

BUSHFIRE THREAT ASSESSMENT & ASSET PROTECTION ZONE REPORT

NORTH BYRON PARKLANDS TWEED VALLEY WAY & JONES ROAD OCEAN SHORES AND WOORYUNG

Prepared for: North Byron Parklands

Prepared by:

Peter Thornton

BPAD-L3 ACCREDITED PRACTITIONER

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BCA Check Pty Ltd
t/as Bushfire Certifiers
4/57 Ballina Street Lennox Head NSW 2478 Australia
(PO Box 375 LENNOX HEAD NSW 2478)

ABN 95104451210
T: 02 66877461
F: 02 66876295
E: bcacheck@bigpond.com



Peter Thornton
Principal
BPAD-L3 Accredited Practitioner No. 14867
MFireSafeEng
Building Surveyor MAIBS

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INTRODUCTION

This report has been prepared in two parts being:

- Part 1 – Proposed Conference Centre, Cabins and Associated Buildings; and
- Part 2 - Assessment of On-Site Bushfire Evacuation Area and Associated APZ.

The report relates to the application which is described by Planners North Consultant Planners as follows -

North Byron Parklands (Parklands) operates a cultural events site at Yelgun near Byron Bay. The site is home to two of Australia's most iconic annual international cultural music festivals, Splendour in the Grass and the Falls Festival Byron.

The Parklands site operates under a Concept Plan Approval and Project Approval, granted by the NSW Planning Assessment Commission (PAC) on behalf of the Minister for Planning on 24 April 2012 (MP 09_0028).

The approvals are subject to a trial period, up to the end of August 2019. Parklands is now seeking approval for ongoing use of the cultural events site following the trial period, including the continued use of existing site infrastructure and the development of additional infrastructure to support the cultural events site.

The PAC approved concept plan allows ongoing events after the trial period subject to further planning approval, meeting certain conditions of approval, and the satisfactory performance of the trial events. The PAC approved concept plan also allow for the development of a conference centre and cultural centre. These aspects of the project require separate development consent. The elements are outlined below.

Conference Centre

The Concept Plan provides that the conference centre would be located in the northern portion of the site, to the west of the events area. The facility would host conferences for up to 180 persons.

The accommodation component of the conference centre would comprise tent, cabin and/or motel unit style accommodation units. Overnight accommodation would be provided.

The current application includes development of the conference centre in a manner that is generally consistent with the concept plan.

Cultural Centre

The Concept Plan provides that the cultural centre would be located adjacent to, and/or integrated with, the approved administration building. The centre was intended to provide for the exhibition of indigenous and non-indigenous heritage and culture, as well as being an administrative point for local indigenous community operations.

The facility would comprise a public interactive area and offices comprising a floor area of approximately 110m², an additional workshop for training young people in a range of potential employment fields, and a depot for the indigenous rainforest restoration team.

The facility is also able to serve as the home base for eco/indigenous programs, activities and attractions, including ecological and cultural walks and tours, subject to further consultation and agreement with Aboriginal stakeholders.

Since the approval of the concept plan, Parklands has undertaken additional consultation with local Aboriginal groups, who have stated a preference that the cultural centre is not developed at this stage. Consequently, the current application does not include construction of the cultural centre.

The trial events are subject to a range of performance and monitoring requirements. Parklands has now gathered over 4 years of operating data covering 9 festivals, which demonstrate that the events are now operating in accordance with the conditions of approval and the relevant performance and monitoring requirements.

The proposal involves undertaking outdoor events on the site for up to 20 event days a year, comprising:

- 2 large events per year (ie. Splendour in the Grass and Falls Festival) over a maximum of 5 event days each, catering for up to 35,000 patrons per event day;*
- 3 medium event days a year (for other music concerts or cultural events), catering for up to 25,000 patrons per event day;*
- 5 small community event days, catering for up to 5,000 patrons per event day; and*
- 2 minor community event days, catering for up to 1,500 patrons per event day.*

Further, approval is sought for the progressive growth of one of the large events (ie. Splendour in the Grass) to 42,500 patrons and then 50,000 patrons a day, subject to meeting key performance indicators (KPIs) relating to traffic.

The proposal also involves:

- temporary camping associated with outdoor events, with capacity for up to 30,000 campers a day.*

- *development of a conference centre and associated accommodation (as per the approved concept plan), with capacity for up to 180 attendees and accommodation for up to 120 guests a day;*
- *continued use of existing site infrastructure and facilities;*
- *development of additional site infrastructure and facilities, including:*
 - *an administration building;*
 - *event area facilities and works, including:*
 - *amphitheatre regrading works;*
 - *drainage improvements;*
 - *potable water infrastructure;*
 - *sewerage infrastructure and amenities;*
 - *security fencing;*
 - *on-site and off-site road and transport facilities and works; and*
- *continued habitat restoration and vegetation management works.*

The proposal is classified as State Significant Development (SSD) under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act), and consequently requires approval from the Minister for Planning. The proposal also requires modification to the approved concept plan, and the Minister is also the approval authority for that application. On 18 January 2017, the Department of Planning & Environment (the Department) issued Secretary's Environmental Assessment Requirements (SEARs) for the proposal.

Part 1 of this report relating to the conference centre and cabins etc. has had a Bushfire Engineering Brief prepared and subsequently amended following an on-site meeting with NSW RFS and a further meeting at the Coffs Harbour Customer Service Centre on the 9th November 2017 where general concurrence was received subject to additional information being provided relating to restrictions for clearing vegetation and details of water supply for fire-fighting purposes. This section of the report reflects the discussions at those meetings.

Part 2 of this report relating to the proposed on-site bushfire evacuation area and associated asset protection zone has been prepared in accordance with NSW RFS requirements for the asset protection zone width requirement and area required for occupant bushfire evacuation assembly area.

All other aspects relating to bushfire emergency evacuation plan such as water supply, paths of travel, triggers, responsibilities, patron care and safety and off-site transportation and off-site evacuation destination will require full detail, consideration and approval by the relevant stakeholders prior to the event being undertaken.

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PART 1: CONFERENCE CENTRE, CABINS & ASSOCIATED BUILDINGS

1.0 INTRODUCTION

The proposed development is for a conference centre within the existing North Byron Parklands which is used as a music festival venue attracting large numbers of people and provides camping facilities, thereby considered a Special Fire Protection Purpose (SFPP) development. This report is prepared to demonstrate compliance with Planning for Bushfire Protection 2006 and is to accompany an application for a Bush Fire Safety Authority.

The proposed conference centre will support 30 habitable cabins that potentially will accommodate a maximum 120 people. Other buildings are provided for services to the conference centre and the occupants such as a day spa building and treatment rooms. A Bushfire Engineering Brief (amended 9/11/17) was prepared outlining the two areas that were subject to the performance solution in this report.

1. The habitable (sleeping) cabins and associated buildings will be constructed to a maximum BAL 29 AS 3959-2009 + PBP2006 with the conference centre located so as not to receive greater than a forecast radiant heat flux of 10kW/m².
2. Modelling forest with a very steep upslope exceeding 15 degrees upslope. The modelling will be undertaken in accordance with Method 2 of AS 3959-2009 however the modelling will be capped at an 8 degree upslope input.

All other bushfire protection measures (BPMs) such as water, utilities and access will be compliant with the acceptable solutions of Planning for Bushfire Protection 2006.

The initial Bushfire Engineering Brief had been amended following an on-site meeting with NSW RFS where it was required to address the reasons why larger APZs could not be supported and a clearer understanding of the proposed water supply for fire-fighting purposes. In this regard the amended brief provided ecological advice (see **attached** Appendix A) and additional engineering documentation (see **attached** Appendix B) is submitted with this final report. Section 4.4 of this report outlines that an AS 2419.1-2005 fire hydrant system will be proposed for the cabins and conference centre.

The following recommendations for Part 1 of the development are made. The full report however is to be considered, it being noted that Significant Environmental Features are not considered by this report.

1. The proposed cabins are to be located a minimum 15m from the bushfire hazard and all areas located between each cabin and the hazard must be managed and maintained to prevent the spread of a fire towards the buildings in accordance with the requirements of Standards for Asset Protection Zones (RFS 2005).
2. Cabins and associated buildings located within the setbacks identified in the following table must be constructed to the corresponding Bushfire Attack Level pursuant to AS 3959 2009 + Addendum to Appendix 3 PBP 2006 where they are within 100m of the bushfire hazard. The conference centre is to be constructed to BAL 12.5 AS 3959-2009 + Addendum to Appendix 3 Planning for Bushfire Protection 2006.

DISTANCE TO HAZARD FROM CABIN	BAL AS 3959-2009 + PBP2006
15m – 31m (see performance solution)	BAL 29 + Addendum appendix 3 PBP2006
31m – 42m	BAL 19 + Addendum appendix 3 PBP2006
42m – 100m	BAL 12.5 + Addendum appendix 3 PBP2006
Conference Centre	BAL 12.5 + Addendum appendix 3 PBP2006

3. Should a gas service be installed the following aspects will require compliance:
 - 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 building 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.
4. Landscaping is to be undertaken within the Asset Protection Zone (APZ) in accordance Appendix 5 of Planning for Bushfire Protection 2006 and managed and maintained in perpetuity.
5. Fire hydrants are to be designed and installed to comply with AS 2419-2005 and s4.1.3 PBP2006.
6. Any proposed access roads must comply with s4.2.7 Planning for Bushfire Protection 2006.
7. 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 and AS 3745 and NSW RFS Fast Fact 7/15 – Music Festivals that Cater for Large Crowds in Bush Fire Prone Areas.

2.0 PROPOSED CONFERENCE CENTRE AND CABINS

The proposed development is for a conference centre within the existing North Byron Parklands which is used as a music festival venue attracting large numbers of people. The proposed conference centre will accommodate up to 180 guests and is supported by 30 habitable cabins that potentially will accommodate a maximum 120 people who will be associated with the conference centre.

Also proposed as ancillary buildings to the proposed use are:

- A day spa.
- Treatment rooms.
- Break out pavilion.
- Event storage.
- Upgrade of existing bar.

The development is located within the northwest precinct of the existing North Byron Parklands development adjacent to the existing water body. The facility will be accessed by the existing internal road network with pathways provided throughout the proposed conference centre development.

