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PO Box 362 Lennox Head, NSW, 2478

Preliminary Bushfire Risk Assessment

In relation to a proposed development at:

193 Dulguigan Road, Dulguigan, NSW

Report No: 193Dul-01 Date: 28/10/2024

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Executive Summary

The purpose of this report is to provide a preliminary bushfire assessment report for the proposed 6 Lot rural/residential subdivision of No. 193 Dulguigan Road, Dulguigan, NSW and assess the ability of the proposal to meet the bushfire specific requirements for subdivision of bushfire prone land as per *Planning for Bushfire Protection 2019*.

In accordance with s.10.3 of the EP&A Act, the subject site has been identified as bushfire prone land and the legislative requirements for building and development on bushfire prone lands are applicable. This assessment includes an analysis of the hazard, threat and subsequent risk to the development proposal and provides recommendations that satisfy the Objectives and Performance requirements of the *Planning for Bushfire Protection 2019*, *AS3959-2018 Construction of buildings in bushfire prone areas* and the *Nation Construction Code*.

1. Description of the subject property

- Property address: No. 193 Dulguigan Road, Dulguigan
- Lot 8/-/DP755685, Lot 1/-/DP364474, Lot 1/-/DP410859, Lot 1/-/DP328107, Lot 1/-/DP376131, and Lot A/-/DP174886
- Local government area: Tweed
- Land zoning: RU1: Primary Production
RU2: Rural landscape
W1: Natural Waterway



Figure 1: Location of the subject site.

2. Development proposal

The development proposal is for the 6 Lot subdivision.

Plans provide by:

