WE CARE. WE DELIVER.

Environmental Management System

Rix's Creek Mine

Rix's Creek North and Rix's Creek South

BUSHFIRE MANAGEMENT PLAN

Doc No:	Bushfire Management Plan
Doc Owner:	Environment Manager – Rix's Creek Pty Ltd
Approval:	Group Environmental Manager – The Bloomfield Group
Signed:	C Knight
Date:	14/9/2021

Revision	Issue Date	Description	Originator	Reviewed	Approved
Draft	30/10/2019		H. Lumsden	Chris Quinn	Chris Knight
1.0	13/1/2020	RFS feedback received	C. Knight	Chris Quinn	Chris Knight
1.1	24/1/2020	RFS feedback incorporated into plan	C. Knight	Chris Quinn	Chris Knight
1.2	14/9/2021	RFS feedback incorporated into plan + MOD 1 6300. Updated reference to "Planning for Bushfire Protection"	C. Knight	Chris Quinn	Chris Knight

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1. PURPOSE

The Bloomfield Group has a duty as a land owner under Section 63(2) of the Rural Fires Act 1997 (RF Act) to prevent the occurrence of bushfires on, and to minimise the danger of the spread of bushfires on Rix's Creek land.

The purpose of this Bushfire Management Plan (BMP) is to;

- Mitigate the risk of a bushfire occurrence;
- Minimise the potential for spread of bushfires in, from or into RCM
- Mitigate the risk to personnel on Rix's Creek Mine from bushfire events;
- Ensure that Bloomfield assets are to all possible extent protected from damage from fires Starting either in or outside the Rix's Creek Mine site;
- Take steps to manage ignition sources on site;
- Take steps to mitigate the risk of bushfire outbreak migrating to adjacent properties.
- Work co-operatively with neighbours, lessees and rural fire brigades in managing bushfires.
- To mitigate the risk of a bushfire outbreak impacting on Aboriginal and European heritage sites, and threatened or endangered flora and fauna located within the Mine site from fire damage;
- To outline the bushfire emergency response; and
- To document preventative strategies to reduce the risk of occurrence of unplanned bushfires

2. SCOPE

This Bushfire Management Plan applies to land within the Rix's Creek Mine (hereafter referred to as the Mine or RCM) and associated properties under the control of Bloomfield Collieries Pty Limited (hereafter referred to as Bloomfield). The location of the RCM mining lease boundary is attached in **Figure 1.**

This BMP provides for asset protection in accordance with the relevant requirements in the Planning for Bushfire Protection (RFS, 2019) guideline (Appendix 15.1) and includes an Emergency Evacuation Plan drawn in accordance with the Guidelines for the Preparation of Emergency/Evacuation Plan (RFS) and the Mining Industry Fact Sheet for Bush Fire Management Plans (RFS) (Appendix 15.2) and Australian Standard AS 3745 Planning for Emergencies in Facilities (Appendix 15.3).

This BMP is implemented in consultation with the local authority of the New South Wales Rural Fire Service (Appendix 15.4).

3. BACKGROUND

RCM is owned and operated by The Bloomfield Group (Bloomfield). It is an open cut coal mine situated within the Singleton local government area, approximately 5 km north-west of Singleton in the Hunter Valley Coalfields of NSW. The Mine comprises the original Rix's Creek Mine, now known as Rix's Creek South (RCS) and the former Vale-Integra Open Cut Mine now known as Rix's Creek North (RCN). RCS has been in continuous operation by Bloomfield since project commencement in 1990 and RCN was purchased by Bloomfield in 2015. RCM covers a combined area of approximately 2500 hectares. **Figure 1** below identifies Rix's Creek land ownership relevant to this BMP.

Rix's Creek Mine is contained within the NSW RFS District of **Hunter Valley District** and is located within the Fire Weather Area of **Greater Hunter**. The bushfire Management Committee for this area is the **Hunter Valley Bush Fire Management Committee.**

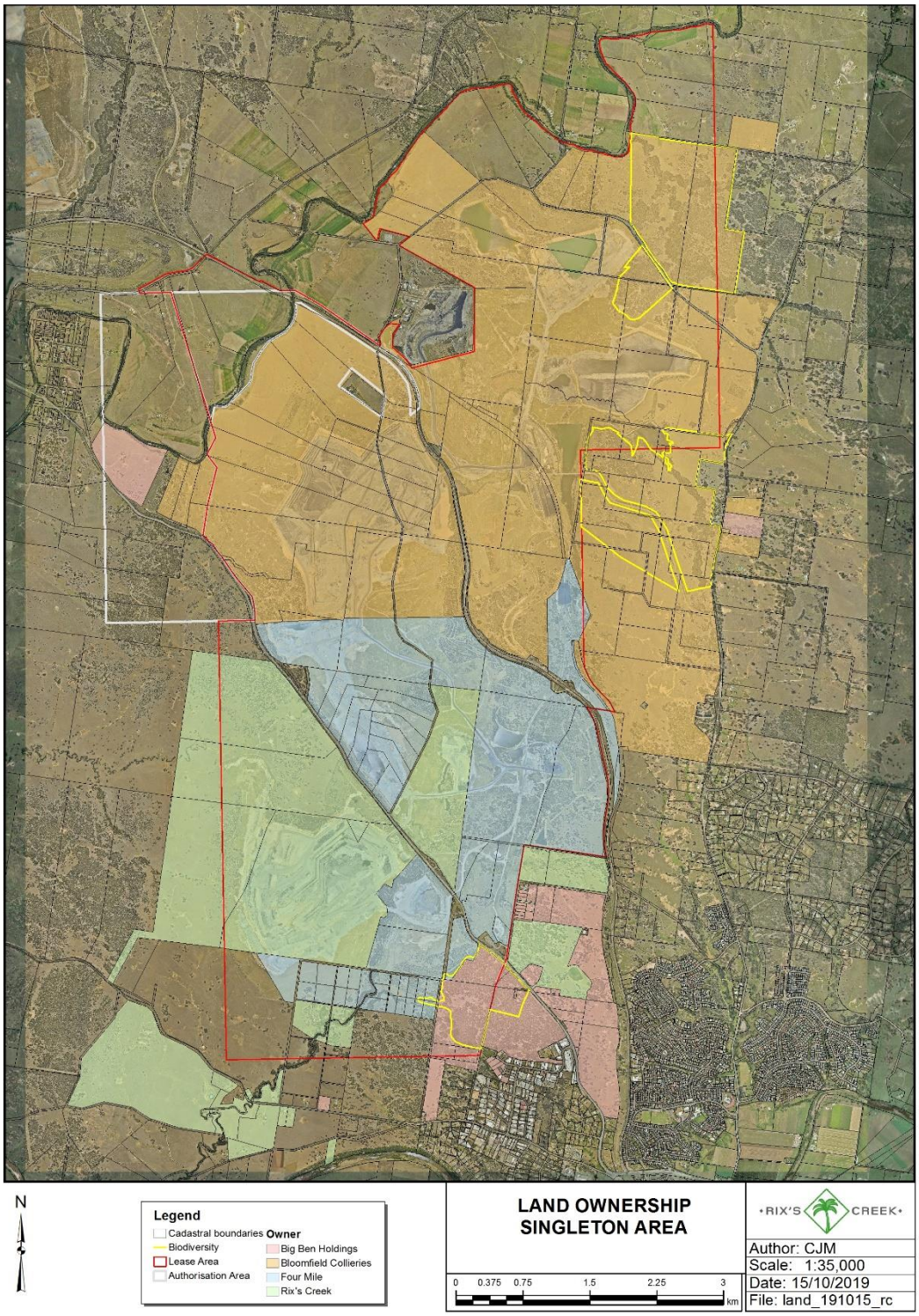


Figure 1 Rix's Creek Land Ownership

4. CONSENT CONDITIONS

The operations at Rix's Creek South are subject to the conditions contained in the Development Consent (SSD 6300) dated 12/10/2019. SSD 6300 is granted under the Environmental Planning & Assessment Act 1979 (EP&A Act). All bushfire management related conditions of SSD6300 are requirements related to this Plan. These are summarised in Table 1

Table 1 Relevant SSD6300 Conditions to this Bushfire Management Plan

Rix's Creek South (SSD 6300)	Condition	Relevant Plan Section
B66	**BUSHFIRE MANAGEMENT** The Applicant must:	
B66(a)	Ensure that the development:	
B66(a)(i)	provides for asset protection in accordance with the relevant requirements in the *Planning for Bushfire Protection* (RFS, 2006) guideline; and	6 7.2
B66(a)(ii)	ensure that there is suitable equipment to respond to any fires on the site; and	7.1
B66(b)	assist the RFS and emergency services to the extent practicable if there is a fire in the vicinity of the site.	9.1 9.1.1
B67	Prior to commencing mining operations under this consent, the Applicant must prepare a Bushfire Management Plan for the development in consultation with RFS. This plan must include a:	
B67(a)	contact person and 24 hour contact phone number;	9.3
B67(b)	schedule and description of proposed bushfire mitigation works, including:	
B67(b)(i)	location of managed and unmanaged vegetation within the site;	

B67(b)(ii)	location of water supply; and	
B67(b)(iii)	internal access roads;	
B67(c)	plan identifying the location and storage of bulk flammable liquids and materials;	5.3.1
B67(d)	'hot works' management plan, including:	8
B67(d)(i)	circumstances when 'hot works' are limited or prohibited; and	8.2
B67(d)(ii)	safety measures to be implemented when 'hot works' and being conducted; and	8.3
B67(e)	Emergency / evacuation plan in accordance with the *Guidelines for the Preparation of Emergency/Evacuation* Plans (RFS) and Australian Standard *AS 3745 Planning for Emergencies in Facilities.*	9.4
B68	The Applicant must implement the Bushfire Management Plan in consultation with RFS.	

Table 2 below outlines the relevant conditions from PA 08_0102 that are applicable to this BMP.

Table 2 Relevant PA 08_0102 Conditions to this Bushfire Management Plan

Rix's Creek North (PA 08_0102)	Condition	Relevant Plan Section
49	**BUSHFIRE MANAGEMENT** The Proponent must:	
49(a)	Ensure that the project is suitably equipped to respond to fires on site; and	7.1
49(b)	Assist the Rural Fire Service and emergency services as much as possible if there is a fire in the vicinity of the site.	9.1 9.1.1

Rix's Creek South Statement of Commitments

Bloomfield Collieries outlined a number of commitments as part of the Environmental Impact Statements (EIS) for SSD6300 dated 5 March 2019. The commitments relevant to this Plan and the section of the Plan where these items are addressed are outlined in Table 3.

Table 3: Rix's Creek South Statement of Commitments.

No.	Factor	Management and Mitigation Measures	Relevant Section of BMP where addressed	Comments
53	Bushfire	A monitoring program will be conducted to monitor fuel load during the fire season.	7	
54	Bushfire	Fuel reduction activities will be undertaken to limit the speed and spread of potential unscheduled fires. This will include thinning or removal of undergrowth.	7.2	
55	Bushfire	Hazard reduction burning will not be undertaken during periods of declared total fire bans.	7.3	
56	Bushfire	Fire trail and access roads to, from and within the mine-owned land will continue to be maintained to a level suitable to provide access for Rural Fire Service tankers.	7.2	
57	Bushfire	The responsibilities for fire management will continue to be those outlined in the internal Fire and Explosion Principal Mining Hazard Management Plan.		
58	Bushfire	In the instance of a bushfire event, the existing Emergency Response Procedures for the Mine will be implemented. Bushfire commitments will be included in a Bushfire Management Plan.	9F	

5. BUSHFIRE HAZARD

5.1 CLIMATE AND BUSHFIRE SEASON

RCM is located within the Hunter Valley District of the NSW Rural Fire Service. The fire season for this area generally begins 1 September and concludes 31 March, however this may vary from time to time depending on meteorological circumstances such as dry or drought conditions, winds and rainfall patterns.

RCM monitors the NSW Rural Fire Service website for season opening and closing dates and monitors the NSW Rural Fire Service website for updates during the nominated fire season.

Wind directions are typically consistent from year to year in line with the following;

- Summer dominated by winds emanating from the south east;
- Autumn dominated by east / south-easterly winds during March and April, with a major shift in wind direction to a dominance by west / north-westerlies occurring in May;
- Winter strongly dominated by west to north-westerlies; and
- Spring dominated by a relatively even combination of east / south-easterlies and west / north-westerlies.

Prevailing weather conditions associated with the bush fire season in the RCM Bushfire Control Area are high temperatures combined with strong, dry westerly winds causing low humidity. There are also frequently dry lightning storms occurring during the bush fire season.

5.2 TOPOGRAPHY

Topography has a significant effect on bushfire behaviour. For every increase in slope gradient, there is a similar increase in fire intensity and rate of fire spread. Fires burning uphill pose the most significant hazard.

The topography of the vegetated areas of RCM are generally level. Rehabilitation across RCM is limited to 14 -18 degree slopes, with the general standard across RCM being 14 degrees to best achieve effective grazing final land use. The fire hazard within and surrounding RCM is generally low due to the undulating nature of the topography, the general absence of long uphill slopes and the disturbed nature of the site.

5.3 BUSHFIRE RISK (IGNITION SOURCES)

Bushfire ignition sources include natural occurrences such as lightning strikes while other occurrences include sparks from power lines and human ignition. High intensity fires, once ignited, occur as a result of low humidity, high temperatures and strong winds during early to mid-summer.

5.3.1 FLAMMABLE LIQUIDS AND MATERIALS

Location of bulk flammable liquids and materials are identified in figures 2 and 3 below.

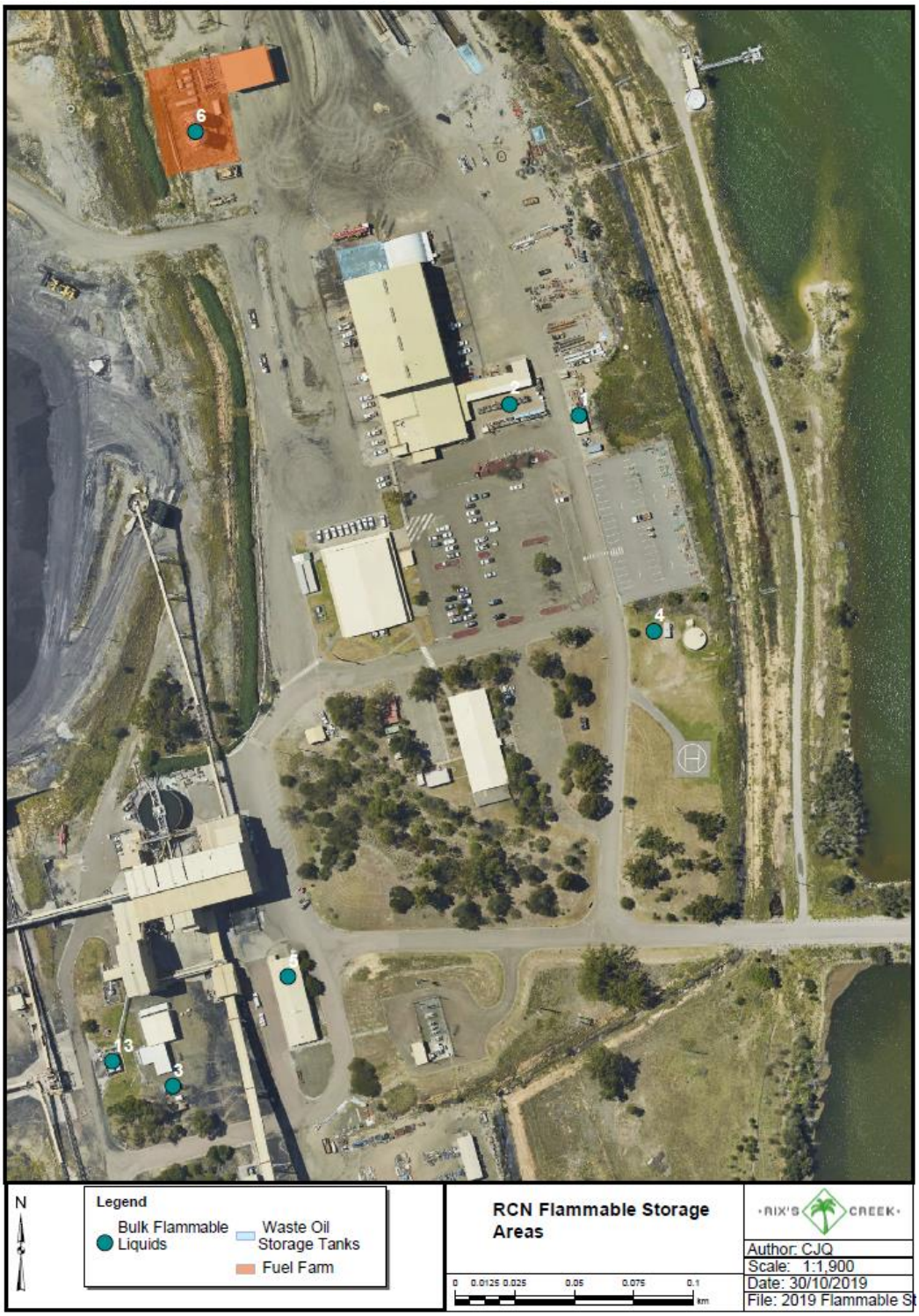


Figure 2 RCN Flammable Storage Areas

Figure 3 RCS Bulk Flammable Storage Areas

6. Mine Site Assets

In relation to bushfire management, assets are defined as anything valued by the community which includes but is not limited to houses, crops, forests, livestock, heritage buildings and places, infrastructure, the environment, commercial and industrial buildings and equipment, which may be at risk from bushfire. Under this plan, where possible, assets will be protected from the effects of bushfire by the establishment of Asset Protection Zones (APZs) around assets at risk and by the establishment of appropriate firebreaks and vegetation maintenance.

6.1 ECONOMIC ASSETS

- Mine surface infrastructure, including fences and pipelines
- Mobile Plant and Equipment
- Offsite buildings and infrastructure
- Rail line and rail loading facilities,
- Coal Handling and Preparation Plants
- Coal Stockpiles and infrastructure
- Coal stockpiles located at the CHPP and adjacent to the Deep Pit area;
- Power lines and on-site Power sub-station; and
- Administration, workshop buildings and equipment laydown areas.

6.2 ENVIRONMENTAL ASSETS

Biodiversity Offset Areas and non-disturbance areas inclusive of this RCM contain native woodland vegetation and native pastures that provide habitat for a number of native threatened fauna species. The following species have been confirmed to exist within Rix's creek Biodiversity Offset areas'

- Grey-crowned Babbler, *Pomatostomus temporalis*;
- Eastern Bentwing-bat, *Miniopterus schreibersii oceanensis*;
- Eastern Freetail-bat, *Mormopterus norfolcensis*; and
- Brush-tailed Phascogale, *Phascogale tapoatafa*.
- The Grey-headed Flying-fox, *Pteropus poliocephalus*, is also expected to be present.

6.3 CULTURAL ASSETS

- European Heritage Sites;
    - James Glennie grave site
    - Coke Ovens
    - Trig Station

- Aboriginal Archaeological Sites

There are a number of Aboriginal sites located within the area covered by this BMP. Due to the nature of these sites the majority are not likely to be adversely affected by bushfire.

Known Aboriginal sites are identified within the Rix's Creek South Aboriginal Cultural Heritage Management Plan.

6.4 HUMAN SETTLEMENT

This BMP covers numerous private and leased properties. RCM will endeavour to prevent a bushfire from entering neighbouring properties.

7. RIX'S CREEK BUSHFIRE PROTECTION MEASURES AND PREPAREDNESS

All personnel conducting works on site complete an appropriate level of fire awareness and general safety training via Bloomfield Site Induction Process.

In the event of a bushfire, site specific inductions advise personnel to first ensure the immediate safety of themselves and others, followed by contacting their supervisor and enacting the appropriate emergency response, detailed further in Section 8.1 of this plan.

In the event of a bushfire outbreak, the site emergency response procedures will be activated.

7.1 EQUIPMENT

All equipment used on site will undergo the RCM approved Introduction to Site process. In addition to this, approved 103 pre-start equipment inspections are conducted prior to use of all plant and machinery. Scheduled maintenance services are conducted on all mine site equipment to identify and repair identified faults.

Fire Fighting Resources incorporate the following equipment and facilities:

- A supply of Fire Hoses & Fittings (compatible with external emergency services firefighting equipment) and contained in the Fire Depots in strategic positions around the operation;
- Fire Extinguishers;
- Appropriate tools in the Emergency Response Cabinets
- Large water carts and smaller water trucks

7.2 VEGETATION AND FIRE BREAK MANAGEMENT

The disturbed areas of RCM provide fire breaks and fuel reduction zones that assist in the prevention of bushfire. Additional firebreaks are provided along site boundaries and major roads. The firebreak plan for the site is provided in Figure 4.

Firebreaks, grassland, lawn, garden and road verges around the site and office buildings are to be kept in a condition to provide adequate setbacks and minimise fuel levels. A number of mechanical methods may be used to achieve a reduction in fuel levels. Such methods include mowing, slashing, herbicide spraying, ploughing, and manual removal.

Where possible Asset Protection Zones (APZ) are established and maintained around key infrastructure on site. This includes administration buildings, remote assets, rail loop infrastructure (including locomotive provisioning facility), overhead power lines, open cut and underground facilities and the coal handling and preparation plant (CHPP). Asset protection zones are buffer zones of minimised fuel loads between a bush fire hazard (i.e. bushland) and infrastructure.

The RCS West Pit open cut mining operation and the New England Highway create a very effective fire break which will assist firefighting authorities in controlling a major fire running north from the Maison Dieu Industrial Estate bushland. Thomas Lane also acts as an effective fire break, limiting the spread of a possible fire onto the Northern Biodiversity Offset area from a major fire running south from Mt Olive.

Administration, workshop buildings and equipment laydown areas are located within the central portion of mining operations approximately 100 metres from bushland vegetation. No bushfire mitigations works are generally required for these assets.

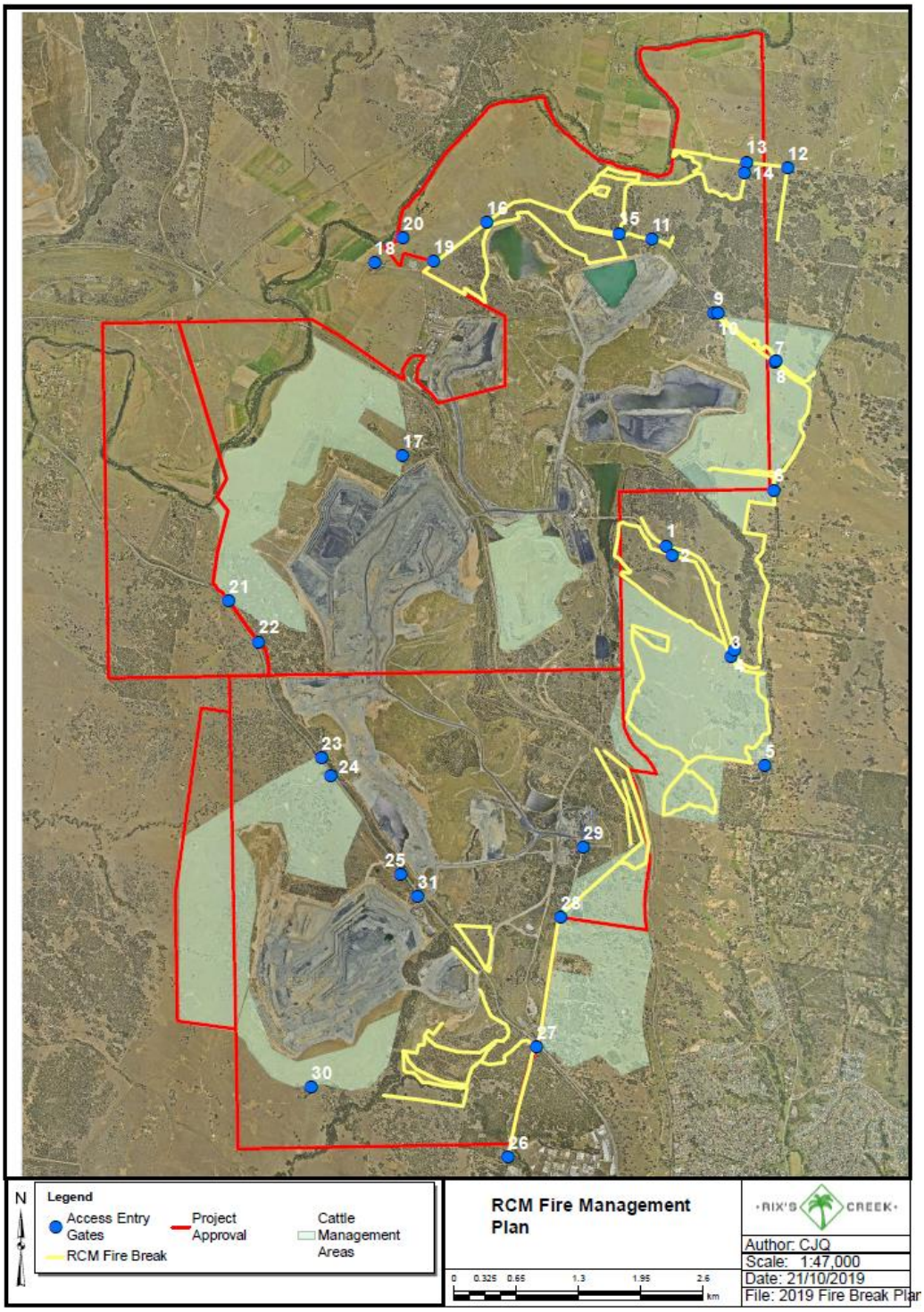


Figure 4 Rix's Creek Fire Management Plan

7.3 FIRE BANS

Fire bans, as determined by the Singleton Rural Fire Service, will be communicated to and adhered to by all staff and enforced by the Mine Manager, at Rix's Creek Mine.

During times of Fire Ban ignition sources such as welding and cutting operations (hot works) will be restricted in accordance with the **Hot Works Management (Section 8)**

7.4 BIODIVERSITY AREAS

A number of Biodiversity Offset Areas (BOAs) surround Rix's Creek Mine. Rix's Creek Mine is required to manage bushfire hazard in BOA's. Activities that will be undertaken to limit the risk of fire occurring in, or spreading into the BOAs include;

- Slashing of boundary fences to create fire breaks when fuel load is assessed to be high.
- Maintenance of access tracks including repairs and slashing for bushfire fighting purposes and fire breaks

8. Hot Works Management

All work activities conducted at RCM are assessed for risks during the job planning stage in accordance with Company Risk Management Systems. Hazards are identified, risks are assessed and controls are implemented.

In addition to the standard risk management process, the following will apply to all Hot Work to be conducted at RCM:

- Hot Work may be carried out in designated Hot Work Areas after an appropriate risk assessment has been carried out if there are no hazards identified that would require a Hot Work Permit to be completed. RCN Hot Work Areas are identified below in **Figure 5** and RCS Hot Work Areas are identified in **Figure 6**.
- In all other areas, a Hot Work Pre-Start Risk Assessment Form (Section 1 and Section 2 of Hot Work Permit) must be completed for any Hot Work. The form assists in the identification of hazards. All persons conducting Hot Work on a particular task must sign the form before commencing work. The form may indicate to the user that a Hot Work Permit (Section 3) must be completed (Note: A Hot Work Permit includes all 3 sections)

An audit of persons undertaking Hot Work Task/s may be conducted periodically by the area Supervisors or Managers to ensure compliance with the Hot Work requirements. The Hot Work Audit Form is used to record the audit with any improvements to be agreed and actioned by the area Manager.