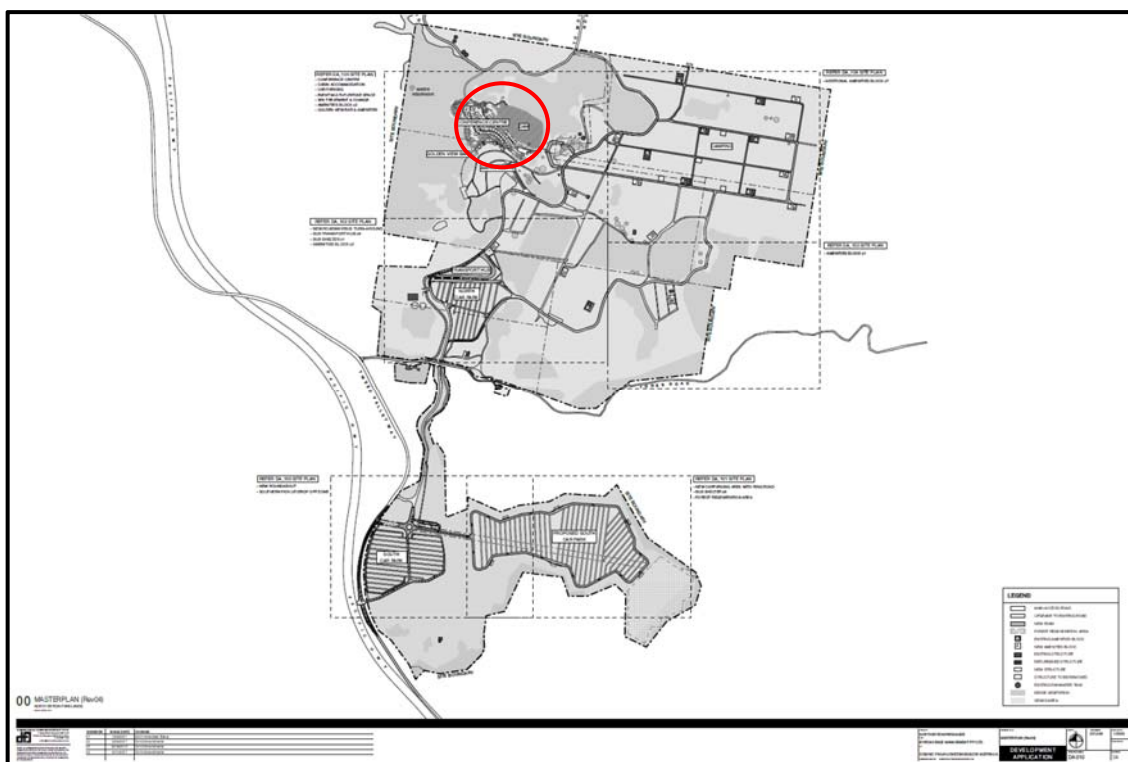


Figure 1: Location of the proposed development in relation to the existing site
(larger image **attached** in Appendix C)

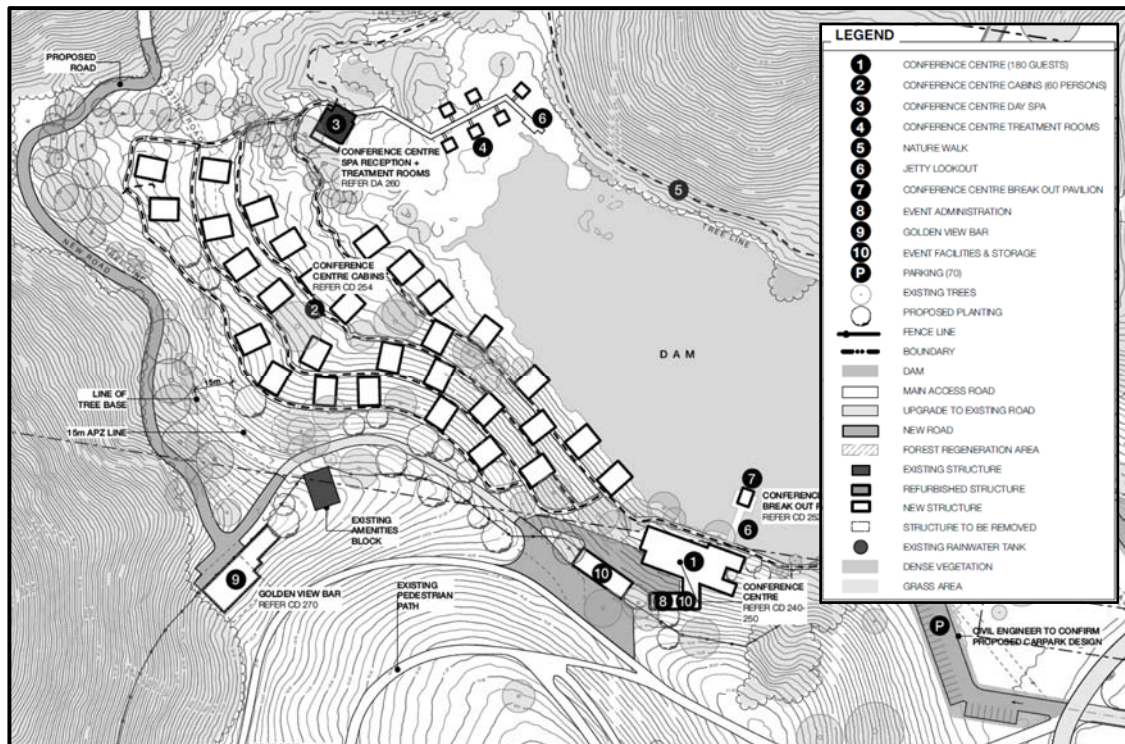


Figure 2: Location of proposed buildings (larger image **attached** in Appendix C)

An assessment may be required to be undertaken with regard to:

- State Environmental Planning Policy No. 44 (Koala Habitat Protection).
- Threatened Species Conservation Act (1995).
- Environmental Protection and Biodiversity Conservation Act (1999).
- National Parks and Wildlife Act, 1974 (Wildlife Atlas)
- Native Vegetation Act 2003.
- 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).

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

3.0 BUSHFIRE THREAT ASSESSMENT

The primary bushfire hazard when assessed 140m from the property boundary is forest vegetation on steep upslopes to the north, west and southwest.

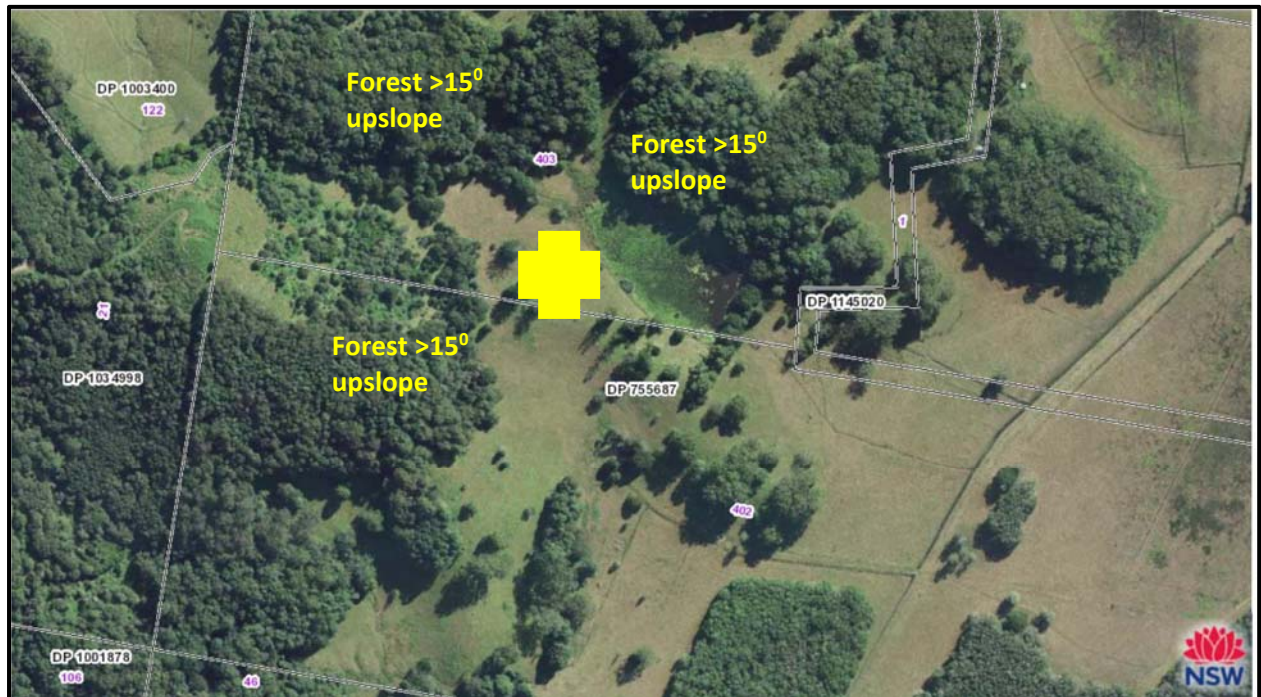


Figure 3: Bushfire hazard assessment.



Forest on steep upslopes to the west, southwest and north across the dam

The following table is a summary of the bushfire threat assessment.

Table 1: Summary Bushfire Threat Assessment		
Aspect	Slope	Vegetation Class (Appendix 3 PBP2006)
West	>8° u/s	Forest
North	>15° u/s	Forest
Southwest	>15° u/s	Forest
East	Managed	Managed

*u/s = upslope

4.0 ASSET PROTECTION ZONES AND CONSTRUCTION STANDARDS

Asset Protection Zones are areas established and maintained to ensure that bushfire fuels are progressively reduced between the development (each building) 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.

The proposed development will generally comply with the acceptable solutions of PBP2006, with exception to the acceptable solution requirement to provide an APZ pursuant to Table A2.6 of Appendix 2 of Planning for Bushfire Protection 2006. In this regard a Performance Solution has been prepared to address this issue as set out in the Bushfire Engineering Brief prepared by this office dated 9th November 2017 and discussed with NSW RFS.