B & P Surveys

Ref No: M31754

Dated: 29.03.23

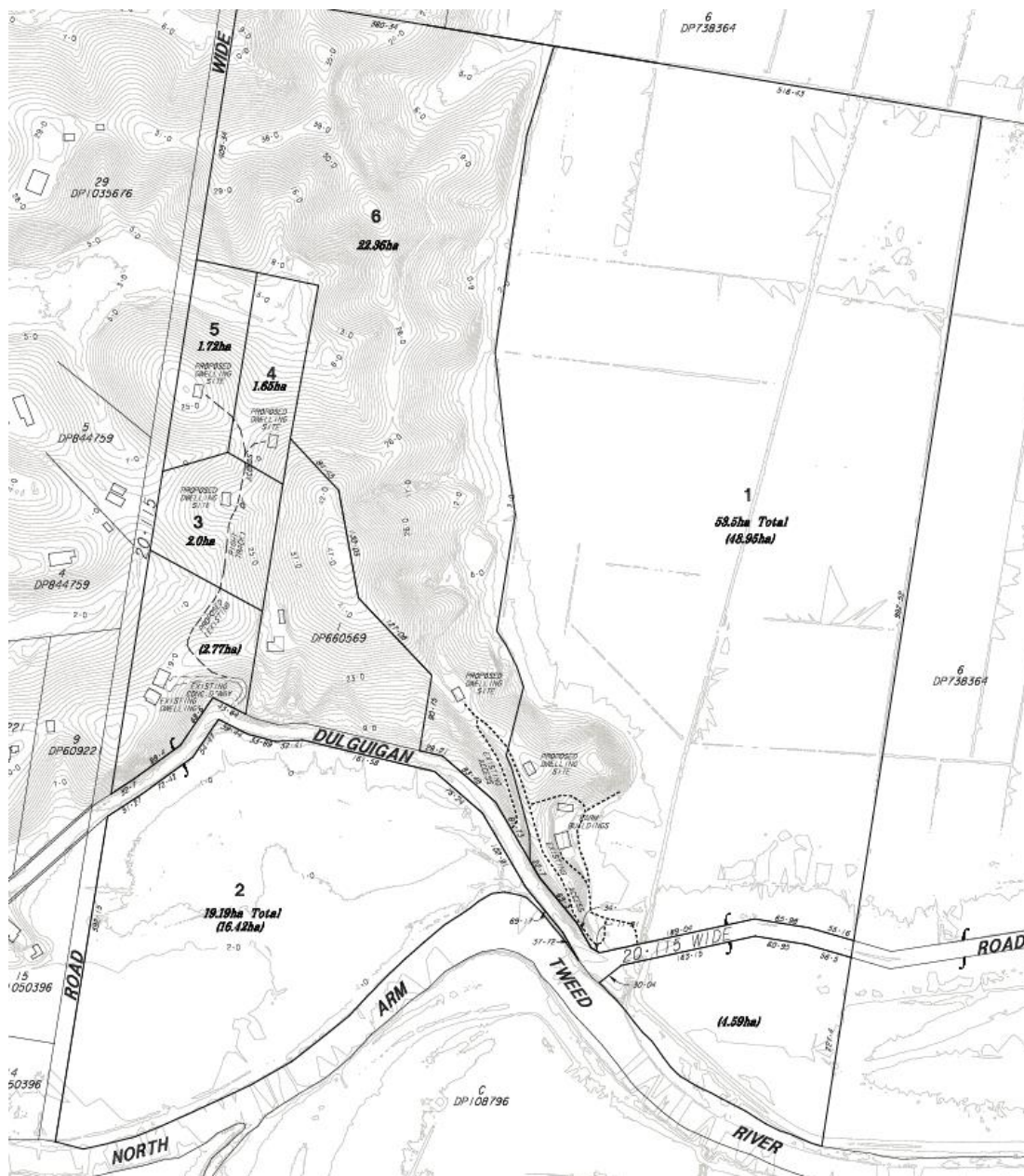


Figure 2: Subdivision plan.

