prone land and would not normally attract the full suite of Planning for Bushfire Protection 2006 requirements.

2. The building will be required to comply with BCA E1.3 – fire hydrants and in turn fire protection of the building will be sufficient for fire fighting intervention, including access to hydrants.

3. The fire hazard is grassland which will have a fire front residence time of 2-15 seconds with negligible residual heat once the fire front has based. In this regard it is unlikely that significant resources will be required to combat an approaching fire or to provide any pre-fire front property protection.

4. The land to the east and southwest is planned for future development in the likely near future and at that point will be managed land with minimal fuel loads. The property to the north has a use that is likely to result in managed land.

5. Ewingsdale Road is the likely staging area for any fire response to the north which is grassland. A grassfire to the north will have minimal direct impact on the building or occupants given the buffer provided by Ewingsdale Road.

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 Appendix 5 of Planning for Bushfire Protection 2006 and managed and maintained for the life of the development.

9.0 EMERGENCY AND EVACUATION PLANNING

Emergency and evacuation planning is a critical measure for a Special Fire Protection Purpose to provide a higher level of co-ordination and safety for the occupants in a bushfire event.

It is extremely important that the emergency plan is constantly monitored and amended when required and that training of staff, participants and stakeholders is sustained at a high level.

The following table outlines the requirements and comments, it being noted that the development is to fully comply with the acceptable solutions in consultation with the Rural Fire Service.

Performance Criteria	Acceptable Solutions	Comment
Intent achieved where:		
An Emergency and Evacuation Management Plan is approved by the relevant fire authority for the area	An emergency/evacuation plan is prepared consistent with the RFS Guidelines for the Preparation of Emergency/Evacuation Plan. Compliance with AS 4083-1997 and the relevant provisions of AS 3745-2002 'Emergency control organization and procedures for buildings, structures and workplaces' for residential accommodation'.	To comply
Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan	An Emergency Planning Committee is established to consult with residents (and their families in the case of aged care accommodation and schools) and staff in developing and implementing an Emergency Procedures Manual. Detailed plans of all Emergency Assembly Areas including "onsite" and "offsite" arrangements as stated in Compliance with AS 4083-1997 AS 3745-2002 are clearly displayed, and an annual (as a minimum) trial emergency evacuation is conducted.	To comply in relation to staff only. To comply.

Compliance with the acceptable solutions is capable of being achieved and in this regard an emergency evacuation procedure is to be prepared and submitted to the certifier for approval prior to the occupation of the building.

An emergency evacuation procedure and detailed plans of all Emergency Assembly Areas (onsite and offsite) are to be prepared in accordance with the RFS Guidelines for the Preparation of Emergency/Evacuation Plan, AS 4087-1997 and AS 3745-2002.

A copy of the approved document is to be provided to the local Bush Fire Management Committee for their information prior to occupation of the building.

10.0 CONCLUSION

The report has established that:

- The proposed development is classified as a Special Fire Protection Purpose development.
- The proposed building is to be constructed pursuant to AS 3959-2009 however the report provides supporting documentation to propose exceptional circumstances may be reasonable to remove the requirement for a Bushfire Attack Level (BAL).
- The required asset protection zones are capable of being achieved to the new hospital building based on PBP2006.

The recommendations in this report and the executive summary are provided for referral to the Rural Fire Service.

Disclaimer

This report was prepared for the purposes and exclusive use of the stated client to address the requirements of Clause 44 Rural Fires Regulation and RFS recommendation for a proposed Special Fire Protection Purpose as requested by the client, 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 2006 and the Building Code of Australia the report is to provide recommendations to reduce the risk of ignition of the proposed additions and does not guarantee the complete building and occupant protection of the building in the event of bush fire. It is noted that the existing building is not considered to be capable of adequately withstanding the impact of a potential bushfire even though the report endeavours to reduce the risk to that currently achieved.

Reporting has been based on the relevant Council and Rural Fire Service Guidelines, however, recommendations 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:

ABCB, (2014), National Construction Code, Building Code of Australia, *Australian Building Codes Board Canberra,* Volume 1.