The methodology will be consistent with the NSW RFS Fast Fact for Ecotourism No. 1/14 dated October 2014. Whilst it is acknowledged that the development is not Ecotourism, the proposed development having regard to occupant behaviour, management and evacuation planning performance will operate in a similar way during a bushfire event.

This is supported by the following.

4.1 DISCUSSION RELATING TO THE PERFORMANCE SOLUTION METHODOLOGY

The Performance Solution provides supporting information in order to determine compliance with the aim and objectives of Planning for Bushfire Protection 2006 and in turn comply with the intent of Section 4.2.7 – Asset Protection Zones.

This is acknowledging that, whilst Planning for Bushfire Protection 2006 states that the performance criteria must be satisfied to demonstrate compliance, there are a number of areas listed in Section 4.2.4 and s4.2.5 of PBP2006 where consideration for specific Special Fire Protection Purposes where exemptions to the 10kW/m² requirement of the performance criteria for asset protection zones are permitted. It is noted that this development being tourist accommodation is identified among these developments.

These areas include the following –

- Permitting alterations and additions of existing home-based child care centres to be construction to BAL 29.
- Alterations to existing SFPP developments are permitted to have APZs consistent with BAL 29.
- Conversion of dwellings to bed and breakfast uses are permitted to have APZs consistent with BAL 29.

The development will comply with the statement in s3.2 and s4.2.4(d) which states:

“It is possible, however, that some SFPPs, such as tourist accommodation (e.g. eco-tourism or local B&Bs) are occupied by able-bodied persons and that evacuation plans or refuge are appropriate alternative options”; and

Further, the objectives of the bushfire protection measures (BMPs) in Section 3.2 of PBP2006 for Special Fire Protection Purposes (SFPPs) that outlines that for those special uses that have occupants with characteristics such as limited mobility or requiring special care (e.g. aged care and schools) each side of the building has a target of 10kW/m² where there are access points in order to defend the property and to allow access to and from the building.

This objective relates to a completely different occupant characteristic than that likely to occupy the proposed cabins. The proposed occupant characteristics, will comply with the intent of Section 3.2 of PBP2006.

“Tourists staying in tourist accommodation have been known to evacuate late or travel down inappropriate roads with fatal results. A better strategy may either be staying within a resilient building as a refuge or having coordinated escorted evacuation. In some cases, the attraction of the site as a bushfire setting conflicts with the need for adequate APZs, however this should not lead to a lower standard of construction or unsuitable access”.

The development will be supporting generally able-bodied persons or a general cross section of the community with staff having a good working knowledge of bushfire evacuation planning and will not likely support occupants with characteristics such as those that occupy nursing homes or hospitals. The occupants of those types of SFPPs do require large APZs and lower radiant heat levels to the building as they rely heavily on assistance and support, have high numbers and have adverse occupant characteristics in a bushfire event and for evacuation.

4.2 APZ PERFORMANCE CRITERIA FOR SFPP DEVELOPMENT

As outlined in Section 4.1 of this report it is considered that the proposed development as with a number of other types of developments listed above are considered to be appropriate to gain concession rather than requiring compliance with the following performance criteria of s4.2.7 PBP2006 –

Radiant heat levels of greater than 10kW/m² will not be experienced by occupants or emergency services workers entering or exiting a building.

This report provides an additional methodology in complying with the performance criteria. Planning for Bushfire Protection 2006 in s4.2.4 requires good evacuation planning for tourist

developments. The evacuation planning will require triggers to ensure that occupants are within a safe refuge well before the impact of the fire front. This is a current requirement for the existing festival events and a procedure is understood to be in place and agreed to by all stakeholders.

On this basis, when an early trigger for evacuation is activated, the facility has sufficient staff to ensure that all occupants are within the conference centre for on-site evacuation. In turn, there will be no need for fire fighters to enter the cabins, rather they will be entering the conference centre which will have APZs compliant with Table A2.6 PBP2006 and will receive forecast levels of radiant heat not exceeding 10kW/m^2 . Occupants will not be within the cabins given the controlled evacuation procedures and therefore they will not be entering or exiting the cabins when the fire front is at the APZ/hazard interface.

Provided evacuation planning is adequately prepared and the conference centre complies with Table A2.6, then emergency services workers will not be entering a building and experiencing radiant heat levels of more than 10kW/m^2 . Therefore, the performance criteria is satisfied provided the measures as outlined in the RFS Fast Fact 1/14 are complied with. It is also note that the Draft PBP2017 will be permitting these type of cabin uses to be within the BAL 29 threshold thereby providing additional acknowledgment of the suitability of the methodology of this performance solution.

The performance solution mirrors the requirements of Fast Fact No. 1/14 as follows;

- ‘Special emphasis needs to be given to emergency planning and management, and the provision of on-site sheltering as a last resort’
- An applicant must recognise that the survivability of structures in a bush fire event has been forsaken to meet the minimum environmental footprints and other constraints of these types of developments.
- An applicant should flag this with their insurers and accept the prospect of significant structural loss within the development. In this regard all habitable buildings will be constructed to comply with the Building Code of Australia.
- Refuge building/s must:
 - Be constructed to a Bushfire Attack Level (BAL) pursuant to Table 2.4.3 AS 3959-2009.
 - Have sufficient APZs that will allow the refuge building not to experience radiant heat flux greater than 10kW/m^2

Fast Fact No. 1/14 Requirement	Comments	Compliance
Emergency management planning shall be provided which complies with Section 4.2.7 of PBP and shall address the use/closure of the facility on extreme and catastrophic fire rating days.	North Byron Parkland have agreed to prepare such a plan and can be conditioned as part of the BFSA.	YES
The identified refuge building/s are designed to accommodate all occupants of the facility	The proposed refuge building (conference centre) will be capable of housing occupants including fire-fighting personnel.	YES
Any refuge building must comply with the occupancy levels permissible for that structure under the BCA	As above	YES
To ensure radiant heat levels of greater than 10kW/m ² are not experienced at any external point of the building refuge buildings are provided with APZs in accordance with Table A2.6 of PBP2006.	The conference centre will achieve the APZs as required by PBP2006 Table A2.6.	YES
The refuge building/s are designed and sited in accordance with the principles listed in PBP and constructed to a minimum BAL 12.5 of AS 3959	Capable of complying – A condition of the BFSA can be included in this regard.	YES
Vehicular access (internal access) is to be provided from a public road to the nominated refuge building and comply with the requirements of Section 4.2.7 of PBP	The internal roads have been previously approved for the existing SFPP development and in turn complies with s4.2.7	YES
Pedestrian paths from cabins to the refuge building/s are to be provided and clearly signposted	To comply and conditioned on BFSA	YES
APZs are provided wholly within the boundaries of the proposed development site (exceptional circumstances for the provision of APZ's on adjoining land may apply as per Section 3.3b PBP)	Capable of complying	YES
For proposals in isolated or remote areas which involve large travel distances through bushfire vegetation, the following matters should be addressed: • The travel level likely to be generated during an emergency evacuation • The capacity of the broader road network to facilitate safe emergency evacuation • Limitations/constraints inherent in the road system	This will be addressed in the evacuation procedures.	YES
Management of potential traffic conflicts (i.e. emergency vehicles vs evacuating members of the public)	To comply and included as a condition on the BFSA	YES

Water, electricity and gas supply to the nominated refuge building/s is to comply with the requirements of Section 4.2.7 PBP2006	To comply and included as a condition on the BFSA	YES
A bushfire report of how the proposed development addresses the performance criteria outlined in section 4.2.7 of PBP must be provided. This is to include documentation that the bush fire engineering brief process was undertaken.	As outlined in this report	YES
For details of what is required in a Bushfire Report for an alternate solution the NSW RFS provides a Practice Note – 1/14 on Submission Requirements. A qualified Bush Fire Consultant can assist with these.	Informative.	YES

4.3 MODELLING FOR ASSET PROTECTION ZONES TO CABINS – MIN. BAL 29

The following modelling has been undertaken to determine the required asset protection zone buffer (no build) for the cabins located on the perimeter of the development.

Run Description: Design Fire 1			
<u>Vegetation Information</u>			
Vegetation Type:	Forest	Vegetation Group:	Forest and Woodland
Vegetation Slope:	8 Degrees	Vegetation Slope Type:	Upslope
Surface Fuel Load(t/ha):	25	Overall Fuel Load(t/ha):	35
<u>Site Information</u>			
Site Slope	0 Degrees	Site Slope Type:	Level
Elevation of Receiver(m)	Default	APZ/Separation(m):	15
<u>Fire Inputs</u>			
Veg./Flame Width(m):	100	Flame Temp(K)	1090
<u>Calculation Parameters</u>			
Flame Emissivity:	95	Relative Humidity(%):	25
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308
Moisture Factor:	5	FDI:	80
<u>Program Outputs</u>			
Category of Attack:	HIGH	Peak Elevation of Receiver(m):	5.87
Level of Construction:	BAL 29	Fire Intensity(kW/m):	24990
Radiant Heat(kW/m2):	28.45	Flame Angle (degrees):	63
Flame Length(m):	13.18	Maximum View Factor:	0.437
Rate Of Spread (km/h):	1.38	Inner Protection Area(m):	10
Transmissivity:	0.857	Outer Protection Area(m):	5

Figure 4: Modelling APZs for BAL 29

The modelling is based on an 8 degree upslope given there is a small area at the location of the gully to the west/southwest that is not as steep as the other aspects however this is only over a short width. This input has been used for conservatism across all slopes.

4.4 WATER SUPPLY

The applicant is proposing to install a fire hydrant system for the conference centre and proposed cabins in accordance with AS 2419.1-2005 and s4.1.3 PBP2006 for a reticulated system.

5.0 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 for the entire development be undertaken in accordance Appendix 5 of Planning for Bushfire Protection 2006 and managed and maintained for the life of the development.

6.0 EMERGENCY AND EVACUATION PLANNING

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 and AS 3745.

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 consent authority for approval prior to the occupation certificate being issued. The developer is to provide a copy of the above document to the local Bushfire Management Committee for their information prior to occupation of the buildings.

7.0 CONCLUSION

The bushfire threat assessment report demonstrates that the application is capable of complying with the intent and performance criteria of Planning for Bushfire Protection 2006 subject to the recommendations of this report.