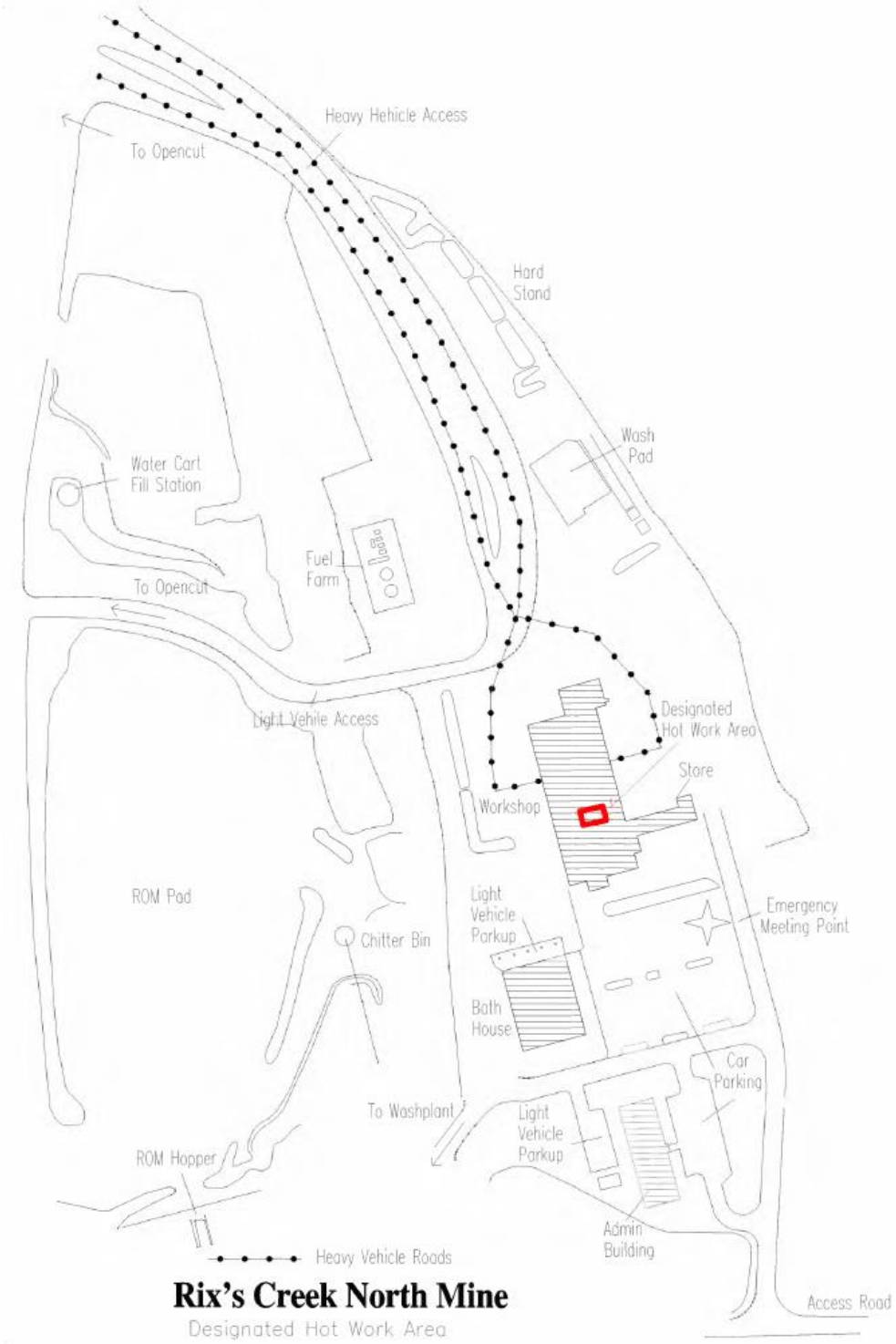
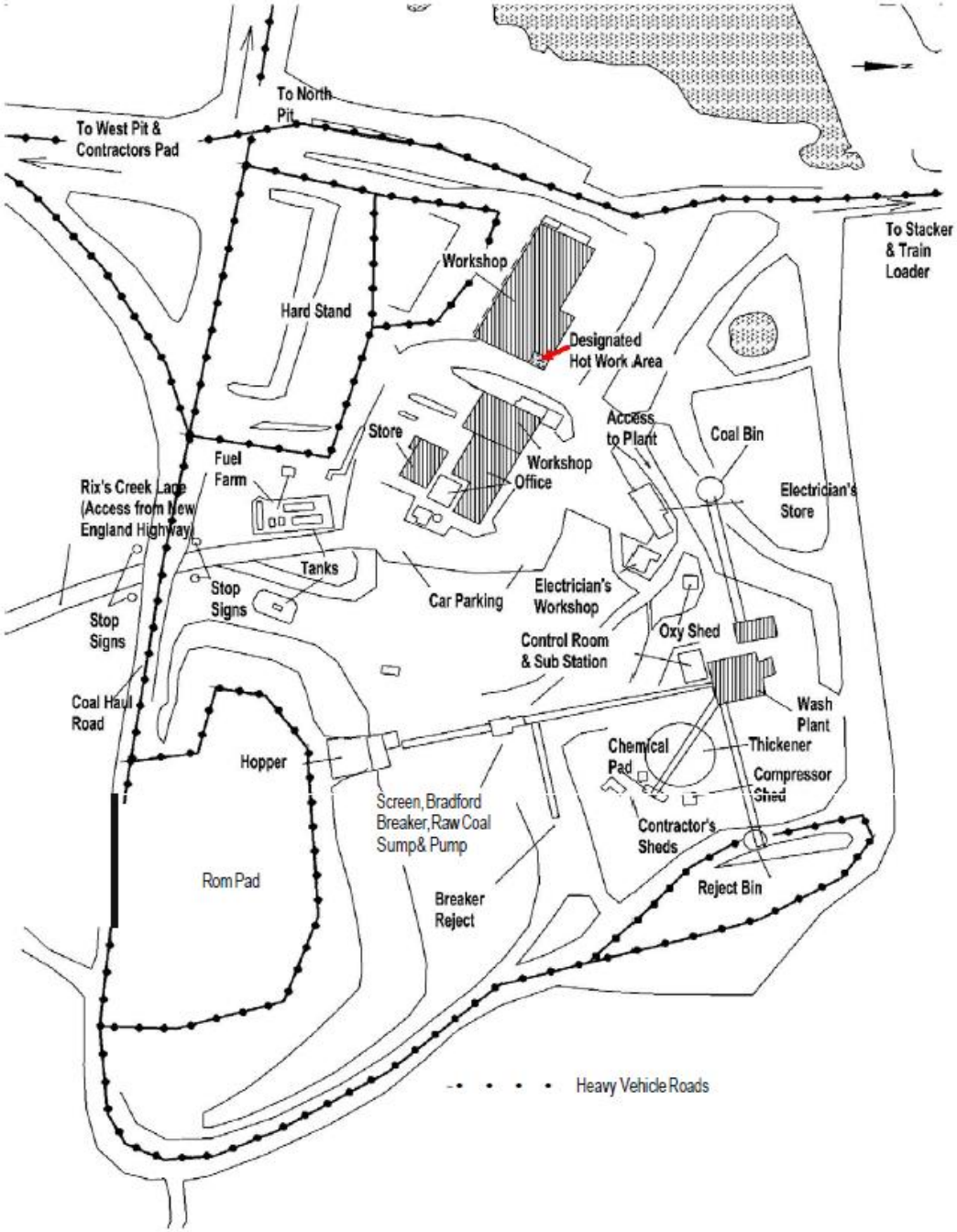


Figure 5 Rix's Creek North Designated Hot Work Area



RIX'S CREEK SOUTH 'DESIGNATED HOT WORK AREA'

Figure 6 Rix's Creek North Designated Hot Work Area

8.1 HOT WORK PERMIT

If a Hot Work Permit is required, the Supervisor ensures that the following has been addressed (either by themselves or others):

- Work area is inspected;
- Assists the permit holder with completion of the Hot Work Permit;
- Approves the Hot Work Permit by signing it, and issues it to the Permit Holder
- Instructs all people associated with the task in the provisions of the Hot Work Permit, or instructs the Permit Holder do so, and ensures they also sign the Hot Work Permit, prior to work commencing;
- Verify the need for a Fire Watch during and after the Hot Work Task
- Work area is inspected after completion of the job.
- Closes the Hot Work Permit by signing it. NOTE: The order of preference for supervisors to sign and approve the permit is the;
    - Supervisor directly supervising the hot work task,
    - Mechanical supervisor for that area/location,
    - A Rix's Creek supervisor (e.g. electrical supervisor, OCE, etc.)

8.2 CIRCUMSTANCES WHEN 'HOT WORKS' ARE LIMITED OR PROHIBITED

8.2.1 HOT WORKS DURING FIRE BAN

During a Total Fire Ban period, the lighting, maintenance or use of any fire or class of fire in the open air is prohibited for such period or periods as may be specified in the ban.

The RFS Act does not specify Mine Site exemptions for Total Fire Bans.

However a number of exemptions are currently detailed in NSW Government Gazette #16 dated 9 Feb 2018 - section 14. See https://gazette.legislation.nsw.gov.au/so/download.w3p?id=Gazette_2018_2018-16.pdf

Prior to commencing any works during a Total Fire Ban the Total Fire Ban the orders must be reviewed to ensure that the exemption for Mine Sites is listed.

An exemption may be given to Mining Operations, if the Total Fire Ban orders are provided, for fire lit, maintained or used in the open air in association with the cutting, welding and/or grinding apparatus which are being used for the purpose of the urgent and essential maintenance and repair of mining equipment provided that:

- The cutting, welding and/or grinding apparatus is used in a manner which will prevent the escape of fire, sparks or burning material from the site of the works; and

- Adequate firefighting equipment is provided at the site of works to prevent the escape or spread of the fire.

RCM considers urgent and essential Hot Works to be Hot Works that are required so that the production of coal continues at standard production levels.

The Total Fire Ban section of the Hot Works Permit must be completed on a day that is declared a Total Fire Ban that contains an approved order for Mining works to be exempted under the Total Fire Ban.

RCM requires a Hot Works Permit, signed by a supervisor, to be correctly completed and implemented for all work that is considered urgent and essential enough to take place outdoors through a Total Fire Ban.

8.2.2 HOT WORK IN HAZARDOUS AREAS

A Hot Work Hazardous Area is an area where the conduct of Hot Work may create a risk to personal safety. Where possible, the requirement to conduct Hot Work within a Hazardous Area should be eliminated.

No Hot Work will be conducted within a Hazardous Area unless a Hot Work Permit has been completed and signed by a person appointed as a Rix's Creek supervisor (this includes contractor supervisors who have been appointed as a Supervisors on Rix's Creek sites) and the controls identified in the Hot Work Permit have been implemented.

No Hot Work is to be conducted on any rim whilst a tyre is fitted, or in an area where the work may cause heating of the tyre or rim.

Areas deemed to be Hazardous Areas include:

- Work on Diesel or Bulk Oil stores, pumps/ fittings etc;
- Work on mobile diesel tank, fuel cart, machine fuel tank;
- Within 3m of flammable gas cylinder store area or acetylene bottle banks;
- Where transfer of heat or spark can occur into a drum/ opening suspected to have held chemicals or fuels;
- Within 4m of the Frother and/ or Collector dosing pumps;
- Within 1.5m of the Frother and/ or Collector line fittings;
- Within 3m of petrol bowser or length of hose +1m past nozzle (whichever is greatest);
- Within 3m of a flammable goods store area (solvents, adhesives, etc);
- Within 10m of Explosives Magazine;
- Within the footprint of a Coal Bin;
- Within a Confined Space;
- Within the Reclaim Tunnel;
- Work on or above Coal Stockpile Area;
- Within the bunded area of the Frother and/ or Collector storage tanks;

- Where heat created in the work piece or surrounding area could create pressure;
- Work on equipment on or adjacent to a loaded or partially loaded blast pattern;
- Work on a rim whilst a tyre is fitted, or in an area where the work may cause heating of the tyre or rim;
- Work within 3m of Excavator centre/ swivel joint.

8.3 HOT WORKS SAFETY MEASURES

Prior to conducting any Hot Work, the area will be inspected by competent personnel. The area to be inspected is within a 15m radius including above and below the work area. This inspection will include where practical:

- All flammable materials such as rags, oils, etc. are either removed from the inspection area, or controlled to mitigate risk of fire before conducting hot work;
- Clear or soak dry grass or scrub in surrounding area if required;
- Locate the nearest firefighting equipment;
- Ventilation is adequate to ensure atmosphere does not contain flammable vapours;
- Combustibles are removed from the opposite side of walls;
- Wall and floor openings are covered;
- Fire equipment is available within 10m of the work area;
- Housekeeping is conducted. Housekeeping may include sweeping of floors, check walls and horizontal surfaces for dust. If outdoors, Housekeeping will include clearing away combustible materials such as vegetation, sawdust, wooden pallets and soak the area if required;
- Disconnect (isolate) electrical sources and other energy sources that may create a hazard;
- Communications and emergency preparedness is in place;
- Access and emergency egress is available;
- In areas subject to people movement, leads and hoses are to be suspended clear of people or run adjacent to kick plates or in similar out of the way positions. Where leads and hoses need to be crossed by people/ equipment moving about, extra protection should be used to prevent insulation damage, e.g. Cable Bridge or other suitable equipment.

9. BUSHFIRE MANAGEMENT AND EMERGENCY RESPONSE

9.1 BUSHFIRE EMERGENCY RESPONSE PROCEDURE

If a bushfire is identified on site the general response to a fire related emergency is followed:

- The first priority, when a fire is discovered, is to ensure personal safety and the safety of any other people in the area.
- Where a person assesses that the fire is capable of being extinguished by their own action and with the equipment available within the immediate vicinity, they should attempt to extinguish the fire.
- Report emergency over the two- way radio to initiate emergency response procedure
    - Emergency! Emergency! Emergency!
    - Your name
    - Your location
    - Type of emergency
    - Type of assistance require
- Stay near the radio or the phone and await further instruction
- Bush and or grass fires that are more than 1 m square and are not immediately extinguished using first attack response are to be advised to the local authority using triple 000
- Any bush or grass fire on a day of Very High Fire Danger or above during the statutory bush fire danger period for the local government area that the mine is located in are to be reported to the local authority using triple 000 regardless of size of fire or if the fire has been extinguished by the organisations response team
- All structure and vehicle fires are to be reported to the local authority using triple 000 regardless of size of fire or if the fire has been extinguished by the organisations response team
- The first arriving officer of the NSW Rural Fire Service is to determine if the fire has been extinguished or if other action and resources are required to control the fire
- The NSW RFS assumes the role of Control for the incident and the organisation commands its resources

In the event of a bushfire emergency at RCM the RFS will be engaged. Once engaged the RFS have the lead role in emergency response for the RCM site. However, due to the potential presence of gases and explosive material, NSW Fire and Rescue (NSWF&R) may also be involved if a HAZMAT is declared. Any HAZMAT event will be coordinated between NSWF&R and RFS.

In the event of a bushfire emergency at RCM, RCM will assist the RFS where possible. In the event of a small fire, RCM may attempt to suppress a fire with portable fire extinguishers and earth moving machinery. A site water cart may also be deployed. In the event of a bushfire occurring on site the operational priorities are for:

- The safety of all personnel, followed by;
- The protection of assets

9.1.1 RFS AND EMERGENCY SERVICES ACCESS POINTS

Roads surrounding RCM include the New England Highway, Rix's Creek Lane, Maison Dieu Road, Belmadar Way, Bridgman Road, Stoney Creek Road and Middle Falbrook Road. These roads provide access to areas of the mine site and allow two-way movement of fully loaded firefighting trucks.

There are a number of unsealed tracks within the mine site that provide additional firefighting access to emergency services. In the event of an emergency, designated RCM personnel will liaise with RFS crews and coordinate the most appropriate meeting point where designated RCM personnel will meet RFS crews and provide escort to the most suitable point for accessing the bushfire. Additional traffic control personnel may be assigned to assist arrival of further equipment and personnel. Figure 4 identifies Entry Access points/ Gates for emergency service use, Access Entry Points are numbered for RFS reference. During an emergency, emergency services including RFS have access to several sources of water that can be used for bushfire fighting purposes.

9.2 EMERGENCY RESPONSE PERSONEL

Due to the proximity of the Rix's Creek Mine to local firefighting expertise, the general response to a fire of any significance is to call out the local fire brigade/ rural fire service using Triple Zero.

The initial response to a fire and resources for dealing with minor fires is provided by the Rix's Creek site firefighting personnel including;

- General Workforce

The general workforce are familiar with the workings of the operation, have completed relevant competencies.

- Fire Team

A fire team is established at the Mine and contains representatives from all shifts. The team is familiar with the workings of the operation and can operate the Fire Tender (Water Cart) and have conducted the relevant training.

- Fire Officer/s

The Manager has appointed a Fire Officer/s who is familiar with the workings of the mine and has completed relevant training course as recognised by the Board of Fire Commissioners of NSW. The Fire Officer/s responsibilities include ensuring that there is suitable equipment to respond to any fires on the site and ensure that all fire-fighting equipment is inspected and maintained as per the relevant Australian Standard and/ or manufacturers' guidelines.

9.3 EMERGENCY CONTACTS

Emergency contact details for 24 hour site contacts are provided in the table below. In addition to emergency services and NSW RFS contact details.

Contact	Contact Details
Rix's Creek Mine Administration Number (24 Hours)	+61 2 6578 8888
Emergency	000
NSW RFS Bush Fire Information Line	1800 679 737
NSW RFS Fire Control Centre – Hunter Valley District (office hours only)	02 6575 1200
NSW RFS Hunter Valley Duty Officer (24 Hours)	+61 2 6575 1222

9.4 EMERGENCY EVACUATION

In the event that there is a need to evacuate the general work areas as a result of an emergency involving Bushfire the following emergency evacuation plan must be followed.

All personnel (including contractors and visitors) not required as part of the emergency response activities must assemble at the designated Exclusion Zone Assembly Area. Relevant Site Contacts take responsibility (as far as possible without endangering themselves or others) of contractors and visitors.

If the designated Exclusion Zone Assembly Area is downwind of an approaching fire front, or located in a high bushfire risk area, an offsite refuge for the designated Exclusion Zone Assembly Area will be nominated by the Operations Manager or delegate.

The following emergency evacuation plan identifies the locations and relevant exclusion zones of bulk flammable liquids and materials.

The following emergency evacuation plan is in accordance with the *Guidelines for the Preparation of Emergency/Evacuation Plans* (RFS) and Australian Standard AS 3745 *Planning for Emergencies in Facilities.*

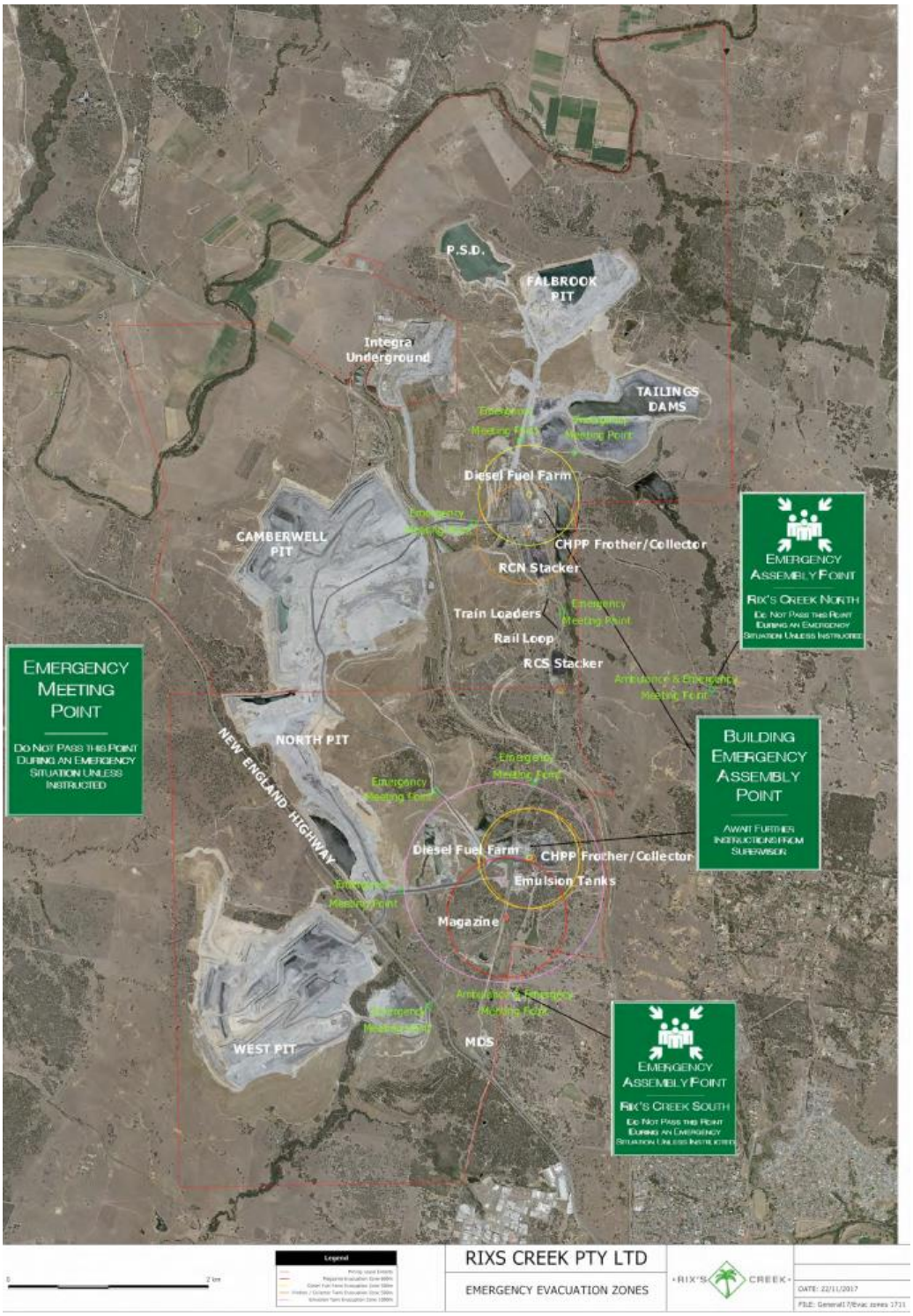


Figure 7 Rix's Creek Emergency Evacuation Plan and Location of Bulk Flammable Liquids and Materials

9.5 SUPPORTING THE RFS

Management of all Rix's Creek owned lands must be undertaken in accordance with license conditions and legislation.

Under the RF Act (1997), the RFS has the power to direct landholders, including RCM, to undertake hazard reduction activities on their property.

It is the duty of the owner or occupier to follow direction of the RFS in order to prevent the occurrence of bush fires and minimise the danger of the spread of bushfires.

10. REPORTING

Annual reporting is through the Annual Review Report. Further regulatory reporting will be at the request of relevant authorities.

11. DOCUMENT REVIEW AND IMPROVEMENT

To ensure that this Plan is updated on a regular basis and to incorporate and recommend measures to improve the environmental performance of RCM this plan will be reviewed by RCM every three years or following a bushfire incident at site.

12. ROLES AND RESPONSIBILITIES

Table 3 Roles and responsibilities

ROLE	RESPONSIBILITY
Mine Manager	• Provide adequate resources to ensure the implementation of this plan. • Appoint a Fire Officer
Environmental Manager or delegate	• Ensure this BMP is reviewed and updated as necessary • Ensure this BMP is in accordance with the operations Development Consent Conditions • Ensure the implementation of this BMP
Environmental Staff	• Understand and comply with the requirements as specified within this plan • Coordinate the re-establishment of firebreaks annually or as required based on fuel loads.

	• Coordinate the maintenance of the lawns, gardens and road verges around the access road and office buildings • Visually monitor and record fuel loads within and around the complex • Coordinate the maintenance of 4WD access roads to isolated pockets of vegetation • Undertake activities in accordance with the operations Development Consent Conditions. • Monitor weather conditions and Fire Danger Index from Rix's Creek Met Station and alert operations above FDI of 75* (Extreme)
Fire Officer	• Shall understand and comply with the requirements as specified within this plan • Liaise with the NSW Rural Fire Service – Hunter Valley regarding in fires in or adjoining lands properties • Ensuring that all fire-fighting equipment is inspected and maintained as per the relevant Australian Standard and/ or manufacturers' guidelines; • Maintaining a record of the condition of the equipment • Ensuring that any damaged/ defective fire-fighting equipment is repaired/ replaced as soon as practicable. If it is likely that there may be a significant delay regarding repair/ replacement, the Fire Officer reports the matter to the Manager and other suitable arrangements are made; • Investigating any complaint or report made concerning the condition of any firefighting equipment; • Ensuring that structured fire-fighting and/ or emergency training and/ or rescue training is carried out for fire team and general workforce (as appropriate); • Coordinating an annual emergency response exercise and/ or annual brief of an actual emergency; • Liaising as appropriate with the relevant external authorities (emergency services) regarding the establishment of the System and its ongoing effectiveness.
All Mine Workers, Contractors and Visitors	• Shall understand and comply with the requirements of this plan as educated via The Bloomfield Group Employee Induction.

13. DEFINITIONS

Table 4 Definitions

Term	Definition
Assets	Anything valued by the operation or stakeholders and includes houses, buildings, infrastructure, equipment, crops, livestock, cultural sites, heritage buildings and places, the environment, businesses, and forests that may be at risk from bushfire.
Asset Protection Zone (APZ)	A mown or slashed area around an asset designed to reduce the potential for flame, radiant heat or embers to ignite a structure and to create a defendable space where occupants or fire-fighters can protect that asset.
Bushfire	A general term used to describe fire in vegetation, includes grass fire.
Bushfire Hazard	The potential severity of a bushfire, which is determined by fuel load, fuel arrangement and topography under a given climatic condition.
Bush Fire Risk	The chance of a bushfire igniting, spreading and causing damage to the community of the assets they value.
Bushfire Threat	Potential bushfire exposure of an asset due to the proximity and type of a hazard, the slope on which the hazard is situated and the weather conditions.
Competent	A person who has acquired, through training, qualification, or experience, or a combination of these, the knowledge and skills qualifying that person to perform the task required.
Fire Depot	Demarcated and dedicated storage area for firefighting equipment and accessories.
Fire Fighting Authorities	The NSW Rural Fire Service, NSW Fire Brigades, the National Parks and Wildlife Service and Forests NSW.
Fuel	Any material such as grass, leaf litter and live vegetation which can be ignited and sustains a fire.
Hazard	A source or a situation with a potential for harm in terms of human injury or ill-health, damage to property, damage to the environment, or a combination of these.
HAZMAT	an abbreviation for "hazardous materials"—substances in quantities or forms that may pose a reasonable risk to health, property, or the environment.

Risk	The likelihood and consequence of that injury or harm occurring.
Risk/Hazard	The overall process of estimating the magnitude of risk and deciding what actions shall be taken to control the risk. (Ref: AS/NZS 4804: 2001)
Strategic Fire Management Zone (SFMZ)	An area where slashing is conducted to reduce fuel loads with the aim of reducing the speed and intensity of a future bushfire. The SFMZ aims to reduce the risk of fires spreading within the site and assists in stopping fires spreading on or to adjoining lands.
Land Management Zone (LMZ)	Lands managed to meet relevant land management objectives where APZs or SFAZs are not appropriate. Relevant examples include land identified for mining operations, biodiversity conservation or by leases for residential or agricultural purposes.
Major Bushfire	A bushfire which requires the attendance of multiple brigades, or causes damage to property or injury to one or more persons.
Prescribed burn	A controlled burn undertaken to meet a defined fuel management purpose with a prescription outlining intended frequency, fire behaviour and fuel reduction targets.

14. REFERENCES

- NSW Work Health and Safety (Mines) Act 2013
- NSW Work Health and Safety (Mines) Regulation 2014
- NSW Work Health & Safety Act 2011
- NSW Work Health and Safety Regulations 2011
- Rural Fires Act, (1997 RFA)
- Rural Fires Regulation, (1997 RFR)
- Planning for Bush Fire Protection (RFS, 2006) guideline
- Guidelines for the Preparation of Emergency/Evacuation Plans (RFS)
- Australian Standard AS 3745 Planning for Emergencies in Facilities

15. APPENDICIES

15.1 PLANNING FOR BUSHFIRE PROTECTION (RFS, 2019)

NSW GOVERNMENT

NSW RURAL FIRE SERVICE

PLANNING FOR BUSH FIRE PROTECTION

A guide for councils, planners, fire authorities and developers

NOVEMBER 2019

ISBN 978-0-646-99126-9

Commissioner
NSW RURAL FIRE SERVICE
Locked Mall Bag 17
Granville NSW 2142

Ministerial Foreword

I like many believe in the age-old adage, *'if you fail to plan, you plan to fail'* and for this reason I am delighted to know that communities across NSW will have access to this resource to help foster greater resilience.