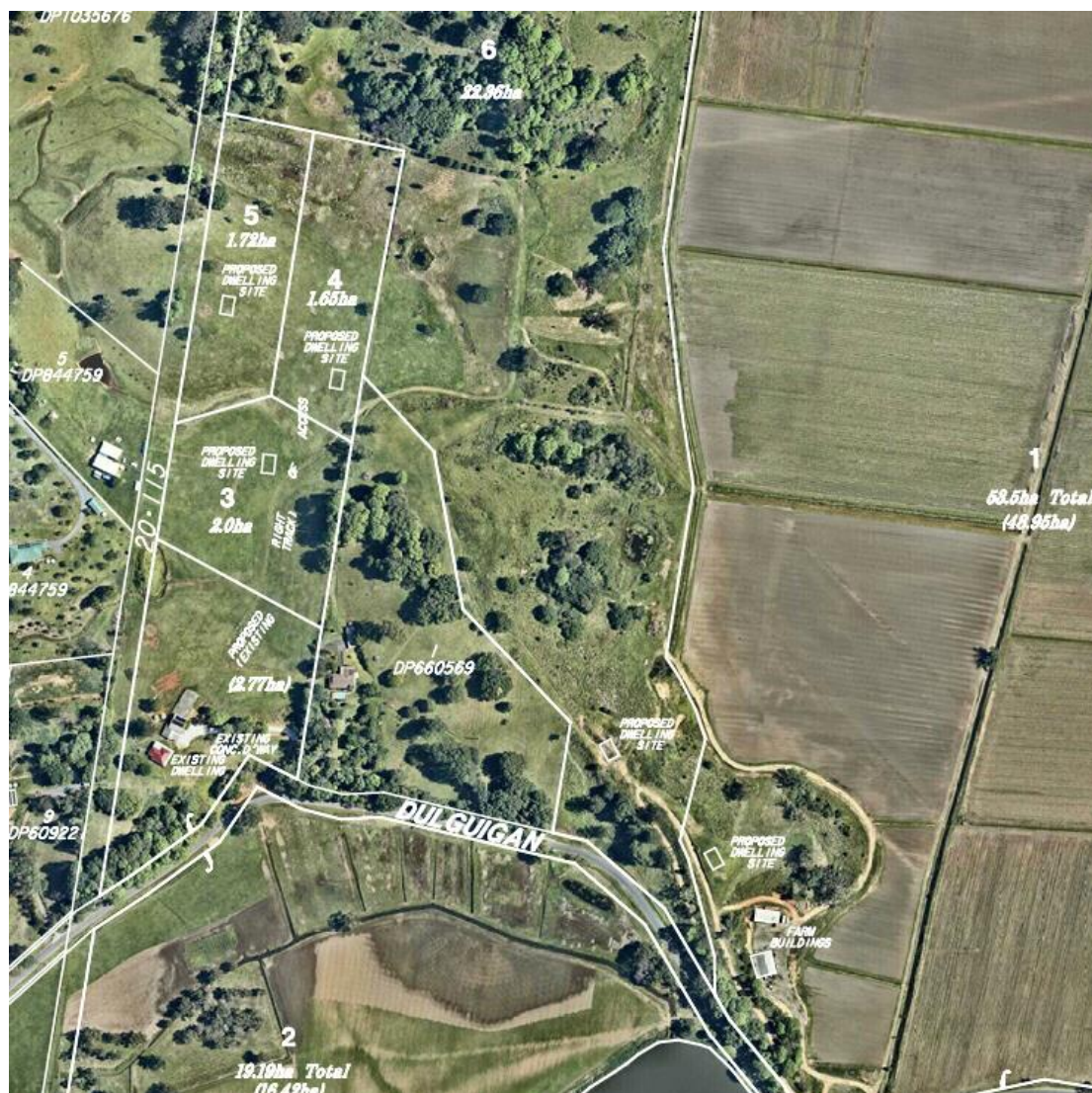


Figure 3: Aerial photo with Subdivision plan overlay

3. Classification of the vegetation on and surrounding the site.

The vegetation formation on and surrounding the area of the proposed subdivision is dominated by cleared paddock for grazing livestock and cane fields. For the purpose of this assessment, this vegetation will be classified as 'Grassland'. There are scattered patches of trees, however, these small clusters are isolated from larger areas of bushland and as their size is less than 1Ha, will be classified as a Remnant (Rainforest)

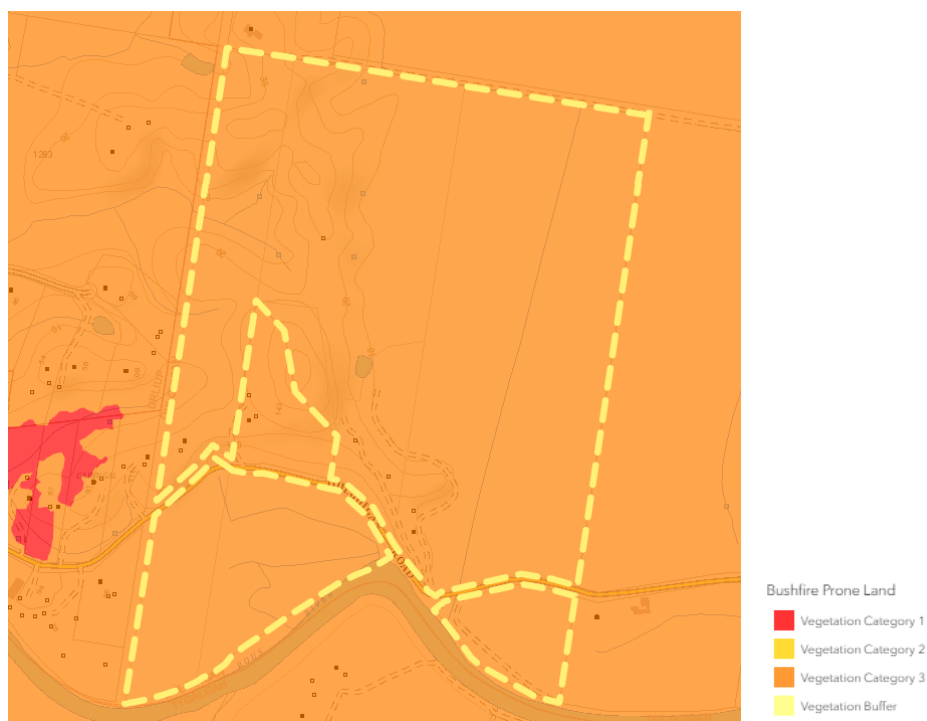


Figure 4: Bushfire prone land map.





