

Appendix 5

Bush Fire Provisions - Landscaping and Property Maintenance

A5.1 Introduction

Bush fires are a natural and periodic event in the Australian landscape. Many Australian plants and animals have adapted to fire over thousands of years and require fire as part of their life cycle.

However, development adjacent to bushland areas has increased the risk of fire impacting on people and their assets. Fire management needs to strike a balance between the protection of life and property and the maintenance of ecological processes and systems.

In Australia, bush fires are inevitable and an essential aspect of the landscape.

However, the impact on property and life can be reduced with responsible preparation and management of bush fire hazards. This is the responsibility of all land managers, as well as communities and individuals taking responsibility for their own fire safety.

The level of protection for life or whether or not a house or other assets survive a bush fire ultimately depends on the landowner and their level of preparedness against bush fire attack.

The planning system can be used to better effect in protecting human life, property and environmental values from the impacts of bush fire events.

In some cases this will involve land use planning and development controls, construction standards, APZs and subdivision layout, siting, design and provision of services. It also involves careful and deliberate consideration of the environmental impacts of these and how we can recognise the need to protect our wetlands, rainforests, koala habitat and other biodiversity and cultural values.

However, the best planning can be undone by poor maintenance and lack of forethought when landscaping a development. Therefore house survival ultimately depends on the householder.

Some maintenance also depends upon adjoining neighbours and upon fuel management in adjacent bush land areas by the owners, occupiers or managers of that land. General housekeeping and maintenance of the grounds by the householder is equally important and, in some cases, may even be more so.

Experience from the Canberra 2003 fires suggests that house losses are greatest in the area up to 250 metres from the bush interface. Distances of

less than 100 metres are particularly vulnerable to flame contact, radiant heat and ember attack.

Hence it is within this distance that efforts should be made to prepare for the onslaught of major bush fire events.

While other legislation provides the impetus for planning objectives, the RF Act provides the legislative vehicle to achieve bush fire management objectives.

In this appendix consideration will be given to the principles for landscaping and management, and the role of property maintenance during the fire event.

A5.2 Principles of Protection

Bush fire attack takes essentially five forms;

- wind,
- smoke,
- ember,
- radiant heat and
- flame.

Evidence indicates ember attack is responsible for most bush fire related house fires. Strong winds resulting from severe bush fires will drive embers into vulnerable areas of a building, preheat and dry fuel ahead of a fire, lift roofing and extend flames along a more horizontal plane closer to building elements. Embers can also cause spotting in advance of the bush fire and provide piloted ignition to building elements. To effectively protect a building, strategies must be implemented that separate it from the hazard and reduce the intensity of bush fires to minimise the combined impact of ember, wind, flame and heat attack.

While smoke will cause minimal damage to property, it can severely affect the health of residents. Smoke is a significant factor in areas in which aged or disabled persons reside – hospitals and nursing homes - and more so where residents are susceptible to respiratory disorders.

Radiant heat (measured in kW/m²) can severely impair firefighting operations, the health of residents and the integrity of building elements. Radiant heat in excess of 10kW/m² can prevent emergency services personnel assisting residents of SFPP developments.

Flame attack will severely restrict firefighting operations, provide piloted ignition to building elements and threaten the health of residents and their capacity to evacuate the area.