Planning for Bush Fire Protection 2019 is a fantastic resource, particularly as we live in one of the most bush fire prone places in the world.

Over time, as our population increases, the issue of preparing for and mitigating against the risk of bush fire has become increasingly complex.

One of our most important assets during a bush fire is a well prepared community.

Since 2001, *Planning for Bush Fire Protection* has been considered industry best practice in the provision of bush fire protection standards. A pre-release version of *Planning for Bush Fire Protection 2018* was published on the NSW Rural Fire Service website in August 2018 which has been developed based on extensive industry and public consultation. *Planning for Bush Fire Protection 2019* is a refined version of the pre-release.

Improved government policy, industry standards, technology and research following significant fire events now sees *Planning for Bush Fire Protection 2019* continue to evolve, and provide improved protection for people and their properties in bush fire prone areas.

The NSW Rural Fire Service has a statutory obligation to protect life, property and the environment. The National Disaster Resilience Strategy (COAG 2011) emphasises the importance of the strategic planning system in contributing to the creation of safer and sustainable communities. The National Disaster Resilience Strategy identifies risk-based land management and planning arrangements as a vital component in building disaster resilient communities.

The NSW Office of Emergency Management 2017 State Level Emergency Risk Assessment listed land use planning as a top priority for NSW over the next 5 years.

Planning for Bush Fire Protection 2019 builds on the outcomes and lessons of bush fire events experienced over the past decade including the 2009 Black Saturday bush fires in Victoria.

It also draws upon the better understanding and experience of fire events in NSW, including those which impacted areas like the Blue Mountains, Coonabarabran and Southern Highlands in 2013, and Tathra 2018.

With lessons learned from major bush fire events, along with changes to building code and construction standards, this substantially revised 2019 edition of *Planning for Bush Fire Protection* is intended for use by councils, town planners, fire authorities, developers, planning and bush fire consultants, surveyors, building practitioners and approval authorities.

While the updated *Planning for Bush Fire Protection 2019* focuses on ensuring developments are provided with appropriate bush fire protection measures, it also aims to streamline processes for people building in bush fire prone areas.

The principles in this edition of *Planning for Bush Fire Protection 2019* will significantly assist those involved in building safe communities within bush fire prone areas, and help to increase resilience and public confidence through the NSW land use planning process. This revised version strikes an appropriate balance of flexibility, the environment, community safety and housing affordability.

I commend the work of the NSW Rural Fire Service in putting this enhanced resource together and encourage its use as widely as possible.

Minister for Police and Emergency Services, the Honourable David Elliott MP

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1 INTRODUCTION

Planning for Bush Fire Protection 2019 (PBP) provides development standards for designing and building on bush fire prone land in New South Wales. PBP provides standards and guidance for:

- strategic land use planning to ensure that new development is not exposed to high bush fire risk;
- creating new residential and rural residential subdivision allotments;
- special fire protection purpose (SFPP) development taking account of occupant vulnerability;
- bush fire protection measures (BPMs) for new buildings; and
- upgrading and maintaining existing development.

PBP is applicable to all development on bush fire prone land (BFPL) in NSW. The general principles underlying this document are that:

- a suite of BPMs are required to reduce the impact of a bush fire;
- protection measures are governed by the degree of threat posed to a development and the vulnerability of occupants;
- minimising the interface of a development to the hazard reduces the bush fire risk to the development; and
- good practice in planning, building and management reduces the risk to developments and their occupants, and increases their resilience.

1.1 Aim and objectives

All development on BFPL must satisfy the aim and objectives of Planning for Bush Fire Protection (PBP).

The aim of PBP is to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.

The objectives are to:

- afford buildings and their occupants protection from exposure to a bush fire;
- provide for a defendable space to be located around buildings;
- provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;
- ensure that appropriate operational access and egress for emergency service personnel and occupants is available;
- provide for ongoing management and maintenance of BPMs; and
- ensure that utility services are adequate to meet the needs of firefighters.

1.2 Bush fire protection principles

Bush fire protection can be achieved through a combination of strategies which are based on the following principles:

- control the types of development permissible in bush fire prone areas;
- minimise the impact of radiant heat and direct flame contact by separating development from bush fire hazards;
- minimise the vulnerability of buildings to ignition and fire spread from flames, radiation and embers;
- enable appropriate access and egress for the public and firefighters;
- provide adequate water supplies for bush fire suppression operations;
- focus on property preparedness, including emergency planning and property maintenance requirements; and
- facilitate the maintenance of Asset Protection Zones (APZs), fire trails, access for firefighting and on site equipment for fire suppression.

1.3 Limitations of this document

Due to a range of limitations, the measures contained in this document do not guarantee that loss of life, injury and/or property damage will not occur during a bush fire event. Limitations of this document include, but are not limited to uncertainties in the following areas:

- Fire Danger Index;
- fuel loads;
- existing developments;
- human behaviour; and
- maintenance.

1.3.1 Fire Danger Index

It may be possible that days of higher Fire Danger Index (FDI) may be experienced than the FDI levels used in this document. This may result in fire situations where conditions challenge survivability of buildings and their occupants.

1.3.2 Fuel loads

Fuel loads and vegetation classes used in this document are specific to NSW.

PBP has adopted a system of assessing fuel accumulation rates based on vegetation formations and time since last fire (Forestry Commission of NSW, 1991). This has also been supported by published literature on fuel loads (i.e. Good, 1994, Watson, 2005, Cheney and Sullivan, 1997).

In some instances fuel loads in an area may be higher than those used in this document. This can influence bush fire behaviour and the potential impact on property.

1.3.3 Existing developments

The requirement to consider BPMs for development in bush fire prone areas was introduced on 1 August 2002. Existing developments that were built prior to August 2002, may have limited or no BPMs incorporated into the design of the building. This also presents major challenges for the design of alterations and additions to existing buildings.

1.3.4 Human behaviour

A person's behaviour in times of bush fire may be unpredictable. A person may have good intentions to stay and defend their property from bush fire, but may change their mind once they experience the stress and anxiety associated with the heat, noise, flames and burning embers. Even where a development can comply with PBP, unpredictable human behaviour can be a limiting factor and may result in injury, death or loss of property.

All occupants in a bush fire prone area are advised to prepare a Bush Fire Survival Plan, available to download at NSW RFS website www.rfs.nsw.gov.au.

1.3.5 Maintenance

An unprepared property is not only a risk to the building owner/occupant, but may also present an increased danger to neighbouring buildings and firefighters. Even buildings which are built to comply with PBP are placed at risk through poor maintenance.

Post bush fire research recorded by the New South Wales Rural Fire Service (NSW RFS) indicates that proper maintenance of dwellings and their curtilage significantly improves the survivability of structures.

Advice regarding the maintenance and protection of existing buildings can be found on the NSW RFS website at www.rfs.nsw.gov.au.

1.4 How to use this document

Applications for development on BFPL should include a bush fire assessment report. This report must demonstrate that the proposal satisfies the requirements of PBP. All applications must meet the Aim and Objectives of PBP.

PBP uses a performance based approach, and identifies objectives and detailed performance criteria to satisfy desired outcomes and meet the Aim and Objectives. Ultimately, any performance based approach must demonstrate that bush fire protection is afforded to a proposed development commensurate with the assessed level of bush fire risk and the characteristics of the occupants.

This can be achieved by either applying the identified acceptable solutions, or by preparing a performance based solution.

A performance based solution must be designed to achieve the appropriate level of protection by tailoring a package of measures which meet the intent and performance criteria relevant to the proposed development.

BPMs are set out in Chapter 3. Performance criteria and acceptable solutions are shown for each specified development type in Chapters 5-8.

Refer to Figure 1.5 for further information on how to use PBP.

1.4.1 Bush fire protection measures

BPM's are the relevant specifications and requirements that need to be satisfied to improve life safety, property protection and community resilience to bush fire attack.

They include:

- APZs;
- Access;
- Construction, siting and design;
- Landscaping;
- Services; and
- Emergency and evacuation planning.

1.4.2 Intent

For each BPM, a broad intent is outlined. The ensuing performance criteria and acceptable solutions are designed to ensure that the general intent for each BPM is met.

1.4.3 Performance criteria

Performance criteria are the outcomes that need to be achieved to satisfy the intent. The performance criteria can be satisfied in one of the following ways:

- acceptable solutions; or
- performance based solution; or
- the combination of the above.

1.4.4 Acceptable solutions

Chapters 5-8 identify acceptable solutions which are considered by the NSW RFS as meeting the performance criteria.

1.4.5 Performance based solutions

Performance based solutions allow flexibility and innovation in responding to site-specific opportunities and constraints while still meeting the identified performance criteria. They also allow the consideration of a broad range of issues and information, including bush fire risk, community expectations, environmental protection and the application of new science, processes and technologies.

Performance based solutions must provide substantiated evidence and clearly demonstrate how the specific objectives and performance criteria are to be satisfied.

When performance based solutions are proposed, they will be assessed on their merits and individual circumstances. In these circumstances, a Bush Fire Design Brief (BFDB) process can be undertaken which would involve early agreement on the key elements and acceptance criteria from all stakeholders including the NSW RFS.

Performance based solutions may be undertaken for any of the BPMs detailed in Chapter 3 and supported in accordance with the submission requirements in Appendix 2.

1.4.6 PBP guidance materials

PBP guidance materials are prepared and published by the NSW RFS in order to support and clarify matters within PBP. Guidance materials (i.e. fact sheets and practice notes) should be reviewed in the preparation of bush fire assessment reports and can be found on the NSW RFS website at www.rfs.nsw.gov.au.

Figure 1.5
Step-by-step guide on how to use PBP

STEP 1

Does PBP apply?

- Is the land mapped as bush fire prone?
  - Check the local bush fire prone land map.

STEP 2

Review aim and objectives

- **Read Chapter 1** which sets out the aim and objectives of PBP.

STEP 3

Determine type of application

- **Read Chapter 2** to determine the type of application:

1. Planning proposal.
2. Development Control Plan amendment, state significant infrastructure (SSI) or state significant development (SSD).
3. Residential or rural residential subdivision.
4. Complying Development.
5. SFPP development.
6. Residential infill development.
7. Other development.

STEP 4

Identify relevant legislative requirements

- Is a bush fire safety authority required?
  - Check the *Rural Fires Act 1997* and the *Rural Fires Regulation 2013* cl. 45 and cl. 46 *(or superseding document).*
- Is the proposed development a Complying Development or is a DA required?
  - Check relevant planning instruments, such as the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*.

STEP 5

Identify the relevant BPMs

- **Read Chapter 3** which explains the BPMs.
- Read the detailed specifications and requirements for your relevant development type.
  - Residential – **Read Chapter 5 and 7**.
  - SFPP – **Read Chapter 6**.
  - Other – **Read Chapter 8**.
  - Grasslands – **Read relevant chapters**.

STEP 6

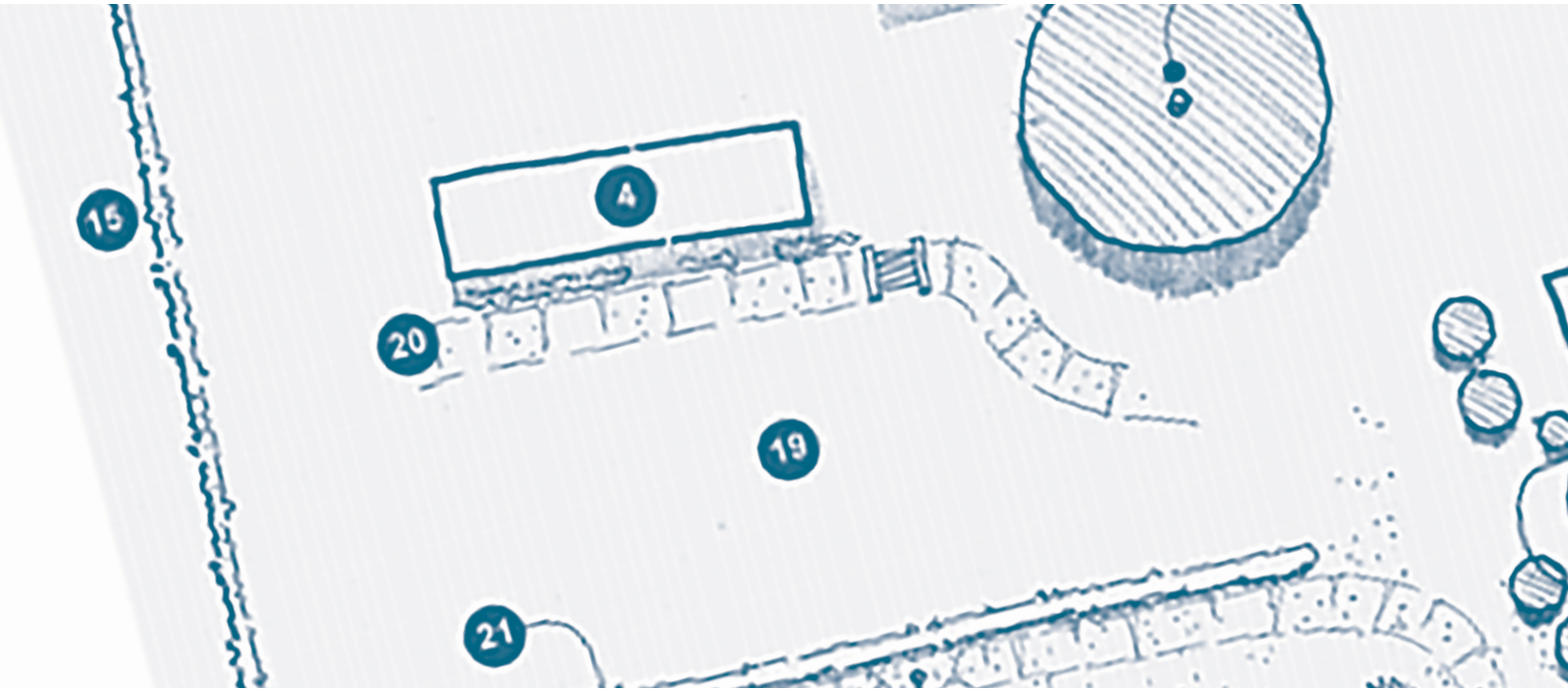
Determine solutions

- Determine the acceptable solutions required for each measure. Can they all be complied with?
  - Adopt the acceptable solutions that have been set out.
  - Alternatively prepare a performance based solution.

STEP 7

Demonstrate compliance

- Prepare a package of measures for submission with the development application, demonstrating compliance with the performance criteria either through acceptable solutions or performance based solutions.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2 FRAMEWORK

PBP is intended to enhance community resilience to bush fires. Bush fire should be considered in every phase of development, from regional plans, land-use zoning, Masterplans, subdivisions to individual building applications.

Comprehensive consideration of bush fire in the planning system requires a sound understanding of the hazards and risks, as well as consideration of strategic planning and development controls that will adequately mitigate these identified risks, as outlined in the *National Disaster Resilience Strategy*, (COAG 2011).

2.1 Legal framework

The Environmental Planning and Assessment Act 1979 (EP&A Act) and the *Rural Fires Act 1997* (RF Act) were amended on 1 August 2002 to enhance bush fire protection in the development assessment process.

The NSW land use planning framework provides, in broad terms, two main phases: strategic planning and development assessment.

PBP provides the foundation for the application of bush fire protection during both of these phases of development. Appropriate consideration of bush fire hazards at the strategic planning phase is required by the EP&A Act s.9.1(2) and PBP should be considered in applying the Section 9.1 Direction.

At the development assessment phase, development on land that is identified as being bush fire prone must comply with PBP. Some types of development on BFPL can be undertaken as Complying Development and must also comply with PBP.

A bush fire safety authority (BFSA) is required from the NSW RFS for residential and rural residential subdivision and SFPP developments on BFPL. An application for a BFSA must address the extent to which the development complies with PBP.

Building work on BFPL must also comply with the requirements of the National Construction Code (NCC). The NCC contains the technical provisions for the design and construction of buildings. Under the Deemed to Satisfy provisions of the NCC, building work on BFPL must comply with *Australian Standard 3959:2018 Construction of buildings in bushfire-prone areas* (AS 3959) or the *National Association of Steel Framed Housing (2014) Steel Framed Construction in Bush Fire Areas* (NASH Standard). This does not apply however in Bush Fire Attack Level - Flame Zone (BAL-FZ), or where modified by the specific conditions of the relevant development consent.

2.2 Bush fire prone land mapping

The identification of BFPL in NSW is required under the EP&A Act s.10.3.

BFPL Maps provide the trigger for the various development assessment provisions.

The Commissioner of the NSW RFS designates what constitutes BFPL and how it is to be mapped. Each council prepares a map in accordance with the guidelines and submits the map to the NSW RFS for certification by the Commissioner. These maps are required to be recertified at least every five years and the Commissioner may make direct changes to a BFPL Map at any time.

Guidelines for the mapping of BFPL can be found on the NSW RFS website at www.rfs.nsw.gov.au.

You can determine whether a site is mapped as being bush fire prone by referring to the BFPL Map which is held by the local council, or on the NSW RFS website.

The BFPL Map is a trigger for the consideration of BFPL Maps for new development. It is not intended as a detailed measure of risk. The map does not form part of the site assessment process, which must be carried out in accordance with Appendix 1.

A consent authority can refer a development application (DA) to the NSW RFS under the provisions of EP&A Act s.4.15, even where it is not mapped as BFPL.

2.3 Strategic planning

Strategic planning is the preparation of planning instruments and policies and includes the making of Local Environmental Plans (LEPs), Development Control Plans (DCPs), housing strategies and other planning instruments that identify proposed uses and land zonings. This also includes any associated strategic proposals and studies.

The strategic planning phase of development is particularly important in contributing to the creation of safer and sustainable communities (COAG 2011). It is an effective way of achieving bush fire protection objectives in new developments.

Strategic bush fire planning and studies are needed to avoid high risk areas, ensure that zoning is appropriate to allow for adequate emergency access, egress, and water supplies, and to ensure that future compliance with this document is achievable.

The most important objective for strategic planning is to identify whether new development is appropriate subject to the identified bush fire risk on a landscape scale. An assessment of proposed land uses and potential for development to impact on existing infrastructure is also a key element of the strategic planning process in bush fire prone areas. Land use planning policies can be introduced to limit the number of people exposed to unacceptable risk.

Planning instruments and policies can ensure bush fire management principles are given appropriate consideration at all stages of the planning and development process.

Once development has been assessed as being appropriate in its bush fire prone context, it will need to be capable of complying with PBP. The ability of proposed land uses and associated future developments to comply with PBP will be assessed at the strategic planning stage. The expectation will be that the development will be able to comply with PBP at the DA stage.

2.4 Development assessment

The provisions of this document apply to all development on land which is bush fire prone (see section 2.2 of this document). This document may also apply where proposals are referred to the NSW RFS under other referral instruments such as EP&A Act s.4.15.

If a development of a type not specifically addressed in this document is proposed on BFPL, the development must meet the Aim and Objectives of PBP and the consent authority can refer the proposal to the NSW RFS for advice. The NSW RFS will advise which specific standards apply to that development. In these circumstances, the development proposal will be a performance based solution and in more complex cases, this may be achieved collaboratively through the BFDB process.

The vast majority of DAs in NSW are assessed by local councils. Councils may assess DAs for certain developments on BFPL that are compliant with this document without the need to refer the proposal to the NSW RFS.

In certain cases building work may not require development consent and can proceed through the Exempt or Complying Development process if the development type is covered by a State Environmental Planning Policy (SEPP) or the relevant LEP.

For further information on development types, please contact the local council or the NSW Department of Planning, Industry and Environment (DPIE).

See Figure 2.4 for a flow chart showing the development assessment process for developments on BFPL.

2.4.1 Development requiring a BFSA

Proposals for subdivision and SFPP development on BFPL require an approval from the NSW RFS in the form of a BFSA under RF Act s.100B.

Development requiring a BFSA is considered Integrated Development under EP&A Act s.4.46.

The BFSA is critical in ensuring these key developments are designed and located in a manner that is suitable to protect human life and facilitate appropriate operational firefighting arrangements. This is a means by which the NSW RFS Commissioner fulfills their statutory obligation to ensure the protection of the community, including firefighters from the impacts of bush fire.

2.4.2 State significant development and infrastructure

In September 2011, EP&A Act pt. 3A was repealed, leading to the creation of two new major project development categories: state significant infrastructure (SSI) and state significant development (SSD).

Because of their size, complexity, importance and/or potential impact, DPIE is predominantly responsible for assessing these DAs. The Minister for Planning and Public Spaces is the consent authority for SSI and SSD applications.

Applications under the now-repealed Part 3A of the EP&A Act and state significant projects are exempt from requiring a BFSA and are not required to be assessed under EP&A Act s4.14.

Given the scale of SSI and SSD projects, the requirements of this document should still be applied, and seeking advice from the NSW RFS is encouraged. Even where comments have been provided by the NSW RFS at the strategic planning stage, future DAs may benefit from further advice from the NSW RFS.

2.4.3 Streamlining development assessment

The NSW Government has provided a pathway for streamlined assessment to occur under the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) cl.273 for new lots in Urban Release Areas (URAs) that are located on BFPL.

The streamlining process allows the assessment of bush fire provisions at subdivision stage within URAs and may exempt the lots from reassessment of bush fire issues when land owners are ready to develop their lots. Post-Subdivision Bush Fire Attack Level Certificates may be issued assigning BALs to all individual lots within the subdivision. An applicant can rely on this Post-Subdivision BAL Certificate for Complying Development up to and including BAL-29.

The option to use Complying Development also allows for a streamlined process for developing on BFPL.

2.4.4 Infill and other development

The EP&A Act s.4.14 requires that the consent authority be satisfied that the relevant specifications and requirements of this document are complied with for development on BFPL. This applies to any development other than subdivision of land that could lawfully be used for residential purposes or development for a SFPP. This can be achieved by the following means:

a. the consent authority is satisfied that the development conforms to the specifications and requirements of PBP; or

b. the consent authority has been provided with a certificate by a person who is recognised by the NSW RFS as a qualified consultant in bush fire risk assessment stating that the development conforms to the relevant specifications and requirements; or

c. If the consent authority is satisfied that the development does not conform to the relevant requirements of PBP, it may still grant consent to the development but only after it has consulted with the Commissioner of the NSW RFS concerning measures to be taken with respect to the development to protect persons, property and the environment from danger that may arise from a bush fire.

2.4.5 Exempt and Complying Development

Some straightforward residential, commercial and industrial development can be undertaken as Exempt or Complying Development under various SEPPs and LEPs.

Exempt Development is minor building works that can be carried out without development approval, such as decks, garden sheds, carports and fences.

Complying Development can be undertaken on lower risk BFPL up to and including BAL-29 where the appropriate construction requirements and all other relevant development standards have been met. Complying Development is not permitted on higher risk BFPL (BAL-40 or BAL-FZ) and a DA is required in these circumstances.

Specified development requirements and standards apply to new development, including alterations and additions, to ensure the relevant provisions of this document are met. This allows for Complying Development on BFPL, while maintaining an appropriate assessment regime for managing bush fire risk.

In certain circumstances, a BAL Certificate must be obtained from the local council or a person recognised by the NSW RFS as a suitably qualified consultant in bush fire assessment, stating that the development is not located in BAL-40 or BAL-FZ.

The development must also meet the identified development standards within the relevant SEPP or LEPs.

2.5 Construction provisions: the National Construction Code (NCC) and bush fire standards

The NCC is a performance based code which comprises the Building Code of Australia (BCA) as Volumes 1 and 2 and the Plumbing Code of Australia as Volume 3.

The NCC contains Performance Requirements and Deemed-to-Satisfy provisions relating to the construction of buildings in bush fire prone areas. In NSW, these provisions apply to Class 1, 2 and 3 buildings, Class 4 parts of a building, Class 9 buildings that are SFPPs, and associated class 10a buildings and decks.

The construction requirements of AS 3959 and the National Association of Steel-framed Housing (NASH) Standard are a Deemed-to-Satisfy solutions in the NCC, as varied in NSW, for buildings in designated bush fire prone areas.

2.6 Other NSW RFS bush fire safety programs

The following NSW RFS programs provide a number of strategies designed to address bush fire protection for the community at a local government or regional level. These provisions are not considered as BPMs for proposed development.

2.6.1 Bush Fire Risk Management Plan

The preparation of a Bush Fire Risk Management Plan (BFRMP) is the responsibility of the Bush Fire Management Committee (BFMC).

The objectives of the local BFRMP are to:

- reduce the number of human-induced bush fire ignitions that cause damage to life, property and the environment;
- manage fuel to reduce the rate of spread and intensity of bush fires while minimising environmental/ecological impacts;
- reduce the community's vulnerability to bush fires by improving its preparedness; and
- effectively contain fires with the potential to cause damage to life, property or the environment.

Enquiries concerning BFRMPs can be directed to the appropriate NSW RFS Fire Control Centre.

2.6.2 Hazard Reduction Certificates

A Bush Fire Hazard Reduction Certificate (HRC) provides environmental approval to carry out bush fire hazard reduction works. The HRC must be consistent with the Bush Fire Environmental Assessment Code and the BFRMP. The HRC details the conditions that are to be adhered to when implementing the bush fire hazard reduction works.

Enquiries on HRCs can be directed to the appropriate NSW RFS Fire Control Centre.

2.6.3 Community Protection Plans

The aim of the Community Protection Plan (CPP) program is to improve the community and firefighters' capacity to prepare for, act during, and survive bush fires. A CPP requires a detailed analysis of communities considered to be exposed to a significant bush fire risk, and ensures that the bush fire risks can be fully understood and adequately treated.

Enquiries on CPPs can be directed to a NSW RFS Planning and Environment Service Centre on 1300 679 737.

2.6.4 Neighbourhood Safer Places

A Neighbourhood Safer Place (NSP) is a location where people facing an immediate threat to their personal safety or property can gather and seek shelter from the impact of a bush fire. They are the last resort option for those in bush fire situations.

Enquiries on NSPs can be directed to the NSW RFS Planning and Environment Service Centres on 1300 679 737.

2.6.5 10/50 Vegetation Clearing Scheme

People living in a bush fire prone area may be eligible to undertake certain clearing practices around an existing dwelling and other specified structures under the 10/50 Vegetation Clearing Scheme. The scheme may only be applied to existing buildings and may not be used in the development assessment process.

The scheme allows people in a 10/50 Vegetation Clearing Entitlement Area to:

- remove, destroy or prune trees on their property within 10 metres of a home, without seeking approval; and
- remove, destroy or prune any vegetation such as shrubs (but not trees) on their property within 50 metres of a home, without seeking approval, if the clearing is carried out in accordance with the 10/50 Vegetation Clearing Code of Practice.

The 10/50 Vegetation Clearing Scheme does not permit you to clear trees or other vegetation contrary to conditions in your development consent or other approvals under the EP&A Act.

You can find out more, including if your property is in a 10/50 Vegetation Clearing Entitlement Area on the NSW RFS website: www.rfs.nsw.gov.au.