PART 2: ASSESSMENT OF ON-SITE BUSHFIRE EVACUATION AREA & ASSOCIATED ASSET PROTECTION ZONE

1.0 INTRODUCTION

Part 2 of this report has been prepared for the existing North Byron Parklands which is used as a music festival venue attracting large numbers of people and provides camping facilities, thereby considered a Special Fire Protection Purpose development. It is understood that an application is being made to increase the potential occupant population to 50,000 patrons and approximately 8,000 personnel (total 58,000 people).

This part of the report identifies the asset protection zones between the on-site evacuation area associated with future events and the bushfire hazard as required by the NSW RFS Fast Fact 7/15 – Music Festivals that Cater for Large Crowds in Bush Fire Prone Areas (see **attached** Appendix E). Onsite evacuation areas are a critical aspect to these types of temporary developments.

Offsite evacuation can be difficult to achieve given the type of use, occupant characteristics and the large number of people. Therefore, evacuation planning with specific trigger points will be essential and agreed to by all stakeholders. Management of the occupants' well-being during evacuation, firefighting resources, transportation and co-ordination area are also areas that will need specific consideration by all stakeholders when preparing evacuation planning and procedures prior to events. The Emergency Evacuation Procedure (EEP) will need to take in to account all aspects of the NSW RFS Fast Fact 7/15 – Music Festivals that Cater for Large Crowds in Bush Fire Prone Areas (as relevant at the time of EEP preparation).

The report establishes a large onsite evacuation area in accordance with the NSW RFS Fast Fact 7/15 – Music Festivals that Cater for Large Crowds in Bush Fire Prone Areas. This assessment is provided for NSW RFS review and concurrence and can be used for implementation into future Emergency Evacuation Planning and Procedures.

The following recommendations are provided -

1. The music festival event and associated camping will require specific triggers that are agreed to by NSW RFS for specific Fire Danger Index (FDI) days and/or other agreed triggers and as determined by the "Lead Agency".

2. A bushfire emergency evacuation procedure (BEEP) and detailed plans of all onsite evacuation areas are to be prepared in accordance with the RFS Guidelines for the Preparation of Emergency/Evacuation Plan and AS 3745-2002.

The BEEP is to have input and concurrence from all stakeholders including the Local Emergency Management Committee (LEMC). The meeting shall include, but not limited to:

- Approval of emergency and evacuation procedures for the event including resources and management of the evacuation area and APZs; and
- Determination of the level and availability of fire-fighting resources required for the event; and
- Determination of the suitability of the event proceeding having regard to forecast weather conditions and/or local fire activity, it being noted that unsheltered evacuation areas should not be used on severe bushfire days unless authorized by the Lead Agency (emergency services) for the event.
- Management procedures for the occupants' wellbeing during the bushfire event and evacuation time e.g. potable water supply, mitigation from extended time in heat and smoke, security etc.
- Transportation and off-site evacuation procedures etc.
- The BEEP should adequately address the limitations of Section 5 of the NSW RFS Neighbourhood Safer Places – Guidelines for the identification and inspection of neighbourhood safer places in NSW.

2.0 PROPOSED DEVELOPMENT

The North Byron Parklands (Parklands) is a cultural arts and music events venue located at Yelgun NSW approximately 9km north east of Mullumbimby. The venue event is located in the Byron Shire whilst the initial on-site evacuation area is located within the Tweed Shire.

The NSW Planning and Assessment Commission granted a trial approval in April 2012 allowing the following events each year:

- A large event up to 35,000 patrons.
- A medium event up to 25,000 patrons.
- A small event up to 15,000 patrons

It is understood that there is approved on a trial basis, a total of 10 event days per calendar year. Parklands propose to apply for Permanent Approval for the following –

- Splendour in the Grass and Falls Festival Byron up to 35,000 patrons and a maximum of 5 days each per calendar year;
- 3 event days up to 25,000 patrons (cumulative or separate); and
- 5 community event days up to 5,000 patrons (cumulative or separate).
- 2 minor community event days, catering for up to 1,500 patrons per event day.

There is understood to be a further component being –

- Subject to meeting Key Performance Indicators for the 35,000 event Splendour in the Grass increasing to 42,500 patrons; and
- Subject to meeting Key Performance Indicators for the 42,500 event Splendour in the Grass to ultimately cater for 50,000 patrons.

This part of the report is provided for the purpose of establishing whether there is sufficient area for up to 50,000 patrons and 8,000 staff and associated personnel to evacuate to an initial on-site evacuation area in conjunction with asset protection zones (APZs) that will comply with the methodology of the NSW RFS Fast Fact 7/15 – Music Festivals that Cater for Large Crowds in Bush Fire Prone Areas.

The following property description is provided by Planners North –

The existing project approval¹ requires Parklands to dedicate approximately 12 hectares of land to the Office of Environment and Heritage (OEH), which once finalised will be annexed to the Billinudgel Nature Reserve. The dedication is part of a land swap proposed in the original concept plan and project application, which also involves the transfer of approximately 7 hectares of former road corridor land to Parklands from OEH.

Parklands and OEH are currently finalising the terms of the land swap, however it is noted that Parklands has now agreed to dedicate approximately 41 hectares of high ecological value land to OEH (ie. 29 hectares more than originally proposed), in exchange for the 7 hectares of road corridor land. The subdivision required for the land swap is being undertaken under separate approval.

Table Parklands Site Details – Existing

Lot	DP	Area (ha)	Land Owner
1	1145020	2.47	Billinudgel Property Pty Ltd
46	755687	16.19	Billinudgel Property Pty Ltd
402	755687	45.65	Billinudgel Property Pty Ltd
403	755687	60.30	Billinudgel Property Pty Ltd
404	755687	16.43	Billinudgel Property Pty Ltd

¹ Condition C20(A), as modified in MOD 4.

410	755687	0.23	Billinudgel Property Pty Ltd
2	848618	31.46	Billinudgel Property Pty Ltd
12	848618	2.45	Billinudgel Property Pty Ltd
101	856767	15.91	Billinudgel Property Pty Ltd
30	880376	16.56	Billinudgel Property Pty Ltd
100	1178907	20.91	Billinudgel Property Pty Ltd
101	1178907	0.50	Billinudgel Property Pty Ltd
101	1001878	1.67	Billinudgel Property Pty Ltd
102	1001878	28.49	Billinudgel Property Pty Ltd
107	1001878	0.13	Billinudgel Property Pty Ltd
Sub-total Area		259.35	
12	875112	2.10	MINISTER ADMINISTERING THE NATIONAL PARKS AND WILDLIFE ACT,
14	875112	4.39	MINISTER ADMINISTERING THE NATIONAL PARKS AND WILDLIFE ACT,
312	1163830	0.77	MINISTER ADMINISTERING THE NATIONAL PARKS AND WILDLIFE ACT,
Sub-total Area		7.26	
Total Area		266.61	

Following completion of the land swap, the Parklands site will reduce to approximately 225 hectares. A summary of the land areas that form the Parklands site following the land swap.

Table Parklands Site Details – Post Land Swap

Lot	DP	Area (ha)	Land Owner #Confirm
1	1145020	2.47	Billinudgel Property Pty Ltd
402	755687	45.65	Billinudgel Property Pty Ltd
403	755687	60.30	Billinudgel Property Pty Ltd
12	848618	2.45	Billinudgel Property Pty Ltd
12	875112	2.10	Billinudgel Property Pty Ltd
14	875112	4.39	Billinudgel Property Pty Ltd
30	880376	16.56	Billinudgel Property Pty Ltd
107	1001878	0.13	Billinudgel Property Pty Ltd
312	1163830	0.77	Billinudgel Property Pty Ltd
A	TBA ¹	12.36	Billinudgel Property Pty Ltd
B	TBA	25.80	Billinudgel Property Pty Ltd
C	TBA	14.49	Billinudgel Property Pty Ltd
D	TBA	13.38	Billinudgel Property Pty Ltd
E	TBA	28.89	Billinudgel Property Pty Ltd

Sub-total Area		229.34	
1	TBA	37.15	MINISTER ADMINISTERING THE NATIONAL PARKS AND WILDLIFE ACT,
Road widening		0.12	Byron Shire Council as the relevant Roads Authority
Total Area		266.61	

1 Lots A to E and NPWS Lot 1 nominally identified. Final real property description subject to subdivision

The proposal also involves some relatively minor use and development of off-site areas to the north of the site, including:

- *Lot 21 in DP 1169952, owned by FNC PROPERTIES PTY LTD, with regard to the proposed northern access road between the site and Wooyung Road; and*
- *Lot 11 in DP 1192842, owned by FNC PROPERTIES PTY LTD, with regard to the existing and proposed off-site bushfire emergency assembly area.*

An assessment may be required to be undertaken with regard to:

- State Environmental Planning Policy No. 44 (Koala Habitat Protection).
- Threatened Species Conservation Act (1995).
- Environmental Protection and Biodiversity Conservation Act (1999).
- National Parks and Wildlife Act, 1974 (Wildlife Atlas)
- Native Vegetation Act 2003.
- 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).

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

3.0 BUSHFIRE THREAT ASSESSMENT

The following bushfire assessment relates to the proposed initial on-site emergency evacuation area for a bushfire event. The evacuation area is proposed to the north of the event site on Lot 4 DP 821947 and Lot 11 DP 1192842 as shown in Figure 1(a). The bushfire hazard assessment is provided in Figure 2(a) and Table 1(a) and will be used to establish the

required asset protection zones in accordance with the methodology outlined in the NSW RFS Fast Fact 7/15 – Music Festivals that Cater for Large Crowds in Bush Fire Prone Areas.

