edition 2

# planning for Bush Fire Protection guidelines

Western Australian Planning Commission

GOVERNMENT OF WESTERN AUSTRALIA

Department of Planning

FESA

Fire & Emergency Services Authority of Western Australia

planning for

# Bush Fire Protection

guidelines

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# Contents

# Introduction

## Background

The personal and community devastation that can be caused by uncontrolled bush fires highlights the need for closer attention to strategies that prevent or mitigate such effects. Fire protection must, therefore, be taken into consideration during all planning phases of land development.

The increase in rural subdivisions and expansion of the urban fringe experienced in recent years has resulted in a greater number of people and facilities being located closer to and within bushland and forests. More people and property are being exposed to the risk of wildfires than was previously the case. In addition, many developments in both urban and rural settings can develop in advance of the capacity of local communities to deliver the level of fire services taken for granted in well-established communities.

These trends call for earlier and better intervention when planning land developments and establishing new communities so as to ensure that fire protection matters are properly considered. It is therefore crucial that all new subdivisions and related development take into account the potential vulnerability of communities in situations where bush fires may pose a risk, and where the capacity of existing response services may not meet the new demand or may not exist.

## Purpose of these planning guidelines

*Planning Guidelines: Planning for Bush Fire Protection* is a set of guidelines that outline a range of matters that need to be addressed at various stages of the planning process, to provide an appropriate level of protection to life and property from bush fires and avoid inappropriately located or designed land use, subdivision and development on land where a bush fire risk is identified.

The guidelines have been prepared jointly by the Fire and Emergency Services Authority of Western Australia (FESA) and the Western Australian Planning Commission (WAPC) in accordance with clause 6 of *State Planning Policy 3.4 Natural Hazards and Disasters* (SPP 3.4). The guidelines replace *DC 3.7 Fire Planning* and *Planning for Bush Fire Protection*, which were released by the WAPC and FESA in December 2001.

The guidelines form the foundation for fire risk management planning in Western Australia at a community and land development level. It provides performance criteria and acceptable solutions to minimise the impact of fire on communities. The primary focus of these guidelines is ensuring that bush fire hazards are considered in planning decisions at all stages of the planning process to avoid increased fire risk to life and property through inappropriately located or designed land use and development.

The guidelines address a number of important fire risk management and planning issues, including:

- the statutory planning process as it relates to fire protection;
- bush fire hazard assessment;
- the definition of bush fire prone areas;
- fire protection requirements for subdivision and development; and
- strategies available to limit the vulnerability to fire.

# 1.1 Implementing the guidelines

The guidelines are intended for use by those who plan, regulate or provide advice as part of the land development process. The guidelines are intended to be used as a tool to ensure fire protection is integrated in the early stages of land development and apply to all levels of planning decisions and proposals which result in the intensification of land use, including strategic and structure planning, through to subdivision and development. The guidelines address issues such as land suitability, development design, road layout, hazard separation and building protection zones.

New subdivisions and related development place additional responsibilities on local governments to provide adequate fire protection. These include: enforcing local government notices, local laws and regulations; and working with new residents to minimise the risks from fires. It is therefore critical that land developers consult closely with local government in planning and undertaking land development.

Local governments are encouraged to adopt the guidelines as policy and may add to their list of acceptable solutions by including solutions that are appropriate to local needs. These solutions can be used to clarify and reinforce the intent of the performance criteria and acceptable solutions in the guidelines.

Special control area provisions may also be included in a local planning scheme, in accordance with part 6 of the Model Scheme Text, so that land use and development takes into account bush fire requirements and includes specified protection measures where there is a risk from bush fires. Special control areas can be used to identify planning issues requiring special consideration, control building and works in response to these planning issues, establish guidelines outlining specific considerations to be taken into account and identify specialist agencies to be consulted prior to determining applications. Bush fire hazard special control area provisions are provided at **appendix 5**.

Applications for rezoning, subdivision and related development should reflect the level of risk identified for the area and address the compliance of the proposal with the relevant performance criteria and acceptable solutions, as specified in the guidelines.

In established areas where it may not be practical to fully comply with the criteria, it may still be possible to achieve acceptable fire protection outcomes by using the information in the guidelines. Any application of the guidelines should also be consistent with local fire prevention, response plans and fire equipment strategies – where these exist.

The performance criteria and acceptable solutions contained in the guidelines are not intended to be enforced retrospectively on existing development in established urban areas, existing townsites or existing subdivisions. Therefore, they are not designed to deal with the bush fire protection requirements of:

- existing buildings in established subdivisions;
- new subdivisions where the subdivision is based on a structure plan, outline development plan, subdivision guide plan or similar that was approved by a local government and the WAPC prior to the introduction of *Planning for Bush Fire Protection in December* 2001; or
- subdivisions that already have a valid approval by the WAPC, but have not yet been developed.

Despite this, the exercise of statutory planning discretions, such as planning approval and subdivision approval involving land that has a moderate or extreme bush fire hazard level or a building attack level (BAL) between BAL-12.5 and BAL-FZ is likely to impose a duty of care on decision-making authorities. In these circumstances the information contained in the guidelines should be applied wherever practicable by both applicants

and government decision-makers to achieve acceptable fire protection outcomes, so that life and property are adequately protected from the risk of bush fires.

Proposals for new subdivision and related development that contain features that cannot comply with the performance criteria and acceptable solutions should be discussed with the relevant local government, as well as the FESA district office. While it is unlikely that FESA will support a proposal that does not meet the performance criteria specified in these guidelines, where proponents can clearly demonstrate alternate solutions which satisfy the performance criteria, these may be considered. A fire management plan would need to be prepared and approved as a condition of subdivision/development for areas at a high risk of bush fires.

## 1.2 Bush fire hazards

Bush fire hazard can be mitigated by: reducing fuel loads in bush areas (eg by modifying fuel zones, lessening scrub and leaf litter by chemical or mechanical means, or using controlled burns); maintaining fire breaks; providing adequate separation distances between buildings and bush fire fuel areas; and ensuring that new buildings in bush fire prone areas are built to *Australian Standard 3959 Construction of Buildings in Bushfire-Prone Areas* (AS 3959). It is strongly recommended that all homes be built to the appropriate bush fire attack level, regardless of whether the home is built in a declared bush fire prone area.

The revised AS 3959 was approved nationally in March 2009. The standard will come into effect through the Building Code of Australia (BCA) in the 2010 edition of the BCA or by regulations associated with the proposed Building Act. The standard requires both the assessment of a site and the construction of buildings to improve their performance when subject to burning debris, radiant heat and flame contact. These only apply in bush fire prone areas, and will not be applied retrospectively (ie for existing buildings) in Western Australia.

Two methods for determining the bush fire hazard level of an area are provided. The first method provided is a 'broad brush' assessment intended to be used at strategic and structure level planning to identify the suitability of an area for the intensification of land use and determine if the area is bush fire prone. The hazard levels are determined based on the predominant vegetation and are identified as being either of low, moderate or extreme bush fire hazard risk. Intensification of land uses in the extreme bush fire hazard level is unlikely to be supported.

Should a site be deemed suitable for intensification of land use based on the initial assessment, a more detailed bush fire hazard assessment is required at the subdivision and development stage to determine

the potential level of construction standard as specified in AS 3959. The distance between the predominant vegetation (hazard separation zone), building protection zone (closest 20 metres to the building) and the level of fuel in the building protection zone, will accumulatively determine the suitability of the site and the potential level of construction required.

Guidance has been prepared to address each of these levels of planning (detailed in part 2) to enable responsible development in bush fire hazard areas. The relationship between various bush fire hazard levels and performance criteria are set out in table 2 of **appendix 2**. The procedures for assessing bush fire hazard level and using the performance criteria are detailed in **appendices 1** and **2**.

Assessment of the level of bush fire hazard may be undertaken at a number of stages in the planning process, particularly for areas outside established urban areas and townsites, including:

- at the local planning scheme review or structure plan stage;
- over areas in a local planning scheme or structure plan stage where a change to the existing situation is being proposed (eg new development areas);
- at a localised level to support an individual rezoning, subdivision or development application; or
- at a localised level (at the construction stage) to determine construction standards under AS 3959.

Information contained in a hazard assessment already undertaken as part of a local planning scheme review or structure plan may be referred to, confirmed, or amplified in the information supporting a submission on a specific proposal. Applicants should contact the relevant local government prior to commencing a bush fire hazard assessment to determine whether any formal bush fire hazard mapping of the subject land has previously been carried out at either state government or local government level. If such mapping exists and is current, there should be no need to conduct a further bush fire hazard assessment. FESA can provide assistance to local governments and applicants to undertake such assessments.

Issues involving landscape protection (ie visual landscape character) and bushland retention/impact on conservation values will also be considered during the planning process. In some instances the level of vegetation clearing required to adequately provide permanent hazard reduction may result in the proposal being unacceptable on the basis of landscape protection and/or impact on conservation values. Permanent hazard reduction measures may constitute clearing of native vegetation and a clearing permit may be required. Advice will need to be sought in relation to this from the Department of Environment and Conservation (DEC).

Bush fire prone areas may be designated by the local government. In designated bush fire prone areas, all new habitable buildings must comply with AS 3959. For the purposes of the guidelines, all areas with a moderate or extreme bush fire hazard level are considered to be bush fire prone areas for planning new subdivisions and developments and for building controls.

## 1.3 How to use the planning guidelines

**Part 1** – provides a general introduction to the guidelines, including general information on bush fire hazard levels/assessment and how to use the guidelines.

**Part 2** – provides objectives, principles, responsibilities and guidance statements related to the application of the guidelines in state and local planning.

**Appendices** – provide detailed, technical advice on the classification of bush fire hazard and bush fire prone areas. **Appendix 1** sets out the two methods for assessing bush fire hazard, some of which may be combined in the assessment process. This involves consideration of vegetation type/class and slope to determine the bush fire hazard levels, which in turn leads to construction requirements, with reference to AS 3959.

The appendices also provide a set of performance criteria and acceptable solutions (**appendix 2**) that are required to be met by new subdivision/ development in bush fire prone areas, accompanied by a compliance checklist (**appendix 3**). A model fire management plan has been included for reference (**appendix 4**) and model bush fire hazard special control area provisions (**appendix 5**).

# Planning guidelines

## 2.1 Objectives of the guidelines

The guidelines have three objectives.

**Objective 1**

To identify areas where fire poses a significant threat to life and property, and through the use of an assessment methodology determine the level of bush fire hazard applying to those areas.

**Objective 2**

To avoid increased fire risk to life and property through inappropriately located or designed land use, subdivision and development.

**Objective 3**

To ensure that land use, subdivision and development takes into account fire protection requirements and includes specified fire protection measures where there is any risk from fires, especially involving land that has a moderate or extreme bush fire hazard level or a bush fire attack level between BAL-12.5 and BAL-FZ.

## 2.2 General principles underpinning the guidelines

There are five general principles underpinning the guidelines. These seek to give effect to the objectives.

**Principle 1**

Bush fire hazards must be considered in planning decisions at all stages of the planning process to avoid increased fire risk to life and property through inappropriately located or designed land use and development.

**Principle 2**

Local governments are to identify bush fire hazard levels in their structure plans, local planning strategies and local planning schemes, based on the bush fire hazard assessment methodology in the guidelines. A detailed assessment is to be undertaken to review the accuracy of a 'broad brush' assessment, as a basis for determining land use and zoning for specific development proposals. The advice of FESA is to be sought in this regard.

**Principle 3**

Subdivision and development in areas with an extreme bush fire hazard level or a bush fire attack level between BAL-40 and BAL-FZ, is to be avoided unless certain fire protection requirements can be implemented to the satisfaction of the WAPC, FESA and/or the local government.

**Principle 4**

In areas with an extreme bush fire hazard level where more intensive subdivision/development, such as residential, rural-residential, hobby farms, tourist and industrial developments, is considered unavoidable, permanent hazard reduction measures need to be implemented to the satisfaction of the decision-making authorities (ie FESA, the WAPC, and/or the relevant local government) to reduce the hazard level to low or moderate or bush fire attack levels between BAL-Low and BAL-29.

**Principle 5**

Structure plans, subdivision and development in areas with a moderate to extreme (or BAL -12.5 to BAL-FZ) bush fire hazard level needs to be supported by an assessment of the bush fire risk and compliance with the performance criteria and acceptable solutions set out in these guidelines. If such development cannot achieve compliance with the performance criteria and acceptable solutions, any alternative acceptable solutions have to be jointly endorsed by FESA, the WAPC, and the relevant local government.

# 2.3 Guidance statements for strategic plans, planning strategies, planning schemes, planning scheme amendments and structure plans

There are eight guidance statements relating to strategic plans, planning strategies, planning schemes, planning scheme amendments and structure plans. These seek to give effect to the general principles and the objectives of the guidelines.

## Guidance statement A1

### Bush fire hazard assessment and analysis required

Unless it is clear to the decision-making authority that the land in question is not in an area that has a moderate or extreme bush fire hazard level[1] , any new proposals or proposals which will effect a change of land use or design resulting in the introduction of, or an intensification of development should:

- include a bush fire hazard assessment based on the fire hazard assessment methodology and classifications set out in appendix 1 of these guidelines;
- identify any bush fire hazard issues arising from that assessment; and
- address those issues, in accordance with the general principles that underpin these guidelines, in a statement or a report which demonstrates that all fire protection requirements can be achieved to the satisfaction of the WAPC.

[1] The Perth CBD, for example, would be deemed by most reasonable people to be in a low bush fire hazard area.