2.7 Bush Fire Survival Plans

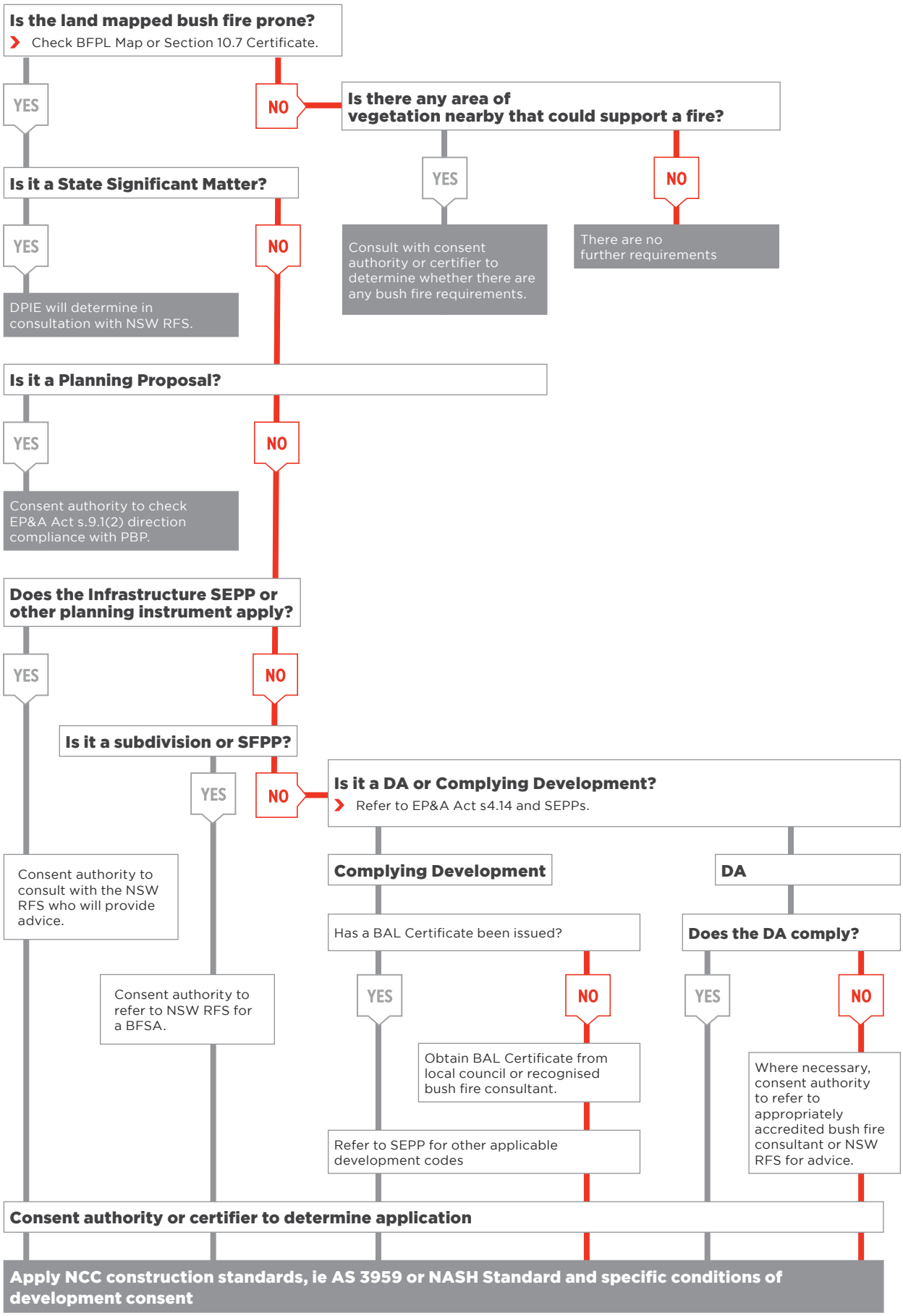
People living in a Bush Fire Prone Area should prepare a Bush Fire Survival Plan which is revised annually prior to the bush fire season.

A *Guide to Making a Bush Fire Survival Plan* has been developed by the NSW RFS to assist residents in the preparation of their plan and can be found at the NSW RFS website.

The Guide provides information on bush fire risk and suggests simple steps as to how individuals and families can protect themselves and their property in the event of a bush fire. On days of catastrophic fire weather, the NSW RFS recommends leaving early as the only safe option.

Figure 2.4

Assessment process for developments in bush fire prone areas



3 BUSH FIRE PROTECTION MEASURES

BPMs can mitigate the impact of bush fire attack on people and assets.

The types of protection measures include APZs, access, landscaping, water supply, building design and construction and emergency management arrangements. These measures assist building survival during a bush fire. They also contribute to the safety of firefighters and members of the community occupying buildings during the passage of a bush fire front.

There are a range of different BPMs which should be applied in combination based upon the development type and the level of bush fire risk.

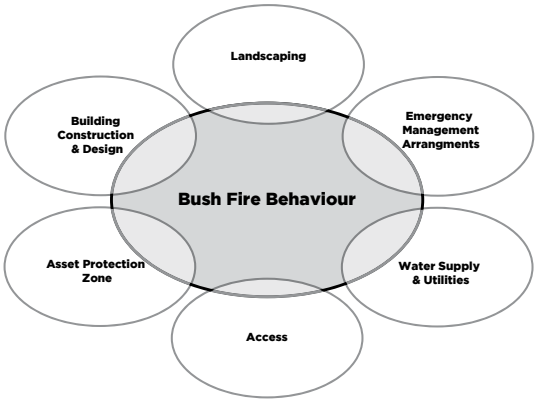
All requirements for BPMs that relate to the development must be provided, as required by this document.

3.1 Introduction

A significant part of NSW is classified as BFPL and local circumstances vary widely as do potential land uses. PBP recognises this and promotes detailed site analysis and the application of a combination of BPMs to achieve an acceptable outcome.

Figure 3.1

BPMs in combination



3.1.1 Applying the BPMs in combination

The design of BPMs should be incorporated at the earliest stages of development. Acceptable bush fire protection proposals will involve a combination of different BPMs depending on their suitability and importance to the particular type of development and different levels of potential bush fire attack.

Appropriate combinations of BPMs not only depend on geographic location and site circumstances but also on the nature of the proposed use, distinguishing between the following development types:

- residential and rural-residential subdivision with a dwelling entitlement;
- SFPP development;
- infill development; and
- other developments (i.e. commercial community and other uses which are not classified as residential or SFPP).

These development types are required to achieve specific objectives which relate to particular circumstances. The acceptable solutions and performance criteria in this document acknowledge that the measures work in combination to improve the capacity for bush fire protection.

Research on bush fire behaviour under a range of location, weather, vegetation and slope conditions has demonstrated the significance of reduced fuel loads and separation distance in limiting the bush fire threat from ember attack through to direct flame contact.

3.2 Asset Protection Zones (APZ)

An APZ is a buffer zone between a bush fire hazard and buildings. The APZ is managed to minimise fuel loads and reduce potential radiant heat levels, flame, localised smoke and ember attack. The appropriate APZ distance is based on vegetation type, slope and the nature of the development.

The APZ can include roads or properties managed to be consistent with APZ standards set out in Appendix 4 and the NSW RFS document *Standards for Asset Protection Zones*. A fuel-reduced, physical separation between buildings and bush fire hazards is a key element in the suite of bush fire measures and has a major influence on the type of construction necessary to mitigate bush fire attack.

Appendix 1 provides the required methodology for determining the APZ based on vegetation type, slope and FFDI.

For new residential development, APZ requirements are based on radiant heat level exposure to buildings not exceeding 29kW/m^2 (calculated on a flame temperature of 1090 Kelvin).

For many SFPPs, larger APZs are required because of the characteristics of occupants. This means a lower radiant heat threshold is required in order to allow for evacuation of occupants and emergency services to operate in support of the most at-risk members of the community.

For most SFPP developments, 10kW/m^2 (calculated on a flame temperature of 1200 Kelvin) is the maximum exposure at any point of the building wall or façade and where emergency services may be supporting or evacuating occupants from the building.

This is to ensure there is an area for firefighters to defend the property and allow access to and from the building. Chapter 6 identifies the performance criteria and acceptable solutions for APZs for SFPP developments.

Information relating to the creation and management of APZs is detailed in Appendix 4 of this document and in the NSW RFS document *"Standards for Asset Protection Zones"* which is available on the NSW RFS website www.rfs.nsw.gov.au.

A fundamental premise for APZs is that they are provided within the property in such a way that the owner/occupant will be able to maintain the area in perpetuity.

Where possible, buildings should be sited so as to reduce exposure to bush fire attack and provide suitable defendable space around a building.

3.2.1 Staged developments

Often an indefinite time lag can occur between one or more stages of development which can result in persons and property being unprotected in the event of a bush fire. A development site that is vegetated but is to be developed and sold in stages will require the creation of APZs that need to be maintained sequentially until the final phase of development is completed to afford each stage of the development the appropriate level of bush fire protection.

Therefore, in staged developments, APZs need to be provided during all stages, and provisions included that ensure ongoing maintenance is undertaken until such time as land is developed. If an easement or covenant is established for the purpose of an APZ it can be extinguished when a bush fire hazard is permanently removed (i.e. when development occurs).

The responsibility for the maintenance of APZs at each stage of development must be clearly defined within the easement or covenant.

3.2.2 APZs on slopes over 18 degrees

APZs on slopes greater than 18 degrees present ongoing maintenance difficulties and may have reduced effectiveness. Challenges in these circumstances may include the following:

- management practices may be difficult;
- the environmental consequences of ground clearing (destabilisation of the slope resulting in landslip, slump, erosion or landslide) may not be acceptable; and
- vegetation is more readily available to a fire, significantly reducing the advantage of having an APZ.

Where it can be demonstrated that these issues can be effectively managed, APZs on steeper slopes may be considered. Where there are effective slopes in excess of 18 degrees it must be demonstrated that management can occur. A management plan must be submitted with the DA to provide details on how the APZ will be implemented and maintained. The management plan should include, but not be limited to:

- The mechanical means necessary to complete the management required;
- A schedule for maintenance to occur to ensure the APZ is regularly managed; and
- The relevant body responsible for maintaining the APZ.

3.2.3 APZs on environmentally protected lands

Where environmentally sensitive vegetation such as endangered ecological communities are to be cleared for the purposes of an APZ, the proposals will need to be carefully considered.

In some cases, a development may be proposed on land with a split zoning (i.e. part residential and part environment protection zone). BPMs may not necessarily be compatible with all zones. It should not be assumed that an APZ can extend into an adjoining non-compatible area, therefore any environmental constraints should be assessed by the appropriate authority.

3.2.4 Defendable space

Defendable space is an area within the Inner Protection Area (IPA) of an APZ adjoining a building. This space provides a safe working environment in which efforts can be undertaken to defend the structure, before and after the passage of a bush fire.

The physical size of the development will determine whether the defendable space is provided as pedestrian access or will require sufficient space for vehicular movements. Vegetation within the defendable space should be kept to an absolute minimum and the area should be free from combustible items and obstructions.

3.2.5 APZs on adjoining land

An APZ imposed by a development consent condition must be maintained for the lifetime of the development, unless modified by a subsequent consent. In order to guarantee that an APZ can be managed in perpetuity, APZs should be contained within the overall development site and not on adjoining lands.

APZs on adjoining land are not encouraged. Where an APZ is proposed on adjoining land, a guarantee must be provided that the land will be managed in perpetuity. In order to achieve this, the land should have an easement under the *Conveyancing Act 1919 s.88B* to ensure:

- surety of APZ and the correct management prescriptions; and
- that management occurs in a binding legal agreement in perpetuity.

These situations shall be assessed on their merits.

In such circumstances, the proponent will need to obtain written confirmation from the relevant parties that the easement will continue in perpetuity and that the land subject to the easement will be maintained in a suitable manner. In all cases, the owner of adjoining land must provide written consent for the easement, which shall be lodged with the DA.

Generally the owner/occupier of the land who has benefited from the easement shall be responsible for maintaining the APZ. Where an APZ easement has been established to the benefit of a community title, it shall be maintained in accordance with a Plan of Management.

Neither the NSW RFS nor a council has the power to impose an APZ on an adjoining landowner for new development. It is therefore the developer's responsibility to negotiate with adjoining land owner/s as part of the DA process. Easements should not be considered where the adjoining land is used for a public purpose and where vegetation management is not likely or cannot be legally granted (eg, National Park, bushland reserve, critical habitat, 'coastal wetlands' or 'littoral rainforests' mapped in the Coastal Management SEPP).

In circumstances where an APZ is proposed on adjoining land, it will be considered as a performance based solution. In addition, the NSW RFS cannot be considered a party to the easement.

3.2.6 Plans of Management

Plans of Management (PoM) are required where developments propose to establish APZs off site on lands belonging to council or government where there is no guaranteed commitment to future management. The adopted PoM provides the assurance that an APZ will be managed in perpetuity.

PoMs are also required where APZs are proposed off site, on lands which may have periodic management but may not meet the ongoing requirements of an APZ. Such lands include council bushland reserves, Crown Lands, Open Space and easements for drainage and services.

Before APZs can be accepted for these types of situations, it must be demonstrated that a management regime is in place to ensure ongoing compliance with APZ requirements. The content of a PoM should include:

- the prescribed APZ requirements and its treatment details (e.g. IPA and OPA widths and fuel loads);
- the predicted timing intervals of the management options;
- notification of any transition arrangements for management or ownership alterations which occur as a result of land dedication or acquisition;
- demonstration that the relevant authority has the necessary experience, resources and funds to undertake the directions; and
- acknowledgement of responsibility from the adjoining landholder that the APZ will be managed in perpetuity.

Any proposed dedication of land which requires council maintenance should include a written approval from that council and a PoM to comply with PBP.

3.3 Building construction, siting and design

The appropriate design and construction of buildings enhance their survivability from bush fires. Construction measures should not be applied as a stand-alone mitigation solution, but should form part of a suite of BPMs. This should also include APZs, appropriate access, water supply and landscaping.

Building design needs to ensure adequate protection of vulnerable building elements. Construction standards are outlined in AS 3959 and the NASH Standard to provide various levels of protection for different building elements.

The level of building construction standard required is based on the FFDI, type of vegetation, the effective slope and the size of APZ. Appendix 1 provides the required methodology for assessing the building construction standards referred to in AS 3959 and the NASH Standard as BALs.

The construction requirements of the NCC are applied in addition to variations to these standards which are discussed in Chapter 7.

3.4 Access arrangements

Design of access roads shall enable safe access and egress for residents attempting to leave the area at the same time that emergency service personnel are arriving to undertake firefighting operations.

Chapters 5-8 detail performance criteria and acceptable solutions for access arrangements, relevant to the development type. Specific access design principles are included in Appendix 3.

In a bush fire prone area, the purpose of the road system is to:

- provide firefighters with access to structures, allowing more efficient use of firefighting resources;
- provide evacuation routes for firefighters and the public; and
- provide access to areas of bush fire hazard for firefighting and hazard mitigation purposes.

Roads shall provide sufficient width and other dimensions to ensure safe unobstructed access and allow firefighting crews to operate equipment around the vehicle. Road width is defined as the trafficable width from kerb to kerb or the inside edge of the table drain.

Dead-end roads should be avoided. However, where they are present, they must incorporate a sufficient turn-around area to minimise the need for vehicles to make multipoint turns.

3.4.1 Perimeter roads

A perimeter road should be provided to separate bush land from urban areas, allowing more efficient use of firefighting resources. A perimeter road is located on the outer extremity of a local area or subdivision and usually runs parallel to the bush land interface.

The perimeter road provides space to conduct active firefighting operations and hazard reduction activities. In developments where no perimeter road exists, property defence in a bush fire event may be more difficult.

3.4.2 Non-perimeter roads

Non-perimeter roads are the interconnecting roads between the perimeter roads and the existing and/or broader road network. These roads form a link for firefighting operations by providing access for emergency vehicles, a safe space for conducting property protection, and a suitable road network for egress of residents.

3.4.3 Property access roads

Property access is any access from private land onto the public road system. In rural areas, in particular isolated rural properties, operational difficulties can be experienced in accessing buildings. Examples include water crossings and roads which may be cut off by fire or other hazardous conditions. As a result, the location and standards of property access roads should be carefully considered.

3.4.4 Fire trails

Fire trails are used as access for firefighters in operational situations, as fire containment lines and for APZ maintenance.

Fire trails are not required for compliance with PBP. A fire trail is not a substitute for a road, nor is it considered an appropriate trade-off for the provision of perimeter, non-perimeter or property road access requirements.

The RF Act pt.3B provides for the establishment, maintenance, protection, certification and registration of fire trails by the NSW RFS Commissioner outside of the DA process.

Where fire trails are incorporated into a development, they must be designed, constructed and maintained in accordance with the NSW RFS *Fire Trail Standards* and the NSW RFS *Fire Trail Design, Construction and Maintenance Manual* to ensure that firefighter safety is not compromised. The responsibility and mechanism for the ongoing management of the fire trail must be clearly identified within the DA. Where the responsibility for fire trail maintenance is placed on a third party, this must be subject to a written agreement from the third party in question.

Where a Registered Fire Trail exists on a property, the function and overall access through the landscape must be carefully considered. These trails have been identified by the local BFMC and are considered of strategic importance for fire access in the area. At the time of development, the NSW RFS will need to consider any impacts the proposed development will have on the current and/or proposed fire trail network.

Importantly, if a fire trail is adopted as part of a development design, it may not necessarily mean that it is a Strategic Fire Trail for the purposes of the NSW RFS *Fire Trail Standards*.

3.5 Water supply and utilities

An adequate supply of water is essential for firefighting purposes. In addition, gas and electricity should be located so as not to contribute to the risk of fire or impede the firefighting effort.

Suitable water supply arrangements shall be provided for firefighting that meet the NSW RFS requirements. It is essential to ensure that any water sources are maintained at the appropriate capacity (see Chapters 5-7).

Where a non-reticulated water supply is provided or the reticulated water supply is deemed inadequate, an additional on site stored supply of water for firefighting will be required. Non-reticulated water is a supply that is not piped by council or a water authority and includes rainwater, ground water or surface water.

From a firefighting point of view, any source of available water may be used during a bush fire event and tanks are not always the most practical option. In light of the above, and the increasing demand for sustainable and efficient use of our water resources, the NSW RFS prefers that water is solely dedicated for firefighting purposes. As such, water holding structures such as tanks, swimming pools and dams can be considered as long as they are accessible, reliable and adequate. Nevertheless, where a water supply is provided it must be available for the life time of the development.

Water capacities, access for firefighters (tanker or pedestrian) and the provision of appropriate connections must also be considered when determining if a proposed water source is suitable.

Where a Static Water Supply (SWS) is provided, a SWS sign should be installed in a visible location on the street front. Regular testing of firefighting equipment should also occur to ensure that it is maintained in working order.

3.6 Emergency management arrangements

SFPP developments are identified as being more vulnerable to the effects of bush fire. This is because the occupants may have a mental or physical impairment, may experience language difficulties, may be unaware of their surroundings or the bush fire risk and may be unable to self-evacuate.

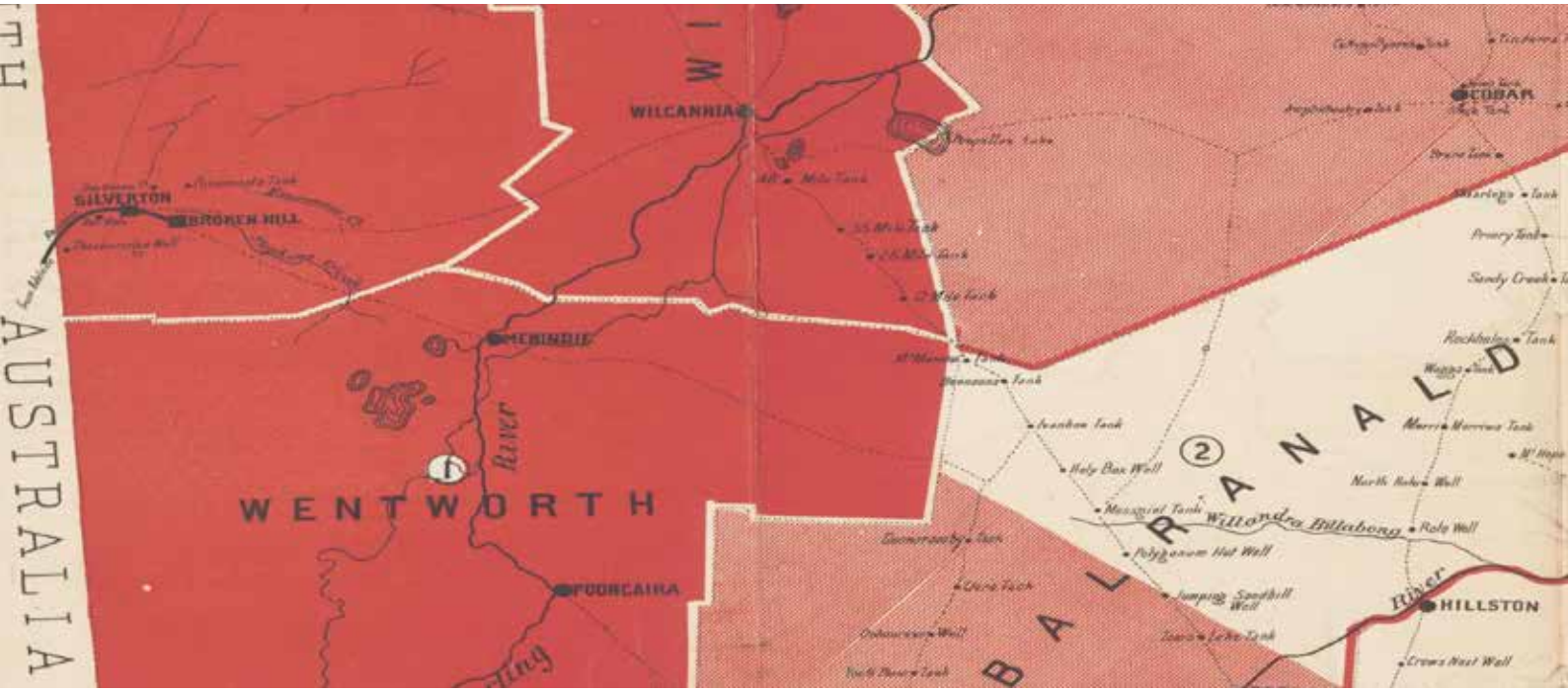
Due to their vulnerability, a higher degree of planning and emphasis on emergency management is required for all SFPP developments. It is imperative that emergency management arrangements are identified at the development planning phase for these developments. An indication of proposed emergency management arrangements should be provided with the DA. A Bush Fire Emergency Evacuation and Management Plan must be prepared for any SFPP development.

Emergency planning arrangements are not required for residential developments. However, anyone living in a bush fire prone area should prepare a Bush Fire Survival Plan, which is available on the NSW RFS website: www.rfs.nsw.gov.au.

3.7 Landscaping

The type, location and ongoing maintenance of landscaping is considered a necessary BPM.

For information about appropriate landscaping, refer to the NSW RFS document *Standards for Asset Protection Zones*, from the NSW RFS website: www.rfs.nsw.gov.au. and Appendix 4 of this document.


AUSTRALIA
WILCANNIA
SILVERTON
BROKEN HILL
MENINDIE
WENTWORTH
Darling River
POORCARIRA
COBAR
BALRANALD
Willandra Billabong
HILLSTON
River

4 STRATEGIC PLANNING

Strategic planning is the first stage in the planning process. It is needed to ensure that businesses and future development are not exposed to an unacceptable risk of bush fire.

The strategic planning phase includes state-level planning, regional planning, LEPs, DCPs and Masterplans or Precinct Plans.

4.1 Strategic principles

Strategic planning occurs at a state, regional and local government level. It often covers a large area, can include a number of different land uses, and establishes longer term development options.

Land use planning can be an effective tool in minimising or avoiding the impact of natural hazards such as bush fire. From a risk management perspective, the safest approach is always to avoid high risk areas. Local land use strategies and LEPs should consider and identify land affected by natural hazards and direct development away from inappropriate and constrained lands.

In a bush fire context, strategic planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bush fire attack. Services and infrastructure that facilitate effective suppression of bush fires also need to be provided for at the earliest stages of planning.

The bush fire risk is considered at the macro-scale, looking at fire runs, steep slopes and any areas of isolation. The amount of proposed development interfacing vegetation will also be considered.

Firefighting access and evacuation potential must be considered and an assessment of traffic volumes and evacuation routes will be required. The potential for these evacuation routes to be non-trafficable during a bush fire event will be factored into the assessment.

Some specific locations have significant fire history and are recognised as known fire paths. These areas may require detailed analysis. The broad principles which apply to this analysis are:

- ensuring land is suitable for development in the context of bush fire risk;
- ensuring new development on BFPL will comply with PBP;
- minimising reliance on performance-based solutions;
- providing adequate infrastructure associated with emergency evacuation and firefighting operations; and
- facilitating appropriate ongoing land management practices.

Strategic planning should provide for the exclusion of inappropriate development in bush fire prone areas as follows:

- the development area is exposed to a high bush fire risk and should be avoided;
- the development is likely to be difficult to evacuate during a bush fire due to its siting in the landscape, access limitations, fire history and/or size and scale;
- the development will adversely effect other bush fire protection strategies or place existing development at increased risk;
- the development is within an area of high bush fire risk where density of existing development may cause evacuation issues for both existing and new occupants; and
- the development has environmental constraints to the area which cannot be overcome.

The relevant BPMs in Chapters 5-8 of this document are to be considered at the strategic planning stage to ensure that future development can comply with PBP.

4.2 Strategic planning in bush fire prone areas

Strategic development proposals in bush fire prone areas require the preparation of a Strategic Bush Fire Study. The level of information required for such a study will be dependent upon the nature of any planning instrument changes, scale of the proposal, the bush fire risk and its potential impact upon the wider infrastructure network. The Strategic Bush Fire Study provides the opportunity to assess whether new development is appropriate in the bush fire hazard context. It also provides the ability to assess the strategic implications of future development for bush fire mitigation and management.

A Strategic Bush Fire Study must include, as a minimum, the components in Table 4.2.1.

Once these strategic issues have been addressed, an assessment of whether the proposal can comply with this document should be carried out. If the strategic issues cannot be resolved then the proposal cannot comply with PBP and will not be supported by the NSW RFS.

Table 4.2.1

Bush Fire Strategic Study

ISSUE	DETAIL	ASSESSMENT CONSIDERATIONS

Bush fire landscape assessment	A bush fire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	› The bush fire hazard in the surrounding area, including:
		  › Vegetation
		  › Topography
		  › Weather
		› The potential fire behaviour that might be generated based on the above;
		› Any history of bush fire in the area;
		› Potential fire runs into the site and the intensity of such fire runs; and
		› The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.

Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	› The risk profile of different areas of the development layout based on the above landscape study; › The proposed land use zones and permitted uses; › The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site); and › The impact of the siting of these uses on APZ provision.
Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	› The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile; › The location of key access routes and direction of travel; and › The potential for development to be isolated in the event of a bush fire.
Emergency services	An assessment of the future impact of new development on emergency services.	› Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/ brigades; and › Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.
Infrastructure	An assessment of the issues associated with infrastructure and utilities.	› The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants; and › Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	› Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.

4.3 Regional strategies and plans

Regional strategies and plans are for specific areas or regions across NSW. They are prepared in partnership with state and local governments, communities and business. Regional strategies and plans set a clear direction for these future growth areas over the longer term.

These strategies and plans should incorporate the bush fire strategic planning principles set out in section 4.1 while having regard for the priorities of state and local governments in identifying appropriate areas for growth.

The NSW RFS is a key stakeholder and should be consulted in the development of regional strategies and plans to ensure that appropriate strategies are developed and future conflicts do not occur.

4.4 Local Environmental Plans (LEPs)

LEPs are legal planning documents that inform planning decisions for local government areas. Through land use zoning and development controls, they impose standards to control development. The planning controls within the LEP are updated and reviewed through the Gateway process, which includes the following steps:

- the preparation of a planning proposal;
- the issuing of a Gateway determination;
- community and other consultation on the planning proposal (as required);
- finalising the planning proposal;
- drafting of the LEP (legal instrument);
- making the plan; and
- notification of the LEP on the NSW Government Legislation website.

The planning controls within an LEP may be updated and reviewed through a planning proposal. A planning proposal explains the intended effect of an amendment to a LEP and provides the justification for making it. The level of information required in a planning proposal is proportionate to the complexity.