Legend:  Remnant vegetation
 Cane fields

Figure 5. Aerial image showing the surrounding vegetation.

3.1 Site photos

Photo 1



Photo 2



Photos 1 and 2 taken from the existing dwelling on the site facing north towards proposed Lots 3, 4 and 5

Photo 3



Photo 3 showing the approximate location of Lots 4 and 5

Photo 4



Phot 4 showing cane fields to the east of the development area of the site.

4. Assessment of the extent to which the development proposal conforms or deviates from the specifications set out in Chapter 5 of *Planning for Bushfire Protection 2019*.

4.1 Asset Protection Zones:

Performance Criteria	Acceptable Solution
Potential building footprints must not be exposed to radiant heat levels exceeding 29kW/m ² on proposed Lot.	APZ's are provided in accordance with Tables A1.12.2 and A1.12.3 based on the FFDI.

Review:

With the surrounding vegetation being grassland and remnant (Rainforest) vegetation, the proposed size of each new allotment will provide for an appropriate APZ to achieve a building footprint that does not exceed 29kW/m² (BAL-29).

Table A1.12.3

Minimum distances for APZs – residential development, FFDI 80 areas ($\leq 29\text{kW/m}^2$, 1090K)

KEITH VEGETATION FORMATION	EFFECTIVE SLOPE				
	Up slopes and flat	>0°-5°	>5°-10°	>10°-15°	>15°-20°
Distance (m) from the asset to the predominant vegetation formation					
Rainforest	9	12	15	20	25
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	20	25	31	39	48
Grassy and Semi-Arid Woodland (including Mallee)	11	13	17	21	27
Forested Wetland (excluding Coastal Swamp Forest)	8	10	13	17	22
Tall Heath	16	18	20	22	25
Short Heath	9	10	12	13	15
Arid-Shrublands (acacia and chenopod)	6	7	8	9	10
Freshwater Wetlands	5	6	6	7	8
Grassland	10	11	12	14	16

Figure 6: Minimum distances for APZ's- residential development (Reference: Table A1.12.3 *Planning for Bush Fire Protection*)

Performance Criteria	Acceptable Solution
APZ's are managed and maintained to prevent the spread of fire towards the building	APZ's are managed in accordance with the requirements of Appendix 4 of PBP.

Review:

The required APZ's will be provided entirely within the proposed new allotment and can be managed in accordance with Appendix 4 of PBP.

Performance Criteria	Acceptable Solution
The APZ's are provided in perpetuity	APZ's are wholly within the boundaries of the development site.

Review:

The required APZ is wholly within the boundaries of the development site.

Performance Criteria	Acceptable Solution
APZ maintenance is practical, soil stability is not compromised and the potential for crown fire is minimised.	APZ's are located on lands with a slope less than 18 degrees.

Review:

The required APZ's can be located on lands with a slope less than 18 degrees.

4.2 Landscaping:

Performance Criteria	Acceptable Solution
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings and the potential for wind driven embers to cause ignition.	<ul style="list-style-type: none"> -Landscaping is in accordance with Appendix 4 of PBP. -Fencing is constructed in accordance with section 7.6 of PBP.

Review:

The designated APZ within each site, which shall be determined as part of a future assessment can be designed and managed as per APZ standard of Appendix 4 of PBP. All new fencing should be of hardwood or non-combustible material.