## Guidance statement A2

### Areas with extreme bush fire hazard levels

Any change of zoning/planning provisions or design resulting in the introduction of, or an intensification of, development in an area that has an extreme bush fire hazard level will normally not be approved.

## Guidance statement A3

### Areas with extreme bush fire hazard levels where the introduction of, or intensification of land use is unavoidable

Any new proposals or proposed land use, zoning or design change that will result in the introduction of, or an intensification of development in an area that has an extreme bush fire hazard level, but which are considered unavoidable, will only be approved where it can be demonstrated that acceptable, permanent hazard reduction measures can be implemented at some subsequent stage in the planning process to reduce the hazard level to an acceptable level, and that the development can be undertaken in accordance with the general principles and building construction standards that underpin these guidelines. This may include an appropriate building protection zone, hazard separation zone and construction to an appropriate standard as specified in AS 3959 and as supported by a satisfactory risk assessment and analysis.

## Guidance statement A4

### Areas with moderate fire hazard levels

Any new proposals or proposed changes of zoning or design that will result in the introduction of, or an intensification of, development in an area that has a moderate bush fire hazard level will only be approved where the development can be undertaken in accordance with the general principles that underpin these guidelines. In the case of structure plans, where the bush fire hazard was addressed at the time of the zoning of the land, the information on that hazard may be re-used, if the information is still relevant.

## Guidance statement A5

### Incorporating bush fire hazard controls in local planning schemes and local planning strategies

Consideration is to be given to providing measures in local planning schemes and their amendments, and local planning strategies to identify bush fire hazard areas and ensure that development in these areas addresses bush fire hazard issues. Special control areas can be linked to the boundaries of the bush fire hazard areas established through a strategic bush fire hazard assessment.

## Guidance statement A6

### Consult with FESA for planning matters and strategic bush fire hazard assessments

The advice of FESA is to be sought where compliance with the guidelines is unlikely to be achieved or additional/alternative measures are proposed to achieve the objectives. FESA is also to be consulted to provide advice on a strategic bush fire hazard assessment and the selection of areas suitable for more intensive development from a bush fire safety point of view.

## Guidance statement A7

### Referral to DEC and other decision-making authorities

Where the land that is the subject of a new proposal or proposed changes of zoning or design that will result in the introduction of, or an intensification of, development in an area that abuts vegetated land managed by DEC or other relevant management agency, the application is to be referred to the DEC (or relevant agency) for advice, regarding the potential impact of their fire management practices on the amenity of the future occupants, prior to a decision being made by the decision-making authority.

## Guidance statement A8

### Matters to be taken into consideration

In addition to the matters normally required to be taken into consideration, any advice received from FESA, the DEC (regarding potential impacts of their fire regime on amenity) or other relevant authority regarding fire management practices is to be taken into consideration before a decision is made by the decision-making authority on that application. When assessing new proposals or proposed changes of zoning or design that will result in the introduction of, or an intensification of, development that abuts land vested in the DEC, FESA will consider input from DEC on bush fire management prior to providing final advice on fire management practices to the decision-making authority.

# 2.4 Guidance statements for subdivision applications, strata applications and development applications

involving land that has a moderate to extreme bush fire hazard level or bush fire attack levels between BAL-12.5 and BAL-FZ

There are 12 guidance statements which relate to proposals for the subdivision and development of land. These seek to give effect to the general principles and the objectives of the guidelines.

## Guidance statement B1

### Diligence required with regard to the guidelines

The decision-making authority will have regard to the objectives and provisions of these guidelines in determining subdivision, strata and development applications in areas where there is a bush fire risk above the 'low' bush fire hazard level.

## Guidance statement B2

### Bush fire hazard assessment required

Unless it is clear to a decision-making authority that the land in question is not in an area that has a moderate or extreme bush fire hazard level or a bush fire attack level between BAL-12.5 and BAL-FZ, subdivision applications, strata applications and development applications should:

- include a bush fire hazard assessment based on the detailed fire hazard assessment methodology and classifications set out in appendix 1 of these guidelines;
- identify any bush fire hazard issues arising from that assessment;

- address those issues, in accordance with the general principles that underpin these guidelines, in a statement or a report which demonstrates that all fire protection requirements can be achieved to the satisfaction of the decision making authority; and
- be accompanied by a fully completed and signed compliance checklist for performance criteria and acceptable solutions form (form in appendix 3 of these guidelines).

## Guidance statement B3

### Areas with extreme bush fire hazard levels

Subdivision/development in an area that has an extreme bush fire hazard land classification and requires construction standards between BAL-40 or BAL-FZ will normally not be approved.

## Guidance statement B4

### Areas with extreme bush fire hazard levels where the introduction of, or intensification of residential land use is unavoidable

Where subdivision/development in an area that has an extreme bush fire hazard land classification and requires construction standards between BAL-40 or BAL-FZ is considered unavoidable, the application will only be approved where it can be demonstrated that acceptable, permanent hazard reduction measures can be implemented to reduce the hazard level to an acceptable level, and that the development can be undertaken in accordance with the general principles and building construction standards that underpin these guidelines.

## Guidance statement B5

### Areas with moderate bush fire hazard levels

Subdivision or development in an area that has a moderate bush fire hazard land classification and requires construction standards between BAL-12.5 and BAL-29 will only be approved where it can be undertaken in accordance with the general principles that underpin these guidelines.

## Guidance statement B6

### Referral to FESA

Any application that does not fully comply with the acceptable solutions set out in appendix 2 of these guidelines (ie involving a performance criteria assessment) is to be referred to FESA for advice prior to a decision being made.

## Guidance statement B7

### Referral to DEC and other decision-making authorities

Where the land that is the subject of the application for subdivision and development abuts vegetated land managed by DEC or other relevant management agency, the application is to be referred to the DEC (or relevant agency) for advice, regarding the potential impact of their fire management practices on the amenity of the future occupants, prior to a decision being made by the decision-making authority.

## Guidance statement B8

### Matters to be taken into consideration

In addition to the matters normally required to be taken into consideration in the determination of a subdivision application, strata application or development application, any advice received from FESA, the DEC (regarding potential impacts of their fire regime on amenity) or other relevant authority regarding fire management practices is to be taken into consideration before a decision is made by the decision-making authority on that application. When

assessing new proposals or proposed changes of design that will result in the introduction of, or an intensification of, development that abuts land vested in the DEC, FESA will consider input from DEC on bush fire management prior to providing final advice on fire management practices to the decision-making authority.

## Guidance statement B9

### WAPC general subdivision/ development conditions

The WAPC may impose conditions on subdivisions, strata applications or development applications to address fire protection issues including, but not limited to:

- the provision of fire fighting water supply and fire hydrants;
- the provision of fire services access;
- the preparation of a fire management plan and implementation of the specific fire protection measures set out in the plan (model fire management plan in appendix 4 of these guidelines);
- the allocation of a site for the location of a fire fighting facility; or
- the implementation of measures to ensure that prospective purchasers are aware of relevant scheme provisions, fire management plan and publications addressing fire safety.

## Guidance statement B10

### WAPC financial contribution subdivision/development conditions

The WAPC may also impose a condition on subdivisions, strata applications or development applications requiring financial contributions for on-going fire protection where the condition is required to give effect to a fire equipment strategy that has been prepared and adopted by a local government and which identifies:

- areas where fire equipment is required;
- the fire equipment to be provided;
- the estimated cost of the fire equipment;
- the timing of the provision of the fire equipment; or
- the contributions to be levied on future subdivisions in areas covered by the strategy to provide that fire equipment.

## Guidance statement B11

### Local government planning approval conditions

Local governments may also impose similar conditions as those listed in guidance statements B9 and B10, with the exception of conditions relating to the provision of fire hydrants and allocation of land for a fire fighting facility, on the development of land, where such conditions have not previously been imposed by the WAPC at the time of subdivision, strata application or development application.

## Guidance statement B12

### Re-use of previous bush fire hazard assessment information

If the issue of a detailed bush fire hazard assessment was addressed at the time of the zoning of the land, the information on that hazard may be re-used for the purpose of guidance statement B2, if that information is still relevant.

# Glossary

### Acceptable solution

A statement describing an acceptable means of complying with the requirements of a corresponding performance criterion.

### Appliance

A fire fighting appliance (vehicle) with structural, grass and bush fire fighting capabilities, with either a 2000 litre water capacity (2.4 appliance) or a 3000 litre water capacity (3.4 appliance), and four-wheel-drive.

### Building protection zone

Low fuel area immediately surrounding buildings. Minimum width 20 m, increasing with slope.

### Bush

Under the *Bush Fires Act 1954* the term 'bush' is defined to include 'trees, bushes, plants, stubble, scrub, and undergrowth of all kind whatsoever whether alive or dead and whether standing or not standing'.

### Bush fire

A general term used to describe fire in vegetation, and includes wildfire.

### Bush fire hazard

The flammability, arrangement and quantity of vegetation, dead or alive, that can be burnt in a bush fire. Development is to be avoided in extreme bush fire hazard designated areas.

### Bush fire hazard special control area

A special overlay planning control which addresses the issue of bush fire hazard and whose purpose is to:

- Identify bush fire prone areas where bush fires pose a significant threat to life and property.
- Avoid development in areas where there is a significant risk to life and property from bush fires.
- Ensure that land use and development takes into account bush fire requirements and includes specified protection measures where there is any risk from bush fires.

### Bush fire prone area

For the purposes of these guidelines, a bush fire prone area is an area that has been declared as such by the relevant local government responsible for an area. Once an area is declared bush fire prone, then AS 3959 applies to new residential development in it.

### Bush fire risk

The chance of a bush fire occurring that will have harmful consequences on life and property. It is measured in terms of consequences and likelihood, and arises from the interaction of hazards, communities and the environment.

### DEC

Department of Environment and Conservation.

### Decision-making authority

The WAPC, FESA and/or the relevant local government that makes decisions regarding the application of these guidelines.

### Development application

An application for approval to carry out development under either a local planning scheme or region planning scheme.

### Emergency access way

Road not normally open but available to the public (using two-wheel-drive vehicles) for evacuation during a bush fire emergency.

### FESA

The Fire and Emergency Services Authority of Western Australia.

### Fire break

Any natural or constructed discontinuity in a fuel bed used to segregate, stop and control the spread of a bush fire, or to provide a fire line from which to suppress a fire. This is an area cleared to reduce the risk of bush fire damage.

### Fire protection

A generic term used to describe the range of services and systems used to mitigate the impact of fire on the community. It encompasses both fire prevention and emergency response.

### Fire management plan

Ongoing, dynamic document that sets out medium to long-term mitigation strategies for fire hazards and risks in particular local government areas. Fire management plans are generally prepared by the local government, with the assistance of FESA staff and using a standard framework.

### Fire services access route

Accessible by heavy four-wheel-drive firefighting vehicles.

### Fuel reduction

See 'hazard reduction'.

### Hazard reduction

Removal and modification of bush fire fuel, or increase in building construction standards, or a combination of the two.

### Hazard separation zone

The fuel reduced area between an area of bush fire hazard and the buildings (and associated building protection zones) of a development.

### Performance criterion

Statement which specifies outcomes required for the protection of life and property from bush fires.

### Special control area

Special control areas are given statutory effect through inclusion in the relevant local planning scheme, in accordance with the Model Scheme Text in appendix B of the *Town Planning Amendment Regulations 1999*. The provisions of a special control area in a local planning scheme apply, in addition to the provisions of any underlying zone or reserve or any general provisions of the scheme.

### Structural fire

A fire in a building.

### WAPC

Western Australian Planning Commission.

# Appendices

# Appendix 1:

## Methodology for Determining Bush Fire Hazard Level

# How to conduct a bush fire hazard assessment

## 1. Classifying the bush fire hazard at the strategic level

Classifying the bush fire hazard by assessing the predominant vegetation (table 1) is a key to the initial determination of the site suitability for subdivision/development and if deemed suitable the potential level of construction standard is determined by the application of the AS 3959 – Construction of buildings in bush fire prone areas at the subdivision/development stage. It is highly recommended that buildings not be constructed in the extreme bush fire hazard rating zone. The bush fire hazard rating based on the predominant vegetation is:

1. **Low** – this area will generally be:
    - areas devoid of standing native vegetation (less than 0.25 ha cumulative area)
    - areas which due to climatic or vegetation (eg rainforest) conditions, do not experience bush fires
    - inner urban or suburban areas with maintained gardens and very limited native standing vegetation (less than 0.25 ha cumulative area)
    - pasture or cropping areas with very limited native standing vegetation that is a shrubland, woodland or forest.
2. **Moderate** – this area will generally be:
    - areas containing pasture or cropping areas with slopes in excess of 10°
    - open woodlands
    - open shrublands
    - low shrubs with slopes of less than 10° or flat land
    - suburban areas with some native tree cover.
3. **Extreme** – this area will generally be:
    - forests
    - woodlands
    - tall shrubs.

## Methodology

The methodology rates bush fire hazard using vegetation type. The methodology is also based on the underlying assumption that land in Western Australia is predominantly undulating with relatively short, steep inclines.

The methodology specifies three bush hazard levels low, moderate and extreme.

Determining the bush fire hazard is a three step process.

### Step 1: Determine the area to be assessed

Use an appropriate aerial photo and define the area that is to be the subject of the bush fire hazard assessment. This aerial photo must be at a scale that clearly shows the vegetation crowns and structure.