4.4.1 Consideration of bush fire Issues

When preparing a draft LEP or planning proposal, local councils are required to apply the EP&A Act s.9.1(2). Direction 4.4 *Planning for Bush Fire Protection* applies to planning proposals that affect, or are in close proximity to, land mapped as BFPL. Under these directions, draft LEPs should follow the below objectives:

i. to protect life, property and the environment from bush fire, by discouraging the establishment of incompatible land uses in bush fire prone areas; and

ii. to encourage sound management of bush fire prone areas.

Under Direction 4.4, a relevant authority must consult with the Commissioner of the NSW RFS during the preparation of a draft LEP and take into account any comments made. The draft LEP shall also have regard to PBP.

As part of the consultation process with the NSW RFS, a bush fire assessment is required to be submitted to demonstrate compliance with the s9.1(2) Directions and PBP. Where the proposal is of a strategic nature, this should take the form of a Strategic Bush Fire Study as outlined in section 4.2.

It is encouraged that key bush fire issues are identified early in the LEP process through consultation with the NSW RFS. Wherever possible, this should take place prior to the proposal being submitted to the Gateway process in order to identify key bush fire issues upfront.

Where an application for rezoning is for residential or SFPP development on BFPL, it shall include an indicative development layout. This enables an assessment of the suitability of the land for the proposed development given the bush fire risk and existing land uses. The proposal must demonstrate that the required APZs can be met on the development site and that the road network can support evacuation demands numbers in the event of an emergency. It is important that new development does not increase the level of bush fire risk to the existing community. A traffic report prepared by a suitably qualified traffic consultant may be required in circumstances where issues relating to access/egress are identified.

In addition to the review of any layout designs, consideration must also be given to the LEP provisions relating to minimum lot sizes to ensure appropriate APZs can be accommodated within future subdivisions.

Careful consideration should be given to other critical infrastructure development, that may impact on or be effected by bush fire events.

4.5 Development Control Plans (DCP)

DCPs, prepared in accordance with the EP&A Act, are used to help achieve the objectives of the LEP by providing specific, comprehensive requirements for certain types of development or locations (e.g. for urban design or heritage precincts and properties).

Some DCP requirements may have implications for the provision of BPMs.

These items could include, but are not limited to:

- environmentally protected lands;
- landscaping;
- open space;
- vehicle access;
- parking;
- building design;
- secondary dwellings;
- dual and multiple occupancy; and
- site specific Masterplans.

When amendments are proposed to a DCP, an assessment of whether the amendments comply with, or may conflict with the requirements of PBP should be carried out. Consultation with the NSW RFS is recommended.

4.6 Masterplans and Precinct Plans

Masterplans and Precinct Plans combine written information, maps and diagrams to outline strategic plans or broad guideline for future development. Masterplanning provides an opportunity to undertake constraint mapping and identify BPMs in accordance with PBP at a larger regional level. Consultation with the NSW RFS should occur during the development of any Masterplan or Precinct Plan on BFPL with consideration given to fire history and the potential impacts from bush fire.

5 RESIDENTIAL AND RURAL RESIDENTIAL SUBDIVISIONS

For the purposes of this document, subdivision of land is the creation of lots for residential or rural residential purposes.

Where a new dwelling entitlement is created, it is important to ensure that appropriate BPMs are provided within the new allotment. This allows for protection measures to be fully incorporated at the design stage of development.

5.1 Background

Under the EP&A Act, subdivision is defined as the division of land into two or more parts that, after the division, would be adapted for separate occupation, use or disposition. The definition of the term subdivision in the EP&A Act also includes boundary adjustments.

A BFSA is required from the NSW RFS for subdivision on BFPL under RF Act. The RF Reg identifies certain subdivision types that are excluded from the requirement for a BFSA.

Subdivision can occur across a range of different forms such as residential, rural-residential and rural. Certain subdivisions may pose significant challenges from a planning and/or bush fire risk perspective and may require additional considerations.

The subdivision stage of land development provides an opportunity for early consideration of siting and access and for the incorporation of the appropriate combination of BPMs.

Re-vegetation or creation of riparian corridors as part of a subdivision development needs to be addressed in subdivision proposals. DCPs, Plans of Management and Vegetation Management Plans need to recognise the creation of potential future and unmapped BFPL. Vegetation regrowth or vegetation corridors may create issues for future development if bush fire risks are not assessed appropriately.

5.1.1 Isolated subdivision

Subdivision for the creation of isolated developments, particularly in rugged, heavily timbered country, poses significant challenges from a planning and/or bush fire risk perspective. Additional considerations for isolated subdivisions are provided in this section.

Where developments are located in isolated areas, occupants may need to travel large distances through bush fire prone vegetation, and firefighters may be hindered from providing assistance. For this reason, the conditions placed upon isolated developments reflect the need for occupants to be more self-sufficient in regards defending their properties.

Consideration should be given, where practical, to grouping of rural-residential buildings into clusters which allow for the establishment of APZs around a group of dwellings rather than having to ensure individual protection for a large number of scattered dwellings. The clustering of dwellings provides for better protection through consolidated vegetation management practices.

The NSW RFS has seen an increase in developments involving the subdivision of large rural blocks into smaller rural-residential allotments. In these circumstances, developers, designers and Consent Authorities need to be made aware that additional BPMs, such as those set out below, will be a requirement to allow for safer and appropriate outcomes for future occupants.

On days of catastrophic fire weather, the NSW RFS recommends leaving early as the only safe option.

Any proposal for this type of development that does not meet the acceptable solutions for subdivision will require the applicant to complete a performance based solution, which may include a BFDB.

To demonstrate the suitability of the proposed subdivision, the following provisions will need to be considered:

- access and egress within the developable land and along the adjoining public road system shall include safety provisions for attending emergency service vehicles and evacuating residents, including road widths and management of vegetation along road verges. Clearing or modifying vegetation in roadside verges of existing road reserves may not be permitted;
- subdivision design shall include perimeter roads separating developable lots from hazardous bushland areas. The objective of perimeter roads is to not only provide a fuel free area adjacent to the hazard but to also ensure suitable unrestricted access for firefighting and fire management purposes. Maintenance of perimeter roads shall be the responsibility of the cluster community;
- access for maintenance of APZ and other fuel management activities;
- larger APZs outside of the range prescribed in PBP and increased Bush Fire Attack Level (BAL) to proposed buildings to create a safer area for occupants and firefighters remaining on site; and
- firefighting water supply and associated firefighting equipment (i.e. pump and hose) for each dwelling in addition to any reticulated water supplies.

There are circumstances where increasing density on the site is just not acceptable given the bush fire risk.

5.1.2 Strata subdivision of existing buildings

A BFSA is required for the strata subdivision of a building except where a development consent has been granted in accordance with EP&A Act s. 4.14.

Consideration should be given as to whether the arrangement will lead to increased densities (see 8.2.1) and vulnerability of future residents.

Emergency planning is critical and should be implemented prior to formal adoption of the strata arrangements. The performance criteria within Chapter 5 of this document must be applied to the building. A property management plan should be prepared and upgrading for ember protection should be considered. Arrangements must be established in a Community Management Statement (e.g. body corporate by-laws) that addresses fire management strategies for the development and takes into account the following:

- continued management of APZs, water supplies and fire trails;
- a right of carriageway for fire management purposes;
- approved hazard reduction proposals that involve the land;
- consultation between the Strata Executive and the appropriate fire agency to confirm contact details and legalities involved with permissions for fire management works on the land together with any other community engagement advice for the occupants; and
- preparation of a Bush Fire Survival Plan for each household.

5.1.3 Existing dwellings

While all new dwellings within a subdivision must comply with PBP, there may be existing dwellings located on the land that would benefit from BPMs.

Conditions may therefore be applied to the subdivision consent requiring the existing structure to be upgraded to provide ember protection and water supplies for fire fighting.

Advice regarding the maintenance, upgrading and protection of existing buildings can be found on the NSW RFS website www.rfs.nsw.gov.au.

5.1.4 Subdivision in grassland hazard areas

The risk posed by grass fires is different to that of fires in other vegetation types. Grass fires burn at a higher intensity and spread more rapidly with a shorter residence time. Embers produced by grass fires are smaller and fewer in number than those produced from forest fires.

At residential subdivision stage, an assessment must be carried out to determine whether an APZ can be provided around the proposed development to avoid flame contact. Subdivision will not be supported where the development would be BAL-40 or BAL-FZ. The APZ distances identified in Tables A1.12.2 and A1.12.3 provide the acceptable solutions for meeting this threshold.

All of the other performance criteria and acceptable solutions within Tables 5.3a to 5.3d apply to residential and rural residential proposals in grassland hazard areas. Table 5.1.4a (see over) provides the relevant FFDI to utilise for grassland hazard areas.

5.1.5 Performance based subdivisions

Where subdivisions are proposed via performance based solutions, a legal mechanism must be created to ensure that further development is consistent with the approved subdivision.

Conditions of consent may require legal easements, BAL Plans and/or Plans of Management and specific bush fire requirements recorded on Section 10.7 Certificates. These issues will need to be addressed as part of the BFDB process for the subdivision.

Table 5.1.4a

Equivalent values for FFDI and GFDI

FOREST FIRE DANGER INDEX (FFDI)	GRASSLAND FIRE DANGER INDEX (GFDI)
50	70
80	110
100	130

5.2 Specific objectives

The specific objectives for residential and rural residential subdivisions with a dwelling entitlement are as follows:

- minimise perimeters of the subdivision exposed to the bush fire hazard (hourglass shapes, which maximise perimeters and create bottlenecks should be avoided);
- minimise vegetated corridors that permit the passage of bush fire towards buildings;
- provide for the siting of future dwellings away from ridge-tops and steep slopes, within saddles and narrow ridge crests;
- ensure that APZs between a bush fire hazard and future dwellings are effectively designed to address the relevant bush fire attack mechanisms;
- ensure the ongoing maintenance of APZs;
- provide adequate access from all properties to the wider road network for residents and emergency services;
- provide access to hazard vegetation to facilitate bush fire mitigation works and fire suppression; and
- ensure the provision of an adequate supply of water and other services to facilitate effective firefighting.

5.3 Bush fire protection measures

The BPMs for residential and rural residential subdivisions include measures relating to APZs, access to structures and water supply, fire trail access, and provision of water. Electricity and gas services should be provided so that they don't add to the bush fire risk to buildings.

All requirements for BPMs that relate to the development must be provided, unless where specific circumstances apply to render a BPM irrelevant (i.e. no landscaping required).

5.3.1 APZs

Intent of measures: to provide sufficient space and maintain reduced fuel loads to ensure radiant heat levels at the buildings are below critical limits and prevent direct flame contact.

Table 5.3a

Performance criteria and acceptable solutions for APZs for residential and rural residential subdivisions.

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
ASSET PROTECTION ZONES	› potential building footprints must not be exposed to radiant heat levels exceeding 29 kW/m² on each proposed lot.	› APZs are provided in accordance with Tables A1.12.2 and A1.12.3 based on the FFDI.
	› APZs are managed and maintained to prevent the spread of a fire towards the building.	› APZs are managed in accordance with the requirements of Appendix 4.
	› the APZs is provided in perpetuity.	› APZs are wholly within the boundaries of the development site
	› APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	› APZs are located on lands with a slope less than 18 degrees.
LANDSCAPING	› landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	› landscaping is in accordance with Appendix 4; and › fencing is constructed in accordance with section 7.6.

5.3.2 Access

Intent of measures: to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area.

Table 5.3b

Performance criteria and acceptable solutions for access for residential and rural residential subdivisions.

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
ACCESS (GENERAL REQUIREMENTS)	› firefighting vehicles are provided with safe, all-weather access to structures.	› property access roads are two-wheel drive, all-weather roads; › perimeter roads are provided for residential subdivisions of three or more allotments; › subdivisions of three or more allotments have more than one access in and out of the development; › traffic management devices are constructed to not prohibit access by emergency services vehicles; › maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient; › all roads are through roads; › dead end roads are not recommended, but if unavoidable, are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end; › where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road; › where access/egress can only be achieved through forest, woodland and heath vegetation, secondary access shall be provided to an alternate point on the existing public road system; and › one way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.
	› the capacity of access roads is adequate for firefighting vehicles.	› the capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/ causeways are to clearly indicate load rating.
	› there is appropriate access to water supply.	› hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression; › hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005 - *Fire hydrant installations System design, installation and commissioning*; and › there is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.

Table 5.3b *Continued*

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
PERIMETER ROADS	❯ access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	❯ are two-way sealed roads; ❯ minimum 8m carriageway width kerb to kerb; ❯ parking is provided outside of the carriageway width; ❯ hydrants are located clear of parking areas; ❯ are through roads, and these are linked to the internal road system at an interval of no greater than 500m; ❯ curves of roads have a minimum inner radius of 6m; ❯ the maximum grade road is 15 degrees and average grade of not more than 10 degrees; ❯ the road crossfall does not exceed 3 degrees; and ❯ a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
NON-PERIMETER ROADS	❯ access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	❯ minimum 5.5m carriageway width kerb to kerb; ❯ parking is provided outside of the carriageway width; ❯ hydrants are located clear of parking areas; ❯ roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m; ❯ curves of roads have a minimum inner radius of 6m; ❯ the road crossfall does not exceed 3 degrees; and ❯ a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

Table 5.3b *Continued*

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
The intent may be achieved where:	
PROPERTY ACCESS › firefighting vehicles can access the dwelling and exit the property safely.	› There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. In circumstances where this cannot occur, the following requirements apply: › minimum 4m carriageway width; › in forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay; › a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; › provide a suitable turning area in accordance with Appendix 3; › curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; › the minimum distance between inner and outer curves is 6m; › the crossfall is not more than 10 degrees; › maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and › a development comprising more than three dwellings has access by dedication of a road and not by right of way. Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.

5.3.3 Services – Water, electricity and gas

Intent of measures: *to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.*

Table 5.3c

Performance criteria and acceptable solutions for water, electricity and gas services for residential and rural residential subdivisions.

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
WATER SUPPLIES	› adequate water supplies is provided for firefighting purposes.	› reticulated water is to be provided to the development where available; › a static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed; and › static water supplies shall comply with Table 5.3d.
	› water supplies are located at regular intervals; and › the water supply is accessible and reliable for firefighting operations.	› fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2005; › hydrants are not located within any road carriageway; and › reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.
	› flows and pressure are appropriate.	› fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
	› the integrity of the water supply is maintained.	› all above-ground water service pipes are metal, including and up to any taps; and › above-ground water storage tanks shall be of concrete or metal.

ELECTRICITY SERVICES	› location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	› where practicable, electrical transmission lines are underground;
		› where overhead, electrical transmission lines are proposed as follows:
		  › lines are installed with short pole spacing of 30m, unless crossing gullies, gorges or riparian areas; and
		  › no part of a tree is closer to a power line than the distance set out in ISSC3 *Guideline for Managing Vegetation Near Power Lines*.

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

Table 5.3d

Water supply requirements for non-reticulated developments or where reticulated water supply cannot be guaranteed.

DEVELOPMENT TYPE	WATER REQUIREMENTS
Residential lots (<1,000m^2)	5,000L/lot
Rural-residential lots (1,000-10,000m^2)	10,000L/lot
Large rural/lifestyle lots (>10,000m^2)	20,000L/lot
Multi-dwelling housing (including dual occupancies)	5,000L/dwelling

6 SPECIAL FIRE PROTECTION PURPOSE DEVELOPMENTS

An SFPP development is one which is occupied by people who are considered to be at-risk members of the community. In a bush fire event, these occupants may be more susceptible to the impacts of bush fire.

Evacuating at-risk members of the community is more challenging because they may be physically or psychologically less able to relocate themselves or are unfamiliar with their surroundings.

Examples of SFPP developments are schools, hospitals, nursing homes and tourist accommodation.

6.1 Introduction

Under RF Act s.100B, a BFSA from the NSW RFS is required for SFPP development. As such, an Integrated Development approval may be required under of the EP&A Act s.4.46.

The specific development types which are considered as SFPP development are listed within the RF Act. The RF Reg also details specific development types which are either excluded from the requirement for a BFSA or are considered as additional SFPP developments for which a BFSA is required.

The nature of SFPP developments means that occupants may be more vulnerable to bush fire attack for one or more of the following reasons:

- they may be less aware in relation to bush fire impacts;
- they may have reduced capacity to evaluate risk and respond adequately to the bush fire threat;
- they may present operational difficulties for evacuation and or management;
- they may be more vulnerable to stress and anxiety arising from bush fire threat and smoke;
- there may be significant communication barriers;
- supervision during a bush fire may be difficult; and
- they may be unfamiliar with the area.

The specific objectives, performance criteria and acceptable solutions for SFPP developments as defined by the RF Act and RF Reg are given in sections 6.2 to 6.8 of this document.

Different vulnerability characteristics have been identified for certain developments which are classified as SFPP under the RF Act and RF Reg. Varied performance criteria and acceptable solutions are identified for these particular uses in section 6.3. These SFPP developments may not be provided for in Table A1.12.1 and will need to be assessed on a performance basis on their own merits.

6.2 Specific objectives

Due to the vulnerable nature of the occupants of SFPP developments, there is more reliance on the provision of an APZ and emergency management.

The specific objectives for SFPP developments are to:

- minimise levels of radiant heat, localised smoke and ember attack through increased APZ, building design and siting;
- provide an appropriate operational environment for emergency service personnel during firefighting and emergency management;
- ensure the capacity of existing infrastructure (such as roads and utilities) can accommodate the increase in demand during emergencies as a result of the development; and
- ensure emergency evacuation procedures and management which provides for the special characteristics and needs of occupants.

The intent and performance criteria within the tables in section 6.8 must be satisfied for SFPP development.

6.3 Objectives for specific uses

Particular SFPP developments demonstrate different characteristics and may require different levels of protection. As such, tailored objectives are specified for these development types, though a BFSA is still required under RF Act s.100B.

Typically, reasons for setting tailored objectives include, but are not limited to:

- lower occupancy levels;
- the presence of a resident/manager on site, thereby improving the potential for informed emergency evacuation decisions; and
- construction under AS 3959 or NASH Standard may be impractical (i.e. tents and caravans).

Varied performance criteria and acceptable solutions are given for specific types of SFPP development in Tables 6.8a to 6.8d.

Although construction levels or APZ requirements differ, it is imperative that water provision, emergency management and access provisions are provided commensurate with occupancy levels, assessed level of risk and characteristics of occupants.

The following commentary outlines particular matters for consideration for specific types of lower risk SFPP developments.

6.3.1 Specific tourism uses

Some SFPP development is occupied on a short-term basis by people who are unaware of their surroundings and the appropriate procedure to follow in the event of a bush fire. Short-term accommodation (six weeks or less) must meet the varied performance criteria in Tables 6.8a to 6.8d.

The NSW RFS defines long-term accommodation as exceeding six weeks in duration and considers that long-term occupants will be familiar with their surrounds, safe refuge areas and evacuation routes. As such, long-term accommodation may be treated as standard residential development and therefore needs to meet a radiant heat threshold of 29kW/m^2.

- **Caravan parks** – Standard type caravans and motor homes used for short-term tourist accommodation generally cannot achieve any level of construction under AS 3959 or NASH Standard. The emphasis is therefore placed on APZs and emergency management, with consideration given to leaving early and non-operation on days of elevated bush fire danger.
- **Camping** – No construction requirements for tents are provided in AS 3959 or NASH Standard. Camping is permissible within the APZ of a caravan or tourist park, provided the other relevant BPMs (e.g. emergency management arrangements) are in place. Careful consideration should be given to the suitability of camping in bush fire prone areas on days of elevated bush fire danger.
- **Primitive camping** – Primitive camping is generally more remote from urban areas, and is defined as having only a limited range of facilities. This is covered by the *Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation 2005*. The NSW RFS discourages the use of primitive camp grounds in high risk and isolated bush fire prone areas during periods of elevated bush fire danger.
- **Bed and breakfast and farmstay accommodation** It is assumed that there is a manager on site who is aware of the bush fire risk and appropriate emergency response procedures and due to the low occupancy rates, the resources and time required for emergency evacuation are reduced. The potential for informed emergency evacuation decisions is therefore improved. As such, the setback and construction requirements of BAL-29 can be applied.
- **Holiday Lets** - Where a building is proposed to be used as a holiday let in an area with reticulated water, it does not back onto public reserves, and the setback and construction requirements of BAL-29 can be applied, they should be treated as a residential infill arrangement. Alternatively, a performance based solution will be required demonstrating adequate levels of bush fire safety before such a proposal can be supported by the NSW RFS.
- **Ecotourism** – Due to its focus on the natural environment and creating minimal impact, the principles of ecotourism and the establishment of APZs for bush fire mitigation are often in conflict. All relevant parties must accept that there is an increase for the potential for loss of structures due to the competing objectives to reduce the environmental footprints of these types of developments. The emphasis is therefore placed on emergency management, leaving early and non-operation on days of extreme or catastrophic fire weather.

  At least one building must be provided on site that can be used as a refuge for the maximum number of occupants on site. The building must have a minimum 10kW/m^2 APZ, be constructed to BAL-12.5 and have vehicular access. Cabins must be within a 100m walking distance of the refuge building.

6.3.2 Specific residential-based SFPP

- **Manufactured home estates** – Manufactured housing can be built to achieve all levels of construction required under the NCC. However, SEPP 36—*Manufactured Home Estates* does not require a separate development consent for each manufactured home after development consent is given for the estate.

  Due to the nature of manufactured home estates, there is no mechanism within the development consent process to ensure that the dwellings will be constructed to the standards applied within AS 3959 or NASH Standard. Therefore, the acceptable solution for manufactured housing is the provision of an APZ which achieves 10kW/m^2 commensurate with SFPP development in line with Table A1.12.1.

  Where evidence can be provided which confirms that dwellings within the manufactured home estate will be constructed to the appropriate construction standards under AS 3959 or NASH Standard, an APZ can be provided which meets 29kW/m^2 in line with Tables A1.12.2 - A1.12.3.

- **Home based child care** - Due to their residential setting and lower occupant numbers, this use is not considered to be a SFPP. The specific standards for home-based child care can be found in Chapter 7. It should be noted that there are other forms of child care which are considered to be SFPP development, including centre based child care and school based child care.

- **Tertiary institutions** - Tertiary institutions such as universities and TAFEs may accommodate large numbers of people with various physical capabilities.

  Where the university or TAFE includes accommodation, the residential component is SFPP.

  Other uses in tertiary institutions may not be defined as SFPP by the RF Reg but require approval under the EP&A Act s4.14. This may include assembly occupancies (see Chapter 8).

6.4 Development of existing SFPP facilities

In circumstances where new building projects within existing SFPP developments are proposed, an appropriate combination of BPMs are required.

This will involve the BFDB process where relevant stakeholders agree on the basis for any assessment and measures that will result in a better bush fire outcome for the proposal. The NSW RFS should be consulted early in the design stage. Refer to Appendix 2 for more detailed information on the BFDB process.

The intention for any building work occurring within an existing SFPP development is to achieve a better bush fire outcome than if the development did not proceed. Achieving this may require a combination of measures including improved construction standards, APZs and evacuation management. This may result in a level of retrofitting of existing buildings and managing other portions of the site (i.e. APZs) to ensure an improved level of bush fire protection.

Intensification of the use or increase in occupancy must consider the risk to occupants and firefighters. Where practically achievable, full compliance should be provided before variations to the required BPMs are considered. Proposals that involve internal alterations only, are not subject to any specific requirements unless the proposal results in a change of use, re-purpose and/or involves an increase in occupants.

Existing SFPP facilities constructed without the benefit of current bush fire requirements need to consider providing a designated safe refuge building to accommodate all occupants. The safe refuge shall provide a radiant heat threshold of no greater than 10kW/m^2 and a minimum BAL-12.5 construction.

Existing services such as water supplies and access may also require upgrading.

Existing structures located within an APZ may be problematic for a new building due to the potential risk of building to building fire spread. Where this occurs, a performance based solution will be required to provide a safer outcome.

A Bush Fire Emergency Management Plan that is consistent with the NSW RFS publication: A Guide *to Developing a Bush Fire Emergency Management and Evacuation Plan*, and the Australian Standard AS 3745:2010 *Planning for emergencies in facilities* will be required to be prepared for the existing facility.

The objectives that apply to existing SFPP development are as follows:

- provide an appropriate defendable space;
- site the building in a location which ensures appropriate separation from the hazard to minimise potential for material ignition;
- provide a better bush fire protection outcome for existing buildings;

- new buildings should be located as far from the hazard as possible and should not be extended towards or situated closer to the hazard than the existing buildings (unless they can comply with section 6.8);
- ensure there is no increase in bush fire management and maintenance responsibility on adjoining land owners without their written confirmation;
- ensure building design and construction enhances the chances of occupant and building survival; and
- provide for safe emergency evacuation procedures including capacity of existing infrastructure (such as roads).

6.5 Minor development in SFPP facilities

Minor development includes the following:

- Internal works;
- Flag poles;
- Aerials and antennas;
- Satellite dishes;
- Paved areas;
- Earth works and draining;
- Class 10a structures located further than 6m from a habitable building; and
- Minor non-structural building alterations (external) such as the following:
  - painting, plastering, cement rendering, cladding, attaching fittings or decorative work;
  - the replacement of an external window, glazing areas or a door (however, the opening and/or external glazed area of the window or door must not be increased in size);
  - the repair to or replacement of a non-structural wall or roof cladding;
  - the installation of a security screen or grill to a door or window or a security door;
  - the repair to or replacement of a balustrade; and
  - re-stumping or repairing structure foundations without increasing the height of the structure.

The development types listed above do not have any influence on potential bush fire impacts and the bush fire protection of the building. For this reason, the NSW RFS does not consider that a BFSA is necessary for the development types listed above. Wherever applicable, the building elements concerned will need to comply with the requirements of AS 3959 or NASH Standard under the NCC.

6.6 Alpine resorts

Alpine resorts are located within the Kosciuszko National Park and include:

- Thredbo;
- Perisher – including Perisher, Smiggin Holes, Mount Blue Cow and Guthega;
- Charlotte Pass;
- Selwyn Snow Resort;
- Ski Rider Hotel;
- Kosciuszko Tourist Park;
- Sponars Chalet; and
- Bullocks Flat Terminal.

The alpine resorts are located within the environmentally significant setting of the Kosciusko National Park. The alpine resort areas are predominantly used for short- term tourist accommodation and are considered to be SFPP development. Much of the existing building stock has not been constructed to current requirements for development in a bush fire prone area.

Leasehold arrangements combined with conflicting land management objectives present challenges in achieving APZs for SFPP developments in the alpine areas.

The specific objectives that apply to SFPP infill development in the alpine resort areas are as follows:

- provide an appropriate defendable space;
- provide a better bush fire protection outcome for existing structures (e.g. via ember protection measures);
- ensure new building work complies with the construction standards set out in AS 3959;
- to ensure ongoing management and maintenance responsibilities are in place where APZs are proposed outside of the sub lease or leasehold area;
- written consent from the land managers is provided for all proposed works outside of the sub lease or leasehold area;
- proposed APZs outside of the sub lease or leasehold area are supported by a suitable legal mechanism to ensure APZs are managed under a binding legal agreement in perpetuity;
- ensure building design and construction standards enhance the chances of occupant and building survival; and

- provide safe emergency evacuation procedures.

Any additional construction requirements should be commensurate with the following:

- the scope of the proposed works, including any increase in size and footprint of the building;
- any additional capacity for the accommodation of guests and/or staff on site; and
- the cost associated with the proposed upgrade of any building.

The NSW RFS has an expectation that a better bush fire outcome is achieved where new development is proposed in association with existing facilities.

As the bulk of existing structures in alpine areas are not constructed to appropriate bush fire standards, longer term plans should be developed to pro-actively enhance the overall bush fire protection.

6.7 SFPP developments in grassland areas

A Grassland Fire Danger Index (GFDI) is one of the factors used to calculate APZ distances for SFPP development in grassland hazard areas. The APZ values for SFPP development in grassland hazard areas are shown in Table A1.12.1 in Appendix 1.

6.8 Bush fire protection measures

The BPMs for SFPP developments should be provided to minimise the risk of fire spread to buildings and take into account the increased vulnerability of the occupants.