4.3 Access:

(General requirements)

Performance Criteria	Acceptable Solution
Firefighting vehicles are provided with safe, all-weather access to structures.	<ul style="list-style-type: none"> -property access roads are two-wheel drive, all-weather roads. -perimeter roads are provided for residential subdivisions for three or more allotments. -subdivisions of three or more allotments have more than one access in and out of the development. -traffic management devices are constructed to not prohibit access by emergency vehicles. -maximum grade for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient. -All roads are through roads. -dead end roads are not recommended, but if unavoidable, are not more than 200m in length, incorporate a minimum

	<p>12m outer radius turning circle and are clearly sign posted as a dead end.</p> <p>-Where kerb and guttering is provided on perimeter roads, top roll kerbing should be used to the hazard side of the road.</p> <p>-where access/egress can only be achieved through a forest, woodland and heath vegetation, secondary access shall be provided to an alternate point on the existing public road system.</p> <p>-one way public access roads are no less than 3.5m wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.</p>
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Critical review:

As the proposal is for more than 3 allotments, a perimeter road should be provided along with more than one access in and out of the development. New roads should be through roads. The current access to Lots 3, 4 and 5 does not accommodate for these requirements.

Performance Criteria	Acceptable Solution
The capacity of access roads is adequate for firefighting vehicles.	The capacity of perimeter and non-perimeter roads surfaces and any bridges/causeways is sufficient to carry a loaded firefighting vehicle (up to 23 tonnes); bridges/causeways are to clearly indicate load ratings.

Review:

New roads shall be designed to carry appropriate loads.

Performance Criteria	Acceptable Solution
There is appropriate access to water supply.	<p>-Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.</p> <p>-hydrants are provided in accordance with the relevant clause of AS 2419.1:2005- <i>Fire hydrant installations System design, installation and commissioning</i>.</p> <p>-there is suitable access for a Category 1 fire appliance to within 4m of a static water supply where no reticulated supply is available.</p>

Critical review:

The new subdivision will not be serviced by a reticulated water supply. A static Water supply for each lot shall be determined at the time of future development.

(Perimeter roads)

Performance Criteria	Acceptable Solution
Access roads are designed to allow for safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	<p>-Are two-way roads</p> <p>-Minimum 8m carriageway width kerb to kerb,</p> <p>-parking is provided outside of the carriageway width,</p> <p>-Hydrants are located clear of parking areas,</p> <p>-are through roads and these are linked to the internal road system at an interval of no greater than 500m,</p> <p>-Curves of roads have a minimum inner radius of 6m,</p> <p>-the maximum grade road is 15 degrees and average grade of not more than 10 degrees,</p>

	<ul style="list-style-type: none"> -the road crossfall does not exceed 3 degrees, -a minimum vertical clearance of 4m to any overhanging obstructions including tree branches is provided.
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Critical review:

The current design of access roads does not incorporate a perimeter road. It is desirable to have a perimeter road to provide for Asset Protection Zones and access for firefighters to hazard vegetation.

(Non-perimeter roads)

Performance Criteria	Acceptable Solution
Access roads are designed to allow safe access for firefighting vehicles while residents are evacuating.	<ul style="list-style-type: none"> -minimum 5m carriageway width kerb to kerb, -parking is provided outside of the carriageway width, -Hydrants are located clear of parking areas, -roads are through roads and these are linked to the internal road system at an interval of no greater than 500m, -curves of roads have a minimum inner radius of 6m, -the road crossfall does not exceed 3 degrees, and; - a minimum vertical clearance of 4m to any overhanging obstructions including tree branches is provided.

Review:

All new roads must be designed in accordance with the above requirements.

(Property access)

Performance Criteria	Acceptable Solution
Firefighting vehicles can access the dwelling and exit the property safely	There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles.

Review:

N/A

4.4 Water Supply:

Performance Criteria	Acceptable Solution
Adequate water supplies is provided for firefighting purposes.	<ul style="list-style-type: none">-reticulated water is to be provided to the development where available.-a static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed, and;-static water supplies shall comply with Table 5.3d.

Review:

The new subdivision will not be serviced by a reticulated water supply. A static Water supply for each lot shall be determined in accordance with Table 5.3d of PBP at the time of future development.