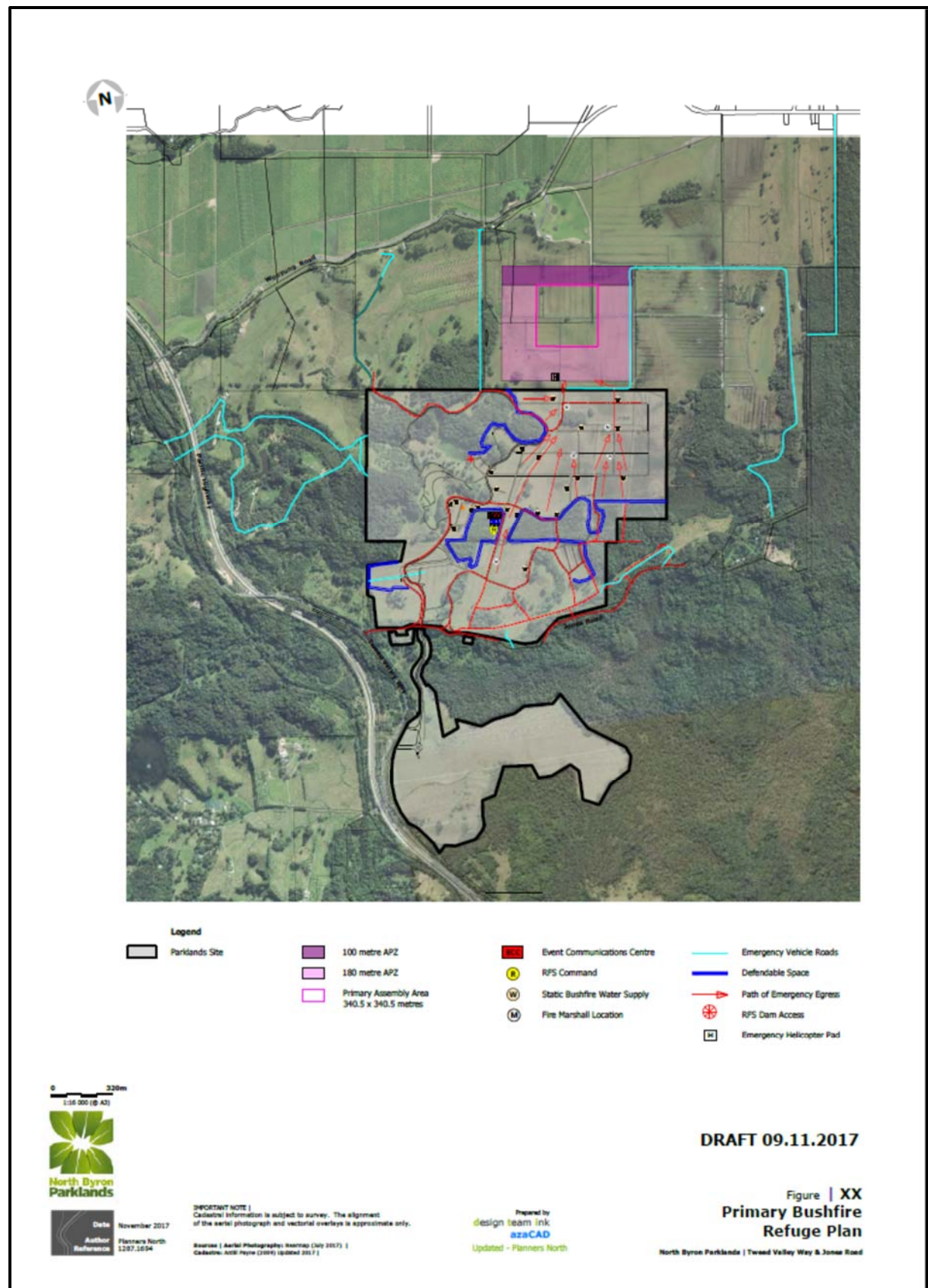


Figure 1(a): Proposed initial on-site evacuation area (larger image **attached** in Appendix D)
Draft Primary Bushfire Refuge Plan, dated 09.11.2017

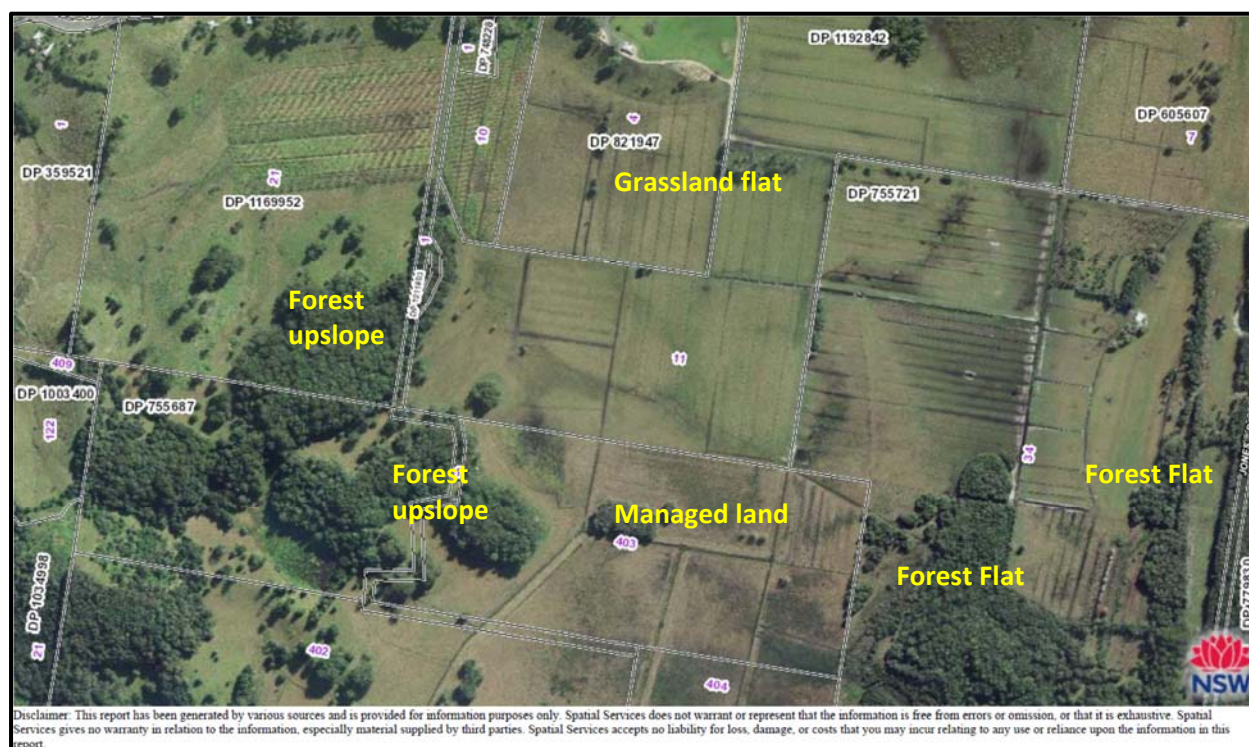


Figure 2(a): Bushfire hazard assessment

Table 1(a): Summary Bushfire Threat Assessment of On-Site Evacuation Area

Aspect	Slope	Vegetation Formation Class
South	0°	Managed land (Forest vegetation APZs used due to southeast and SW)
North	0°	Grassland
West, SW	0° upslope	Forest upslope
East, SE	0°	Forest (based on the Billinudgel Nature Reserve)

4.0 ASSET PROTECTION ZONES FOR THE ON-SITE EVACUATION AREA

Asset Protection Zones are areas established and maintained to ensure that bushfire fuels are progressively reduced between the on-site evacuation area and the bushfire hazard. The Asset Protection Zone in this circumstance will be required to be managed for the entire width as an Inner Protection Area (IPA). These areas are to be monitored and management in accordance with the 'Standards for Asset Protection Zones' (RFS 2005) (see **attached** Appendix F) and Appendix 5 of PBP2006 as part of the EEP prior to the event.

The Inner Protection Area is to commence from the perimeter of the evacuation area proposed for patron temporary occupation. It is considered that the initial 50m should be specifically assessed prior to an event and treated to ensure that there is an extended

reduction in the risk of fire having a path of travel to occupants within the IPA area. In this regard, and depending on the conditions and curing of the managed grass within the APZ, there may need to be some additional measures implemented if the risk warrants it.

The following requirement is outlined in the NSW RFS Fast Fact Sheet – Music Festivals that Cater for Large Crowds in Bush Fire Prone Lands.

Provision of refuge building(s) on site of suitable capacity for participants and staff that can meet the maximum radiant heat exposure of 10kW/m². Alternatively an open air bushfire emergency assembly area of suitable size may be provided that complies with the requirements for Neighbourhood Safer Places.

4.1 DISCUSSION

Neighbourhood Safer Places is a document that provides safer places in a bushfire event during all times of year and any part of NSW. This includes the time of year such as mid-summer and locations such as the southern parts of NSW where FDI days of 120 may be likely to occur. It is acknowledged that the event is held in the northeast part of NSW and it is less likely that the FDI will reach this level. Further, the bushfire emergency evacuation procedure will potentially not allow patrons on site when there is a forecast as either severe, extreme or catastrophic. In this regard, it is not envisaged to have people occupying the site when the FDI of 50 is triggered for a severe day given the on-site evacuation will be in the open area without a well prepared shelter.

The NSW RFS Bushfire Danger Ratings for severe days - “*is that leaving early is the safest option for survival. Well prepared homes that are actively defended can provide safety – but only stay if you are physically and mentally prepared to defend in these conditions. If you are not prepared then leave early in the day*”.

(NSW RFS advice on severe days).

As the occupants may not be able to leave early due to potential driving impairment relating to alcohol or the like, do not have a well prepared structure on site and may not be physically or mentally prepared to defend in these conditions, it is considered reasonable to have a severe day as being a day that occupants should potentially not be on site. It is recommended that this be used as one trigger in the evacuation planning however it may be overridden by nominated emergency personnel as deemed appropriate as part of the decision making process of the EEP.

It is noted however that the proposed APZs will be modelled as required by the aforementioned NSW RFS Fast Fact with the input of Fire Danger Index (FDI) of 120 when establishing a 2kW/m² upper limit of radiant heat forecast on an exposed receiver

(occupant). The flame temperature used in the modelling will be 1200 Kelvin with the fire front defaulted to 100m as required by Planning for Bushfire Protection 2006.

The asset protection zones to the hazard are provided based on the summary assessment in Table 1(a) of this report and the following modelling provided for each aspect in accordance with the NSW RFS Fast Fact Sheet – Music Festivals that Cater for Large Crowds in Bush Fire Prone Lands and Method 2 AS 3959-2009.