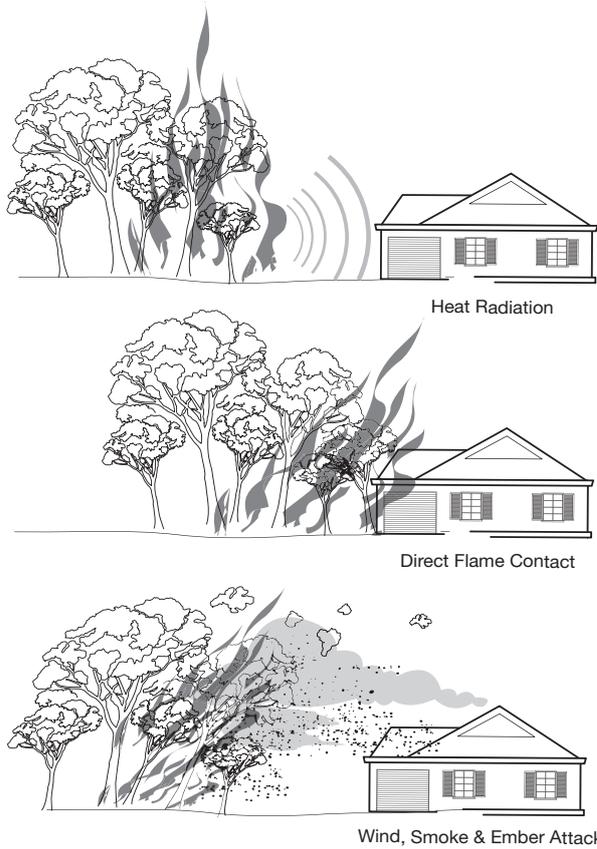


Figure A 5.1 Bush Fire Attack Mechanisms

Overall the intention of bush fire protection measures should be to prevent flame contact to a structure, reduce radiant heat to below the ignition thresholds for various elements of a building, to minimise the potential for wind driven embers to cause ignition and reduce the effects of smoke on residents and firefighters.

A5.3 Principles of Landscaping Properties for Bush Fire Protection

The principles of landscaping for bush fire protection aim to:

- Prevent flame impingement on the dwelling;
- Provide a defendable space for property protection;
- Reduce fire spread;
- Deflect and filter embers;
- Provide shelter from radiant heat; and
- Reduce wind speed.

(a) Vegetation choices

All vegetative material can burn under the influence of bush fire.

With this in mind, careful attention must be paid to species selection, their location relative to their flammability, avoidance of continuity of vegetation (horizontally and vertically), and ongoing maintenance to readily remove flammable fuels (leaf litter, twigs and debris).

In the paper “*Landscape and Building Design for Bushfire Areas*” G.C. Ramsay and L. Rudolph have provided 14 attributes of vegetation which affect bush fire attack. In summary these attributes are:

- Moisture content of leaves;
- Volatile oil content of leaves;
- Mineral content of leaves;
- Leaf fineness;
- Density of foliage;
- Continuity of plant form;
- Height of lowest foliage above ground;
- Size of plant;
- Dead foliage on the plant;
- Bark texture;
- Quantity of ground fuels;
- Fineness of ground fuels;
- Compaction ability of ground fuels; and
- Mineral content of ground fuel.

What is clear is that the higher moisture content of leaves (mesic), the less bark that will be available and the lower the leaf drop, all of which will assist with maintenance of the understorey and will also assist in reducing bush fire attack.

Work in the USA and elsewhere has also suggested that in addition to removal of understorey species, the trimming of lower limbs of trees also assists in reducing fire penetration into the canopy. Trees such as ‘pencil pines’ and African olive have been attributed with high fire propagation due to the high fine fuel and/or oil content captured within the canopy. This leads to significant flame height. Avoid such species in favour of rainforest species such as Figs and Syzygium.

When choosing plants, be sure not to introduce weed species into an area. Fire events may provide the opportunity for weed species to spread and may contribute fuel to an area of otherwise lower fuel loads.

Contact local councils, plant nurseries and plant societies to determine suitable species for your area.

(b) Trees as Windbreaks

The use of trees as windbreaks is a common practice but trees also provide a useful function, trapping embers and flying debris, which would otherwise reach the house. The tree crown will rarely carry fire unless there is a significant fuel loading on the ground.

By reducing the wind speed, a row of trees also slows the rate of spread of a bush fire and a dense foliage traps radiant heat, lowering bush fire radiant heat.

Because of the effect of turbulence, a balance has to be struck between a high density of trees (that

maximises the trapping of embers and radiant heat but also maximises turbulence) and a lower density (that allows more embers and radiant heat to pass through but minimises turbulence). A windbreak that allows 30–60% of the wind to pass through is ideal as less than this becomes too solid with ember laden winds being carried over the top of the break.

To be effective a windbreak must:

- be located on the side of the lot from which fire weather normally approaches;
- be of sufficient length (generally 100 metres minimum length);
- be located at a distance of one to three times the height of fully grown trees but not within the IPA;
- use smooth barked eucalypts, rainforest trees or deciduous trees;
- make sure there are no breaks of sufficient size to allow winds to funnel through; and
- be separated by sufficient distance from the hazard so as not to be consumed and become a hazard itself.

A5.4 Vegetation Management

Where APZs have been incorporated as part of the development approval for subdivision or for dwelling construction, the environmental aspects of the development should have already been taken into account.

In general, it is expected that APZs will be maintained by the owner of the land including maintenance of any fire trail constructed as part of the development.

It is accepted practice that after construction of a dwelling, gardens will be established and landscaping of the grounds will be undertaken. It is essential that efforts to reduce fuels on adjoining properties are therefore not negated by actions within the immediate curtilage of the building.