Performance Criteria	Acceptable Solution
<ul style="list-style-type: none">-Water supplies are located at regular intervals; and;-The water supply is accessible and reliable for firefighting operations.	<ul style="list-style-type: none">-Fire hydrant, spacing, design and sizing complies with the relevant clauses of <i>AS 2419.1:2005- Fire hydrant installations System design, installation and commissioning</i>.-Hydrants are not located within any road carriageway,-reticulated water supply to urban subdivisions use a ring main systems for areas with perimeter roads.

Review:

N/A

Performance Criteria	Acceptable Solution
Flows and pressures are appropriate	Hydrant flows and pressure comply with the relevant clauses of <i>AS 2419.1:2005- Fire hydrant installations System design, installation and commissioning</i> .

Critical review:

N/A

Performance Criteria	Acceptable Solution
Integrity of the water supply is maintained	<ul style="list-style-type: none">-All above-ground water service pipes are metal, including and up to any taps.-above-ground water storage tanks shall be concrete or metal.

Review:

N/A at this point of development.

4.5 Electricity Services:

Performance Criteria	Acceptable Solution
Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of the buildings.	<p>-where practicable, electrical transmission lines are underground.</p> <p>-where overhead electrical transmission lines are proposed as follows;</p> <ul style="list-style-type: none"> • Lines are installed with short pole spacing of 30m, unless crossing gullies, gorges or riparian areas, and • No part of a tree is closer to a power line than the distance set out in <i>ISSC3 Guidelines for managing vegetation near power lines</i>.

Review:

All new electrical transmission lines are underground.

4.6 Gas Services:

Performance Criteria	Acceptable Solution
Location and design of gas services will not lead to the ignition of surrounding bushland or the fabric of buildings.	<p>-reticulated or bottled gas is installed and maintained in accordance with <i>AS/NZS 1596:2014- The storage and handling of LP Gas</i>, the requirement of relevant authorities and metal piping is used.</p> <p>-all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side.</p> <p>-connections to and from gas cylinders are metal,</p> <p>-polymer-sheathed flexible gas supply lines are not used, and</p> <p>-above-ground gas service pipes are metal, including and up to any outlets</p>

Review:

- There is no reticulated gas or gas bottle that form part of this development.

5. Summary

This report consists of a bushfire risk assessment for the proposed 6 Lot subdivision of No. 193 Dulguigan Road, Dulguigan, NSW.

The report concludes that the proposed development is on designated bushfire prone land and the legislative requirements for development in bushfire prone areas are applicable. A review of the proposed subdivision has determined the development can meet all bushfire measures with the exception of access. The access roads servicing the new subdivision will need to be designed in accordance with the require of PBP as specified within this report.

Note: Not with standing the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small always remains, and although the standard is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any one building will withstand a bushfire attack on every occasion. This report is a Bushfire Hazard Assessment that provides the required information to assist Local Councils and the Rural fire Service in determining compliance in accordance with Planning for Bushfire Protection 2019 and AS3959, 2018. The local Council is the final consenting authority and the construction of the building must comply with the recommendations included in the council's conditions of consent.



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6. References

Australian Building Codes Board

Building Code of Australia

Volume 1 & 2

Canprint

Australian Building Codes Board [2001]

Fire Safety Engineering Guidelines

Edition 2001

ABCB Canberra

D. Drysdale D. [1998]

Introduction to Fire Dynamics 2nd Edition

John Wiley & Sons Ltd

NSW Government Environmental Planning and Assessment Act [1979]

Part 4.14 -Consultation and development consent- certain bushfire prone land

NSW Government Printer

Planning for Bushfire Protection 2019

A guide for Councils, Planners, Fire Authorities and Developers

This document provides the necessary planning considerations when developing areas for residential use in residential, rural residential, rural and urban areas when development sites are in close proximity to areas likely to be affected by bushfire events and replaces Planning for Bushfire Protection 2006.