### Step 2: Identify vegetation type, determine vegetation class and create a vegetation classes map

Either through vegetation mapping data or physical inspection of the site the vegetation classification must be determined and characterised. The characterisation should use table 1 and figure 1 to identify which vegetation type or types predominate in the bush fire hazard assessment area.

Where there are various vegetation types in the assessment area the areas greater than 0.25 hectares are to be identified

and mapped. Areas of varying vegetation less than 0.25 hectares may be identified and mapped if required.

Map the results of the analysis to create a vegetation classes map covering the bush fire hazard assessment area.

### Step 3: Map the bush fire hazard levels

Finally, map the results of the analysis carried out in step 2 to create a bush fire hazard assessment map.

This analysis will form the basis of the land capability for land use planning assessment at the strategic level. Additional considerations may be required on whether any future subdivision/development will require increasing the construction standard of the homes and ensuring that the potential bush fire attack level determined during the subdivision/development phase aligns with the potential bush fire risks for that area.

## 2. Classifying the bush fire attack level (subdivision and development)

This process is applied after the bush fire hazard and land capability assessment has been conducted.

The methodology for the assessment of bush fire attack in these guidelines is based on the methodology used in *Australian Standard AS 3959: Construction of Buildings in Bushfire-Prone Areas* (AS 3959-2009).

The methodology rates bush fire attack using a combination of vegetation type (ie fuel type, load and structure) and the distance from the predominant vegetation. It assumes a forest fire danger index of 80 scenario in so far as weather conditions and fire behaviour are concerned. The methodology is also based on the underlying assumption that land in Western Australia is predominantly undulating with relatively short, steep inclines.

The methodology specifies six bush fire attack levels BAL-low, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ – and also identifies the appropriate AS 3959 construction standard for each hazard level[2].

The bush fire attack assessment process involves six discrete steps. Some of these steps may be able to be combined during the actual assessment process.

### Step 1: Determine the area to be assessed

Use an appropriately scaled map or aerial photo and define the area that is to be the subject of the bush fire attack assessment.

The bush fire attack assessment area should, as a minimum, include:

- all land within 100 metres of the external boundaries of the lot or lots in question or within 100 meters of a vegetation change if the vegetation is not homogenous.

### Step 2: Identify vegetation type, determine vegetation class and create a vegetation classes map

Use table 1 and figure 1 (at the end of this section) to identify which vegetation type or types predominate in the bush fire hazard assessment area, and then classify these vegetation types into more generalised vegetation classes.

Where there are various vegetation types in the assessment area the areas greater

[2] It should be noted that any modification to vegetation type or distance from vegetation will also modify the bush fire attack and therefore the AS 3959 construction standard required.

than 0.25 hectares are to be identified and mapped. Areas of varying vegetation less than 0.25 hectares may be identified and mapped if required.

Map the results of the analysis to create a vegetation classes map covering the bush fire hazard assessment area.

### Step 3: Distance of the site from classified vegetation

For each vegetation type classified in step 2, determine the distance of the site (building envelope containing the house, sheds, outbuildings, water tanks and so on or proposed lot) from the classified vegetation, measured in the horizontal plane.

### Step 4: Determine average slope, map average slope and create an Average Slope Map

Slope refers to the slope under the classified vegetation in relation to the building - not the slope between the vegetation and the building.

For each vegetation type classified in step 2, determine the effective slope (in degrees) of the land under the classified vegetation and whether it is upslope or downslope in relation to the site (building envelope containing the house, sheds, outbuildings, water tanks and so on or proposed lot).

Effective slope of land under classified vegetation is presented in degrees, approximate slope ratios and percentages. As fires travel slower down a hill, all classified vegetation that is upslope will assume a value of 0° (ie flat land).

### Step 5: Determination of bushfire attack level (BAL)

The determination of bushfire attack level (BAL) for a site shall be determined in accordance with:

- Select the relevant table from table 2.
- Using the relevant table, determine the BAL for each of the vegetation classifications determined in step 2, the distance from the site determined at step 3 and the effective slope determined at step 4.
- Select the highest BAL obtained from table 2 for that site (building envelope containing the house, sheds, outbuildings, water tanks and so on or proposed lot).

### Step 6: Determination of the appropriate construction requirements

Use the combined information created in previous steps to determine the bush fire attack levels and appropriate construction standard (table 3) in the bush fire hazard assessment area.

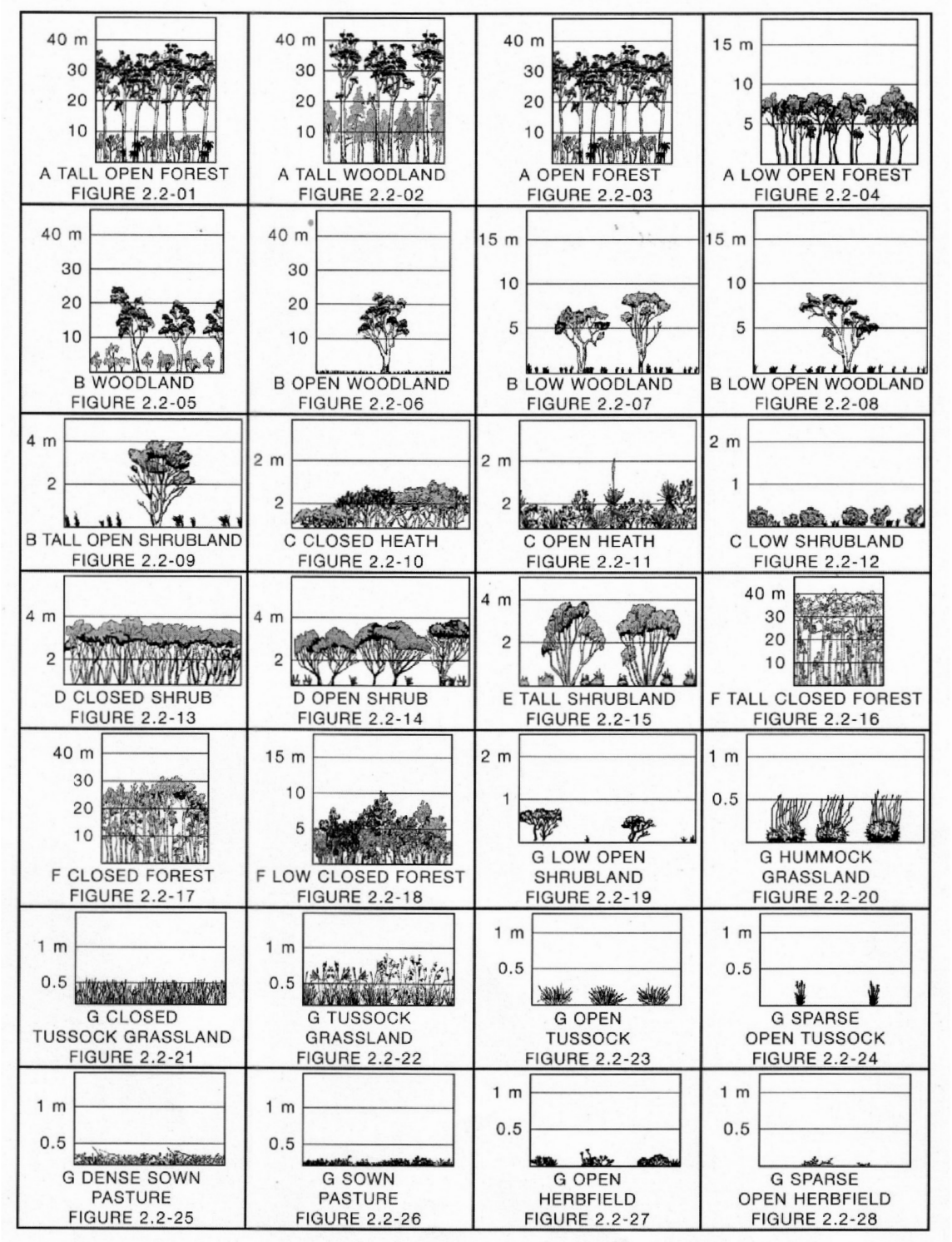
## Table 1: Vegetation type and class (text description)

| Vegetation classification (See tables 2.4.1 – 2.4.4) | Vegetation Type | Figure No. in Fig 1 | Description |
|---|---|---|---|
| **A Forest** | Tall open forest<br>Tall woodland | 01<br>02 | Trees over 30 metres high; 30-70% foliage cover; (may include understorey ranging from rainforest and tree ferns to low trees and tall shrubs). Found in areas of high reliable rainfall. Typically dominated by eucalypts. |
| | Open forest<br>Low open forest | 03<br>04 | Trees 10-30 metres high; 30-70% foliage cover; (may include understorey of sclerophyllous low trees and tall scrubs or grass). Typically dominated by eucalypts. |
| | Pine Plantation | Not shown in Figure 2.3 | Trees 10-30 metres in height at maturity generally comprising Pinus species or other softwood species, planted as a single species for the production of timber. |
| **B Woodland** | Woodland<br>Low woodland | 05 | Trees 10-30 metres high; 10-30% foliage cover dominated by eucalypts; understorey low trees to tall shrubs typically dominated by Acacia, Callitris or Casuarina. |
| | Low woodland<br>Low open woodland<br>Open shrubland | 06<br>07<br>08<br>09 | Low trees and shrubs 2-10 metres high; foliage cover less than 10%. Dominated by eucalypts and acacias. Often have a grassy understorey or low shrubs. Acacias and Casuarina woodlands grade to Atriplex shrublands in the arid and semi-arid zones. |
| **C Shrubland** | Closed heath<br>Open heath | 10<br>11 | Found in wet areas but which are affected by poor soil fertility or shallow soils. Shrubs 1-2 metres high often comprising Banksia, Acacia, Hakea and Grevillea. Wet heaths occur in sands adjoining dunes of the littoral (shore) zone. Montane heaths occur on shallow or water-logged soils. |
| | Low shrubland | 12 | Shrubs <2 metres high; greater than 30% foliage cover. Understoreys can contain grasses, Acacia and Casuarina often dominant in the arid and semi arid zones. |
| **D Scrub** | Closed scrub | 13 | Found in areas wet enough to support eucalypts trees, which are affected by poor soil fertility or shallow soils. >30% foliage cover. Dry heaths occur in rocky areas. Shrubs 1-2 metres high. Often coastal wetlands. |
| | Open scrub | 14 | Trees greater than 2 metres high, 10-30% foliage cover. Dominated by eucalypts or co-dominant melaleuca and myoporum with a mixed understorey |
| **E Mallee/ Mulga** | Tall shrubland | 15 | Vegetation dominated by shrubs (especially eucalypts and acacias) with a multi-stemmed habit; usually greater than 2 metres in height <30% foliage cover. Understorey of widespread to dense low shrubs (Acacia) or sparse grasses. |
| **F Rainforest** | Tall closed forest<br>Closed forest<br>Low closed forest | 16<br>17<br>18 | Trees 10-40 metres in height; >90% foliage cover; understorey may contain a large number of species with a variety of heights. |
| **G Grassland (unmanaged) (Appears in table 2.4.3 FDI 50, only – See Note 1)** | Low open shrubland<br>Hummock grassland<br>Closed tussock grassland<br>Tussock grassland<br>Open tussock<br>Sparse open tussock<br>Dense sown pasture<br>Sown pasture<br>Open herbfield<br>Sparse open herbfield | 19<br>20<br>21<br>22<br>23<br>24<br>25<br>26<br>27<br>28 | All forms including situations with shrubs and trees if the overstorey foliage cover is less than 10%. |

**Notes:**
Grassland, although classified as unmanaged, is not considered in the category of bush fire attack, except in Tasmania see Clause 2.4.2.
Overstoreys of Open Woodland, Low Open Woodland, Tall Open Shrubland and Low Open Shrubland should be classified to the vegetation type on the basis of their understoreys, others to be classified on the basis of their overstoreys.
Vegetation height is the average height of the top of the overstorey.

Source: "AS 3959 - 2009 Construction of buildings in bushfire-prone areas" published by Standards Australia, Sydney.

## Figure 1: Vegetation type and class (graphic description)




Source: "AS 3959 - 2009 Construction of buildings in bushfire-prone areas" published by Standards Australia, Sydney.