In terms of priorities of addressing bush fire attack, priority should be given to preventing flame impingement by not allowing fine debris to accumulate close to the building. Secondly, removal of understorey fuels aids in the reduction of flame heights and likely canopy fire, thereby reducing overall radiant heat. Removal of loose bark and fine fuels reduces both heat output and ember generation, while the retention of taller trees with canopies will also assist in filtering out embers.

To maintain a garden that does not contribute to the spread of bush fires, it is necessary to plan the layout of the garden beds and take an active decision to minimise certain features in favour of other features. These should include:

- maintaining a clear area of low cut lawn or pavement adjacent to the house;
- keeping areas under fences, fence posts and

- gates and trees raked and cleared of fuel;
- utilising non-combustible fencing and retaining walls
- breaking up the canopy of trees and shrubs with defined garden beds;
- organic mulch should not be used in bush fire prone areas and non flammable material should be used as ground cover, eg Scoria, pebbles, recycled crushed bricks.
- planting trees and shrubs such that:
 - the branches will not overhang the roof;
 - the tree canopy is not continuous; and
 - there is a windbreak in the direction from which fires are likely to approach.

The RFS has developed its document “Standards for Asset Protection Zones” which should be consulted for APZ specifications. This is also available on the RFS web page at www.rfs.nsw.gov.au.

A5.5 Maintenance of Property

Sensible arrangements for landscaping and maintenance of the property are critical in the prevention of losses.

In considering property maintenance the following items should therefore be implemented in advance of the bush fire season:

- removal of material such as litter from the roof and gutters;
- ensure painted surfaces are in good condition with decaying timbers being given particular attention to prevent the lodging of embers within gaps;
- check pumps and water supplies are available and in working order;
- driveways are in good condition with trees not being too close and forming an obstacle during smoky conditions;
- check tiles and roof lines for broken tiles or dislodged roofing materials;
- screens on windows and doors are in good condition without breaks or holes in flyscreen material and frames are well fitting into sills and window frames;
- drenching or spray systems are regularly tested before the commencement of the fire season;
- hoses and hose reels are not perished and fittings are tight and in good order;
- doors are fitted with draught seals and well maintained;
- mats are of non combustible material or in areas of low potential exposure; and
- woodpiles, garden sheds and other combustible materials are located downslope and well away from the house.

Trees and other vegetation in the vicinity of power lines and tower lines should be managed and trimmed in accordance with the specifications in “Vegetation Safety Clearances” issued by Energy Australia (NS179, April 2002).

AS 3959

Australian Standard AS 3959 Construction of buildings in bushfire-prone areas, Standards Australia, 1999, that outlines construction standards applicable to residential developments in bush fire prone areas.

Asset Protection Zone (APZ)

Often referred to as a fire protection zone. Aims to protect human life, property and highly valued public assets and values. An area surrounding a development managed to reduce the bush fire hazard to an acceptable level. The width of the APZ will vary with slope, vegetation and construction level. The APZ, consisting of an area maintained to minimal fuel loads and, for subdivision, comprising a combination of perimeter road, fire trail, rear yard or a reserve, so that a fire path is not created between the hazard and the building.

Bush fire protection measures (BPM)

The suite of measures available for minimizing the risk of bush fire attack and the threat to life and property.

Building Code of Australia (BCA)

The Building Code of Australia means the document of that name published on behalf of the Australian Building Codes Board (ABCB) (as amended), together with:

- a) such amendments made by the Board, and
- b) such variations approved by the Board in relation to New South Wales, as are prescribed by the EP&A Regulations.

There are 10 classes of buildings as defined by the BCA (see Appendix 1).

Building footprint

The area shown on a plan over which a building can be erected.

Bush fire (also Bushfire)

A fire involving grass, scrub or forest.

Bush fire attack

Arises from direct flame impingement, radiant heat or ember attack.

Bush fire hazard

The potential severity of a fire. Usually measured in terms of intensity (kW/m), the factors that influence a bush fire hazard include climate and weather patterns, vegetation (fuel quantity, distribution and moisture) and slope.

Bush fire hazard reduction works

- a) the establishment or maintenance of fire breaks on land, and

- b) the controlled application of appropriate fire regimes or other means for the reduction or modification of available fuels within a predetermined area to mitigate against the spread of a bush fire,

but does not include construction of a track, trail or road.