4.2 APZ NORTH OF THE EVACUATION AREA – GRASSLAND

As outlined in Table 1(a) the potential bushfire hazard to the north is grassland located on flat topography. The following modelling is provided based on the inputs of Table 2(a) including a Grass Fire Danger Index (GFDI) of 130 which is consistent with the higher FDI required for forest vegetation.

Table 2(a): Condition inputs for Design Fire – 2kW/m²

Fire Characteristic	Level
Fire Danger Index (FDI)	120 (Catastrophic) - GFDI 130
Flame Width	100m
Flame Temperature	1200K
Radiation Attenuation through Atmosphere	No
Flame Emissivity	100%

Site Street Address:	North Byron Parklands, Yelgun		
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: North - Grassland			
<u>Vegetation Information</u>			
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
<u>Site Information</u>			
Site Slope	0 Degrees	Site Slope Type:	Level
Elevation of Receiver(m)	Default	APZ/Separation(m):	100
<u>Fire Inputs</u>			
Veg./Flame Width(m):	100	Flame Temp(K)	1200
<u>Calculation Parameters</u>			
Flame Emissivity:	95	Relative Humidity(%):	25
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308
Moisture Factor:	5	FDI:	130
<u>Program Outputs</u>			
Category of Attack:	LOW	Peak Elevation of Receiver(m):	3.73
Level of Construction:	BAL 12.5	Fire Intensity(kW/m):	39293
Radiant Heat(kW/m2):	1.69	Flame Angle (degrees):	86
Flame Length(m):	7.47	Maximum View Factor:	0.021
Rate Of Spread (km/h):	16.9	Inner Protection Area(m):	100
Transmissivity:	0.734	Outer Protection Area(m):	0

Figure 3(a): Design Fire to the north - Grassland

The design fire establishes that a 100m inner protection area to the north between the hazard and evacuation area for patron occupation for initial evacuation in a bushfire event will receive a forecast radiant heat flux of 1.69kW/m^2 at the perimeter of the occupation area.

This IPA width will be sufficient to achieve compliance with the acceptable solution criteria of Section 7.1 of the NSW RFS Neighbourhood Safer Places – Guidelines for the identification and inspection of neighbourhood safer places in NSW.

4.3 APZ EAST, SOUTH AND WEST OF THE EVACUATION AREA – FOREST

As outlined in Table 1(a) the potential bushfire hazard to the east, south and west is forest vegetation (dry forest and forested wetland) located on up-slopes and flat topography. The following modelling is provided based on the inputs of Table 2 including a Fire Danger Index (FDI) of 120.

Site Street Address:	North Byron Parklands, Yelgun		
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: APZ for On-site Evacuation Area			
<u>Vegetation Information</u>			
Vegetation Type:	Forest	Vegetation Group:	Forest and Woodland
Vegetation Slope:	0 Degrees	Vegetation Slope Type:	Level
Surface Fuel Load(t/ha):	25	Overall Fuel Load(t/ha):	35
<u>Site Information</u>			
Site Slope	0 Degrees	Site Slope Type:	Level
Elevation of Receiver(m)	Default	APZ/Separation(m):	180
<u>Fire Inputs</u>			
Veg./Flame Width(m):	100	Flame Temp(K)	1200
<u>Calculation Parameters</u>			
Flame Emissivity:	95	Relative Humidity(%):	25
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308
Moisture Factor:	5	FDI:	120
<u>Program Outputs</u>			
Category of Attack:	VERY LOW	Peak Elevation of Receiver(m):	13.67
Level of Construction:	BAL LOW	Fire Intensity(kW/m):	65100
Radiant Heat(kW/m2):	1.99	Flame Angle (degrees):	82
Flame Length(m):	27.6	Maximum View Factor:	0.026
Rate Of Spread (km/h):	3.6	Inner Protection Area(m):	180
Transmissivity:	0.687	Outer Protection Area(m):	

Figure 4(a): Design fire for APZs East, South and West of the Evacuation Area.

The design fire establishes that a 180m inner protection area between the hazard and evacuation area to the east, south and west for patron occupation for initial evacuation in a bushfire event will receive a forecast radiant heat flux of 1.99kW/m² at the perimeter of the occupation area. This IPA width will be sufficient to achieve compliance with the acceptable solution criteria of Section 7.1 of the NSW RFS Neighbourhood Safer Places – Guidelines for the identification and inspection of neighbourhood safer places in NSW.

4.4 ASSESSMENT OF THE SIZE OF THE EVACUATION AREA FOR 58,000 PEOPLE

The size of the evacuation area has been determined using the Building Code of Australia 2016 as a means of determining a suitable size for an open area for temporary accommodation of patrons for the initial on-site evacuation.

BCA Table D1.13 of the Building Code of Australia 2016 establishes adequate minimum floor area for occupation depending on the use of the area. The proposed temporary use for evacuation does not fit neatly into any specific category and therefore a level of qualification is provided for consultation use.

BCA Table D1.3 allows 1 person for every 1m² for a restaurant or multi-purpose school hall use however it is considered that the potential time spent on-site prior to off-site evacuation or resumption of the event should be considered. In this regard Table D1.13 identifies that for a transport terminal use an allowance of 2m² per person is the occupation rate permitted.

The alignment to a transport terminal is considered to be more consistent with the use in that lengthy delays may be expected, there would need to be sufficient room for luggage and although luggage is not expected in this circumstance it may compensate for any emergency aid equipment that may be needed etc.

For an area supporting 58,000 people (patrons and staff etc) it is therefore considered that a reasonable area set aside for housing occupants within an on-site initial evacuation area would be 116,000m² or 11.6ha.

5.0 EVACUATION PROCEDURES

Detailed Bushfire Evacuation procedures will be required prior to the event and agreed to by all relevant stakeholders. The evacuation procedures will need to address the requirements of NSW RFS Fast Fact Sheet – Music Festivals that Cater for Large Crowds in Bush Fire Prone Lands including the limitations.

Disclaimer

This report was prepared for the purposes and exclusive use of the stated client to accompany a submission for referral to the NSW RFS as part of an application for a Bush Fire Safety Authority for a conference centre and cabins and the establishment of the required asset protection zone and an on-site bushfire evacuation area for future events at North Byron Parklands 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.

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. The report is dependent on ongoing maintenance of building materials, asset protection zones, water supply and landscaping as recommended in the report. The content of the report is based on the assumption, as consistent with PBP2006, that all doors and windows will be closed during a bushfire event.

References

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: (PART 1) ECOLOGICAL AUSTRALIA CORRESPONDENCE, DATED
08.11.2017**

Mat Morris
General Manager
North Byron Parklands
Via email: mat@northbyronparklands.com



ECO LOGICAL AUSTRALIA PTY LTD
ABN 87 096 512 088
www.ecoaus.com.au

Our reference: 6437

8 November 2017

Dear Mat,

Vegetation adjacent to the proposed APZ for the conference centre

I understand that Asset Protection Zones (APZs) zones are required for the conference centre proposed to be constructed at North Byron Parklands. The standard requirement for such infrastructure is a 50 m APZ, however the Parklands is proposing a ~15 m APZ in this instance. This is to avoid clearing of high value vegetation, which we support from an ecological perspective.

There are two intact vegetation communities identified in the general area of the conference centre. This includes Brush Box moist forest as well as Blackbutt / Turpentine forest. These exist mainly to the north and west of the proposed infrastructure. The forest patches are remnant vegetation and have a relatively high ecological value due to flora species diversity and functional habitat attributes. This includes elements such as an abundance of litter and a healthy humic layer; fallen woody debris; a diversity and abundance of flora in the ground layer and shrub layer; and large remnant trees that sometimes support hollows. All these attributes contribute to the provision of habitat for a range of native flora and fauna and also provide a scenic backdrop to the parklands site.

The value of the vegetation is further demonstrated by the diversity of flora and fauna that has been observed on the property. Many of the species observed during flora and fauna surveys over the past 10 years inhabit the forest habitat in and surrounding the site. The forest patches also provide potential habitat for several threatened flora and fauna species protected under both State and Federal legislation. This includes as koalas, microbats, and a range of bird species.

Clearing of this vegetation is not desirable for a number of reasons. Primarily, this includes the direct loss of remnant native vegetation and associated habitat values, as described above. Furthermore, the edges of the vegetation patches currently function as an external buffer for the more intact 'core' habitat that lies within the forest patch. Clearing of vegetation on the edges of the forest patch would expose core habitat to edge effects and also shrinks the area of core habitat within.

The Parklands has undertaken an extensive program of habitat restoration, including planting of ~22,000 trees since 2007. Any additional vegetation clearance would be contrary to the outcomes this program has achieved. Furthermore, given the location and slope of the vegetation, any clearing would present significant challenges from an erosion and sediment control perspective.

For the reasons above, we support the retention of vegetation near to the conference centre from an ecological perspective, provided it can be balanced with appropriate bushfire safety measures.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Steve Jarman'.

Steve Jarman
Senior Ecologist

APPENDIX B: (PART 1) Engineering Risks for Vegetation Clearing. Westera Partners, dated 16.11.2017

16 November 2017

Bushfire Certifiers
Bushfire and Building Consultants
4/57 Ballina Street
Lennox Head NSW 2478
PO Box 375 Lennox Head NSW 2478

Westera Partners Pty Ltd
Po Box 2016
Fortitude Valley BC
QLD 4006
P 07 38524333
F 07 38524777

Attention: Peter Thornton

**RE: ENGINEERING RISKS REGARDING VEGETATION CLEARING WEST OF THE PROPOSED
CONFERENCE CENTRE FOR THE NORTH BYRON PARKLANDS PROPERTY AT
YELGUN, NSW**

This letter has been prepared to outline risks relating to any possible vegetation clearing west of the proposed conference center at the North Byron Parklands property.

The subject area is highlighted in Figure 1 below and is currently vegetated land with a slope of approximately 40% (1V:2.5H).

Significant risks can be associated with clearing vegetation in this area on such a steep slope towards the base of a hillside. In particular the land will be prone to high levels of erosion and potential mass movement of colluvial material. The following extract is taken from Landcom's 'Managing Urban Stormwater: Soils and Construction', Volume 1, 4th Edition, March 2004 (the "Blue Book").