NSW Rural Fire Service and Planning NSW (2006), *Planning for bushfire protection, A guide for councils planners fire authorities developers and homeowners.* Rural Fire Service NSW Australia.

Standards Australia, (2009), AS3959 *Construction of buildings in bushfire prone areas,* Australian Standards, Sydney.

Legislation.

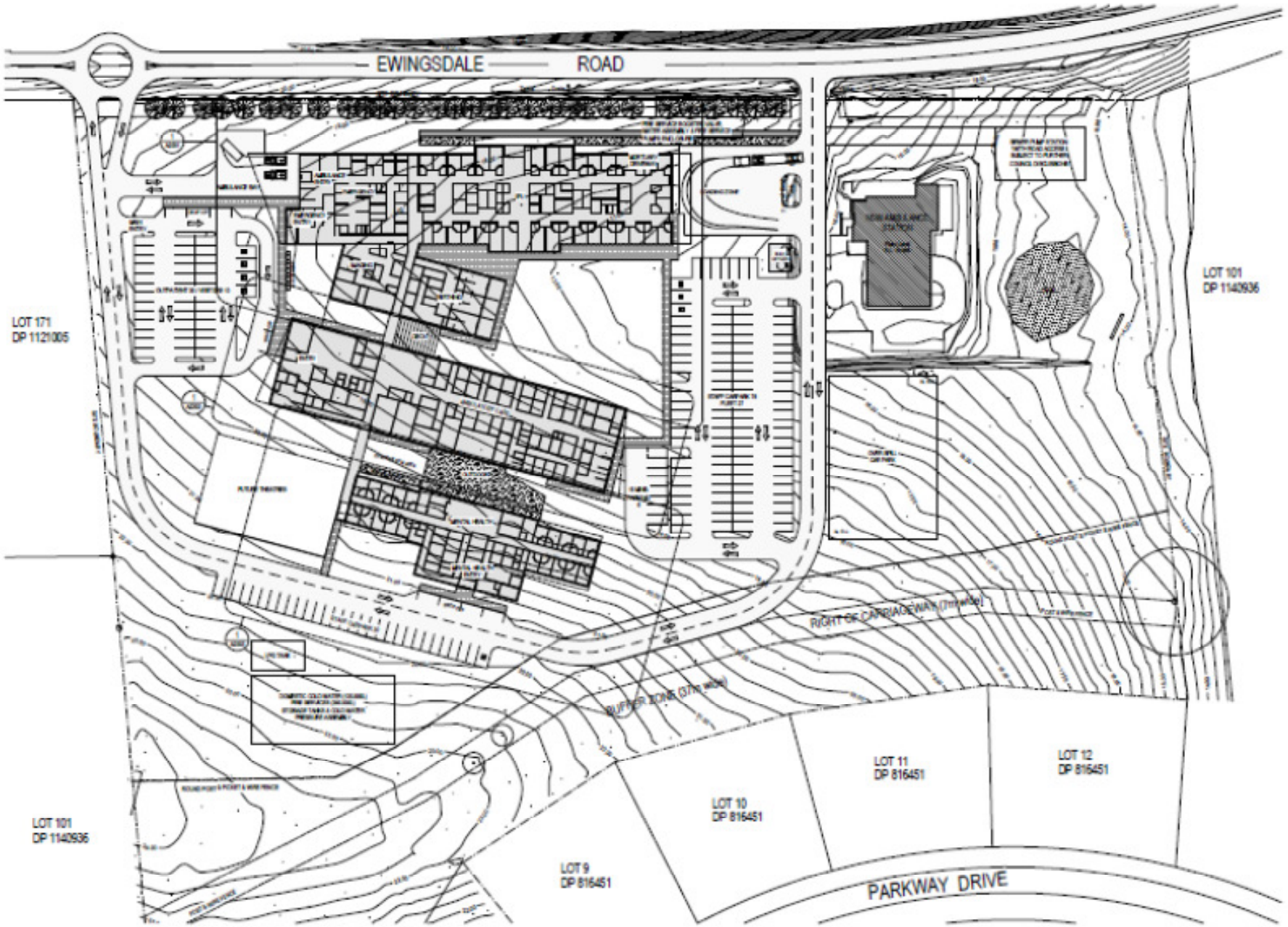
Environmental Planning and Assessment Act 1979 and Regulations 2000. *New South Wales.* Parliamentary Counsel's Office, NSW Government Information Service.