## Table: 2 Determination of bush fire attack level (BAL)

| Vegetation classification | Bush fire Attack Levels (BALs) | | | | |
|---|---|---|---|---|---|
| | BAL—FZ | BAL—40 | BAL—29 | BAL—19 | BAL—12.5 |
| | Distance (m) of the site from the predominant vegetation class | | | | |
| | Vegetation is upslope and flat land (0 degrees) | | | | |
| A. Forest | <16 | 16–<21 | 21–<31 | 31–<42 | 42–<100 |
| B. Woodland | <10 | 10–<14 | 14–<20 | 20–<29 | 29–<100 |
| C. Shrubland | <10 | 10–<13 | 13–<19 | 19–<27 | 27–<100 |
| D. Scrub | <7 | 7–<9 | 9–<13 | 13–<19 | 19–<100 |
| E. Mallee/Mulga | <6 | 6–<8 | 8–<12 | 12–<17 | 17–<100 |
| F. Rainforest | <6 | 6–<9 | 9–<13 | 13–<19 | 19–<100 |
| | Vegetation is downslope (building is upslope) >0 to 5 degrees | | | | |
| A. Forest | <20 | 20–<27 | 27–<37 | 37–<50 | 50–<100 |
| B. Woodland | <13 | 13–<17 | 17–<25 | 25–<35 | 35–<100 |
| C. Shrubland | <11 | 11–<15 | 15–<22 | 22–<31 | 31–<100 |
| D. Scrub | <7 | 7–<10 | 10–<15 | 15–<22 | 22–<100 |
| E. Mallee/Mulga | <7 | 7–<9 | 9–<13 | 13–<20 | 20–<100 |
| F. Rainforest | <8 | 8–<11 | 11–<17 | 17–<24 | 24–<100 |
| | Vegetation is downslope (building is upslope) >5 to 10 degrees | | | | |
| A. Forest | <26 | 26–<33 | 33–<46 | 46–<61 | 61–<100 |
| B. Woodland | <16 | 16–<22 | 22–<31 | 31–<43 | 43–<100 |
| C. Shrubland | <12 | 12–<17 | 17–<24 | 24–<35 | 35–<100 |
| D. Scrub | <8 | 8–<11 | 11–<17 | 17–<25 | 25–<100 |
| E. Mallee/Mulga | <7 | 7–<10 | 10–<15 | 15–<23 | 23–<100 |
| F. Rainforest | <11 | 11–<15 | 15–<22 | 22–<31 | 31–<100 |
| | Vegetation is downslope (building is upslope) >10 to 15 degrees | | | | |
| A. Forest | <33 | 33–<42 | 42–<56 | 56–<73 | 73–<100 |
| B. Woodland | <21 | 21–<28 | 28–<39 | 39–<53 | 53–<100 |
| C. Shrubland | <14 | 14–<19 | 19–<28 | 28–<39 | 39–<100 |
| D. Scrub | <9 | 9–<13 | 13–<19 | 19–<28 | 28–<100 |
| E. Mallee/Mulga | <8 | 8–<11 | 11–<18 | 18–<26 | 26–<100 |
| F. Rainforest | <14 | 14–<19 | 19–<28 | 28–<39 | 39–<100 |
| | Downslope >15 to 20 degrees | | | | |
| A. Forest | <42 | 42–<52 | 52–<68 | 68–<87 | 87–<100 |
| B. Woodland | <27 | 27–<35 | 35–<48 | 48–<64 | 64–<100 |
| C. Shrubland | <15 | 15–<21 | 21–<31 | 31–<43 | 43–<100 |
| D. Scrub | <10 | 10–<15 | 15–<22 | 22–<31 | 31–<100 |
| E. Mallee/Mulga | <9 | 9–<13 | 13–<20 | 20–<29 | 29–<100 |
| F. Rainforest | <18 | 18–<25 | 25–<36 | 36–<48 | 48–<100 |

**Notes:**

1. Siting of residential development in the BAL-FZ and BAL-40 zone is not recommended.

2. The separation distances in the table align with the tables within AS 3959.

Source: "AS 3959 - 2009 Construction of buildings in bushfire-prone areas" published by Standards Australia, Sydney.

## Table 3: Bushfire attack levels and corresponding sections for specific construction requirements

| Bushfire Attack Level (BAL) | Classified vegetation within 100 m of the site and heat flux exposure thresholds | Description of predicted bush fire attack and levels of exposure | Construction Section as per AS 3959 |
|---|---|---|---|
| BAL-LOW | | There is insufficient risk to warrant specific construction requirements. Despite this, FESA strongly recommends that ember protection features be incorporated in design where practicable. | 4 |
| BAL-12.5 | ≤12.5 kW/m$^2$ | Ember attack | 3 and 5 |
| BAL-19 | >12.5 kW/m$^2$ ≤19 kW/m$^2$ | Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux. | 3 and 6 |
| BAL-29 | >19 kW/m$^2$ ≤29 kW/m$^2$ | Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux. | 3 and 7 |
| BAL-40 | >29 kW/m$^2$ ≤40 kW/m$^2$ | Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux with the increased likelihood of exposure to flames. | 3 and 8 |
| BAL-FZ | >40 kW/m$^2$ | Direct exposure to flames from fire front in addition to heat flux and ember attack. | 3 and 9 |

Source: “AS 3959 - 2009 Construction of buildings in bushfire-prone areas” published by Standards Australia, Sydney.

# Appendix 2:

## Bush fire protection performance criteria and acceptable solutions

## 1. Explanation of performance criteria and acceptable solution approach

These guidelines adopt a performance-based system of control for each bush fire hazard management issue using a consistent format as follows:

- element number and management issue;
- a concise statement of intent;
- performance criteria (P) in left hand column;
- acceptable solutions (A) in right hand column; and
- explanatory notes (E), often supplemented by photographs or diagrams.

The management issues are:

1. location
2. vehicular access
3. water
4. siting of development
5. design of development.

The *intent* outlines the desired outcome for each bush fire hazard management issue, and reflects identified planning and policy requirements in respect of each issue.

*Performance criteria* are general statements of the means of achieving the intent. They are not meant to be limiting in nature. Instead, they provide applicants with an opportunity to develop a variety of design responses to address each bush fire hazard management issue.

*Acceptable solutions* illustrate one example of satisfactorily meeting the corresponding performance criterion, and are provided as examples of acceptable design outcomes. Acceptable solutions are therefore intended to provide a straightforward pathway to assessment and approval – compliance with an acceptable solution automatically means compliance with the corresponding performance criterion, and thus fulfilment of the intent of each bush fire hazard management issue.

## 2. Applicant requirements

Applicants have a choice to select either:

1. a performance approach for assessment;
2. an acceptable solutions approach;
3. or a combination of the two.

If an applicant wishes to have a proposal assessed against the performance criteria, then all relevant performance criteria in the left hand column must be addressed.

> *In a performance criteria assessment, the onus is always on the applicant to demonstrate to a decision-maker's satisfaction that the proposal satisfactorily complies with the performance criteria.*

It needs to be remembered that the assessment of a proposal using the performance criteria will involve the exercise of discretion on the part of a decision-maker.

If the applicant requests that a proposal be assessed against the acceptable solutions, then the provisions in the right hand column for the relevant criteria must be satisfied. Acceptable solutions offer only ONE example of potentially meeting the criterion.

Given that the acceptable solutions illustrate only one example of satisfactorily meeting the corresponding performance criterion, the use of an acceptable solution as a yardstick or evaluation standard during a performance criteria assessment is generally not appropriate. It needs to be remembered that the assessment of a proposal

using the performance criteria will involve the exercise of discretion on the part of the decision-maker.

If an applicant wishes to have a proposal assessed against a combination of both the performance criteria and the acceptable solutions, then all relevant provisions must be addressed and satisfied.

## 3. Changing the acceptable solutions to recognise local or regional circumstances

In some circumstances local governments that have formally adopted these guidelines as a decision-making tool may wish to make modifications to the acceptable solutions in the guidelines in recognition of special local or regional circumstances (eg topography).

These alternative acceptable solutions will need to be endorsed in writing by both FESA and the WAPC before they can be considered to have any formal status in the context of the guidelines.

There is no formal statutory process for this procedure. Requests to modify the acceptable solutions will be dealt with on a case-by-case basis.

Such requests will need to be supported by a well-argued case that clearly:

- explains the reasons why the modification is required; and
- demonstrates to the satisfaction of both FESA and the WAPC that the modifications satisfactorily comply with the corresponding performance criteria and are in accordance with best practice in so far as bush fire hazard management is concerned.

Any local government wishing to explore the possibility of modifying the acceptable solutions should commence the process by initiating informal discussions with local FESA staff and Department of Planning staff (acting on behalf of the WAPC). The steps required to obtain the formal endorsement of both organisations, and the mechanism by which the modifications should take effect (eg local planning scheme amendment or local planning policy), can be defined during those discussions.

## 4. Bush fire hazard levels and performance criteria

The relationship between the various bush fire hazard levels and the performance criteria are set out in the table below.

### Table 2: Bush fire hazard levels and performance criteria

| Level of bush fire hazard | Bush fire protection performance criteria required |
|---|---|
| **Low hazard** | Development does not require special bush fire planning controls. Despite this, FESA strongly recommends that ember protection features be incorporated in design where practicable. |
| **Moderate hazard** | Performance criteria for:<br>• location (P1)<br>• vehicular access (P2)<br>• water (P3)<br>• siting of development (P4)<br>• design of development (P5) |
| **Extreme hazard** | Development is to be avoided in areas with these hazard levels. |

## Element 1: Location

| Intent |
|---|
| To ensure that development/intensification of land use is located in areas where the bush fire hazard does not present an unreasonable level of risk to life and property. |

| Performance criteria | Acceptable solutions |
|---|---|
| *The intent may be achieved where:* | *The acceptable solutions illustrate ONE EXAMPLE of meeting the associated performance criteria.* |
| **P1**<br>The subdivision/development is located in an area where the bush fire hazard level is manageable. | **A1.1 Development location**<br>The subdivision/development is located on land that is not subject to either an extreme bush fire hazard land classification or requires construction standards to BAL-40 or BAL-FZ. |

| Explanatory notes |
|---|
| **E1.1a Development location**<br>Rezoning, subdivision and development applications must have due regard to bush fire protection requirements. Land is most suitable for new subdivisions and related development where hazard levels are low. Where residents and buildings cannot be protected due to excessive bush fire hazard the land may not be suitable for development.<br><br>The level of bush fire hazard provides a measure of the likely intensity of a bush fire and the likely level of bush fire attack on a subdivision and related development – whether from within or from outside the subdivision. This measure, therefore, provides an indication of the suitability of land for subdivision and development.<br><br>Hazard levels can be assigned to a whole subdivision area or parts of a subdivision area, or even parts of individual lots. In the latter case, bush fire hazard levels can assist with determining suitable or unsuitable locations for building envelopes and buildings. |

## Element 2: Vehicular Access

| Intent |
|---|
| To ensure that the vehicular access serving a subdivision/ development is safe in the event of a bush fire occurring. |

| Performance criteria | Acceptable solutions |
|---|---|
| *The intent may be achieved where:* | *The acceptable solutions illustrate ONE EXAMPLE of meeting the associated performance criteria.* |
| **P2**<br><br>The internal layout, design and construction of public and private vehicular access in the subdivision/development allows emergency and other vehicles to move through it easily and safely at all times. | **A2.1 Two access routes**<br><br>Two different vehicular access routes, both of which connect to the public road network, are available to all residents/the public at all times.<br><br>And<br><br>**A2.2 Public roads**<br><br>Public roads meet the following requirements:<br><br>• minimum trafficable surface: 6 metres<br>• horizontal clearance: 6 metres<br>• vertical clearance: 4 metres<br>• maximum grades: 1 in 8<br>• maximum grade over <50 metres: 1 in 5<br>• maximum average grade: 1 in 7<br>• minimum weight capacity: 15 tonnes<br>• maximum crossfall: 1 in 33<br>• curves minimum inner radius: 12 metres<br><br>*Notes to A2.2:*<br>*6 metre trafficable surface width does not necessarily mean paving width. It could, for example, include 4 metre wide paving and 1 metre wide constructed road shoulders.*<br><br>*In special circumstances, where 8 or less lots are being serviced, a public road with a minimum trafficable surface of 4 metres for a maximum distance of 90 metres may be provided subject to the approval of both the local government and FESA.*<br><br>And |

## Element 2: Vehicular Acess

| Performance criteria | Acceptable solutions |
|---|---|
| | **A2.3 Cul-de-sacs** (including dead end roads) are generally not encouraged in bush fire prone areas. Where used, however, cul-de-sac standards are to be as follows:<br>• maximum length: 200 metres (if emergency access is provided between cul-de-sac heads maximum length can be increased to 600 metres provided no more than 8 lots are serviced)<br>• minimum trafficable surface: 6 metres<br>• horizontal clearance: 6 metres<br>• maximum grades: 1 in 8<br>• maximum grade over <50 metres: 1 in 5<br>• maximum average grade: 1 in 7<br>• minimum weight capacity: 15 tonnes<br>• maximum crossfall: 1 in 33<br>• curves minimum inner radius: 12 metres<br>• as per turn around area requirements – including 21 metre diameter head.<br><br>And<br><br>**A2.4 Battle axes**<br><br>Battle axe access legs meet the following requirements:<br>• maximum length: 600 metres<br>• minimum width: 6 metres<br>• minimum trafficable surface: 4 metres<br>• horizontal clearance: 6 metres<br>• vertical clearance: 4 metres<br>• maximum grades: 1 in 8<br>• maximum grade over <50 metres: 1 in 5<br>• maximum average grade: 1 in 7<br>• minimum weight capacity: 15 tonnes<br>• maximum crossfall: 1 in 33<br>• curves minimum inner radius: 12 metres.<br><br>*Note to A2.4:*<br><br>*Where possible, battle axe lots should be avoided in areas that are subject to a bush fire hazard level of moderate to extreme.*<br><br>And |

## Element 2: Vehicular Acess

| Performance criteria | Acceptable solutions |
|---|---|

**A2.5 Private driveways**

Constructed private driveways meet the following requirements:

- required where house site is more than 50 metres from a public road
- minimum trafficable surface: 4 metres
- horizontal clearance: 6 metres
- vertical clearance: 4 metres
- maximum grades: 1 in 8
- maximum grade over <50 metres: 1 in 5
- maximum average grade: 1 in 7
- minimum weight capacity: 15 tonnes
- maximum crossfall: 1 in 33
- curves minimum inner radius: 12 metres
- passing bays: every 200 metres with a minimum length of 20 metres and a minimum width of 2 metres (ie the combined width of the passing bay and constructed private driveway to be minimum 6 metres)
- turn around areas designed to accommodate 3.4 fire appliances and to enable them to turn around safely: every 500 metres and within 50 metres of a house.