The most common triggering agent for mass movement is water in the slip zone that reduces shear strength and increases slope loads. Studies suggest that most landslips occur in very wet periods following long dry spells, especially on hillslopes facing the rain bearing winds. Other common human induced landslide generating factors include:

- *removal of material from the toe of a slope (especially on or below a former slip plane)*
- *concentration of surface water or groundwater in slip-prone areas*
- *removal of trees and other plants that might "pump" the watertable downwards.*

The extent of damage that could result from significant bank erosion is not easily quantified without detailed geotechnical information. However, given the above associated erosion risks with clearing vegetation in this area, all options and alternative management measures should be considered to avoid potential mass removing of existing vegetation.

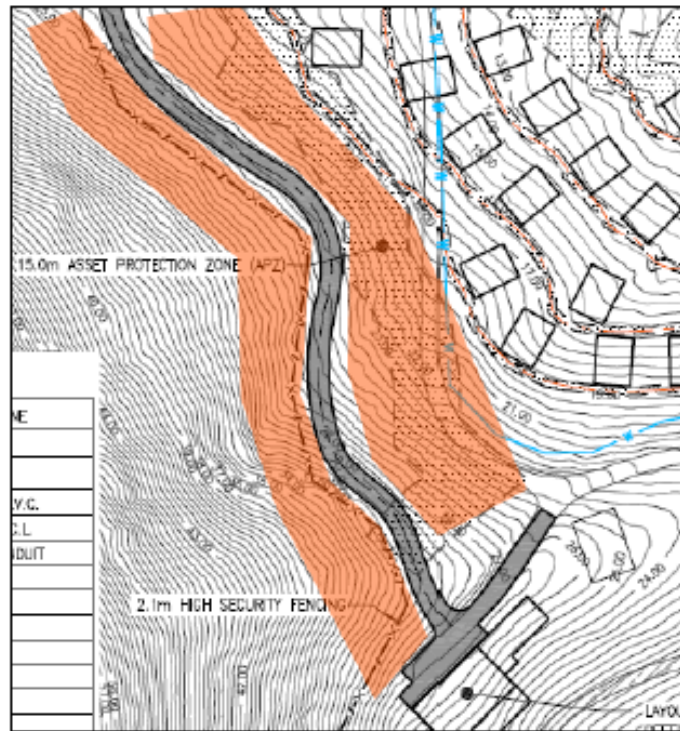


Figure 1 – Area in consideration for vegetation clearing.

Please don't hesitate to contact Sam Ide should there be any questions regarding this letter.

Kind Regards,

Samuel J. Ide CPEng NER 2901822

**Civil & Environmental Engineer
Westera Partners Pty Ltd**

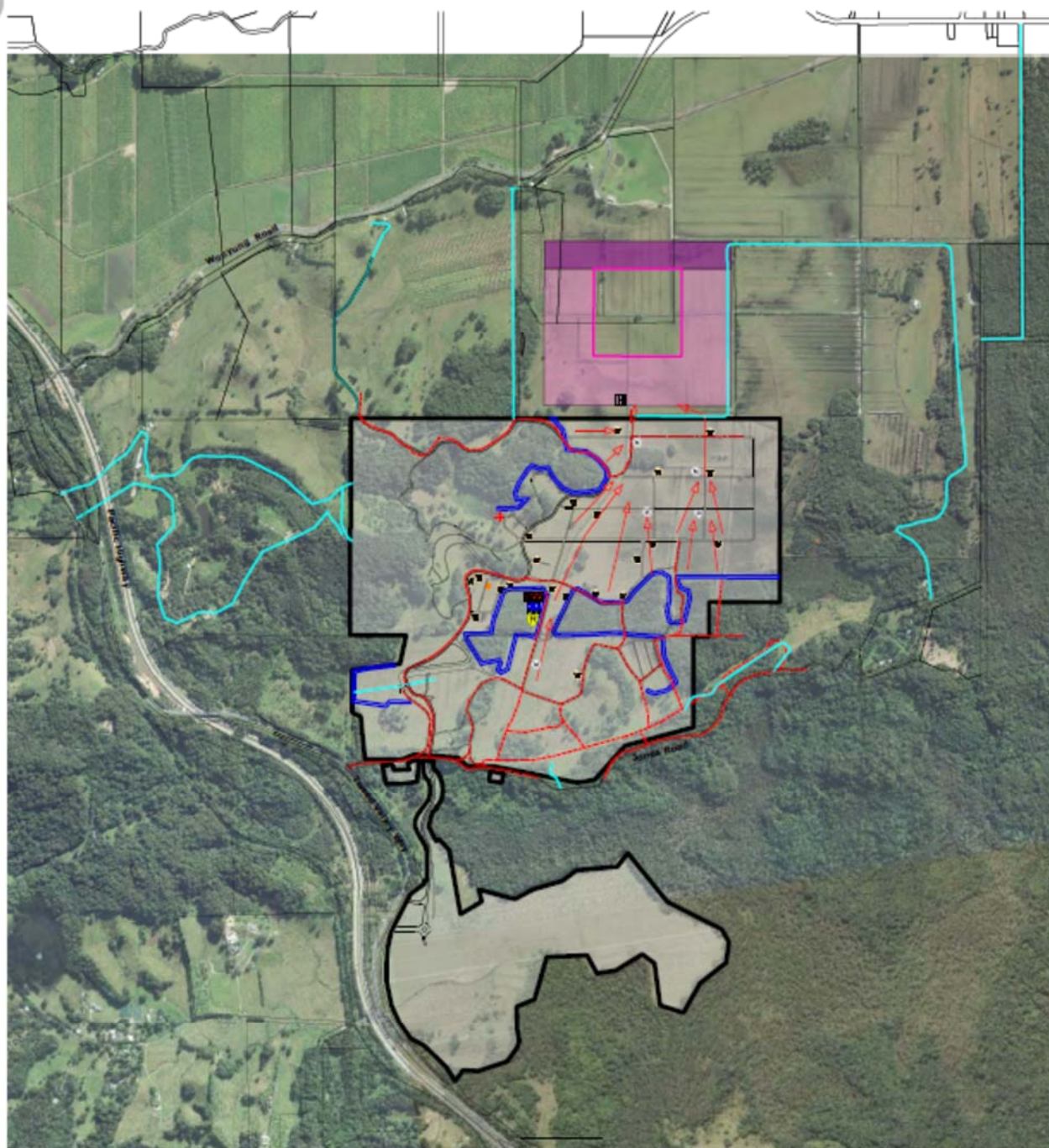
Our Ref: B17/016

2/2

APPENDIX C: (PART 1) Site Plans



APPENDIX D: (PART 2) Draft Primary Bushfire Refuge Plan, dated 09.11.2017



Legend			
	Parklands Site		100 metre APZ
			180 metre APZ
			Primary Assembly Area 340.5 x 340.5 metres
	Event Communications Centre		Emergency Vehicle Roads
	RPS Command		Defendable Space
	Static Bushfire Water Supply		Path of Emergency Egress
	Fire Marshall Location		RPS Dam Access
			Emergency Helicopter Pad

0 320m
1:16 000 (A3)



Date
November 2017
Author
Planners North
Reference
1207.1094

IMPORTANT NOTE
Cadastral information is subject to survey. The alignment of the aerial photograph and vectorial overlays is approximate only.
Sources: Aerial Photography: ReaMap (July 2017) |
Cadastral: ACR Payne (2004) Updated 2017 |

Prepared by
design team ink
azaCAD
Updated - Planners North

DRAFT 09.11.2017

Figure | XX
**Primary Bushfire
Refuge Plan**

North Byron Parklands | Tweed Valley Way & Jones Road

**APPENDIX E: (PART 2) NSW RFS Fact Sheet 7/15, 'Music Festivals that Cater for Large Crowds
in Bush Fire Prone Areas'**



MUSIC FESTIVALS THAT CATER FOR LARGE CROWDS IN BUSH FIRE PRONE AREAS

COMMUNITY RESILIENCE

FACT SHEET 7/15

The aim of this fact sheet is to clarify the position of the NSW Rural Fire Service (NSW RFS) in relation to music festivals and other open air events that cater for large crowds when the event is located on bush fire prone land. Events that involve overnight camping and multiple days are of particular concern.

The following is a recommended framework for consideration by event organisers, consent authorities and emergency services in relation to the safe operation of such events from a bush fire perspective.

Such events may attract large numbers of patrons and can create a number of logistic and operational issues if evacuation is required due to a bush fire.

Crowd control and operational access at the venue during bush fire events can prove to be challenging especially if they are held in remote locations.

Preparation of the site to further reduce bush fire risk to patrons is paramount.

All of the following issues need to be addressed when assessing each individual site:

1. Whether the event is programmed during the gazetted bush fire danger period for the area or on days with an extreme or catastrophic fire danger rating. The NSW RFS would discourage any large festival event that would attract large numbers of patrons during the bush fire danger period.
2. Whether a bush fire assessment has been undertaken that identifies access and egress routes for both emergency services

and patrons should the site need to be evacuated.

3. The provision of bulk water supplies specifically dedicated for firefighting purposes is to be provided.
4. Unobstructed Asset Protection Zones (APZ) of suitable width must surround the site along the boundaries adjacent to the bush fire threat. Slashing of grassed areas needs to occur in the lead up to the event and maintained during the event.
5. Emergency management must occur during the planning stage of event organisation and in consultation with the NSW RFS and all other relevant stakeholders.
6. Advance warning by event organisers is to be provided to patrons identifying that the event is located on bush fire prone land. Advice is to be prepared listing the precautions and requirements of patrons in the event of a bush fire event. Patrons should also be reminded that they will be required to comply with any fire restrictions. This could be undertaken at the time of sale of tickets.
7. Fires for cooking and heating will be in approved fire places only and should be addressed via a Fire Management Plan (e.g. operation and supervision of communal bonfire).
8. An emergency management and evacuation plan is to be provided that is acceptable to relevant stakeholders. This is to include crowd management and security and needs to be consistent with the NSW RFS document titled 'A guide to developing a bush fire emergency management and evacuation plan'.

9. Provision of refuge building(s) on-site of suitable capacity for participants and staff that can meet the maximum radiant heat exposure of 10 kW/m². Alternatively an open air bush fire emergency assembly area of suitable size may be provided that complies with the requirements for Neighbourhood Safer Places.
10. A method of accounting for all people on site during an emergency (eg through gate monitoring and check-points) is to be provided.