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

Site Plan



HEALTH INFRASTRUCTURE

BYRON BAY CENTRAL HOSPITAL

WOODS BAGOT

SITE PLAN

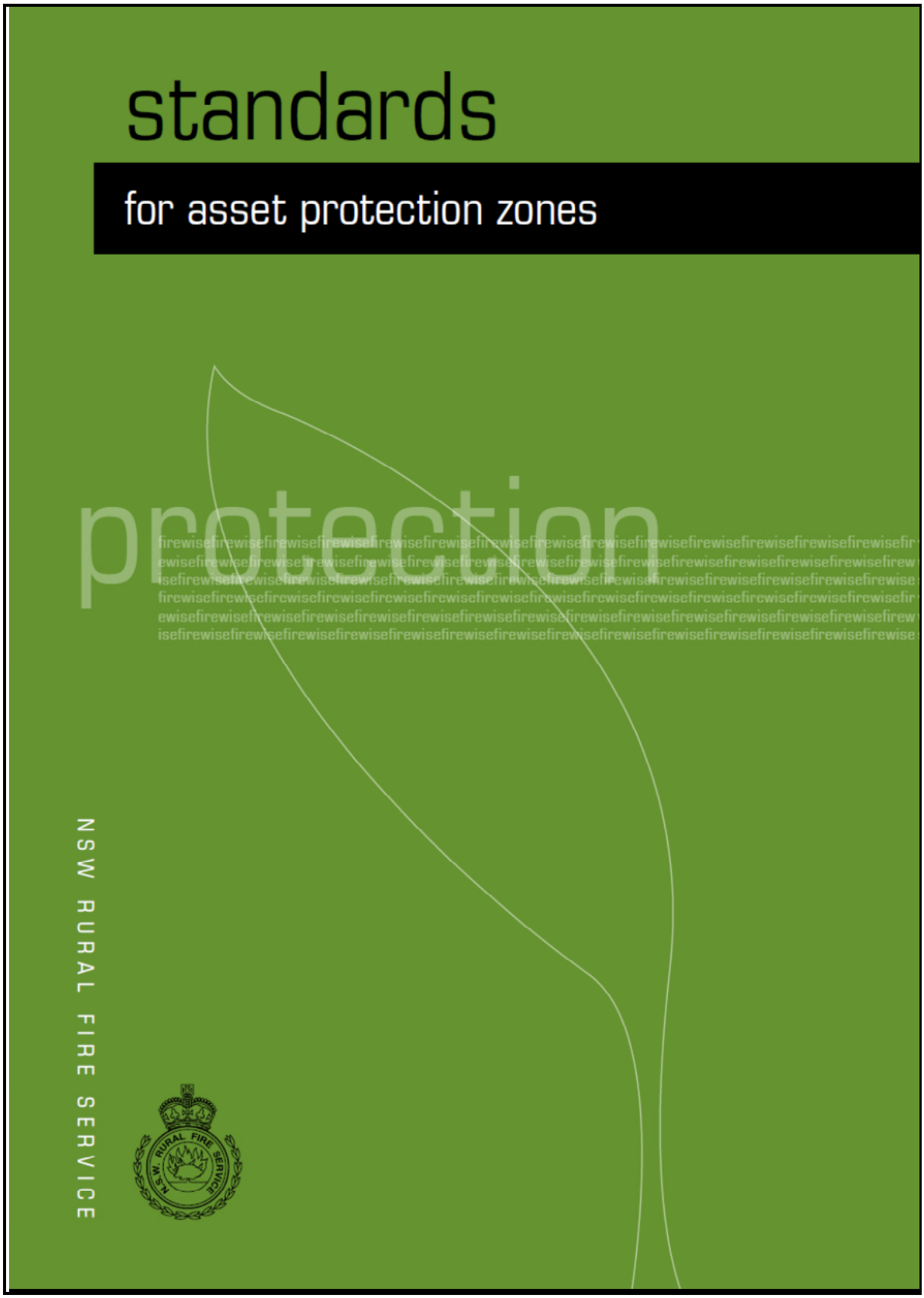
AD GS 1 : 500

120433 A1001 A

PRELIMINARY

APPENDIX B

Standards for Asset Protection Zones (RFS 2005)


standards
for asset protection zones
protection
NSW RURAL FIRE SERVICE

STANDARDS FOR ASSET PROTECTION ZONES

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.