And

**A2.6 Emergency access ways**

Emergency access ways, providing alternative links to public roads during emergencies meet the following requirements:

- minimum trafficable surface: 6 metres
- horizontal clearance: 6 metres
- vertical clearance: 4 metres
- maximum grades: 1 in 8
- maximum grade over <50 metres: 1 in 5
- maximum average grade: 1 in 7
- minimum weight capacity: 15 tonnes
- maximum crossfall: 1 in 33
- curves minimum inner radius: 12 metres
- must be signposted.

And

## Element 2: Vehicular Acess

| Performance criteria | Acceptable solutions |
|---|---|
| | **A2.7 Fire service access routes**<br><br>Fire services access routes, providing links between public road networks for fire fighting purposes, meet the following requirements:<br><br>• surface: all weather<br>• dead end: not permitted<br>• minimum trafficable surface: 6 metres<br>• horizontal clearance: 6 metres<br>• vertical clearance: 4 metres<br>• maximum grades: 1 in 7<br>• maximum grade over <50 metres: 1 in 4<br>• maximum average grade: 1 in 5<br>• minimum weight capacity: 15 tonnes<br>• maximum crossfall: 1 in 33<br>• curves minimum inner radius: 12 metres<br>• turn around areas designed to accommodate 3.4 appliances and to enable them to turn around safely: every 500 metres<br>• erosion control measures and long term maintenance arrangements in place<br>• access to public road network: every 1000 metres<br>• allow for two way traffic.<br><br>And<br><br>**A2.8 Gates**<br><br>All gates used to restrict traffic on emergency access ways and fire service access routes meet the following requirements:<br><br>• minimum width 3.6 metres<br>• design and construction: to be approved by relevant local government<br>• emergency access way gates: must not be locked<br>• fire service access route gates: may be locked but only with a common key that is available to local fire service personnel<br>• Signposted.<br><br>And |

## Element 2: Vehicular Acess

| Performance criteria | Acceptable solutions |
|---|---|
| | **A2.9 Firebreak widths** Lots greater than 0.5 hectares must have an internal perimeter firebreak of a minimum 3 metres width.<br><br>And<br><br>**A2.10 Signs**<br><br>Signs are erected where emergency access ways and fire services access routes adjoin public roads, and meet the following requirements:<br><br>• minimum height above ground: 0.9 metres<br>• design and construction: to be approved by relevant local government<br>• lettering height: 100 millimetres<br>• to display the following wording (as appropriate): 'Fire Service Access – No Public Access' or 'Emergency Access Only'. |

### Explanatory notes

**E2.1 Need two fire service access routes**

It is essential that residents and the community, as well as fire services, have safe access to and egress from both the subdivision and individual houses/development. It is the developer's responsibility, as part of the bush fire hazard and land suitability assessment, to ensure that subdivision and development design allow for performance criteria to be met regarding driveways and turn around areas at house sites (ie slope, rock).

It is also necessary that the public have two different access options. This applies to access routes leading into a subdivision, as well as those within a subdivision. By providing two access options, residents can evacuate and fire services can enter even when one access route is blocked by fire. All access should be suitable to accommodate 3.4 fire appliances (ie appliances on a 4WD 7 tonne chassis). New subdivisions and related developments will only be permitted where these performance criteria can be met.

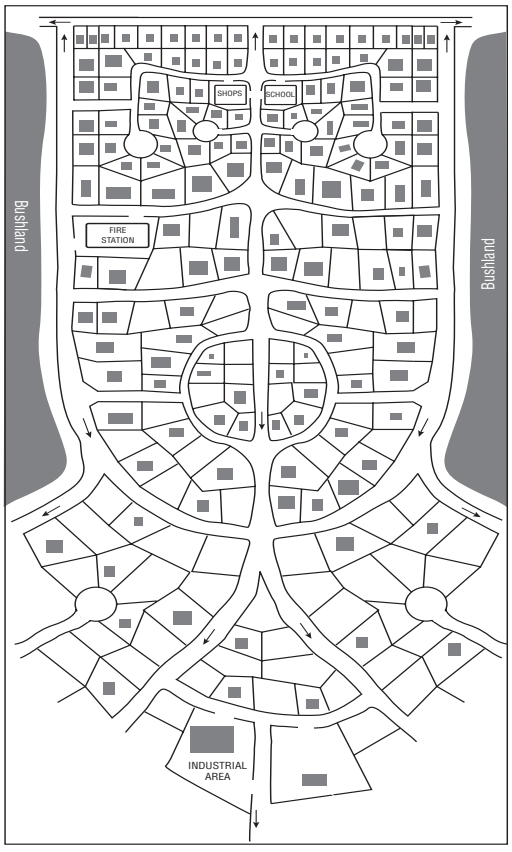



Diagram E2.1 Subdivision with access in accordance with A2.1

## Element 2: Vehicular Acess

### Explanatory notes

#### E2.2 Public road design

All roads should allow for two-way traffic and for conventional two-wheel-drive vehicles to travel safely on them. Widths quoted for access routes refer to the width of the trafficable surface. All public and fire access routes should allow for two-way traffic, so that vehicles can safely enter as well as evacuate in a fire emergency.

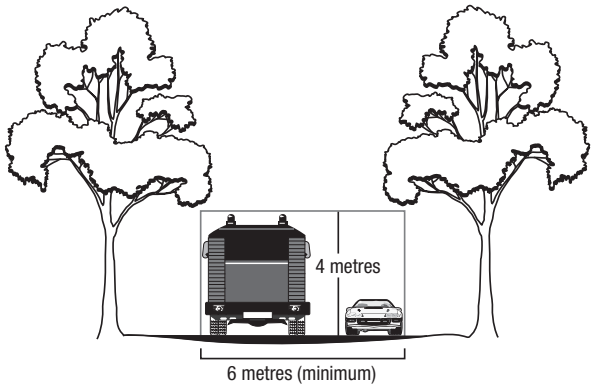



Diagram E2.2 All public roads should allow for two-way traffic and for conventional two-wheel-drive vehicles and 2.4 and 3.4 fire appliances to travel safely on them.
(Ref P2, A2.2)

#### E2.3 Cul-de-sacs

In bush fire prone areas cul-de-sacs are generally not encouraged because they do not provide two way access and egress to residents. Where they are used, however, they should not exceed 200 m in length. In some instances it may be possible to provide emergency access between cul-de-sac heads – so as to provide residents with two way access and egress.

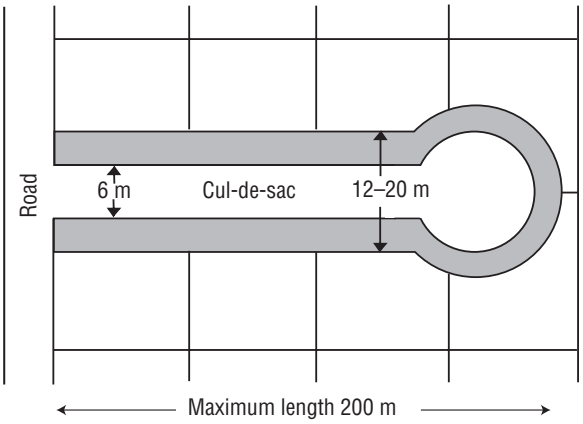



Diagram E2.3 If cul-de-sacs are utilised, these design guidelines are required to be followed. (Ref. P2, A2.3)

#### E2.4 Battle axe access

In bush fire prone areas battle axe accesses should generally be avoided because they often do not provide two-way access and egress to residents. However, where they are used to overcome specific site constraints they should comply with the minimum standards for driveways.

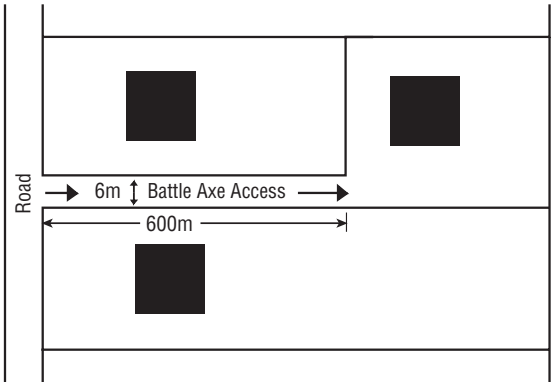



Diagram E2.4 Where possible, battle axe lots should be avoided in areas that are subject to a bush fire hazard level of moderate to extreme. (Ref. P2, A2.4)

## Element 2: Vehicular Acess

### Explanatory notes

#### E2.5 Private driveways

Where house sites are more than 50 m from a public road, access to individual houses and turning areas should be available for both conventional two-wheel-drive vehicles of residents and 3.4 fire appliances. Turn around areas should be located within 50 m of a house. Passing bays should be available where driveways are longer than 200 m and turn around areas in driveways that are longer than 500 m. This criteria should be addressed through land suitability assessment and subdivision design.

Passing bays should be provided at 200 m intervals along driveways and battle axe accesses to allow two way traffic. They should be a minimum length of 20 m, with the combined width of the passing bay and the access being a minimum of 6 m.

Turn around areas should allow 3.4 fire appliances to turn around safely and should be available at cul-de-sac heads, house sites and at 500 m intervals along driveways and fire service accesses.

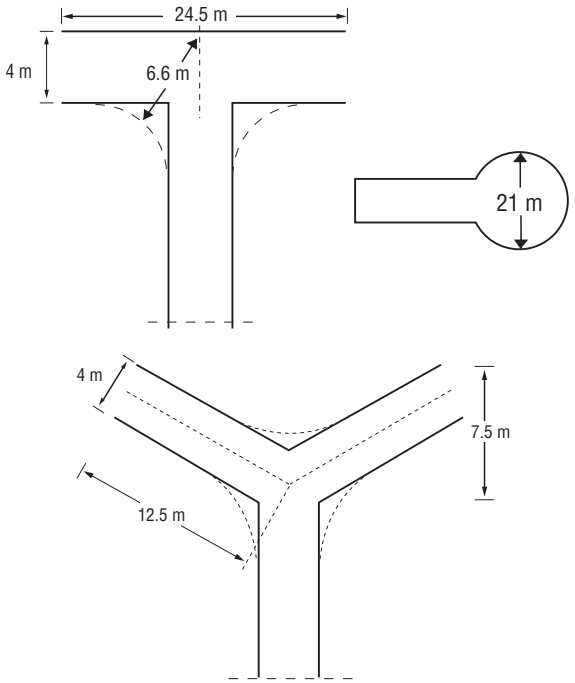



Diagram E2.5 Turning areas should allow 3.4 fire appliances to turn safely. (Ref. P2, A2.5)

#### E2.6 Emergency access ways

Emergency accesses may be used to link up with roads to allow alternative access and egress during emergencies where traffic flow designs do not allow for two-way access. The access should comply with minimum standards for roads and should be signposted. Where gates are used to control traffic flow during non-emergency periods, these must not be locked.

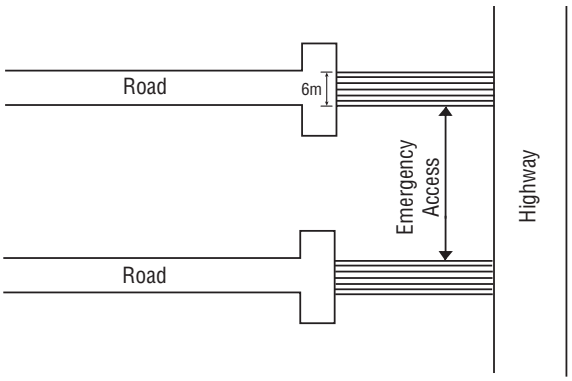



Diagram E2.6 Two different vehicular access routes, both of which connect to the public road network, should be available to all residents at all times. (Ref. P2, A2.6)

## Element 2: Vehicular Acess

### Explanatory notes

#### E2.7 Fire service access routes

Fire service access routes should be established to separate bush fire hazard areas from developed areas, and to provide access within and around the edge of the subdivision and related development. Fire service access is used during bush fire suppression operations but can also be used for fire prevention work.

Fire service access routes should:

- Link up with the road network at regular intervals – the development and road network forms part of the fire service access system.
- Be adequately signposted.
- Allow for two-way traffic – that is, two fire appliances must be able to safely pass each other.
- Have a hard surface.
- Have erosion control measures in place.

Driveways may be used as part of the designated fire service access system, provided they meet the minimum standard for fire service access routes. It is beneficial to link the fire service access routes with individual driveways to allow quick access to properties and houses during fire emergencies.

Management and access arrangements should be in place to ensure that the maintenance of fire service access routes will occur in the long-term after an area has been subdivided. A number of options can be used to achieve this, including but not limited to:

- Individual property owners being responsible for maintaining fire service access routes where these fall on their property.
- Easements being in place to provide for access.
- A levy system administered by local government covering the cost of maintaining fire exit routes.

Such arrangements should be documented in relevant planning application (such as a structure plan, subdivision plan or development plans) and should be agreed to by local government.