[This document is essential reading. Download a copy from the RFS website or purchase a copy through the NSW Government online shop or phone 9228 6333.](#)

Ramsay C & Rudolph L [2003]

Landscape and building design for bushfire prone areas

CSIRO Publishing

Standards Australia [2018]

Australian Standards 3959

Australian Building Code Board

Abbreviations and definitions

AS 3959	Australian Standard AS 3959:2018 <i>Construction of buildings in bush fire-prone areas</i>
AS 2419.1:2005	Australian Standard AS 2419.1:2005 <i>Fire hydrant installations System design, installation and commissioning</i>
AS 2441:2005	Australian Standard AS 2441:2005 <i>Planning for emergencies in facilities</i>
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BFPL	Bushfire prone land
BRPL Map	Bushfire prone land map
BPM's	Bushfire protection measures
BFSA	Bushfire safety authority
DA	Development application
DCP	Development Control Plan
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
FDI	Fire Danger index
FFDI	Forest Fire Danger Index
IPA	Inner Protection Area
kW/m ²	Kilowatts per metre squared
LGA	Local government area
NASH	Nation Association of Steel Framed Housing Steel Framed Construction in Bushfire Areas 2021
NCC	National Construction Code
OPA	Outer Protection Area
PBP	<i>Planning for Bush Fire protection 2019</i>
RF Act	<i>Rural Fires Act 1997</i>
RF Reg	<i>Rural Fires Regulation 2013</i>
NSW RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire protection Purpose
SFR	Short fire run

Asset Protection Zone: A fuel reduced area surrounding a built asset or structure which provides a buffer zone between a bush fire hazard and an asset. The APZ includes a defensible space within which firefighting operations can be carried out. The size of the required APZ varies with slope, vegetation and FFDI.

Bush Fire Attack level (BAL): A means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact. IN the NCC, the BAL is used as the basis for establishing the requirements for construction to improve protection of building elements.

Bush fire: An unplanned fire burning in vegetation, also referred to as wildfire.

Bush fire prone land (BFPL): An area of land that can support a bush fire or is likely to be subject to bush fire attack, as designated on a bush fire prone land map.

Bush fire prone land map: A map prepared in accordance with the NSW RFS requirements and certified by the Commissioner of the NSW RFS under EP&A Act s.10.3(2).

Bush fire protection measures (BPMs): A range of measures used to minimise the risk from a bushfire that need to be complied with. BPM's include APZ's, construction provisions, suitable access, water and utility services, emergency management and landscaping.

Bush fire safety authority (BFSa): An approval by the commissioner of the NSW RFS that is required for a subdivision for residential or rural residential purpose or for a SFPP development listed under section 100B of the RF Act.

Consent authority: As identified in the EP&A Act, in relation to development consents, usually the local council.

Defendable space: An area adjoining a building that is managed to reduce combustible elements free from constructed impediments. It is a safe working environment in which efforts can be undertaken to defend the structure, before and after the passage of a bush fire.

Effective slope: The land beneath the vegetation which most significantly effects fire behaviour, having regard to the vegetation present.

Fire Danger Index (FDI): The chance of a fire starting, its rate of spread, its intensity and the difficulty potential for its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long- and short-term drought effects.

Inner protection Area (IPA): The component of a APZ which is closest to the asset (measured from unmanaged vegetation). It consists of an area maintained to minimal fuel loads so that a fire path is not created between the hazard and the building.

Managed land: Land that has vegetation removed or maintained to a level that limits the spread and impact of bush fire. This may include developed land (residential, commercial or industrial), roads, golf course fairways, playgrounds, sports fields, vineyards, orchards, cultivated ornamental gardens and commercial nurseries. Most common will be gardens and lawns within curtilage of buildings. These areas are managed to meet the requirements of an APZ.

Outer Protection Area (OPA): The outer component of an APZ, where fuel loads are maintained at a level where the intensity of an approaching bush fire would be significantly reduced. Applies to Forest vegetation only.

Special Fire Protection Purpose (SFPP) developments: Developments where the vulnerable nature of the occupants means that a lower radiant heat threshold needs to be accommodated for in order to allow for the evacuation of occupants and emergency services.

Vegetation classification: Vegetation types identified using the formations and classifications within *Ocean Shores to Desert Dunes: The Native Vegetation of New South Wales and ACT* (Keith, 2004).