6.8.1 APZs and building construction

Intent of measures: to provide suitable building design, construction and sufficient space to ensure that radiant heat levels do not exceed critical limits for firefighters and other emergency services personnel undertaking operations, including supporting or evacuating occupants.

Table 6.8a

Performance criteria and acceptable solutions for APZs and construction for SFPP development.

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
ASSET PROTECTION ZONES	› radiant heat levels of greater than 10kW/m² (calculated at 1200K) will not be experienced on any part of the building.	› the building is provided with an APZ in accordance with Table A1.12.1 in Appendix 1.
	› APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	› APZs are located on lands with a slope less than 18 degrees.
	› APZs are managed and maintained to prevent the spread of fire to the building. › the APZ is provided in perpetuity.	› the APZ is managed in accordance with the requirements of Appendix 4 of this document, and is wholly within the boundaries of the development site; › APZ are wholly within the boundaries of the development site; and › other structures located within the APZ need to be located further than 6m from the refuge building.
	VARIATIONS	
	Camping and primitive camping: no performance criteria applicable.	› N/A.
	Bed and breakfast and farmstay: the building will not be exposed to radiant heat levels exceeding 29kW/m² (1090K).	› an APZ is provided in accordance with Tables A1.12.2 or A1.12.3 in Appendix 1 of this document around the entire building or structure.
	Ecotourism: radiant heat levels of greater than 10kW/m² (1200K) are not experienced by emergency service personnel and occupants during firefighting and emergency management around a building on site that can be used as a refuge.	› an APZ is provided in accordance with Table A1.12.1 in Appendix 1 of this document around the entire refuge building or structure.
	Manufactured home estates: APZs achieve radiant heat levels that are commensurate with the construction standard for the proposed dwellings.	› an APZ in accordance with Table A1.12.1 in Appendix 1 of this document is provided to all new dwellings; or › an APZ in accordance with Table A1.12.2 or A1.12.3 in Appendix 1 of this document is provided where it is demonstrated that all new dwellings will be constructed in accordance with BAL-29.

Table 6.8a *Continued*

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
LANDSCAPING	› landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	› landscaping is in accordance with Appendix 4; and › fencing is constructed in accordance with section 7.6.
CONSTRUCTION STANDARDS	› the proposed building can withstand bush fire attack in the form of wind, embers, radiant heat and flame contact.	› a construction level of BAL-12.5 under AS 3959 or NASH Standard and section 7.5 of PBP is applied.
	VARIATIONS	
	Camping and primitive camping: no performance criteria applicable.	› N/A.
	Bed and breakfast and farmstay: the proposed building can withstand bush fire attack in the form of wind, embers, radiant heat and flame contact.	› construction is applied in accordance with Appendix 1 of PBP.
	Ecotourism: the proposed refuge building can withstand bush fire attack in the form of wind, embers, radiant heat and flame contact.	› a construction level of BAL-12.5 or greater is applied to the refuge building in accordance with AS 3959 or NASH Standard and 7.5 of PBP.
	Manufactured home estates: the proposed manufactured home can withstand bush fire attack in the form of wind, embers, radiant heat and flame contact.	› Where an APZ is provided in accordance with Table A1.12.1 in Appendix 1 of this document the construction standards for BAL-12.5 shall apply; or › Where an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1 of this document the construction standards for BAL-29 shall apply.
	Ecotourism	
	occupants of the ecotourism facility are provided with appropriate shelter in the event of a bush fire.	› a refuge building is provided; › the refuge building must have sufficient space for all occupants and comply with the occupancy levels permissible for that structure; and › the refuge building must be constructed to BAL-12.5 or greater in accordance with AS 3959 or NASH Standard and 7.5 of PBP.

All APZ modelling for the purposes of SFPP development is based on a flame temperature of 1200 Kelvin (K).

6.8.2 Access

Intent of measures: to provide safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing an area.

Table 6.8b

Performance criteria and acceptable solutions for access for SFPP development.

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
ACCESS	› firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	› SFPP access roads are two-wheel drive, all-weather roads; › access is provided to all structures; › traffic management devices are constructed to not prohibit access by emergency services vehicles; › access roads must provide suitable turning areas in accordance with Appendix 3; and › one way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.
	VARIATIONS	
	Primitive camping: Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	› access is provided in accordance with the property access requirements of Table 5.3b.
	Bed and breakfast and farmstay: Firefighting vehicles are provided with safe, all-weather access to structures.	› access is provided in accordance with the property access requirements of Table 5.3b.
	Ecotourism: fire fighting vehicles are provided with safe, all-weather access to the proposed refuge building.	› vehicular access is provided to the refuge building from a public road in accordance with property access requirements of Table 5.3b; › accommodation is within 100m of the refuge building; and › pedestrian paths from accommodation to the refuge building/s are provided and clearly signposted.
	› the capacity of access roads is adequate for firefighting vehicles.	› the capacity of road surfaces and any bridges/ causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges and causeways are to clearly indicate load rating.
	› there is appropriate access to water supply.	› hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression; › hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005; and › there is suitable access for a Category 1 fire appliances to within 4m of the static water supply where no reticulated supply is available.

Table 6.8b *Continued*

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
PERIMETER ROADS	❯ perimeter access roads are designed to allow safe access and egress for firefighting vehicles while occupants are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	❯ there are two-way sealed roads; ❯ minimum 8m carriageway width kerb to kerb; ❯ parking is provided outside of the carriageway width; ❯ hydrants are to be located clear of parking areas; ❯ there are through roads, and these are linked to the internal road system at an interval of no greater than 500m; ❯ curves of roads have a minimum inner radius of 6m; ❯ the maximum grade road is 15 degrees and average grade of not more than 10 degrees; ❯ the road crossfall does not exceed 3 degrees; and ❯ a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
NON-PERIMETER ROADS	❯ non-perimeter access roads are designed to allow safe access and egress for firefighting vehicles while occupants are evacuating.	❯ minimum 5.5m carriageway width kerb to kerb; ❯ parking is provided outside of the carriageway width; ❯ hydrants are located clear of parking areas; ❯ there are through roads, and these are linked to the internal road system at an interval of no greater than 500m; ❯ curves of roads have a minimum inner radius of 6m; ❯ the maximum grade road is 15 degrees and average grade of not more than 10 degrees; ❯ the road crossfall does not exceed 3 degrees; and ❯ a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

6.8.3 Services – Water, gas and electricity

Intent of measures: to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.

Table 6.8c

Performance criteria and acceptable solutions for water, electricity and gas services for SFPP development.

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
WATER SUPPLY	❯ an adequate water supply for firefighting purposes is installed and maintained.	❯ reticulated water is to be provided to the development, where available; or ❯ a 10,000 litres minimum static water supply for firefighting purposes is provided for each occupied building where no reticulated water is available.
	VARIATIONS	
	Caravan and camping grounds: an adequate water supply for firefighting purposes is installed and maintained. **Primitive camping**: an adequate water supply for firefighting purposes is installed and maintained.	❯ either a reticulated water supply is provided or a 10,000 litres minimum water supply on site.
	❯ water supplies are located at regular intervals. ❯ the water supply is accessible and reliable for firefighting operations.	❯ fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005; ❯ hydrants are not located within any road carriageway; and ❯ reticulated water supply to SFPPs uses a ring main system for areas with perimeter roads.
	❯ flows and pressure are appropriate.	❯ fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
	❯ the integrity of the water supply is maintained.	❯ all above-ground water service pipes external to the building are metal, including and up to any taps.
	❯ water supplies are adequate in areas where reticulated water is not available.	❯ a connection for firefighting purposes is located within the IPA or non hazard side and away from the structure; a 65mm Storz outlet with a ball valve is fitted to the outlet; ❯ ball valve and pipes are adequate for water flow and are metal; ❯ supply pipes from tank to ball valve have the same bore size to ensure flow volume; ❯ underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank; ❯ a hardened ground surface for truck access is supplied within 4m of the access hole; ❯ above-ground tanks are manufactured from concrete or metal; ❯ raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F AS 3959); ❯ unobstructed access is provided at all times; ❯ tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters; and ❯ underground tanks are clearly marked,

Table 6.8c *Continued*

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
WATER SUPPLIES	*(continued from previous page)* › water supplies are adequate in areas where reticulated water is not available.	› all exposed water pipes external to the building are metal, including any fittings; › where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bush fire attack; Any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and › fire hose reels are constructed in accordance with AS/NZS 1221:1997 *Fire hose reels*, and installed in accordance with the relevant clauses of AS 2441:2005 *Installation of fire hose reels.*
ELECTRICITY SERVICES	› location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	› where practicable, electrical transmission lines are underground; › where overhead, electrical transmission lines are proposed as follow: › lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and › no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 *Guideline for Managing Vegetation Near Power Lines.*
GAS SERVICES	› location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	› reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used; › all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side; › connections to and from gas cylinders are metal; › if gas cylinders need to be kept close to the building, safety valves are directed away from the building and at least 2m away from any combustible material, so they do not act as a catalyst to combustion; › polymer-sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used; and › above-ground gas service pipes external to the building are metal, including and up to any outlets.

6.8.4 Emergency management planning

Intent of measures: to provide suitable emergency and evacuation arrangements for occupants of SFPP developments.

Table 6.8d

Performance criteria and acceptable solutions for emergency management plans for SFPP development.

EMERGENCY MANAGEMENT

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
The intent may be achieved where:	
➢ a Bush Fire Emergency Management and Evacuation Plan is prepared.	➢ Bush Fire Emergency Management and Evacuation Plan is prepared consistent with the: ➢ The NSW RFS document: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan*; ➢ *NSW RFS Schools Program Guide;* ➢ Australian Standard AS 3745:2010 *Planning for emergencies in facilities*; and ➢ Australian Standard AS 4083:2010 *Planning for emergencies – Health care facilities* (where applicable). ➢ the Bush Fire Emergency Management and Evacuation Plan should include planning for the early relocation of occupants. Note: A copy of the Bush Fire Emergency Management and Evacuation Plan should be provided to the Local Emergency Management Committee for its information prior to occupation of the development.
VARIATIONS	
Caravan and camping grounds: a Bush Fire Emergency Management and Evacuation Plan is prepared. **Primitive camping**: a Bush Fire Emergency Management and Evacuation Plan is prepared. **Ecotourism**: a Bush Fire Emergency Management and Evacuation Plan is prepared.	➢ a Bush Fire Emergency Management and Evacuation Plan is prepared consistent with the NSW RFS document: *A Guide to Developing a Bush Fire Emergency Management* and Evacuation *Plan*, and AS 3745:2010; ➢ for proposals in isolated or remote areas which involve large travel distances through bush fire prone vegetation, the following issues should be determined and addressed: ➢ the amount of travel likely to be generated during an emergency evacuation; ➢ the capacity of the broader road network to facilitate safe emergency evacuation; ➢ limitations/constraints inherent in the road system; and ➢ management of potential traffic conflicts (such as emergency vehicles versus evacuating members of the public). ➢ the Bush Fire Emergency Management and Evacuation Plan must consider a mechanism for the early relocation of occupants on days when adverse fire weather is notified or adverse fire activity occurs in the local government area in which the development operates. Note: A copy of the Bush Fire Emergency Management and Evacuation Plan shall be provided to the Local Emergency Management Committee for its information prior to occupation of the development.
➢ appropriate and adequate management arrangements are established for consultation and implementation of the Bush Fire Emergency Management and Evacuation Plan.	➢ an Emergency Planning Committee is established to consult with residents (and their families in the case of aged care accommodation and schools) and staff in developing and implementing an Emergency Procedures Manual; and ➢ detailed plans of all emergency assembly areas including on site and off-site arrangements as stated in AS 3745:2010 are clearly displayed, and an annually emergency evacuation is conducted.

7 RESIDENTIAL INFILL DEVELOPMENT

Residential infill development refers to the development of land by the erection of, alteration or addition to, a dwelling which does not require the spatial extension of services including public roads, electricity, water or sewerage and is within an existing lot.

7.1 Introduction

The requirement to address BPMs for new development was introduced on 1 August 2002. Development approved before this time may not provide BPMs in accordance with this document.

Under EP&A Act s4.14, all development on BFPL must comply with PBP. The consent authority must be satisfied that the development conforms to PBP, if not it must consult with the Commissioner of the NSW RFS. Infill developments will be considered in accordance with the acceptable solutions and performance criteria specified in section 7.4.

For other types of residential development, including dual occupancy, granny flats and multi-unit residential developments, please refer to Chapter 8.

In most cases, infill development proposals will be constrained by:

- existing lot size;
- existing subdivision patterns;
- existing access and water provisions; and
- existing built forms surrounding the subject site.

Where a development expectation arises from the zoning of the land to build, rebuild, alter or add to a dwelling in pre-existing subdivisions, attempts should be made to find a solution taking into account the level of risk present. The expectation of building or altering a house is recognised even though the ability to provide for APZs or access requirements now required for residential development may not be possible.

7.2 Home-based occupations

Home-based occupations may occur within existing dwellings. Some home-based occupations include more occupants that are less familiar with their surroundings and may require increased protection.

7.2.1 Home-based child care

Home-based child care is excluded from the definition of a child care facility under the *Standard Instrument—Principal LEP*. These facilities have specific requirements, as they have some distinct differences to SFPP developments:

- they have an established limit to the number of occupants;
- they are required to submit evacuation information prior to licensing, which details the procedures for safe evacuation of all occupants during an emergency;
- At least one person on site is a resident and should therefore be aware of the bush fire risk and evacuation procedure;
- there is a different ratio of staff to occupants than other SFPPs; and
- they are covered under clause 30 of *SEPP (Educational Establishments and Child Care Facilities) 2017* which requires them to meet certain standards including the submission of an Emergency Management and Evacuation Plan, access to a public road and access to water supply in order to be Complying Development.

7.3 Specific objectives

Proposals for infill development are to:

- provide a defendable space to enable unimpeded access for firefighting around the building;
- provide better bush fire outcomes on a redevelopment site than currently exists, commensurate with the scale of works proposed;
- design and construct buildings commensurate with the bush fire risk;
- provide access, services and landscaping to aid firefighting operations;
- not impose an increased bush fire management and maintenance responsibility on adjoining land owners; and
- increase the level of bush fire protection to existing dwellings based on the scale of the proposed work and level of bush fire risk.

7.4 Bush fire protection measures

The BPMs for residential infill development include provisions relating to APZs, access, water supply, electricity and gas services, construction standards, landscaping and emergency evacuation. In order to create appropriate separation between a dwelling and the bush fire hazard, APZs commensurate with those specified for new subdivision must be provided. The acceptable solutions for residential development proposals need to comply with Tables A1.12.2 and A1.12.3. Applications proposing BAL-40 and BAL-FZ construction are performance based.

Intent of measures: to minimise the risk of bush fire attack and provide protection for emergency services personnel, residents and others assisting firefighting activities.

Table 7.4a

Performance criteria and acceptable solutions for residential infill development.

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
ASSET PROTECTION ZONES	› APZs are provided commensurate with the construction of the building; and › A defendable space is provided.	› an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.
	› APZs are managed and maintained to prevent the spread of a fire to the building.	› APZs are managed in accordance with the requirements of Appendix 4 of PBP.
	› the APZ is provided in perpetuity. › APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	› APZs are wholly within the boundaries of the development site. › APZ are located on lands with a slope less than 18 degrees.
	Home-based child care: the building must not be exposed to radiant heat levels exceeding 29kW/m^2 (1090K).	› an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.

Table 7.4a *Continued*

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
ACCESS	› firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	› property access roads are two-wheel drive, all-weather roads.
	› the capacity of access roads is adequate for firefighting vehicles.	› the capacity of road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes), bridges and causeways are to clearly indicate load rating.
	› there is appropriate access to water supply.	› hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005; › There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.
	› firefighting vehicles can access the dwelling and exit the property safely.	› at least one alternative property access road is provided for individual dwellings or groups of dwellings that are located more than 200 metres from a public through road; › There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. In circumstances where this cannot occur, the following requirements apply: › minimum 4m carriageway width; › in forest, woodland and heath situations, rural property roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m, at the passing bay; › a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; › property access must provide a suitable turning area in accordance with Appendix 3; › curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; › the minimum distance between inner and outer curves is 6m; › the crossfall is not more than 10 degrees; › maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and › a development comprising more than three dwellings has formalised access by dedication of a road and not by right of way. Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.

Table 7.4a *Continued*

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
WATER SUPPLIES	an adequate water supply is provided for firefighting purposes.	reticulated water is to be provided to the development, where available; and a static water supply is provided where no reticulated water is available.
	water supplies are located at regular intervals; and the water supply is accessible and reliable for firefighting operations.	fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005; hydrants are not located within any road carriageway; and reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.
	flows and pressure are appropriate.	fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
	the integrity of the water supply is maintained.	all above-ground water service pipes external to the building are metal, including and up to any taps.
	a static water supply is provided for firefighting purposes in areas where reticulated water is not available.	where no reticulated water supply is available, water for firefighting purposes is provided in accordance with Table 5.3d; a connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure; 65mm Storz outlet with a ball valve is fitted to the outlet; ball valve and pipes are adequate for water flow and are metal; supply pipes from tank to ball valve have the same bore size to ensure flow volume; underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank; a hardened ground surface for truck access is supplied within 4m; above-ground tanks are manufactured from concrete or metal; raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F of AS 3959); unobstructed access can be provided at all times; underground tanks are clearly marked; tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters; all exposed water pipes external to the building are metal, including any fittings; where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bush fire attack; any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and fire hose reels are constructed in accordance with AS/NZS 1221:1997, and installed in accordance with the relevant clauses of AS 2441:2005.

Table 7.4a *Continued*

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	

ELECTRICITY SERVICES	› location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	› where practicable, electrical transmission lines are underground; and
		› where overhead, electrical transmission lines are proposed as follows:
		  › lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and
		  › no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 *Guideline for Managing Vegetation Near Power Lines.*

GAS SERVICES	› location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	› reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used; › all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side; › connections to and from gas cylinders are metal; › polymer-sheathed flexible gas supply lines are not used; and › above-ground gas service pipes are metal, including and up to any outlets.
CONSTRUCTION STANDARDS	› the proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.	› BAL is determined in accordance with Tables A1.12.5 to A1.12.7; and › construction provided in accordance with the NCC and as modified by section 7.5 (please see advice on construction in the flame zone).
	› proposed fences and gates are designed to minimise the spread of bush fire.	› fencing and gates are constructed in accordance with section 7.6.
	› proposed Class 10a buildings are designed to minimise the spread of bush fire.	› Class 10a buildings are constructed in accordance with section 8.3.2.
	Home-based child care: the proposed building can withstand bush fire attack in the form of wind, localised smoke, embers and expected levels of radiant heat.	› an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1 of this document around the entire building or structure; and › the existing dwelling is required to be upgraded to improve ember protection. This is to be achieved by enclosing or covering openings with a corrosion-resistant steel, bronze or aluminium mesh with a maximum aperture of 2mm. Where applicable this includes the openable portion of the windows, vents, weepholes and eaves, but does not include roof tile spaces. Weather strips, draught excluders or draught seals shall be installed at the base of side hung external doors as per AS 3959. The subfloor space must be enclosed.

Table 7.4a *Continued*

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
LANDSCAPING	❯ landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	❯ compliance with the NSW RFS *'Asset protection zone standards'* (see Appendix 4); ❯ a clear area of low-cut lawn or pavement is maintained adjacent to the house; ❯ fencing is constructed in accordance with section 7.6; and ❯ trees and shrubs are located so that: ❯ the branches will not overhang the roof; ❯ the tree canopy is not continuous; and ❯ any proposed windbreak is located on the elevation from which fires are likely to approach.
EMERGENCY MANAGEMENT	**Home-based child care**: a bush fire emergency and evacuation management plan is prepared.	❯ a Bush Fire Emergency Management and Evacuation Plan is prepared by the operator consistent with the NSW RFS publication: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Pla*n, and the AS 3745:2010.

Note: the above specifications and requirements apply in relation to residential infill developments but may be used to guide the application of BPMs for 'other' developments (see Chapter 8).

7.5 Additional construction requirements

To ensure the performance criteria for construction standards given in section 7.4 can be met, PBP adopts additional measures over and above AS 3959 and NASH Standard as follows:

- construction measures for ember protection at BAL-12.5 and BAL-19 provided by AS 3959;
- construction measures for development in BAL-FZ; and
- requirements over and above the performance criteria contained within AS 1530.8.1 and AS 1530.8.2 apply in regards to flaming.

7.5.1 Ember protection

Based on the findings from the 2009 Victorian Bush Fires Royal Commission, PBP aims to maintain the safety levels previously provided by AS 3959:1999 in relation to ember protection at lower Bush Fire Attack Levels.

In particular, the areas addressed are in relation to:

- sarking;
- subfloor screening;
- floors;
- verandas, decks, steps, ramps and landings;
- timber support posts and beams; and
- fascias and bargeboards.

7.5.2 NSW State Variations under G5.2(a)(i) and 3.10.5.0(c)(i) of the NCC

Certain provisions of AS 3959 are varied in NSW based on the findings of the Victorian Bush Fires Royal Commission and bush fire industry research.

The following variations to AS 3959 apply in NSW for the purposes of NSW G5.2(a)(i) of Volume One and NSW 3.10.5.0(c)(i) of Volume Two of the NCC;

- clause 3.10 of AS 3959 is deleted and any sarking used for BAL-12.5, BAL-19, BAL-29 or BAL-40 shall:
  - be non-combustible; or
  - comply with AS/NZS 4200.1, be installed on the outside of the frame and have a flammability index of not more than 5 as determined by AS 1530.2; and
- clause 5.2 and 6.2 of AS 3959 is replaced by clause 7.2 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and
- clause 5.7 and 6.7 of AS 3959 is replaced by clause 7.7 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and
- fascias and bargeboards, in BAL-40, shall comply with:
  - clause 8.4.1(b) of AS 3959; or
  - clause 8.6.6 of AS 3959.

7.5.3 Construction in the flame zone

The flame zone is the area that has significant potential for sustained flame contact during a bush fire. The flame zone is determined by the calculated distance at which the radiant heat of the design fire exceeds 40kW/m^2.

The NCC references AS 3959 and the NASH Standard. The NSW variation to the NCC excludes both AS 3959 and the NASH Standard as a Deemed to Satisfy solution for buildings that are required to be constructed to BAL-FZ as defined in AS 3959.

Although Chapter 9 of AS 3959 and the NASH Standard has not been adopted, they should still be used as a basis for a performance based solution demonstrating compliance with the performance requirements of the NCC and PBP for construction in the flame zone.

All flame zone developments should be sited and designed to minimise the risk of bush fire attack. Buildings should be designed and sited in accordance with appropriate siting and design principles to ensure the safest protection from bush fire impacts.

7.5.4 Flaming

Materials that allow flaming can be problematic and are not supported by the NSW RFS for the following reasons:

- flaming materials increase the exposure of other elements of construction and the adjoining structure to flame contact after a bush fire front has passed; and
- flaming materials will potentially increase the exposure of occupants of the building to radiant heat, direct flame contact, smoke after a bush fire front has passed.

This increase in exposure can contribute to the risk of loss of life and compromise the ability of residents to defend their property and egress from the building once the bush fire front has passed.

In addition, it can reduce the ability of occupants to make safe and effective decisions about their safety.

Where there is potential for materials of construction to ignite as a result of bush fire attack, the proposed building solution generally fails the construction performance criteria for residential infill development.

For development which may be subject to flame contact (BAL-40 and BAL-FZ), systems tested in accordance with AS 1530.8.1 and AS 1530.8.2 respectively will be considered, except that there is to be no flaming of the specimen except for:

- window frames that have passed the criteria of AS 1530.8.1 and AS 1530.8.2, may be approved provided their flaming is not considered to compromise the safety of other elements of the building; and
- use of other minor elements which allow flaming may be considered provided they do not compromise the integrity of the fire safety of the building (examples include address numbers, house names, decorative artwork, etc).

Flaming of other more significant elements of the building (such as aesthetic wall cladding) is considered to pose an unacceptable risk and will not be supported.

7.6 Fences and gates

Fences and gates in bush fire prone areas may play a significant role in the vulnerability of structures during bush fires. In this regard, all fences in bush fire prone areas should be made of either hardwood or non-combustible material.

However, in circumstances where the fence is within 6m of a building or in areas of BAL-29 or greater, they should be made of non-combustible material only.

7.7 Determination of the BAL

The modelling procedure for the assessment of the BAL in PBP uses the input values and the Detailed Method for Determining the BAL - Method 2 in AS 3959.

The BAL tables in Appendix 1 replace the tables in AS 3959 in NSW.

7.8 Better bush fire outcomes

Where an alteration and addition is proposed to a dwelling built prior to 2002 and the existing building has little or no BPMs incorporated into its design, consideration must be given to upgrading the existing structure.

The new works are required to comply with the NCC. Consideration should be given to whether strict compliance with the NCC is the best outcome for the property or whether a more balanced holistic outcome that addresses the entire building is more appropriate.

Where it is determined that strict compliance with the NCC for the alterations and additions is not the best outcome for the site, a full performance based solution should be prepared. The performance based solution should address the best bush fire protection solution for the entire site and seek to apply BPMs in combination. The BFDB process may be the most appropriate way of determining the criteria for this kind of proposal (refer to Appendix 2).

Where it is not demonstrated and agreed that the proposal is the best outcome for the site as a whole, strict compliance with the NCC will be required.

7.9 Grassland Deeming Provisions

The risk posed by grass fires is different to that of fires in other vegetation types. Grass fires burn at a higher intensity and spread more rapidly with a shorter residence time. Embers produced by grass fires are smaller and fewer in number than those produced from forest fires.

In recognition of the characteristics of grassland fire behaviour, the NSW RFS has developed a simplified set of Deeming Provisions for residential infill development. This process provides another acceptable set of simple requirements for infill development located in a grassland hazard area. A site assessment as detailed in Appendix 1 is not required, nor is referral to the NSW RFS.

Where an APZ of 50m can be provided, no further BPMs are required. Where an APZ of 20-49m can be provided, the set of provisions shown in Table 7.9a apply. However where the Grassland Deeming Provisions cannot be achieved or a merit based approach is desired, the standard assessment process outlined in Appendix 1 must be adopted. The maximum slope for the Deeming Provisions is restricted to 15 degrees downslope.

Note: Please note that GFDI and not FFDI values apply to grassland areas. The GFDI values shown in Table 5.1.4a have been used to calculate the APZ distances for grassland areas in Appendix 1 and shall also be used for relevant performance based solutions.

For developments in grassland hazard areas where the deeming provisions are applied, compliance with Table 7.9a is prescribed as a variation for the purposes of NSW G5.2(a)(i) of Volume One and NSW 3.10.5.0(c)(i) of Volume Two of the NCC.

The deeming provisions and the residential infill development APZ tables are derived from different methodologies, however both are considered compliant outcomes.

Table 7.9a

Grassland Deeming Provisions

BUSH FIRE PROTECTION MEASURE	GRASSLAND DEEMING PROVISIONS
APZ	› limited to a maximum of 15 degrees downslope; › minimum APZ of 20m is provided between the building and the hazard; › the APZ is wholly within the boundaries of the development site; and › the APZ is maintained as a mown area with grass heights less than 100mm.
Construction	› construction in accordance with BAL-12.5 of AS 3959 and section 7.5 of PBP.
Access	› comply with the property access provisions in Table 5.3b.
Water supply	› comply with the water supply provisions in Table 7.4a.
Landscaping	› comply with the relevant provisions in Appendix 4, noting that other vegetation bush fire hazards cannot be present if these provisions are to apply.

8 OTHER DEVELOPMENT

Other development refers to any type of development that is not covered by Chapters 5 to 7 of this document. This includes commercial uses, industrial uses, infrastructure and development which involves large numbers of people.

8.1 Introduction

There are other developments where bush fire provisions or requirements need to be applied, that align with the unique features of the development type.

In order to comply with PBP the following conditions must be met:

- satisfy the aim and objectives of PBP outlined in Chapter 1;
- consider any issues listed for the specific purpose for the development set out in this chapter; and
- propose an appropriate combination of BPMs.