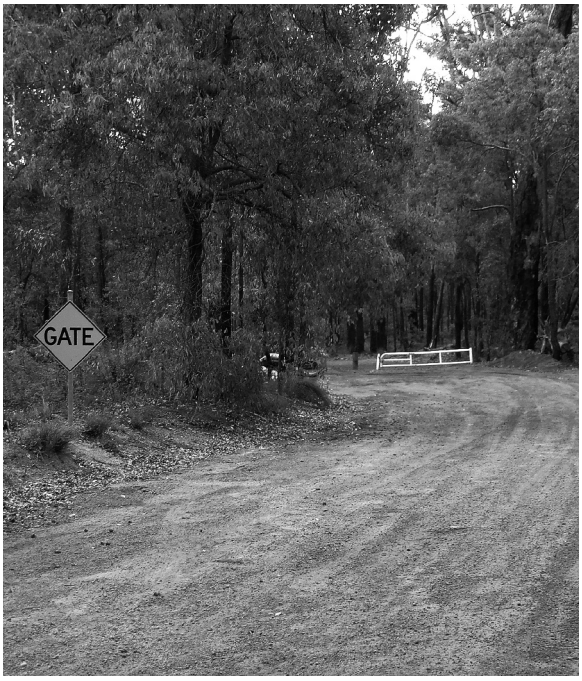



Diagram E2.8 Emergency access ways may be used to link up with roads to allow alternative ingress and egress during fire emergencies. Emergency access way gates must not be locked. (Ref. P2, A2.8 and A2.10)

## Element 2: Vehicular Acess

### Explanatory notes

#### E2.8 Gates

Gates may be used to restrict traffic on emergency access and fire service access routes. Where gates are used these should be wide enough to accommodate 3.4 fire appliances. Gates on fire service access routes may be locked to restrict access provided that a common key system is used and such keys are made available for fire appliances and designated fire officers within the local government area and/or surrounding district. Gates used to restrict access to emergency accesses must not be locked. Gates should be installed where fences cross fire service access routes.

Diagram E2.9 Fire service access routes may be used to provide links between public road networks for fire fighting purposes. Fire service access route gates may be locked but only with a common key that is available to local fire service personnel. Emergency access gates must not be locked. Signs are erected where emergency access ways adjoin public roads.
(Ref. P2, A2.7, A2.8)

#### E2.9 Fire break widths

This requirement is in accordance with standard fire break orders issued by local governments.

#### E2.10 Signs

Signs are to be installed where fire service access routes and emergency access adjoin public roads. This includes driveways that are used as fire service access routes. Signs shall display the following wording as appropriate:

- 'Fire Service Access - No Public Access'
- 'Emergency Access Only'.

## Element 3: Water

| Intent |
|---|
| To ensure that water is available to the development to enable life and property to be defended from bush fire. |

| Performance criteria | Acceptable solutions |
|---|---|
| *The intent may be achieved where:* | *The acceptable solutions illustrate ONE EXAMPLE of meeting the associated performance criteria.* |
| **P3** The development is provided with a permanent and secure water supply that is sufficient for fire fighting purposes. | **Reticulated areas**<br><br>**A3.1**<br>The development is provided with a reticulated water supply, together with fire hydrants, in accordance with the specifications of the relevant water supply authority and FESA.<br><br>*Notes to A3.1*<br>*Water supply authorities in Western Australia include the Water Corporation, Aqwest and the Busselton Water Board.*<br>*The 'Water Corporation's No.63 Water Reticulation Standard' is deemed to be the baseline criteria for developments and should be applied unless local water supply authorities conditions apply.*<br><br>**Non-reticulated areas**<br><br>**A3.2**<br>Water tanks with a hydrant or standpipe are provided and meet the following requirements:<br>• volume: 50,000 litres per tank<br>• ratio of tanks to lots: 1 tank per 25 lots (or part thereof)<br>• tank location: tanks are located to allow a 2.4 appliance to achieve a 20 minute turn around time at legal road speeds from the tanks to the furthest dwelling site within the residential development<br>• tank construction: above ground tanks are constructed of concrete or metal and the stands of raised tanks are constructed using non-combustible materials and heat shielding where appropriate (ie heat shielding will be required in the case of metal tank stands) |

## Element 3: Water

| Performance criteria | Acceptable solutions |
|---|---|
| | • It is the responsibility of the local government to ensure that these tanks are full of water<br>• pipe construction: galvanised or copper pipe are used above ground, although PVC pipe may be used if buried 300 millimetres below ground<br>• couplings are to be in accordance with the FESA guidelines available at www.fesa.wa.gov.au<br>• procedures are put in place to ensure water tanks are maintained at full capacity at all times<br>• hardstand and turn around area suitable for a 3.4 appliance are provided within 3 metres of each water tank<br>• water tanks and associated facilities are vested in the relevant local government.<br><br>Or<br><br>**A3.3**<br><br>A dam (or dams) with permanent water all year (including during drought years) is provided and meets the following requirements:<br>• volume: 200 cubic metres of water storage at the driest time of the year for every 25 lots (or part thereof)<br>• dam (or dams) is either vested in the relevant local government, or has a caveat placed on it to ensure fire services access. |

## Element 3: Water

### Explanatory notes

#### E3.1 Reticulated water supply – hydrant location

It is critical that fire services have ready access to an adequate water supply during fire emergencies. Water supplies have to be:

- easily accessible
- located at regular intervals.

#### E3.2 Non-reticulated areas – water tanks

Where scheme water is not available, water tanks and a standpipe or hydrant must be used. Construction and design of the tank and associated facilities must be approved by local government. An engineer's certificate is required in relation to the foundation, construction and water flow rates of the facility.

Galvanised or copper pipe must be used above ground. PVC or polypipe can only be used where pipes are buried a minimum of 300 mm below ground level when measured from the top of the pipe. A hardstand and turn around area suitable for a 3.4 fire appliance is required at the hardstand.

A procedure must be in place to ensure that tanks are maintained at full capacity at all times. Options include:

- Agreement with the local government/fire service to maintain tank to full capacity.
- Filling system from bore or dam that maintains tank to full capacity. Design and construction of such a system must be approved by local government. Minimum flow rates should be 50 litres per minutes.

Water tanks and associated facilities must be vested in local government.

#### E3.3 Non-reticulated areas – dams

A dam (or dams) with permanent water all year (including during drought years) needs to meet specific requirements for volume per serviced lots and fire service access.

## Element 4: Siting of development

| Intent |
|---|
| To ensure that the siting of development minimises the level of bush fire impact. |

| Performance criteria | Acceptable solutions |
|---|---|
| *The intent may be achieved where:* | *The acceptable solutions illustrate ONE EXAMPLE of meeting the associated performance criteria.* |
| **P4**<br><br>The siting (including paths and landscaping) of the development minimises the bush fire risk to life and property.<br><br>*Notes to P4:*<br><br>*The minimum distances of 100 metres and 20 metres set out in A4.1 and A4.2 may be reduced using a performance criteria assessment.*<br><br>*One way for residential development to meet this performance criterion would be compliance with AS 3959.*<br><br>*Under AS 3959, as the distance from the vegetation is reduced, the construction standard must be increased. Table 2 of appendix 1 sets out the relationship between construction standard and distance from vegetation.*<br><br>*It should be noted that enforcement of AS 3959 through the Building Code of Australia (BCA) requires that land be designated under a power in legislation as being subject, or likely to be subject, to bush fires (ie has a attack level of BAL-12.5, BAL-19, BAL-29, BAL-40 or BAL-FZ using the methodology set out in these guidelines).* | **A4.1 Hazard separation – moderate to extreme bush fire hazard level**<br><br>Every building is sited a minimum distance of 100 metres from any vegetation classified under table 1 and figure 1 as forests, woodlands, closed shrub, open shrub, mallee/mulga and rainforest (ie in an area with an moderate or extreme bush fire hazard level) or has its construction standard increased to align with the appropriate bush fire attack level for that location. Under AS 3959, the distance between the predominant vegetation and the building can be reduced but, the construction standard must be increased.<br><br>And<br><br>**A4.2 Hazard separation - low bush fire hazard level**<br><br>Every building is sited a minimum distance of 20 metres from any vegetation classified under table 1 and figure 1 of appendix 1 as grassland (ie in an area with a low bush fire hazard level).<br><br>And |

## Element 4: Siting of development

| Performance criteria | Acceptable solutions |
|---|---|
| | **A4.3 Building protection zone**<br><br>Every building is surrounded by a building protection zone that meets the following requirements:<br>• width: 20 metres measured from any external wall of the building<br>• location: within the boundaries of the lot on which the building is situated<br>• fuel load: reduced to and maintained at 2 tonnes per hectare<br>• trees (crowns) are a minimum of 10 metres apart<br>• trees are low pruned at least to a height of 2 metres<br>• no tall shrub or tree is located within 2 metres of a building (including windows)<br>• there are no tree crowns overhanging the building<br>• fences and sheds within the building protection zone are constructed using non-combustible materials (eg colourbond iron, brick, limestone)<br>• shrubs in the building protection zone have no dead material within the plant<br>• tall shrubs in the building protection zone are not planted in clumps close to the building ie within 3 metres<br>• trees in the building protection zone have no dead material within the plant's crown or on the bole.<br><br>*Notes to A4.3:*<br>*To measure and determine fuel loads use FESA's visual fuel load guide.*<br><br>*Surface bush fire fuels should be kept low to the ground.*<br><br>*Potential bush fire fuels should be kept green if possible.*<br><br>*The extent of the building protection zone must be depicted on the plans.*<br><br>And<br><br>**A4.4 Hazard separation zone**<br><br>Every building and its contiguous building protection zone is surrounded by a hazard separation zone that meets the following requirements:<br>• minimum width: 80 metres in the case of vegetation classified under table 1 and figure 1 as forests, woodlands, closed shrub, open shrub, mallee/mulga and rainforest, measured from the outer edge of the building protection zone |

## Element 4: Siting of development

| Performance criteria | Acceptable solutions |
|---|---|
| | • location: within the boundaries of the lot on which the building is situated or, where this is not possible or desirable, within the boundaries of the overall residential development in which the building is proposed to be located<br>• fuel load: reduced to and maintained at between 5 and 8 tonnes per hectare for jarrah/marri dominated forest and woodlands, below 12-15t/ha in mallee heath and below 15t/ha in karri forest<br>• trees (crowns) are a minimum of 10 metres apart<br>• trees in the hazard separation zone have no dead material within the plant's crown or on the bole.<br><br>*Note to A4.4:*<br><br>*To measure and determine fuel loads use FESA's visual fuel load guide.*<br><br>*The extent of the hazard separation zone should be depicted on the plans.*<br><br>And/or<br><br>**A4.5 Reduction in bush fire attack level due to shielding**<br><br>A reduction in the bushfire attack level (BAL) due to shielding from direct flame contact or radiant heat via a stand alone non-combustible structure shall be considered achieved when the following applies:<br>• A building elevation that is not exposed to the source of bushfire attack can be classified to the next lower bushfire attack level for those elevations.<br>• A reduction in the bushfire attack level (see (a) above) and the according construction standards cannot fall below BAL-12.5.<br>• An elevation is deemed to be exposed to the source of the bush fire if any of the straight lines between that elevation and source of bush fire attack is not obstructed by another part of the building, for this method, only the side(s) furthest from the vegetation will gain the reduction. |

## Element 4: Siting of development

### Explanatory notes

#### E4.1a and E4.2a Hazard separation zones – around subdivisions

There must be a physical separation between extreme bush fire hazards and development in low, medium and high bush fire hazard areas. Hazard separation zones assist in reducing fire intensity when a bush fire impacts on buildings within a subdivision. Separation can be achieved in a number of different ways. For example, a public road between the bush fire hazard and all the buildings can be combined with hazard reduced zones to make such a separation. Alternatively, hazard reduced areas such as a golf course or a lake may be incorporated into the design of a subdivision or development to create the separation zone.

It should be noted that the use of hazard separation zones will only minimise bush fire vulnerability. It is only one example of the tools to be applied to reduce likely bush fire intensity adjacent to buildings. Under adverse fire conditions, high intensity bush fires can still occur in, and fire fronts can burn through even well maintained hazard separation zones.

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#### E4.1b and E4.2b Hazard separation zones – within subdivisions

Separation may be necessary on the perimeter of a subdivision but may also be needed where bush fire hazards exist within a subdivision. This separation reduces the overall vulnerability of a subdivision and related development and assists with fire control operations.

Hazard separation zones must be provided between extreme bush fire hazards and buildings within a subdivision to create a minimum separation distance of 100 metres between the buildings and the hazard - in order to protect them from burning debris (spotting, airborne embers), radiant heat and direct flame contact.

Where bush fire hazards exist within a subdivision, a separation zone should be created between these hazards and the buildings. Examples of bush fire hazards within a subdivision might include wetlands, gullies or public open space with remnant vegetation. Other hazard areas may include undeveloped stages or lots within, or adjacent to, a subdivision and related development.