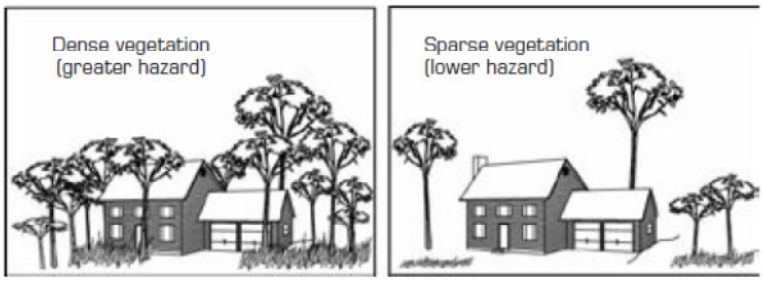
STEP 1. DETERMINE IF AN APZ IS REQUIRED

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.

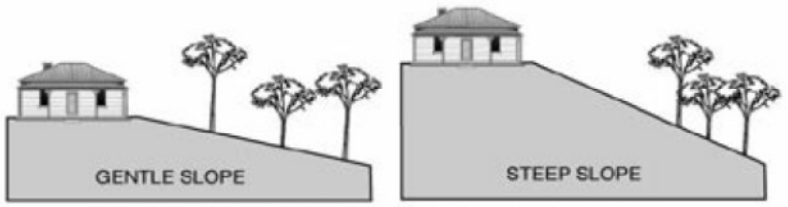
If your current development consent provides for an APZ, you do not need further approvals for works that are consistent with this consent.

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.

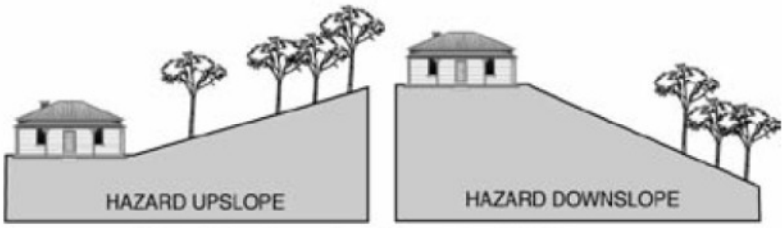
STEP 3. DETERMINE THE APZ WIDTH

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.



Gentle slopes require a smaller APZ distance than steep slopes



A hazard downslope will require a greater APZ distance then a hazard upslope 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.

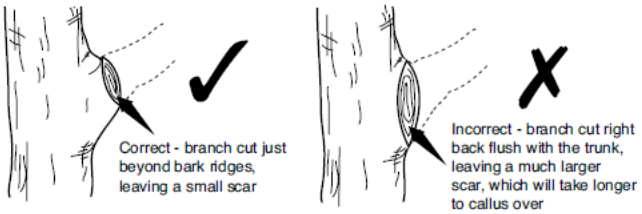
When choosing plants for removal, the following basic rules should be followed:

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 acordance 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.

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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