It is important to ensure that a defendable space is provided for the size and scale of the development. Proposed measures must operate in combination to minimise the impact of bush fire and ensure that access and services are adequate.

8.2 Other residential development

Residential development, other than single dwellings and subdivisions, covered in this section must also meet the requirements of Chapter 7.

8.2.1 Increased residential densities

In some situations increased densities may not be appropriate having regard to the strategic principles (see section 4.1), even though zoning has been approved for the proposed use. A Bush Fire Strategic Study may be required for these proposals as part of the broader BFDB process.

Increased resident densities of existing lots that are bush fire prone may heighten the level of risk to the occupants. The presence of additional dwellings can impact on the evacuation and sheltering of residents during a bush fire.

Where a new dwelling or dwellings are proposed on existing lots which already contain one or more dwellings, this is considered to be an increase in residential density and can include the following:

- dual occupancy;
- multi-dwelling housing;
- secondary dwellings;
- rural workers dwellings; and
- boarding houses.

This increase in residential density does not necessarily require a subdivision approval. However, the same principles and criteria associated with subdivisions in bush fire prone areas will apply. This includes ensuring an APZ based on a radiant heat threshold of 29kW/m^2 for any new dwellings, along with suitable provision for construction, access, water and landscaping.

Where there is an existing dwelling within the subject site and a second building can otherwise comply with the provisions of this document, it may be necessary to upgrade the existing dwelling to provide:

- ember protection;
- improved water availability;
- suitable access; and
- APZs.

8.2.2 Multi-storey residential development

Buildings exceeding three storeys in height are considered to be multi-storey buildings. The rise in storeys shall be calculated as per the definition in Volume 1 of the NCC 2019. A residential flat building under the meaning within the Standard Instrument LEP is a multi-storey building in the context of PBP.

Multi-storey buildings are required to comply with the performance criteria within Chapter 5, including the requirement for an APZ which meets a threshold of 29kW/m^2. There are additional considerations associated with multi-storey residential buildings and the key issues are as follows:

- **Population** - higher resident densities can pose issues for emergency management;
- **Location** – bush fire impacts can be increased where high rise buildings are located in higher elevations or on ridge tops;
- **Egress** - is more challenging and places an increased demand on road infrastructure during evacuation;
- **Construction** - there is a higher external façade surface area that may be exposed to bush fire attack and:
  - car and storage facilities on the ground level can provide an additional fuel loading;
  - balconies and external features can easily trap embers which can ignite combustible materials.
- **Height** -the height can result in increased exposure to convective heat.

In addition to the requirements in Chapter 5, the following table provides the considerations for multi-storey buildings in bush fire prone areas to ensure that the design of a building and its warning and suppression system adequately address bush fire risk.

Table 8.2.2

Issues and considerations specific to multi-storey residential development.

ISSUE	SPECIFIC CONCERN	TECHNICAL CONSIDERATIONS
Population	› Impact on existing community and infrastructure.	› What capacity does the existing infrastructure have to allow evacuation of existing and proposed residents in the event of a bush fire?
Location of Building	› Locating on ridge tops emphasises the risk of convective plume interaction and wind related impacts.	› Can the building be located away from ridge tops to areas that have a reduced bush fire exposure? › If unavoidable, what is the impact on the risk to the building? › Is this risk appropriate for the building and occupant numbers?
Design Fire	› Different elements of the flame could have different impacts on different levels of the building; and › The whole building could be impacted by ember attack and multiple floors could be alight simultaneously.	› What are the flame dimensions, including the flame angle? › Where is the hottest part of the flame located? How would this impact on the proposed building? › How would the warning and suppression systems in the building cope with this?
Egress	› Elevations exposed to bush fire risk.	› How does the emergency evacuation procedure take account of the location of bush fire prone vegetation?
Building construction	› Performance of the building façade in a bush fire scenario. › Balconies may contain external features which could ignite and contribute to building ignition and fuel loads.	› What wall and cladding materials are proposed and what is proposed for the openings/penetrations (i.e. windows and doors)? › How does the proposed building construction deal with fire spread from the vegetation to the inside of the building? › Is compliance with AS 3959 sufficient to ensure that the bush fire risk is mitigated? › Is this appropriate for the design fire scenario? › Are there balconies proposed? › What may be stored on the balconies? › Can there be restrictions on what is stored on the balconies due to fire risk?
Car Parking	› Lower storey car park could be subject to ember attack and high radiant heat loads.	› Is the warning and suppression system designed to take account of bush fire impact? › Where are exits located? Are they guiding occupants away from the car park?
Other Considerations	› Access for fire fighters may be restricted or challenging; and › Risk implications of floor to floor fire spread.	› What would this mean for fire suppression? › How would warning and suppression systems take account of this? › What would this mean for evacuation?

Because of the challenges that multi-storey buildings pose when located in bush fire prone areas, a performance based solution should be prepared which will include a BFDB. Heads of consideration for the performance based solution include the following:

- **Location** – multi-storey buildings should not be located along ridges or slopes with significant fire runs.
- **Existing infrastructure** – when multi-storey developments are proposed, the fire protection provided during potential bush fire emergencies needs to be considered, particularly in terms of evacuating occupants along the road network and the availability of water supplies for firefighting.
- **External facades** – these may be subject to an increased exposure to radiant heat and also convection columns. Modelling may be needed and APZs may need to be increased over and above those specified to account for this.
- **Egress** – the risk associated with occupant egress is higher in multi-storey buildings than for lower-rise structures and therefore adequate emergency egress during a bush fire emergency should be addressed.

Such developments should only be considered on BFPL if an analysis based on the requirements of Chapter 5, can demonstrate that the above issues do not pose an unacceptable risk.

8.2.3 Historic buildings

In relation to buildings identified as having heritage significance, the usual requirements for bush fire protection may conflict with the conservation of significant heritage fabric and/or its setting. Development affecting heritage issues and related requirements, should be considered on an individual basis.

The application of PBP is to be considered in the context of the conservation principles, processes and practices of the Illustrated Burra Charter (Australia ICOMOS, 2013).

The development of a suitable bush fire safety proposal that considers constraints of heritage issues may require a performance based solution and therefore may require a BFDB.

8.3 Other non-residential development

Other non-residential development includes development that is not used for residential purposes or may have a dual usage.

8.3.1 Buildings of Class 5 to 8 under the NCC

Under the building classification system within the NCC, Class 5 to 8 buildings include offices, shops, factories, warehouses, public car parks and other commercial and industrial facilities.

The NCC does not provide for any bush fire specific performance requirements for these particular classes of buildings. As such AS 3959 and the NASH Standard are not considered as a set of Deemed to Satisfy provisions, however compliance with AS 3959 and the NASH Standard must be considered when meeting the aims and objectives of PBP.

Whilst bush fire is not captured in the NCC for Class 5-8 buildings, the following objectives will be applied in relation to access, water supply and services, and emergency and evacuation planning:

- to provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation;
- to provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development;
- to provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building; and
- provide for the storage of hazardous materials away from the hazard wherever possible.

The general fire safety construction provisions of the NCC are taken as acceptable solutions however construction requirements for bush fire protection will need to be considered on a case-by-case basis.

Where a mixed use development is proposed to have a SFPP component, an appropriate mix of BPMs should be applied consistent with the SFPP provisions in Chapter 6.

8.3.2 Class 10 structures

The NCC defines a Class 10 building as a non-habitable building or structure such as a:

a. Class 10a – a non-habitable building being a private garage, carport, shed or the like; or
b. Class 10b – a structure being a fence, mast, antenna, retaining or free-standing wall, swimming pool, or the like; or
c. Class 10c – a private bush fire shelter

There is no bush fire protection requirements for Class 10a buildings located more than 6m from a dwelling in bush fire prone areas. Where a Class 10a building is located within 6m of a dwelling it must be constructed in accordance with the NCC.

8.3.3 Private bush fire shelters

Under the NCC, a private bush fire shelter is a Class 10c structure "associated with, but not attached to, or part of a Class 1a dwelling that may, as a last resort, provide shelter for occupants from immediate life threatening effects of a bush fire" (NCC 2019).

In NSW, any proposal to construct a private bush fire shelter on BFPL will be subject to the provisions of EP&A Act s4.14. For applications on land that is not identified as bush fire prone, the consent authority can consider bush fire matters under EP&A Act s4.15.

Regardless of the level of bush fire attack, all private bush fire shelters need to comply with Performance Requirement P2.7.6 of the NCC. *The Performance Standard for Private Bushfire Shelters* published by the Australian Building Codes Board (ABCB) in 2014 provides guidance in demonstrating compliance with the Performance Requirement. Where it is proposed to construct a private bush fire shelter compliance is required with Table 2.4 – *Acceptance Criteria* of the *Performance Standard for Private Bushfire Shelters 2014*.

In addition, design and construction of a private bush fire shelter must be informed by appropriately qualified and experienced practitioners. Given the life safety risks that an inadequately designed and poorly maintained private bush fire shelter can present to occupants, a conservative approach to this matter is required.

Although the *Performance Standard for Private Bushfire Shelters 2014* allows for the design and construction of private bush fire shelters based on the calculated BAL using the methodology contained in AS 3959, the NSW RFS requires that in all cases private bush fire shelters be designed for BAL-FZ. Private bush fire shelters need to be designed on a performance basis. However, private bush fire shelters are not accepted as an offset for compliance of the dwelling with AS 3959 or the NASH Standard and the BPMs outlined in PBP.

It must be emphasised that private bush fire shelters should not be relied on as the sole answer to reducing the risk to residents in bush fire prone areas. For existing development, consideration should be given to upgrading existing buildings, increasing the separation of dwellings from bush fire hazards and implementing other BPMs before contemplating a private bush fire shelter.

The preparation of a well thought out bush fire survival plan is pivotal to reducing the risk of loss of life during a bush fire.

8.3.4 Community bush fire refuges

Community bush fire refuges need to comply with the design and *Construction of Community Bush Fire Refuges Handbook* published by the ABCB.

In NSW, any proposal to construct a community bush fire refuge should be referred to the NSW RFS.

8.3.5 Wind and solar farms

Wind and solar farms require special consideration and should be provided with adequate clearances to combustible vegetation as well as firefighting access and water.

The following should be provided for wind and solar farms:

- a minimum 10m APZ for the structures and associated buildings/infrastructure; and
- the APZ must be maintained to the standard of an IPA for the life of the development.

Infrastructure for the purposes of requiring APZ excludes:

- road access to the site; and
- power or other services to the site and associated fencing.

Essential equipment should be designed and housed in such a way as to minimise the impact of bush fires on the capabilities of the infrastructure during bush fire emergencies. It should also be designed and maintained so that it will not serve as a bush fire risk to surrounding bush.

A Bush Fire Emergency Management and Operations Plan should identify all relevant risks and mitigation measures associated with the construction and operation of the wind or solar farm. This should include:

- detailed measures to prevent or mitigate fires igniting;
- work that should not be carried out during total fire bans;
- availability of fire-suppression equipment, access and water;
- storage and maintenance of fuels and other flammable materials;
- notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate; and
- appropriate bush fire emergency management planning.

It is important to be aware of operations that may be carried out on days of Total Fire Ban and any prohibited activities or exemptions that are notified by the Commissioner of the NSW RFS under the RF Act s.99.

8.3.6 Mining (underground and open cut) and petroleum production

Where mining and associated activities are carried out on BFPL, consideration should be given to any hazards and risks associated with bush fire. It may be necessary to implement measures to control and manage any identified hazards and risks.

Petroleum exploration and production may also be a consideration in bush fire prone areas. Petroleum includes coal seam gas (CSG). As a minimum, a 10m APZ should be provided around any infrastructure associated with mining and petroleum production.

Given the potential hazard and risks, a Bush Fire Emergency Management and Operations Plan should be prepared to cover any mining activities and petroleum production undertaken on BFPL, with consideration to the same provisions detailed in section 8.3.5 for wind and solar farms.

8.3.7 Telecommunications towers

Telecommunication sites are sites that hold infrastructure associated with mobile phones, internet, microwave radio links, trunk mobile radio or private mobile radio.

Essential telecommunication infrastructure should be designed in such a way as to minimise the impact of bush fires and ensure that communications capabilities are not compromised during bush fire emergencies. BPMs should be commensurate with the bush fire risk and criticality of the infrastructure.

In order to determine the level of bush fire risk and to develop a suitable suite of protection measures, the NSW RFS should be consulted.

There should be a minimum APZ around the tower/buildings/associated infrastructure which will increase based on the assessed level of risk and criticality.

Telecommunication towers should be constructed from non-combustible materials, and designed to mitigate the risk of flame damage, ember attack and radiant heat.

The APZ is only concerned with the underlying infrastructure required to support telecommunication services. These are predominately structures and buildings. Infrastructure requiring APZs does not include:

- road access to the site;
- power to the site; and
- associated fencing.

The APZ must be managed to the standard of an IPA. The IPA must be free from surface fuel and elevated fuel with minimum canopy cover.

An access strategy should be prepared that details the access arrangements for firefighting and APZ maintenance.

Generally, critical telecommunications infrastructure will be identified in a Bush Fire Risk Management Plan. Other operational planning should be undertaken for critical infrastructure associated with telecommunications.

8.3.8 Outdoor events in bush fire prone areas

Outdoor events often cater for large numbers of people in isolated locations, can continue over a number of days and may include on site accommodation. They include music festivals, cultural festivals, sporting events, and regional shows. Events that involve overnight camping, multiple days, or attract large numbers of people in high risk or isolated bush fire prone areas during the bush fire danger period require careful consideration. Such events create a number of logistical and operational issues if evacuation is required due to a bush fire.

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

Other considerations for outdoor events on BFPL are outlined below:

- holding events outside the gazetted bush fire danger period for the area;
- areas of accommodation should be strategically located to ensure maximum time to warn and evacuate people who may be sleeping and slow to respond. This also ensures that highly flammable and combustible materials, such as tent fabric, vehicle fuels and gas cookers are in areas that will not facilitate the spread of fire;
- a Bush Fire Emergency Management and Evacuation Plan must be prepared that is acceptable to relevant stakeholders, including crowd management and security. It should be consistent with the NSW RFS document: *A guide to developing a bush fire emergency management and evacuation plan*;
- access and egress routes for emergency services and patrons in the event that evacuation is required;
- a refuge building of suitable capacity to contain all participants and staff that complies with the NSW RFS Neighborhood Safer Place Guidelines (see www.rfs.nsw.gov.au);
- an open air bush fire emergency assembly area capable of accommodating all participants and staff that complies with the NSW RFS Neighborhood Safer Place Guidelines (see www.rfs.nsw.gov.au);
- a suitable method of staging evacuation, ensuring that evacuation flow is directed through different stages/areas of the site, moving from areas of higher risk to lower risk;
- expected evacuation timeframes;
- on severe or higher fire danger rating days the event will not proceed;

- advance warning to patrons identifying that the event is located on BFPL and giving advice on any fire restrictions;
- ability to cease and override P.A. and audio systems throughout the site to announce emergency warnings, alerts or safety information, which can be clearly heard from all areas of the site; and
- a prescribed ratio of trained fire wardens to participants.

A suitable package of other protection measures should be proposed based on individual event characteristics which considers the following:

- bulk water supplies on site that are specifically allocated to firefighting purposes;
- unobstructed APZs of suitable width surrounding the site along the boundaries adjacent to the bush fire threat. Slashing of grassed areas needs to occur in the lead-up to the event and maintained throughout its duration;
- emergency management planning during the event organisation stage to be undertaken in consultation with the NSW RFS and all other relevant stakeholders; and
- fires for cooking and heating in approved fire places only and addressed by a Fire Management Plan.

8.3.9 Hazardous industry

Some developments are considered by their very nature to be hazardous, as much for their ability to start bush fires as their susceptibility to bush fire impacts. New developments of this nature should be avoided on BFPL. However, where hazardous industries are proposed, prior consultation with the NSW RFS and preparation of a performance based solution, potentially including a BFDB, will be required.

In preparation of a performance based solution or BFDB, the Fire Safety Study prepared under the DPIE *Hazardous Industry Planning and Assessment Papers* (HIPAPs) should be considered. This study provides details of all credible fire hazards and the associated fire prevention and mitigation measures for the development. The BFDB must address the appropriate protection measures to be provided commensurate with the bush fire hazards and associated risks. Care should also be taken to ensure that such facilities do not impact on existing developments.

Hazardous industries include but are not limited to:

- power generating works;
- sawmills;
- junk yards;
- liquid fuel depots;
- hazardous industries/storage;
- chemical industries/storage;
- service stations;
- ammunition storage/manufacture; and
- fireworks manufacture/storage.

8.3.10 Commercial and industrial development

Commercial and industrial development on BFPL is captured by EP&A Act s.4.14 where a manager's residence is included in the proposal. Where no residential component is included, commercial and industrial development is addressed through the aim and objectives of PBP (see Chapter 1 of this document).

A suitable package of BPMs should be proposed commensurate with the assessed level of risk to the development. The scale of the development and numbers of people likely to be occupying the building will be directly relevant to the BPMs proposed.

The provisions within Chapter 7 of this document should be used as a base for the development of a package of measures. Each development will be assessed on its own individual merits.

8.3.11 Public assembly buildings

Public assembly buildings are not defined as SFPP by the RF Reg but require referral under EP&A Act s.4.14 to the NSW RFS. Buildings used for public assembly with a floor space area of greater than 500m^2 are required to consider bush fire. These developments will be treated technically as SFPP due to the evacuation challenges presented by large numbers of occupants.

Assembly buildings can accommodate large numbers of persons of various physical capabilities. Emergency management planning for these developments must account for the total number of occupants and be commensurate with the level of risk. These developments must not experience radiant heat levels of greater than 10kW/m^2 on any part of the building. Assembly buildings include places of public worship.

Due to the variation in risk associated with the occupants of assembly buildings, a variety of bush fire safety solutions may apply based on the merits of the situation.

APPENDIX 1

SITE ASSESSMENT METHODOLOGY

This appendix sets out the methodology to undertake a site bush fire attack assessment in relation to the application of appropriate APZs and associated construction levels.

A1.1 Application

The following methodology must be used to determine BALs and appropriate APZs. It is the acceptable solutions methodology applicable in NSW.

For further details on each of the steps below, see the related sections or tables in this document.

This Appendix replaces Section 2 of AS 3959 for the purposes of NSW G5.2(a)(i) of Volume One and NSW 3.10.5.0(c)(i) of Volume Two of the NCC . It must also be used to determine the relevant BAL for the purposes of the NASH Standard under NSW 3.10.5.0(d)(i) of Volume Two of the NCC.

Identify APZs

Step 1: Determine vegetation formation in all directions around the building to a distance of 140 metres (refer to A1.2);

Step 2: Determine the effective slope of the land from the building for a distance of 100 metres (refer to A1.4 and A1.5);

Step 3: Determine the relevant FFDI for the council area in which the development is to be undertaken (refer to A1.6); and

Step 4: Match the relevant FFDI, vegetation formation and effective slope to determine the APZ required from the appropriate table of this Appendix (refer to A1.7).

Identify construction requirements

Step 1: Follow steps 1 - 3 above;

Step 2: Determine the separation distance by measuring from the edge of the unmanaged vegetation to the closest external wall;

Step 3: Match the relevant FFDI, appropriate vegetation, distance and effective slope to determine the appropriate BAL using the relevant tables at the end of this section (A1.12.5, A1.12.6 and A1.12.7); and

Step 4: Refer to Section 3 in AS 3959 and NASH Standard to identify appropriate construction requirements for the calculated BAL.

A1.2 Determine vegetation formation

Identify all the vegetation formations for each aspect of the development within 140 metres of the development site or asset as per Keith (2004). This includes vegetation both within and external to the site boundaries.

Where mixes of vegetation formations are located together, the vegetation formation providing the greater hazard shall be used for the purpose of assessment. The combination of vegetation and slope that yields the worst case scenario shall be used.

The determination of the BALs is based on a worst case scenario and a calculation derived from maximum fuel loads. Consideration should also be given to any clearing, re-vegetation or landscaping likely to occur.

A1.2.1 About the classification system

The vegetation classification system used within this document is based on the Keith (2004) framework. Available fuel loads are based on recent information provided by:

- The University of Wollongong's (UoW) Fuels Modelling Project;
- The University of Melbourne (UoM) which reference the fuel classifications found in Keith (2004); and
- CSIRO Ecosystems Sciences and Bushfire Dynamics and Applications.

For the purposes of bush fire assessment in NSW, vegetation formations are as per Keith (2004) (excepting heathlands which includes two sub-formations rather than one, and are based largely on vegetation height).

All references to 'Keith (2004)' within this Appendix is a reference to the publication '*Ocean Shores to Desert Dunes*' – David Keith (2004).

Figure A1.2

Description of vegetation formations.

Photo courtesy Ross Peacock

Rainforest

Closed and continuous complex tree canopy composed of relatively soft, horizontal-held leaves. Generally lacking in eucalypts. Understorey is typically ferns and herbs. Vines often present in canopy and/or understorey.

Occurs mainly in areas that are reliably moist, less prone to fires than sclerophyll forests and have soils of moderate to high fertility. Typically coastal and escarpment locations.

Photo courtesy Ken Turner

Wet Sclerophyll Forest

High open tree canopy dominated by tall (typically >30m), straight trunked eucalypt species. Luxuriant understorey composed of soft leaved shrubs, ferns and herbs. Many understorey plants are rainforest species. Found on moderately fertile soils in areas of high (>900mm) rainfall.

Photo courtesy Ross Peacock

Dry Sclerophyll Forest

Open tree canopy dominated by eucalypt species (typically 10-30m in height) with crowns that touch and overlap. Canopy allows most sunlight to penetrate supporting growth of a prominent understorey layer varying between hard-leaved shrubs to luxuriant soft leaved shrubs, ferns and herbs.

Photo courtesy Catherine Ryland

Woodland

Dominated by an open to sparse layer of eucalypts with the crowns rarely touching. Typically 15-35m high (may be shorter at sub-alpine altitudes). Diverse ground cover of grasses and herbs. Shrubs are sparsely distributed. Usually found on flat or undulating ground.

Photo courtesy Waminda Parker

Tall Heath

Shrubby vegetation greater than 2 metres tall. Principal plant species include banksias, spider flowers, wattles, legumes, eucalypts, tea trees, paperbarks, she oaks, grass trees, cord rushes and sedges. Grasses are scarce.

Not found in arid and semi arid locations.

Includes Hawkesbury Sandstone vegetation with scattered overstorey trees and predominately healthy understorey and coastal heath. May include some mallee eucalypts in coastal locations.

Photo courtesy Corey Shackleton

Short Heath

Shrubby vegetation less than 2 metres in height. Often more open in canopy. Principal plant species include banksias, spider flowers, wattles, legumes, eucalypts, tea trees, paperbarks, she oaks, grass trees, cord rushes and sedges. Grasses are scarce.

Not found in arid and semi arid locations.

Photo courtesy Mark Hawkins

Grassland

Maritime Grasslands, Temperate Montane Grasslands, Western Slopes Grassland, Riverine Plain Grasslands and Semi-arid Floodplain Grasslands.

Dominated by perennial grasses and the presence of broad-leaved herbs on flat topography. Lack of woody plants.

Plants include grasses, daisies, legumes, geraniums, saltbushes and copperburrs.

A1.3 Grassland assessment

Where the vegetation formation is determined to be grassland the following applies. For all other vegetation formations please refer to A1.4-A1.7 below.

If the vegetation formation is grassland and a 20m-49m APZ can be provided, the Grassland Deeming Provisions may be applicable. There would be no need for further assessment (please refer to section 7.9).

Where a 20m APZ cannot be provided or a full site assessment methodology is required please refer to A1.4-A1.7 below.

Where 50m APZ can be provided, there are no further requirements.

A1.4 Determine slope

Slope assessment is derived from the most detailed contour data available, such as topographic maps displaying contour intervals determined when land is surveyed.

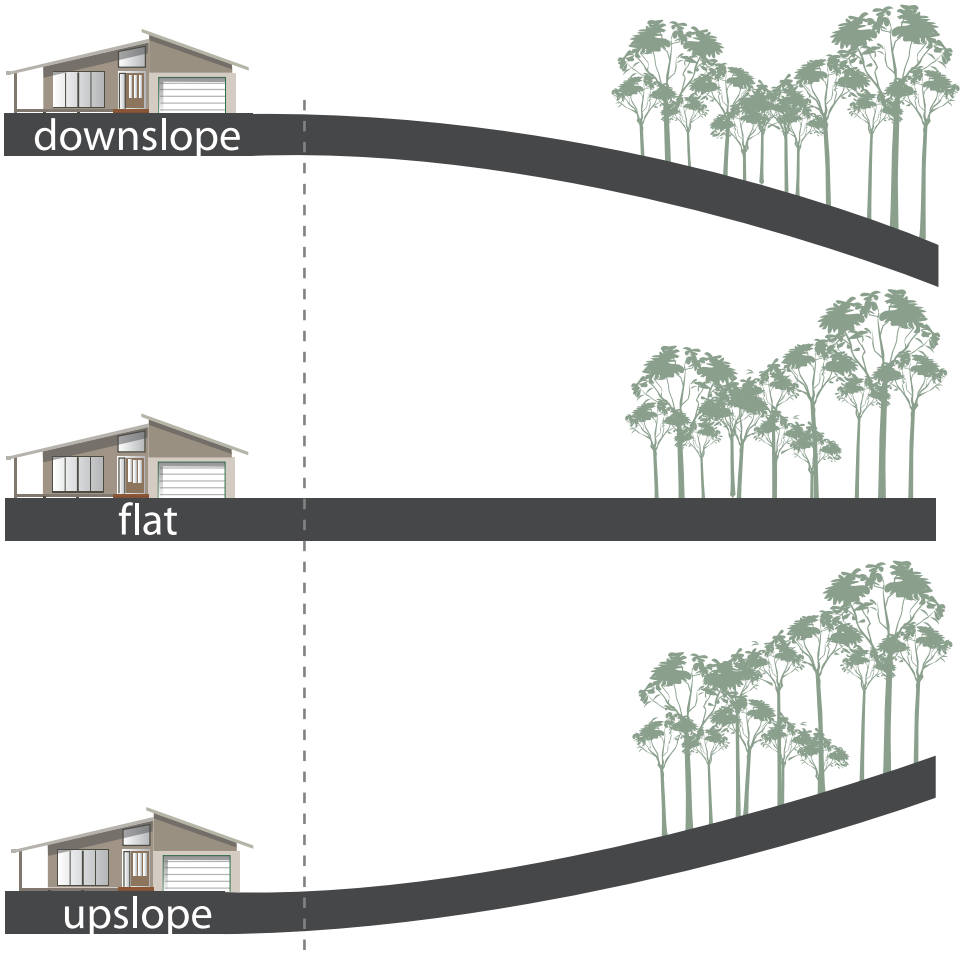
The slope is to be categorised into one of following classes, relative to the location of the hazard:

- all upslope vegetation (considered 0 degrees);
- >0 to 5 degrees downslope vegetation;
- >5 degrees to 10 degrees downslope vegetation;
- >10 degrees to 15 degrees downslope vegetation; and
- >15 degrees to 20 degrees downslope vegetation.

APZ tables within PBP are provided for acceptable solutions with slopes of up to 20 degrees. Effective slopes are to be assessed with hazards on slopes in excess of 20 degrees will require a detailed performance assessment. This may include a consideration of the potential flame length and its impact on the proposed development. Please see section A1.5 for information on determining the effective slope.

Figure A1.4

Determining slope.



A1.5 Determine effective slope

The slope of the land under the classified vegetation has a direct influence on the rate of fire spread, the intensity of the fire and the ultimate level of radiant heat flux.

The effective slope is the slope of the ground under the hazard (vegetation). It is not the slope between the vegetation and the building (slope located between the asset and vegetation is the site slope).

In identifying the effective slope, it may be found that there are a variety of slopes covering different distances within the vegetation. The effective slope is considered to be the slope under the vegetation which will most significantly influence the bush fire behaviour for each aspect (see Figure A1.5 below).