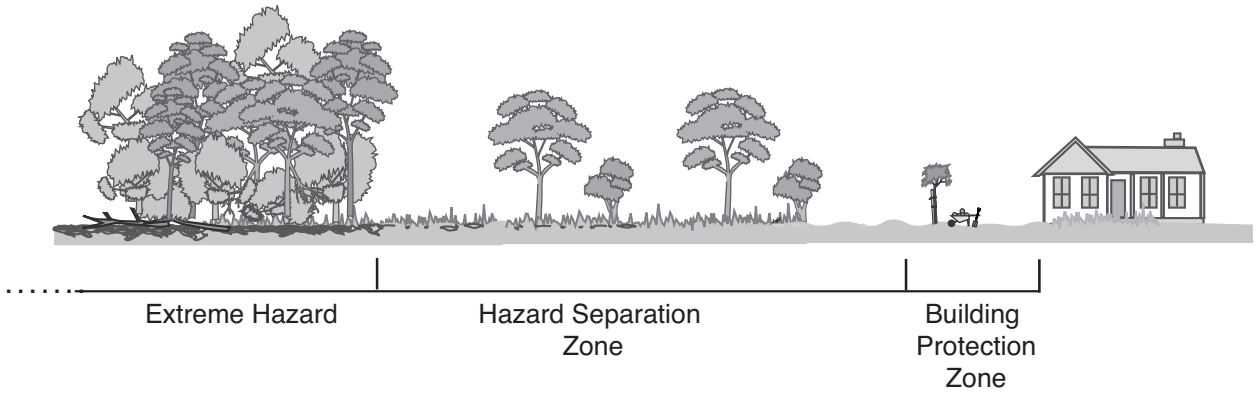


Diagram E4.1b and E4.2b Hazard separation zones within subdivisions, including the building protection zone, to consider for development. (Ref. P4, A4.1, A4.2)

## Element 4: Siting of development

### Explanatory notes

**E4.3a and E4.4a Building/hazard protection zones – suitable development**

Building protection zones are required in addition to hazard separation zones. The performance criteria for building protection zones are essential criteria and must be achieved. The building protection zone is a low fuel area immediately surrounding a building and is designed to minimise the likelihood of flame contact with buildings. It must fulfil the following outlined within A4.3 including:

- Fuel load reduced to and maintained at 2 tonnes per hectare (see FESA's visual fuel load guide)
- Trees are low pruned (lower branches trimmed) at least to a height of 2 metres
- No tall shrub or tree is located within 2 metres of a building (including windows)
- There are no tree crowns overhanging the building.

Features such as driveways, vegetable patches, lawn or landscaped garden (including deciduous trees and fire resistant plant species) may form part of building protection zones. Isolated shrubs and trees may be retained within building protection zones. Building protection zones vary in size depending on slope. Zones must be a minimum of 20 metres wide on flat land with the width of the zone increasing as the slope increases.

Note that building protection/hazard separation zones can adversely affect the retention of native vegetation. Where this loss of vegetation is not acceptable or causes conflict with either landscape or environmental objectives, reducing lot yield may be necessary in order to minimise the removal and modification of remnant vegetation.

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**E4.3b and E4.4b Building/hazard protection zones – widths to protect development**

Building protection zones can be achieved through careful subdivision and development design and should be contained within a subdivision and related development so as not to extend beyond its boundaries. Roads, footpaths and verges can be combined to create appropriate zones to reduce the bush fire hazard.

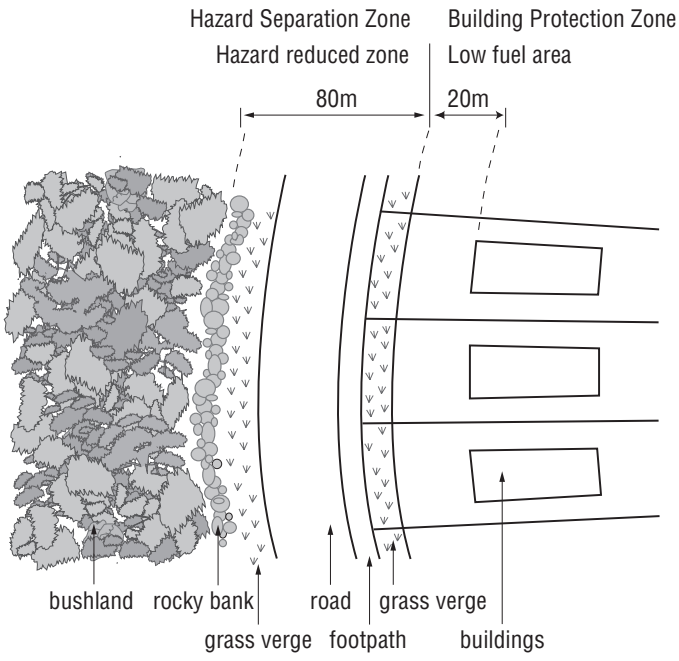


Diagram E4.3b and E4.4b Consideration of widths to protect residential assets. (Ref P4, A4.3, A4.4)

## Element 4: Siting of development

### Explanatory notes

#### E4.3c and E4.4c Building protection zones – suitable development

Building protection zones should generally be contained within an individual lot. In areas where this cannot be achieved (eg where lot sizes are small), it may be possible to create building protection zones across lot boundaries.

However, this is only acceptable where adjacent subdivisions and developments have the same or a compatible land use and fire breaks are maintained.

Note, the 80 m hazard separate zone may be reduced if housing construction standards are increased in accordance with AS 3959.

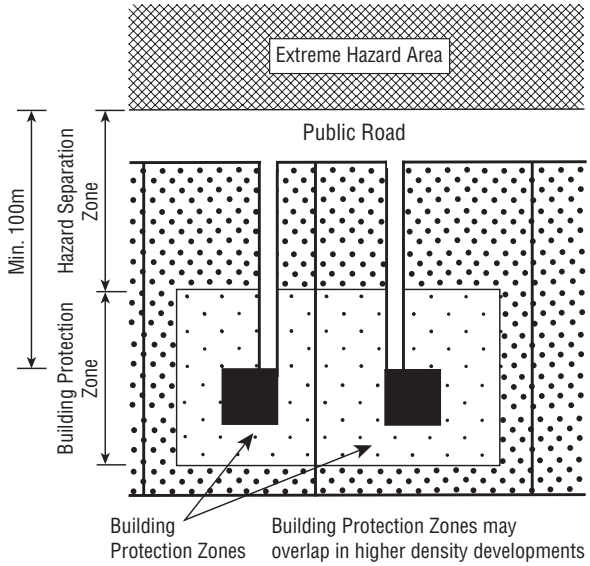


Diagram E4.3c and E4.4c Building protection zones may overlap in higher density developments. (Ref. P4, A4.3, A4.4)

#### E4.3d and E4.4d Building protection zones – unsuitable development

The maintenance of building protection zones must be able to be guaranteed across lot boundaries through the implementation of the local government fire break notice.

Where this is not done, the development becomes unsuitable, even if it had been originally designed and developed in a suitable manner.

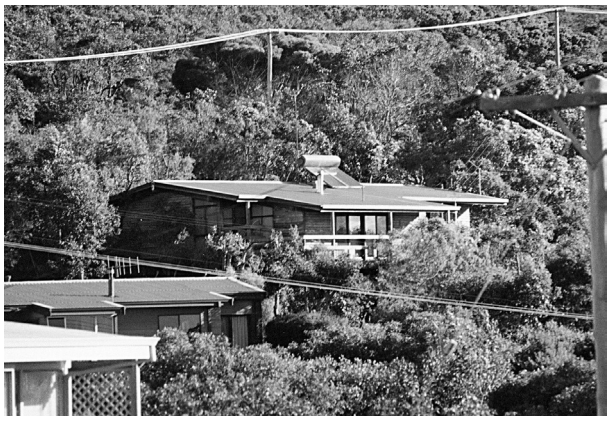

Diagram E4.3d and E4.4d An unsuitable development - building protection zones do not exist in this development due to the poor maintenance of fire breaks and by allowing too much vegetation to intrude into the building protection zones. (Ref P4, A4.3, A4.4)

#### E4.5 Shielding

The construction requirements for the next lower BAL than that determined for the site may be applied to an elevation of the building where the elevation is not exposed to the source of bush fire attack. An elevation is deemed to be not exposed to the source of bush fire attack if all of the straight lines between that elevation and the source of bush fire attack are obstructed by a barrier constructed of non-combustible material or another part of the building.

The construction requirements for a shielded elevation shall be not less than that required for BAL-12.5, except where the exposed elevations have been determined as BAL-LOW.

## Element 5: Design of development

| Intent | |
|---|---|
| To ensure that the design of the development minimises the level of bush fire impact. | |
| **Performance criteria** | **Acceptable solutions** |
| *The intent may be achieved where:* | *The Acceptable Solutions illustrate ONE EXAMPLE of meeting the associated Performance Criteria.* |
| **P5**<br>The design of the development is appropriate to the level of bush fire hazard that applies to the development site.<br><br>*Notes to P5:*<br><br>*One way for residential development to meet this performance criterion would be compliance with AS 3959.*<br><br>*Under AS 3959, as the distance from the vegetation is reduced, the construction standard must be increased. Table 2 of appendix 1 sets out the relationship between construction standard and distance from vegetation.*<br><br>*It should be noted that enforcement of AS 3959 through the BCA requires that land be designated under a power in legislation as being subject, or likely to be subject, to bush fires (ie has a attack level of BAL-12.5, BAL-29, BAL-40 or BAL-FZ using the methodology set out in these guidelines).* | **A5.1 Compliant development**<br>For development that complies with acceptable solutions A4.1, A4.2, A4.3 and A4.4 there are no special design requirements.<br><br>*Note to A5.1:*<br><br>*This is because such compliance results in a low bush fire hazard level.*<br><br>**A5.2 Non-compliant development**<br>For development that does not comply with acceptable solutions A4.1, A4.2, A4.3 and A4.4 there is no acceptable solution. All such proposals must be assessed under performance criterion P5. |

## Element 5: Design of development

### Explanatory notes

#### E5.1 Design for compliant development

The design and layout of subdivision and development can reduce the vulnerability of dwellings and residents from the impact of a bush fire. Appropriate design will greatly assist with bush fire prevention and suppression operations. Bush fire protection features form an integral part of subdivision and development design. They must be taken into consideration and integrated during initial planning stages. Experience has shown that it is generally not sufficient – nor indeed practical – to try to add bush fire protection features once a subdivision and related development has been designed or established.

A number of different bush fire protection features must be incorporated into the design of a subdivision and related development to minimise the impact of a bush fire in bush fire prone areas. Each feature is a performance criteria on its own. However, it is the combination of the different features which minimises the likely impact a bush fire will have.

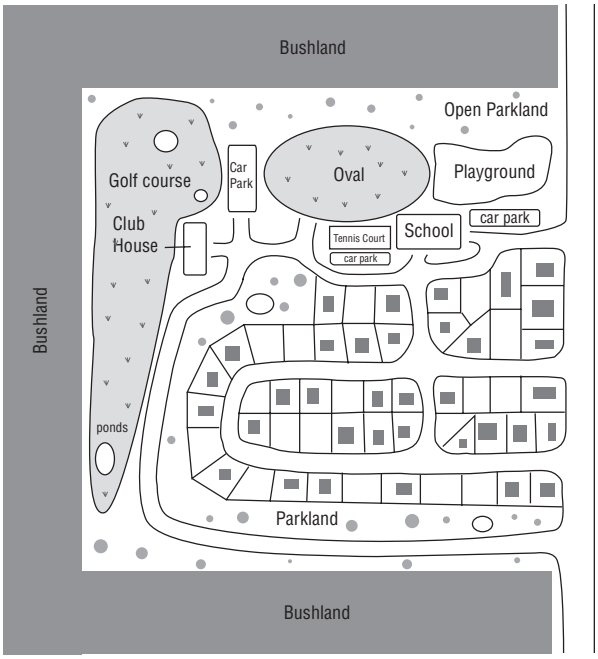


Diagram E5.1 An example of a development, surrounded on three sides by bush fire hazard areas, that has bush fire protection features – in this case hazard reduced areas like the golf course, cleared parkland, oval and playground. (Ref. P5, A5.1)

#### E5.2 Non-compliant development

There is no acceptable solution for development that does not comply with acceptable solutions A4.1, A4.2, A4.3 and A4.4.

# Appendix 3:
# Model fire management plan

# 1. Introduction

The purpose of the plan is to provide guidance as to how to plan for and manage the potential bush fire threat in specified areas. These areas can be a single dwelling, a farm, a subdivision, settlement, townsite or local government area. This model guide has been developed to assist with bush fire planning by providing a framework.

As a guide the plan should include a general background (eg include the scope of plan and the area the plan covers).

The following topics may also be addressed:

- What can be achieved by applying this plan.
- The need for each individual land holder to protect his or her property.
- The fact that fire appliances may not be available to protect each dwelling.

The following should be specified to ensure that the plan remains up to date:

- A time limit for any update of the plan (this may be every year).
- A time limit for the revision of the plan (this may be every 5 years).
- The authority responsible for the above.

# 2. Aim

The aim of the plan should be clearly stated. It is suggested that the aim of fire management plan is to reduce the occurrence of, and minimise the impact of bush fires, thereby reducing the threat to life, property and the environment.

The aim of a fire management plan is to document fire prevention requirements of any area.

# 3. Objectives

This is a list of achievable and measurable goals of the plan. Examples are as follows.

**3.1 Define areas where values are located**

This is closely related to land use such as urban, special rural, plantations, crops and industrial assets.

**3.2 Define and rank fire hazard areas**

This relates to different fuel types and loadings as well as to flammability of fuels.

**3.3** Nominate individuals and organisations responsible for fire management and associated works within the area of the plan (eg local government for land vested in it and private property owners for freehold land).

**3.4** Propose fire management strategies for all land, with due regard for life, property and the environment.

**3.5** Define an assessment procedure which will evaluate the effectiveness and impact of proposed, as well as existing, fire prevention work and strategies.

**3.6** Provide performance criteria and acceptable solutions for all fire management works.

This could include performance criteria and acceptable solutions for fire breaks or low fuel areas, building construction standards, maximum compartment size in a plantation or minimum equipment levels during harvesting or burning off operations. Minimum standards may be included in an appendix and should not compromise those accepted by FESA Fire Services.

# 4. Description of the area

## 4.1 General

A general overview of the area that describes the physical, social and cultural features of the area.

## 4.2 Climate

Growing season, rainfall, length of fire season, worst fire weather conditions and/or wind direction, and frequency of lightning.

## 4.3 Topography

A description of the topography of the area (eg flat, undulating, steep, broken up by river systems).