In summary, this advice is provided to assist event organisers and approval authorities when assessing proposals for music festivals and other open air events that are likely to place large crowds in bush fire prone areas. Events must be referred to the NSW RFS under S79BA of the EP&A Act as there are no deemed to satisfy provisions that relate to these types of events.

It is the responsibility of the event organiser to take steps to ensure patron safety and provide a safe place and awareness of possible issues regarding the impact of bush fire.

Disclaimer: Any representation, statement opinion, or advice expressed or implied in this publication is made in good faith on the basis that the State of New South Wales, the NSW Rural Fire Service, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above.



For further information regarding this document, please contact the NSW RFS Customer Service Centre on 1300 NSW RFS or 1300 679 737 or email csc@rfs.nsw.gov.au

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

standards

for asset protection zones

protection

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.

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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.

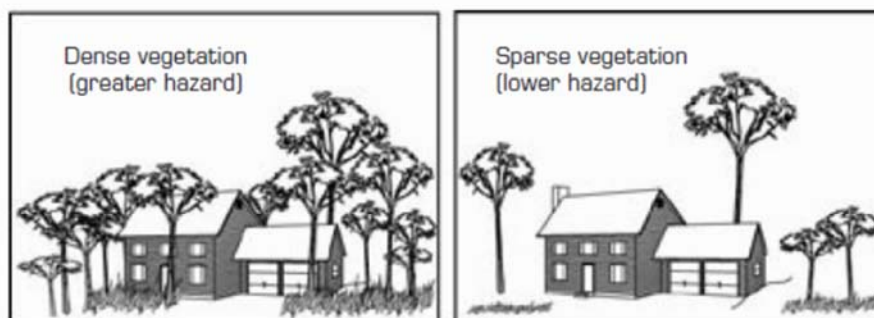
STEP 1. DETERMINE IF AN APZ IS REQUIRED

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.

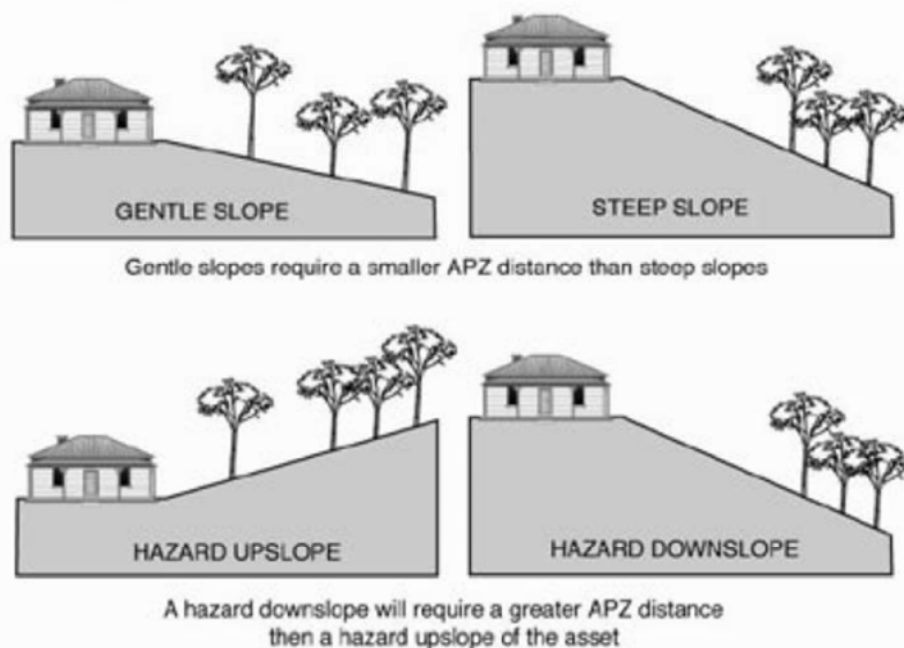
If you intend to burn off to reduce fuel levels on your property you may also need to obtain a Fire Permit through the RFS or NSW Fire Brigades. See the RFS document *Before You Light That Fire* for an explanation of when a permit is required.

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.

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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.

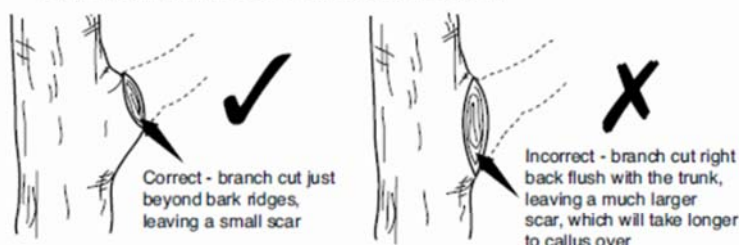
When choosing plants for removal, the following basic rules should be followed:

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

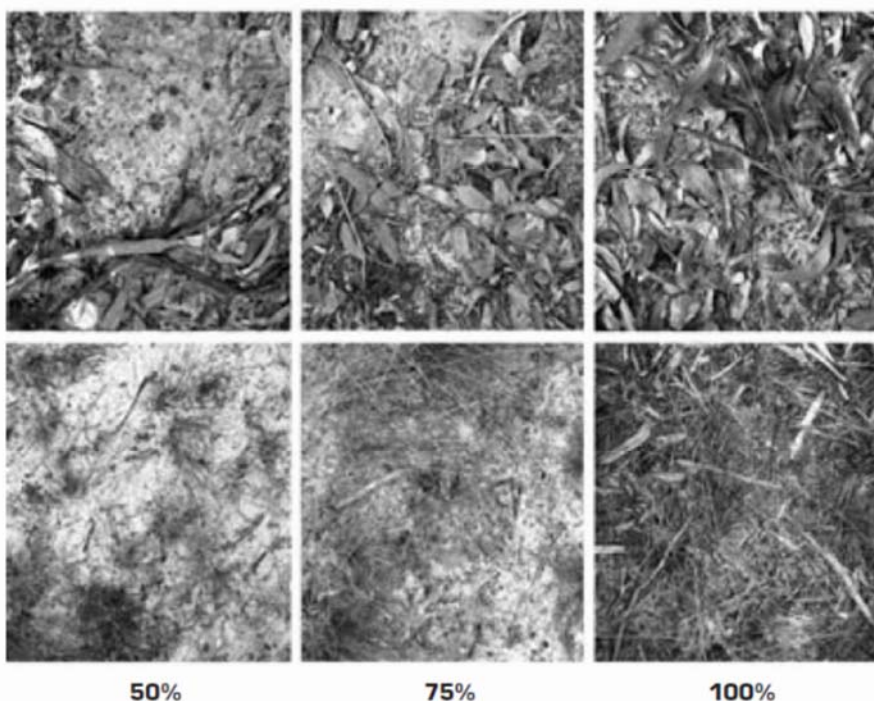
While the removal of fuel is necessary to reduce a bush fire hazard, you also need to consider soil stability, particularly on sloping areas.

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

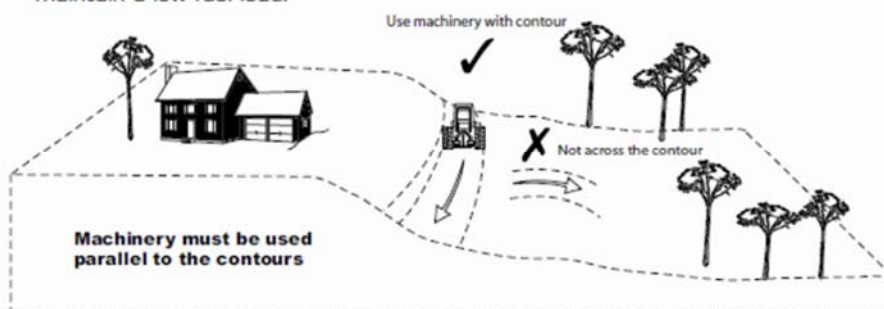
A small amount of ground cover can greatly improve soil stability and does not constitute a significant bush fire hazard. Ground cover includes any material which directly covers the soil surface such as vegetation, twigs, leaf litter, clippings or rocks. A permanent ground cover should be established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

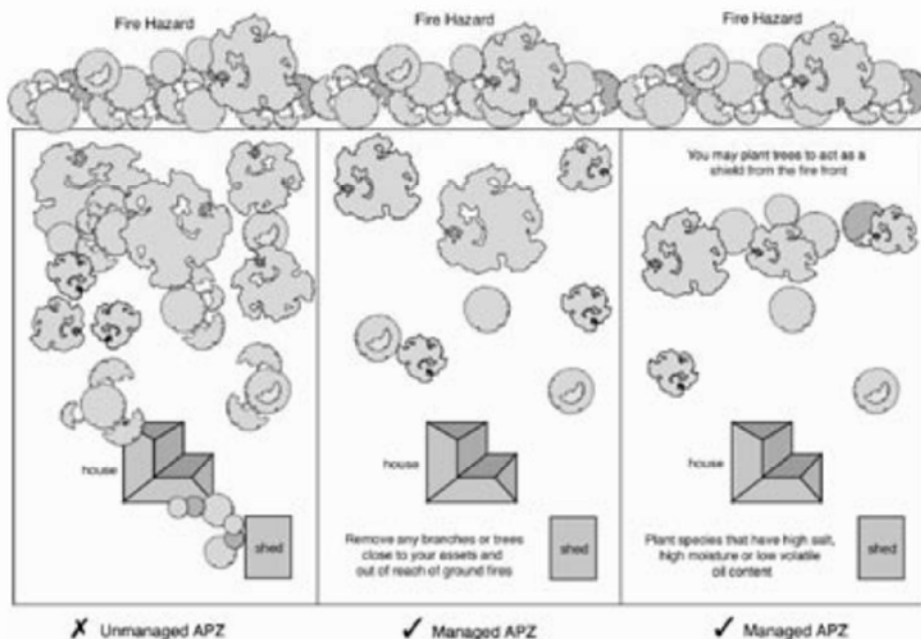
Rows of trees can provide a wind break to trap embers and flying debris that could otherwise reach the house or asset.

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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GRANVILLE, NSW 2142. Ph. 1800 679 737**
www.rfs.nsw.gov.au

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