Bush fire prone area/land

Is an area of land that can support a bush fire or is likely to be subject to bush fire attack. In general, a bush fire prone area is an area mapped for a local government area that identifies the vegetation types and associated buffer zones. Bush fire prone land maps are prepared by local councils and certified by the Commissioner of the RFS.

Bush fire prone land map (BPL Map)

for an area means a map certified under section 146(2) of the EP&A Act.

Bush fire protection measures (BPMs)

are a range of measures (controls) available to minimise the risk arising from a bush fire. BPMs include APZs, construction standards, suitable access arrangements, water and utility services, emergency management arrangements and landscaping.

Bush fire risk

Is the chance of a bush fire igniting, spreading and causing damage to assets of value to the community. Risk may be rated as being extreme, major, moderate, minor or insignificant and is related to the vulnerability of the asset.

Bush fire safety authority

An approval of the Commissioner of the NSW RFS required for a subdivision for residential or rural residential purpose or for a special fire protection purpose listed under section 100B(6) of the RF Act. This form of development is considered to be integrated development.

Bush fire assessment report

A report submitted in support of a development application by an applicant which determines the extent of bush fire attack to a development and the measures used to mitigate that attack. Appendix 4 provides the information requirements for a bush fire assessment. See also clause 46 of the RF Regulation.

Certifying Authority

As defined in the EP&A Act. Those with authority to issue Part 4A and Complying Development Certificates.

Consent Authority

Is defined in the EP&A Act, in relation to Development Consents. Usually the local council.

Defendable space

Is an area within the asset protection zone that provides an environment in which a person can undertake property protection after the passage of a bush fire with some level of safety.

Development

Is defined in the EP&A Act.

Development Application (DA)

An application for consent to carry out development such as building, subdivision, or the use of a building or land. Applications are normally made to the local council.

Ecologically Sustainable Development (ESD)

As defined in section 6 of the *Protection of the Environment Administration Act (NSW) 1991*.

Ecotourist developments

aim to foster environmental and cultural understanding, appreciation and conservation and to be ecologically sustainable (being located in a relatively undisturbed natural area).

Equivalent to an APZ

is when the building will be separated from the bush fire hazard by other development (including roads, other buildings and managed properties) with a setback distance greater than or equal to the distance which would have been occupied by an APZ, if the development had been established having regard to the provisions of Appendix 3 of this document.

Fire Intensity

the rate of heat release, per unit length of fire front. The primary unit is kilowatts per metre of fire front (kW/m). It is a function of the heat content of the fuel (H), the weight of the fuel consumed (W), and the rate of spread of the fire (r).

Fire protection systems.

In this document the term is used to refer to the use of drencher/sprinkler systems used to dispense water on to the walls, roof, windows and other elements of a building.

Flame zone

The distance from a bush fire at which there is significant potential for sustained flame contact to a building. Determined by the calculated distance at which the radiant heat of the design fire exceeds 29kW/m² or calculated by the sustained flame length, whichever is the lesser.

Infill development

refers to the development of land by the erection of or addition to a residential building (or buildings) which does not require the spatial extension of services including public roads, electricity, water or sewerage and is within an existing allotment.

Integrated development

is development referred to under section 91 of the EP&A Act.

Integrated housing

development means a subdivision into two or more lots and the simultaneous design and construction of dwellings.

Local Environmental Plan (LEP)

Local Environmental Plan prepared under Part 3 of the EP&A Act. Plans prepared by a council that describe the planning status (zone) and/or development standards required for the future development of an area.

Public road

is an area that is open to or used by the public and is developed for, or has as one of its main uses, the driving or riding of motor vehicles.

Setback

The distance required through planning provisions to separate a building from the bush fire hazard, street frontage or from adjacent buildings.

Should

This is to be read as a prescriptive requirement but recognises that there are exceptional circumstances that warrant consideration of a bush fire protection measure based on performance and the merits of the case including provision for community safety.

Special fire protection purposes

are defined in Appendix 3.1.

State Environmental Planning Policy (SEPP)

is an environmental planning instrument prepared under Part 3 of the EP&A Act

Subdivision

of land means the division of land into two or more parts that, after the division, would be obviously adapted for separate occupation, use or disposition. The division may (but need not) be effected:

- (a) by conveyance, transfer or partition, or
- (b) by any agreement dealing, plan or instrument rendering different parts of the land available for separate occupation, use or disposition.

It includes strata subdivision, community title and boundary adjustments.

Vegetation formations (and sub-formations)

are different vegetation types and classes defined by Keith D. 2004 in: "Ocean Shores to Desert Dunes" published by DEC.

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