## 4.4 Bush fire fuels

A description of the vegetation types and quantities.

## 4.5 Land use

A general overview of different land uses within the area (eg rural, plantations, public land, national parks, special rural, urban). A map of the whole area of the fire management plan showing the different land uses is required. Specific erosion problems may also be highlighted in this section.

## 4.6 Assets

A general overview of the location of assets within the area of the plan. This could include town sites, subdivisions, construction standards for housing in bush fire prone areas, historical sites, aboriginal cultural sites, plantations, cropping areas or bush areas of high conservation value. A map may be appropriate.

## 4.7 Access

A description of the type and quality of roads (eg two-way, two-wheel drive or one-way, four-wheel drive). Natural barriers should be noted (eg rivers, swamps, large bush areas, dieback and sand ridges).

## 4.8 Water supply

A description of the water sources available both domestic irrigation and external water sources (eg hydrants, rivers, water points, tanks).

# 5. Fire problem

## 5.1 Bush fire history

A general description of bush fires which have occurred in the past and the damage they caused. List also the reason why the bush fires were eventually extinguished (eg change to milder weather conditions, fire fighting effort along a low fuel buffer, nothing left to burn). This may give valuable background information. Major fire events from some decades ago should be included. Furthermore, a list of causes and a map of the locations, sizes and shapes of bush fires, possibly covering the last 5 to 10 years, may provide valuable information on the fire problem in the area.

## 5.2 Bush fire risk

Bush fire risk is a concept used to describe the likelihood of harmful consequences arising from the interaction of hazards, community and the environment.

## 5.3 Bush fire hazard

A hazard is a potential or existing condition that may cause harm to people or damage property or the environment.

### 5.4 Bush fire threat

Threat is the product of risk and hazard. Fire threat is greatest where the likelihood of fires starting is high and where bush fire fuels are adjacent to development or assets.

### 5.5 Summary of bush fire potential issues

Summarise items 5.1 to 5.4 to give an overview of the potential bush fire issues in the area. This may be achieved by preparing overlays for bush fire history, bush fire risk, and bush fire hazard and placing them over the base map of the area. Overlays may not be required in all cases, especially when the frequency of fire is low. In some cases, overlays may be produced for the whole area as well as for specific high risk areas to give more detail.

## 6. Fire mitigation strategies

Any action or work proposed within each subsection may be highlighted. It should also be included in the works program.

### 6.1 Hazard management

This section addresses fuel management within each different land use (eg urban, rural and public land). Priority should be given to areas adjacent to life and property as a minimum requirement, low fuel building protection buffers at least 20 m wide around individual dwellings should be considered as should an appropriate hazard separation zone of up to 100 m. As a consequence of the change of land use the bush fire fuel loads must be maintained at less than or equal to 8t/ha for jarrah and marri forest, 12-15 t/ha in mallee/heath and below 15 t/ha in karri forest.

Hazard management may also address fire breaks or strategic fire breaks and low fuel buffers, especially around assets or areas where numerous fires have occurred in the past.

It is important that hazard management programs undertaken by different organisations within the area of the plan complement each other. This should also apply to district or farm fire protection plans, where these have been drawn up. Hazard management may recommend or specify areas suitable or not suitable for development.

This section also defines requirements for inspections and possible work orders and infringement notices where required. It also lists the individuals or authorities responsible and the time frame for fire prevention works and inspections.

### 6.2 Bush fire risk management

This relates to previous fire causes and likely fire causes. The aim is to reduce the number of fires occurring and to reduce the impact of those that do occur. For example, issues which could be addressed may include:

- Restrictions on the use of machinery (eg vehicle movement on fire danger days above ‘very high’ or imposed by local government).
- Restrictions on the use of reserves and national parks on fire danger days above ‘very high’.
- Requirements to have fire fighting equipment (eg extinguisher, fire appliances) on site during operations which are likely to start a fire (angle grinder, harvesting, burning off refuse sites).
- Installation of gas barbecues where campfires may be a problem.

- Public education/community awareness (6.5 - Public education and community awareness).
- Timing and implementation of restricted and prohibited burning times.

## 6.3 Future development

Guidelines for the location, layout and management of future development can reduce fire threat. These guidelines might include:

- Designating bush fire prone areas.
- Restricting new development to low fire threat areas or, alternatively, the specification of minimum standards for access.
- Planning of low fuel areas and fire breaks, water supply and building standards for development in bush fire prone areas.
- Construction standards of building are to the appropriate Australian Standard.

## 6.4 Access and fire breaks

Determine, list and map the location of access and fire breaks, specify minimum standards, where required. Include a works program for construction and maintenance, together with the individual or authority responsible for the work and for inspecting the work, and a time frame, in an appendix.

## 6.5 Public education and community awareness

Public education and community awareness may include school-based education, fire awareness campaigns such as open days, field days and seminars, electronic media or signage visible from major access roads or other suitable location. It may be appropriate to have no public education other than the standard local government firebreak notice.

## 6.6 Fire safer areas

The development, maintenance and signposting of bush fire safer areas can be incorporated within this plan. They could be community centres such as hospitals or schools, recreation centres or ovals, individual safe houses which are not likely to be affected by a bush fire, or even a large, slashed or cleared low fuel area within a national park or bush block. Include a works program in the appendix.

## 6.7 Assessment of fire management strategies

When fire management strategies and works are proposed, it is important to assess their social, financial and environmental impact and effectiveness before these are implemented and again after they have been in place for some time. Issues which could be addressed include:

- Does the work achieve the expected result?

  For example:

  Is it possible to stop a fire?

  Does the public education program reduce the number of fires starting?

  Do restrictions on harvesting, such as bans during BAL-40 fire weather or the requirement to have a fire unit in attendance, reduce the number or size of harvest fires?

- Is it likely that fire response operations utilise fire prevention works?

  For example:

  If fire breaks are established and maintained are fires stopped at those breaks or are new breaks constructed during suppression?

  Is it likely that residents and visitors will use refuge areas in the even of a bush fire?

- Is the cost of fire prevention work (eg installation and maintenance of fire breaks or low fuel breaks, public education programs) offset by a reduction in personal or economic loss or by a saving in fire response resources?
- What is the impact of fire prevention work and is the impact acceptable to the community?

  This may include economic as well as environment factors (erosion, conservation, spread of dieback disease, visual).

It is suggested that a checklist is developed in this section against which all fire prevention work, proposed or already in place, is assessed. It is recommended that the above issues are included in the checklist and that further points are added as required.

### 6.8 Implementation of fire management plan

Outlines the ongoing implementation of the fire management plan, such as ongoing responsibilities and maintenance requirements.

# 7. Appendix

### 7.1 Maps

Maps showing the location of low fuel areas, fuel ages, high risk areas, access. Specify the individual or authority responsible for producing and updating maps, together with a timeframe.

### 7.2 Works program

This should include tasks to be performed, cost and date by which the work has to be completed and by whom. Programs could be based on an annual maintenance and/or a five year program.

### 7.3 Guidelines, specifications and minimum standards

Copies of all specifications or standards relevant to this plan should be included for easy reference. Examples are:

- standard fire breaks order of the area;
- Planning for Bush Fire Protection;
- Australian Standard 3959 Construction in bush fire-prone areas
- minimum standards for strategic fire breaks;
- minimum standards for static water points (tanks) in rural subdivisions
- minimum standards for equipment required during harvesting or burning.

### 7.4 Glossary

Include a glossary to ensure that all parties understand the terminology used. The Australasian Fire Authorities Council's 'Glossary of Rural Fire Terminology' is recommended.

### 7.5 References

# Appendix 4:

## Compliance checklist for performance criteria and acceptable solutions

# Compliance checklist for performance criteria and acceptable solutions

## Element 1: Location

**Does the proposal comply with the performance criteria by applying acceptable solution A1.1?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P1 for this area of non-compliance, and attach this explanation to the rear of this checklist.

## Element 2: Vehicular access

**Does the proposal comply with the performance criteria by applying acceptable solution A2.1?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P2 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A2.2?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P2 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A2.3?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P2 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A2.4?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P2 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A2.5?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P2 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A2.6?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P2 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A2.7?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P2 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A2.8?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P2 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A2.9?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P2 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A2.10?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P2 for this area of non-compliance, and attach this explanation to the rear of this checklist.

## Element 3: Water

**Does the proposal comply with the performance criteria by applying acceptable solution A3.1?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P3 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A3.2?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P3 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A3.3?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P3 for this area of non-compliance, and attach this explanation to the rear of this checklist.

## Element 4: Siting of development

**Does the proposal comply with the performance criteria by applying acceptable solution A4.1?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P4 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A4.2?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P4 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A4.3?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P4 for this area of non-compliance, and attach this explanation to the rear of this checklist.

*Note: Please indicate the extent of the building protection zone on the plans submitted.*

**Does the proposal comply with the performance criteria by applying acceptable solution A4.4?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P4 for this area of non-compliance, and attach this explanation to the rear of this checklist.

*Note: Please indicate the extent of the hazard separation zone on the plans.*

**Does the proposal comply with the performance criteria by applying acceptable solution A4.5?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P4 for this area of non-compliance, and attach this explanation to the rear of this checklist.

*Note: Please provide details of the proposed shielding to be implemented as part of the development.*

## Element 5: Design of development

**Does the proposal comply with the performance criteria by applying acceptable solution A5.1?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P5 for this area of non-compliance, and attach this explanation to the rear of this checklist.

**Does the proposal comply with the performance criteria by applying acceptable solution A5.2?**

**Yes** ☐ **No** ☐

If no, please explain in writing how the proposal satisfactorily complies with performance criterion P5 for this area of non-compliance, and attach this explanation to the rear of this checklist.

---

### Applicant Declaration

I declare that the information provided is true and correct to the best of my knowledge.

Full name: .....

Applicant signature: .....

Date: .....

## Application property details:

# Appendix 5:

## Special control area provisions bush fire hazard

# Special control area provisions bush fire hazard

## 6.1 Bush fire hazard special control area

6.1.1 The bush fire hazard special control area is shown on the scheme map as BFH[3].

6.1.2 In respect of a special control area shown on a scheme map, the provisions applying to the special control area apply in addition to the provisions applying to any underlying zone or reserve and any general provisions of the scheme.

## 6.2 Purpose of bush fire hazard special control area

6.2.1 The purpose of the bush fire hazard special control area is:

(a) to implement *State Planning Policy 3.4 Natural Hazards and Disasters*;

(b) to identify land that is subject, or likely to be subject, to bush fire hazard,

(c) to ensure a bush fire attack level assessment is carried out on land that is subject, or likely to be subject, to bush fire hazard; and

(d) to ensure that development effectively addresses the level of bush fire hazard applying to the land.

## 6.3 Development in the bush fire hazard special control area

6.3.1 Prior to the adoption or amendment of a structure plan resulting in the introduction or intensification of development or approval of a subdivision or development application within a bush fire hazard area, a bush fire attack level assessment satisfactorily addressing the level of bush fire hazard applying to the land is to be submitted.

6.3.2 In addition to development which otherwise requires approval under the scheme, planning approval is required for any development within the bush fire hazard area that does not comply with an approved bush fire hazard assessment undertaken as part of the structure planning or subdivision of an area or is inconsistent with the WAPC's and FESA Authority's *Planning for Bush Fire Protection Guidelines (Edition 2)*.

6.3.3 In determining an application to carry out development in the bush fire hazard area, the local government may refuse the application, or impose conditions on the any planning approval as to:

- The provision of a fire fighting water supply.
- The provision of fire services access.
- The preparation of a fire management plan in accordance with the *Planning for Bush Fire Protection Guidelines (Edition 2)* and implementation of specific fire protection measures set out in the plan.
- The implementation of measures to ensure that prospective purchasers are aware of the relevant scheme provisions, fire management plan and publications addressing fire safety.

[3] The Bush Fire Hazard Special Control Area should apply to all stands of significant vegetation and all land within 100 metres of the perimeter of that vegetation. This will ensure that all land subject to a BAL-12.5, Bal-19, BAL-29, Bal-40 and Bal-FZ bush fire hazard is located within the special control area.

- Require financial contributions for on-going fire equipment where a strategy that has been adopted by the local government and which clearly identifies the areas where fire equipment is to be provided, estimated cost of the fire equipment, timing of the provision of the fire equipment and detailing the equitable apportionment of the costs of providing that fire equipment.

## 6.4 Additional information requirements

6.4.1 An application for development approval must be accompanied by:

(a) a bush fire attack level assessment carried out in accordance with the methodology contained in the *Planning for Bush Fire Protection Guidelines (Edition 2)*; and

(b) a statement or report that demonstrates that all relevant bush fire protection acceptable solutions, or alternatively all relevant performance criteria, contained in the *Planning for Bush Fire Protection Guidelines (Edition 2)* have been considered and complied with, and effectively address the level of bush fire hazard applying to the land.

## 6.5 Referral of applications

6.5.1 If, in the opinion of the local government, a development application does not fully comply with the bush fire protection acceptable solutions contained in the Planning for *Bush Fire Protection Guidelines (Edition 2)*, the application shall be referred to the FESA for advice prior to a decision being made.

## 6.6 Planning requirements

6.6.1 In considering proposals in the bush fire hazard area, the local government is to have regard to:

(a) *State Planning Policy 3.4 Natural Hazards and Disasters*;

(b) the WAPC's and FESA's *Planning for Bush Fire Protection Guidelines (Edition 2)*;

(c) any advice obtained from FESA; and

(d) any other planning consideration the local government considers relevant.