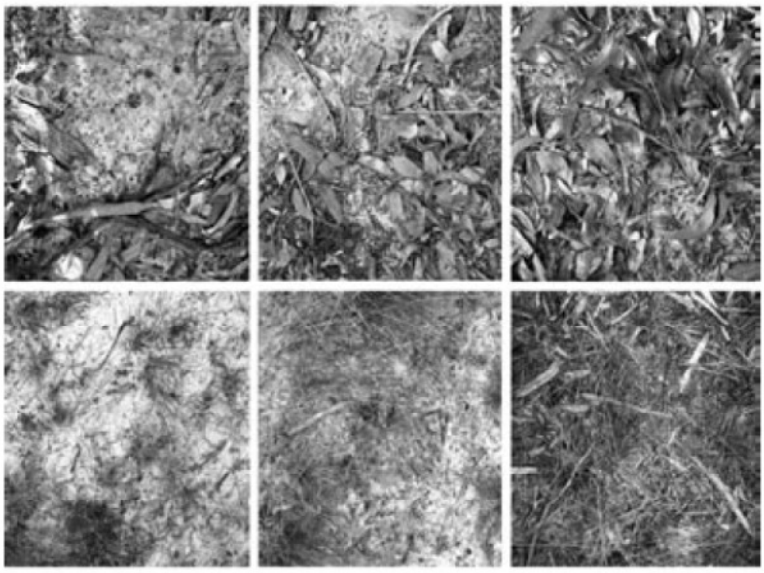
While the removal of fuel is necessary to reduce a bush fire hazard, you also need to consider soil stability, particularly on sloping areas.

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.

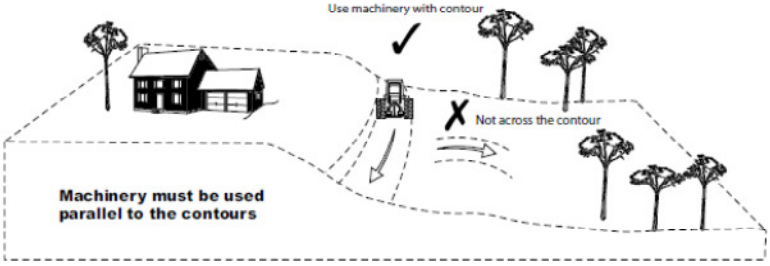
When using mechanical hazard reduction methods, you should retain a ground cover of at least 75% to prevent soil erosion. However, if your area is particularly susceptible to soil erosion, your Hazard Reduction Certificate may require that 90% ground cover be retained.



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.

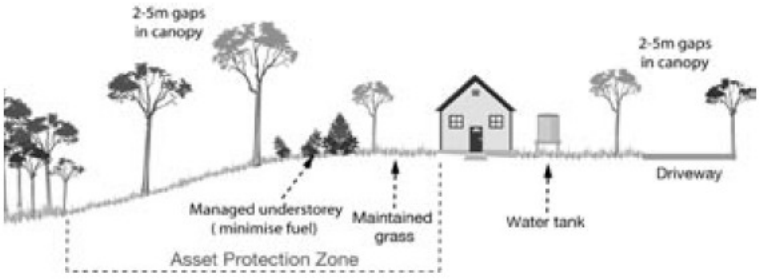


STEP 6. ONGOING MANAGEMENT AND LANDSCAPING

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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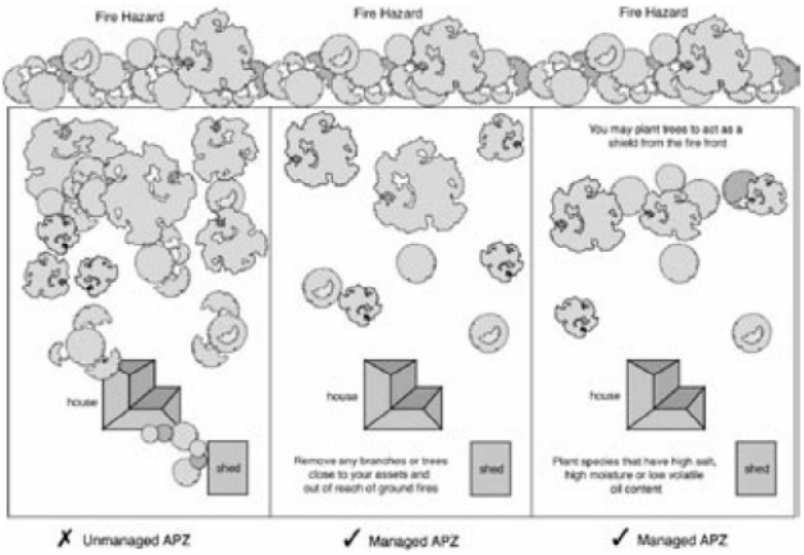

HOW CAN I FIND OUT MORE?

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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