This is usually the steepest slope. In situations where this is not the case, the proposed approach must be fully justified.

Vegetation located closest to an asset may not necessarily be located on the effective slope.

A1.6 Determine appropriate fire (weather) areas

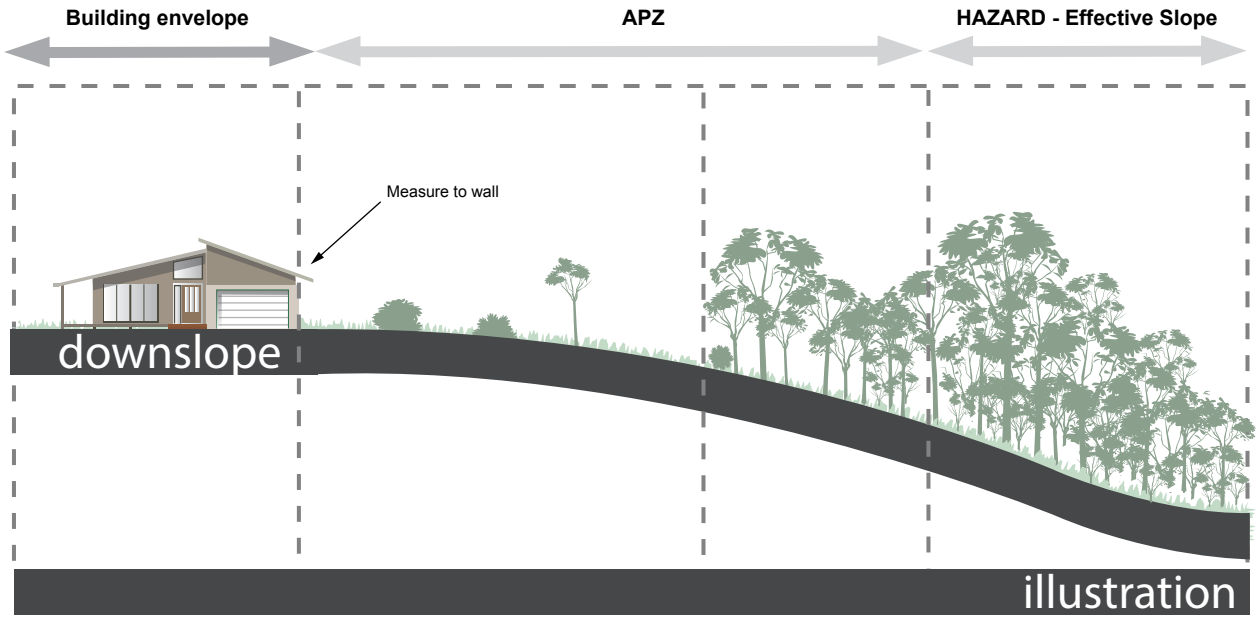
For all development requiring an APZ, the relevant FFDI must be identified. The FFDI measures the degree of danger of fire in Australian vegetation. For the purposes of PBP, the FFDI required to be used for development assessment purposes is based on local government boundaries.

The 1:50 year fire weather scenario for most of the state was determined as FFDI 80, however, a number of areas including the Greater Sydney, Greater Hunter, Illawarra, Far South Coast and Southern Ranges Fire Areas have higher FFDIs which are set at 100.

To assist in identifying your LGA and the appropriate FFDI, please consult the NSW RFS website which provides information on LGAs and their appropriate FFDIs.

Figure A1.5

Effective slope.



A1.7 Determine Bush Fire Attack Level

Once steps A1.2-A1.6 have been completed, the APZ or Bush Fire Attack Level can be determined in Tables A1.12.5, A1.12.6 and A1.12.7 below. Table A1.7 provides a description of each Bush Fire Attack Level.

Table A1.7

Radiant heat flux exposure and appropriate Bush Fire Attack Level (BAL).

Heat flux exposure	Description	AS 3959 construction level
N/A	Minimal attack from radiant heat and flame due to the distance of the building from the vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements.	BAL-LOW
≤12.5	Attack by burning debris is significant with radiant heat (not greater than 12.5kW/m^2). Radiant heat is unlikely to threaten building elements (such as unscreened glass). Specific construction requirements for ember protection and accumulation of debris are warranted.	BAL-12.5
>12.5 ≤19	Attack by burning debris is significant with radiant heat flux (not greater than 19kW/m^2) threatening some building elements (such as screened glass). Specific construction requirements for embers and radiant heat are warranted.	BAL-19
>19 ≤29	Attack by burning debris is significant and radiant heat flux (not greater than 29kW/m^2) threatens building integrity. Specific construction requirements for ember and higher levels of radiant heat are warranted. Some flame contact is possible.	BAL-29
>29 ≤40	Radiant heat flux and potential flame contact could threaten building integrity.	BAL-40
>40	Significant radiant heat and significantly higher likelihood of flame contact from the fire front will threaten building integrity and result in significant risk to residents.	BAL-FZ

Note: Attack from burning debris increases with the Bush Fire Attack Level. Source AS 3959.

A1.8 Shielding

Where an elevation is shielded from direct radiant heat arising from bush fire attack, then the construction requirements for that elevation can be reduced to the next lower BAL.

Proposals to apply radiant heat shielding from another structure must be accompanied by a detailed performance based solution addressing siting, view factor exposure and consideration of the potential fire spread from adjoining structures.

An elevation is considered to not be exposed to the source of bush fire attack if the line of sight between that elevation and the source of bush fire attack are obstructed by another part of the building.

The shielding of an elevation shall apply to all the elements of the wall but shall not apply to subfloors or roofs.

The construction requirements for a shielded elevation shall not be less than that required for BAL-12.5.

Reduced construction requirements do not apply where any elevation is BAL-FZ unless justified with an appropriate performance based demonstration of the shielding.

Figure A1.8a

Radiant heat impact and shielding.

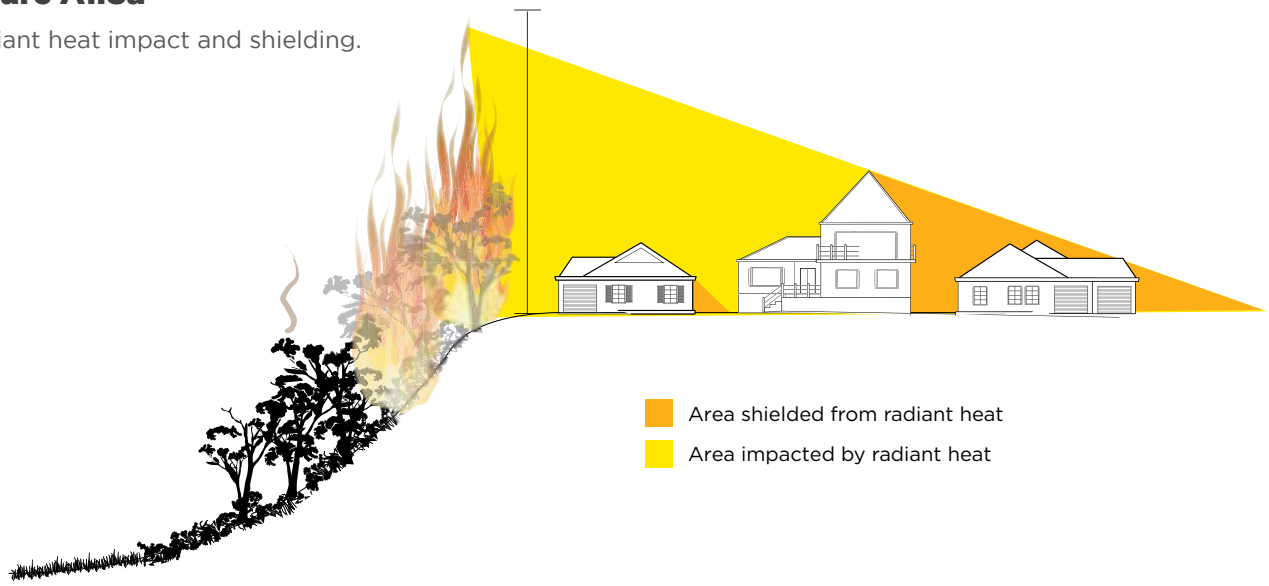
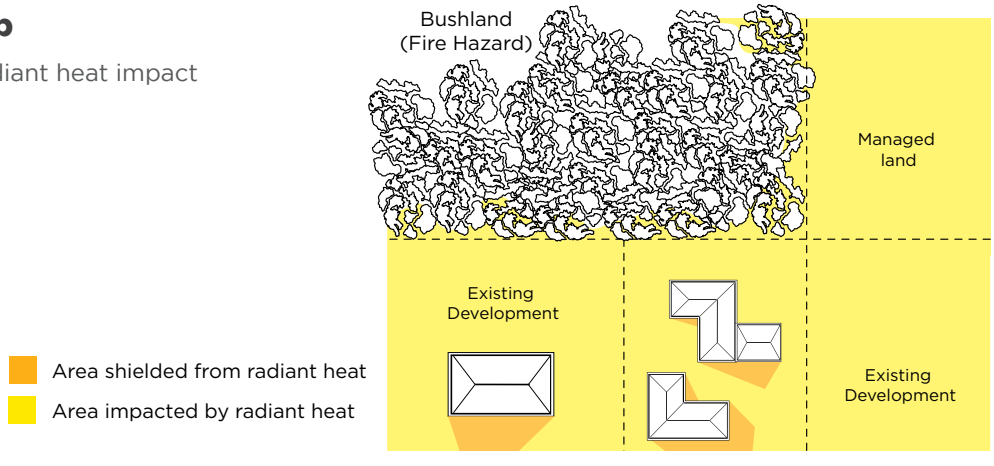


Figure A1.8b

Plan view of radiant heat impact and shielding.



A1.9 Exotic vegetation

In certain parts of NSW there are many communities of exotic vegetations that may cover large areas.

The four main exotic species include:

- **Camphor Laurel** *Cinnamomum camphora*: (large tree);
- **Privet** *Ligustrum sinense*, *Ligustrum lucidum*: (large shrub);
- **Lantana** *Lantana camara*, *Lantana montevidensis*: (woody vine); and
- **Running Bamboo** *Phyllostachys spp*: (large grass).

Check with the local Council for additional weed and exotic vegetation information for your area.

These plant species have been declared environmental weeds as their control is significantly challenging. They generally occupy rich alluvial and volcanic soils. Under adverse fire weather conditions these plants can contribute to the intensity of bush fires.

Camphor Laurel trees have a significant amount of leaf fall, especially when stressed by drought or frost.

Anecdotal evidence obtained from previous fire events indicates that although these trees generally do not carry a canopy fire, they commonly support intense surface fires.

Exotic species display similar fire behaviour characteristics to some of the native vegetation classifications with lower fuel loads. Table A1.9 can be used to convert the vegetation formations and fuel loads where the predominant vegetation formation is demonstrated over a distance of 140 metres to be an exotic species. Where a mixture of exotic and native vegetation exists, the vegetation fuel loads having the most influence on fire behaviour will apply.

For other exotic vegetation types not identified in Table A1.9, an assessment should be undertaken to determine the most appropriate appropriate fuel loads to apply. This should take into account the structure and fuel loads and may require consultation with the NSW RFS.

Table A1.9

Exotic vegetation conversions

PREDOMINANT VEGETATION TYPE	< or equal to 70% canopy cover	>70% canopy cover
	Vegetation formation in AS 3959	
Exotic vegetation (Camphor Laurel, Privet) or woody weeds (such as Lantana) mix	Woodland	Rainforest
Rainforest or woody weeds (such as Lantana) mix	Woodland	Rainforest
Bamboo mixed with exotic vegetation	Tall heath	Woodland
Bamboo mixed with rainforest vegetation	Woodland	Rainforest

A1.10 Low threat vegetation – exclusions

Modified landscapes, coastal wetlands and riparian areas vary significantly in structure and composition, but are generally considered as bush fire hazards, with the exception of saline wetlands. The following exclusions of AS 3959 apply, and are not required to be considered for the purposes of PBP, as detailed below:

- Single areas of vegetation less than 1 hectare in area and greater than 100 metres separation from other areas of Category 1 or 2 vegetation.
- Multiple areas of vegetation less than 0.25 hectares in area and not within 20m of the site, or each other or of other areas of vegetation being classified vegetation.
- Strips of vegetation less than 20 metres in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site or 2 each other, or other areas of vegetation being Category 1, 2 or 3 vegetation.
- Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load, including grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses such as playing areas and fairways, maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens and other non-curing crops, cultivated gardens, arboretums, commercial nurseries, nature strips and windbreaks.
  Note: 1. Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bush fire attack (recognizable as short cropped grass for example, to a nominal height of 100 mm). 2. A windbreak is considered a single row of planted trees located on a boundary and used as a screen or to reduce the effect of wind on the leeward side of the trees.
- Existing areas of managed gardens and lawns within curtilage of buildings.
- Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops.

A1.11 Assessing remnant bushland and narrow vegetation corridors

The size and shape of small areas of vegetation influences the behaviour of bush fires and the associated risk to the built environment. Small or narrow parcels of vegetation have less opportunity to support fully developed bush fires because of their limited size.

There are two recognized pathways for assessing remnant bushland or narrow vegetated corridors. An assessment can either follow the simplified approach or the short fire run approach. The two approaches should not normally be used simultaneously to assess a patch of vegetation.

A1.11.1 Simplified approach

The simplified approach provides an acceptable method for assessing remnant vegetation. Remnant vegetation is a parcel of vegetation with a size of less than 1 Ha or a shape that provides a potential fire run that could threaten buildings not exceeding 50m. These remnants are considered a low hazard and APZ setbacks and building construction standards for these may be the same as for rainforests.

The effective slope is to be determined under the remnant that provides the most significant bush fire behavior.

A1.11.2 Short fire run

Small or narrow parcels of vegetation that are less likely to support fully developed bush fires are referred to as a short fire run (SFR).

Before any SFR proposal is developed, the NSW RFS should be consulted for their agreement that the SFR approach is appropriate for the parcels being considered.

Assessment of SFRs is undertaken by determining the reduced head fire width and flame length of the SFR, as appropriate, then calculating the amount of radiant heat impacting the site. From this modelling, APZs may be calculated which are less than those required for larger bushland parcels.

The SFR method is based on AS 3959 Method 2.

Proposals for the SFR methodology need to be prepared as a performance based solution and should go through the BFDB process.

A1.12 Comprehensive APZ, BAL and vegetation class tables

The following pages contain detailed tables for determining BALs, minimum distances for APZs, and vegetation fuel loads, as listed below.

TABLE INDEX

SFPP developments

Residential subdivision

Residential development

Table A1.12.1

Minimum distances for APZs – SFPP developments (≤10kW/m², 1200K)

KEITH VEGETATION FORMATION	EFFECTIVE SLOPE				
	Up slopes and flat	>0°-5°	>5°-10°	>10°-15°	>15°-20°
	Distance (m) from the asset to the predominant vegetation formation				
Rainforest	38	47	57	69	81
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	67	79	93	100	100
Grassy and Semi-Arid Woodland (including Mallee)	42	50	60	72	85
Forested Wetland (excluding Coastal Swamp Forest)	34	42	51	62	73
Tall Heath	50	56	61	67	72
Short Heath	33	37	41	45	49
Arid-Shrublands (acacia and chenopod)	24	27	30	34	37
Freshwater Wetlands	19	22	25	28	30
Grassland	36	40	45	50	55

Table A1.12.2

Minimum distances for APZs – residential development, FFDI 100 areas (≤29kW/m², 1090K)

KEITH VEGETATION FORMATION	EFFECTIVE SLOPE				
	Up slopes and flat	>0°-5°	>5°-10°	>10°-15°	>15°-20°
	Distance (m) from the asset to the predominant vegetation formation				
Rainforest	11	14	18	23	30
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	24	29	36	45	56
Grassy and Semi-Arid Woodland (including Mallee)	12	16	20	25	32
Forested Wetland (excluding Coastal Swamp Forest)	10	12	16	20	26
Tall Heath	16	18	20	22	25
Short Heath	9	10	12	13	15
Arid-Shrublands (acacia and chenopod)	6	7	8	9	10
Freshwater Wetlands	5	6	6	7	8
Grassland	10	12	13	15	17

Table A1.12.3

Minimum distances for APZs – residential development, FFDI 80 areas (≤29kW/m², 1090K)

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

Table A1.12.4

Allowable Outer Protection Area distances (m), within an APZ for forest vegetation

VEGETATION	UPSLOPE/FLAT	>0°-5°	>5°-10°	>10°-15°	>15°-20°
Forests FFDI 100 - subdivision	10	10	15	20	25
Forests FFDI 80 - subdivision	10	10	15	15	20
Forests SFPP	20	25	25	25	15

Table A1.12.5

Determination of BAL, FFDI 100 – residential developments

KEITH VEGETATION FORMATION		BUSH FIRE ATTACK LEVEL (BAL)				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) asset to predominant vegetation class				
ALL UPSLOPE AND FLAT LAND	Rainforest	< 8	8 -< 11	11 -< 16	16 -< 23	23 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 18	18 -< 24	24 -< 33	33 -< 45	45 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 9	9 -< 12	12 -< 18	18 -< 26	26 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 7	7 -< 10	10 -< 14	14 -< 21	21 -< 100
	Tall Heath	< 12	12 -< 16	16 -< 23	23 -< 32	32 -< 100
	Short Heath	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 6	6 -< 9	9 -< 14	14 -< 100
	Freshwater Wetlands	< 4	4 -< 5	5 -< 7	7 -< 11	11 -< 100
	Grassland	< 8	8 -< 10	10 -< 15	15 -< 22	22 -< 50
> 0 > 5 DEGREES – DOWNSLOPE	Rainforest	< 11	11 -< 14	14 -< 21	21 -< 29	29 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 22	22 -< 29	29 -< 40	40 -< 54	54 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 12	12 -< 16	16 -< 23	23 -< 32	32 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 9	9 -< 12	12 -< 18	18 -< 26	26 -< 100
	Tall Heath	< 13	13 -< 18	18 -< 26	26 -< 36	36 -< 100
	Short Heath	< 8	8 -< 10	10 -< 15	15 -< 22	22 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 7	7 -< 11	11 -< 16	16 -< 100
	Freshwater Wetlands	< 4	4 -< 6	6 -< 8	8 -< 12	12 -< 100
	Grassland	< 9	9 -< 12	12 -< 17	17 -< 25	25 -< 50
> 5 > 10 DEGREES – DOWNSLOPE	Rainforest	< 14	14 -< 18	18 -< 26	26 -< 37	37 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 28	28 -< 36	36 -< 49	49 -< 65	65 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 15	15 -< 20	20 -< 28	28 -< 39	39 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 12	12 -< 16	16 -< 23	23 -< 33	33 -< 100
	Tall Heath	< 15	15 -< 20	20 -< 29	29 -< 40	40 -< 100
	Short Heath	< 9	9 -< 12	12 -< 18	18 -< 25	25 -< 100
	Arid-Shrublands (acacia and chenopod)	< 6	6 -< 8	8 -< 12	12 -< 18	18 -< 100
	Freshwater Wetlands	<5	5 -< 6	6 -< 10	10 -< 14	14 -< 100
	Grassland	< 10	10 -< 13	13 -< 20	20 -< 28	28 -< 50
> 10 > 15 DEGREES – DOWNSLOPE	Rainforest	< 17	17 -< 23	23 -< 34	34 -< 46	46 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 36	36 -< 45	45 -< 60	60 -< 77	77 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 19	19 -< 25	25 -< 36	36 -< 49	49 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 15	15 -< 20	20 -< 29	29 -< 41	41 -< 100
	Tall Heath	< 17	17 -< 22	22 -< 32	32 -< 44	44 -< 100
	Short Heath	< 10	10 -< 13	13 -< 20	20 -< 29	29 -< 100
	Arid-Shrublands (acacia and chenopod)	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
	Freshwater Wetlands	< 5	5 -< 7	7 -< 11	11 -< 16	16 -< 100
	Grassland	< 11	11 -< 15	15 -< 23	23 -< 32	32 -< 50
> 15 > 20 DEGREES – DOWNSLOPE	Rainforest	< 23	23 -< 30	30 -< 42	42 -< 56	56 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 46	46 -< 56	56 -< 73	73 -< 92	92 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 24	24 -< 32	32 -< 44	44 -< 59	59 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 19	19 -< 26	26 -< 37	37 -< 50	50 -< 100
	Tall Heath	< 19	19 -< 25	25 -< 36	36 -< 49	49 -< 100
	Short Heath	< 11	11 -< 15	15 -< 23	23 -< 32	32 -< 100
	Arid-Shrublands (acacia and chenopod)	< 7	7 -< 10	10 -< 16	16 -< 23	23 -< 100
	Freshwater Wetlands	< 6	6 -< 8	8 -< 13	13 -< 18	18 -< 100
	Grassland	<13	13 -< 17	17 -< 26	26 -< 36	36 -< 50

Table A1.12.6

Determination of BAL, FFDI 80 – residential development

KEITH VEGETATION FORMATION		BUSH FIRE ATTACK LEVEL (BAL)				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) asset to predominant vegetation class				
ALL UPSLOPE AND FLAT LAND	Rainforest	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 15	15 -< 20	20 -< 29	29 -< 40	40 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 8	8 -< 11	11 -< 16	16 -< 22	22 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 6	6 -< 8	8 -< 12	12 -< 18	18 -< 100
	Tall Heath	< 12	12 -< 16	16 -< 23	23 -< 32	32 -< 100
	Short Heath	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 6	6 -< 9	9 -< 14	14 -< 100
	Freshwater Wetlands	< 4	4 -< 5	5 -< 7	7 -< 11	11 -< 100
	Grassland	< 7	7 -< 10	10 -< 14	14 -< 20	20 -< 50
> 0 > 5 DEGREES – DOWNSLOPE	Rainforest	< 9	9 -< 12	12 -< 17	17 -< 25	25 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 19	19 -< 25	25 -< 35	35 -< 47	47 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 10	10 -< 13	13 -< 19	19 -< 28	28 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 8	8 -< 10	10 -< 15	15 -< 22	22 -< 100
	Tall Heath	< 13	13 -< 18	18 -< 26	26 -< 36	36 -< 100
	Short Heath	< 8	8 -< 10	10 -< 15	15 -< 22	22 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 7	7 -< 11	11 -< 16	16 -< 100
	Freshwater Wetlands	< 4	4 -< 6	6 -< 8	8 -< 12	12 -< 100
	Grassland	< 8	8 -< 11	11 -< 16	16 -< 23	23 -< 50
> 5 > 10 DEGREES – DOWNSLOPE	Rainforest	< 11	11 -< 15	15 -< 22	22 -< 32	32 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 24	24 -< 31	31 -< 43	43 -< 57	57 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 12	12 -< 17	17 -< 24	24 -< 34	34 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 10	10 -< 13	13 -< 20	20 -< 28	28 -< 100
	Tall Heath	< 15	15 -< 20	20 -< 29	29 -< 40	40 -< 100
	Short Heath	< 9	9 -< 12	12 -< 18	18 -< 25	25 -< 100
	Arid-Shrublands (acacia and chenopod)	< 6	6 -< 8	8 -< 12	12 -< 18	18 -< 100
	Freshwater Wetlands	< 5	5 -< 6	6 -< 10	10 -< 14	14 -< 100
	Grassland	< 9	9 -< 12	12 -< 18	18 -< 26	26 -< 50
> 10 > 15 DEGREES – DOWNSLOPE	Rainforest	< 14	14 -< 20	20 -< 29	29 -< 40	40 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 30	30 -< 39	39 -< 52	52 -< 68	68 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 16	16 -< 21	21 -< 31	31 -< 42	42 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 12	12 -< 17	17 -< 25	25 -< 35	35 -< 100
	Tall Heath	< 17	17 -< 22	22 -< 32	32 -< 44	44 -< 100
	Short Heath	< 10	10 -< 13	13 -< 20	20 -< 29	29 -< 100
	Arid-Shrublands (acacia and chenopod)	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
	Freshwater Wetlands	< 5	5 -< 7	7 -< 11	11 -< 16	16 -< 100
	Grassland	< 10	10 -< 14	14 -< 21	21 -< 30	30 -< 50
> 15 > 20 DEGREES – DOWNSLOPE	Rainforest	< 19	19 -< 25	25 -< 36	36 -< 49	49 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 38	38 -< 48	48 -< 63	63 -< 81	81 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 20	20 -< 27	27 -< 38	38 -< 52	52 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 16	16 -< 22	22 -< 32	32 -< 43	43 -< 100
	Tall Heath	< 19	19 -< 25	25 -< 36	36 -< 49	49 -< 100
	Short Heath	< 11	11 -< 15	15 -< 23	23 -< 32	32 -< 100
	Arid-Shrublands (acacia and chenopod)	< 7	7 -< 10	10 -< 16	16 -< 23	23 -< 100
	Freshwater Wetlands	< 6	6 -< 8	8 -< 13	13 -< 18	18 -< 100
	Grassland	< 12	12 -< 16	16 -< 24	24 -< 34	34 -< 50

Table A1.12.7

Determination of BAL, FFDI 50 – alpine areas

KEITH VEGETATION FORMATION		BUSH FIRE ATTACK LEVEL (BAL)				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) asset to predominant vegetation class				
ALL UPSLOPE AND FLAT LAND	Rainforest	< 5	5 -< 7	7 -< 10	10 -< 15	15 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 11	11 -< 15	15 -< 22	22 -< 30	30 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 6	6 -< 8	8 -< 12	12 -< 17	17 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 5	5 -< 6	6 -< 9	9 -< 13	13 -< 100
	Tall Heath	< 12	12 -< 16	16 -< 23	23 -< 32	32 -< 100
	Short Heath	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 6	6 -< 9	9 -< 14	14 -< 100
	Freshwater Wetlands	< 4	4 -< 5	5 -< 7	7 -< 11	11 -< 100
	Alpine Complex	< 4	4 -< 6	6 -< 8	8 -< 12	12 -< 100
	Grassland	< 6	6 -< 8	8 -< 11	11 -< 17	17 -< 50
> 0 > 5 DEGREES – DOWNSLOPE	Rainforest	< 6	6 -< 8	8 -< 12	12 -< 18	18 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 14	14 -< 18	18 -< 26	26 -< 36	36 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 7	7 -< 10	10 -< 14	14 -< 21	21 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 6	6 -< 8	8 -< 11	11 -< 16	16 -< 100
	Tall Heath	< 13	13 -< 18	18 -< 26	26 -< 36	36 -< 100
	Short Heath	< 8	8 -< 10	10 -< 15	15 -< 22	22 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 7	7 -< 11	11 -< 16	16 -< 100
	Freshwater Wetlands	< 4	4 -< 6	6 -< 8	8 -< 12	12 -< 100
	Alpine Complex	<5	5 -< 6	6 -< 10	10 -< 14	14 -< 100
	Grassland	< 7	7 -< 9	9 -< 13	13 -< 19	19 -< 50
> 5 > 10 DEGREES – DOWNSLOPE	Rainforest	< 8	8 -< 11	11 -< 16	16 -< 23	23 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 17	17 -< 22	22 -< 32	32 -< 43	43 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 9	9 -< 12	12 -< 17	17 -< 25	25 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
	Tall Heath	< 15	15 -< 20	20 -< 29	29 -< 40	40 -< 100
	Short Heath	< 9	9 -< 12	12 -< 18	18 -< 25	25 -< 100
	Arid-Shrublands (acacia and chenopod)	< 6	6 -< 8	8 -< 12	12 -< 18	18 -< 100
	Freshwater Wetlands	< 5	5 -< 6	6 -< 10	10 -< 14	14 -< 100
	Alpine Complex	< 5	5 -< 7	7 -< 11	11 -< 16	16 -< 100
	Grassland	< 7	7 -< 10	10 -< 15	15 -< 22	22 -< 50
> 10 > 15 DEGREES – DOWNSLOPE	Rainforest	< 10	10 -< 13	13 -< 20	20 -< 29	29 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 21	21 -< 28	28 -< 39	39 -< 52	52 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 11	11 -< 15	15 -< 22	22 -< 31	31 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 9	9 -< 12	12 -< 18	18 -< 26	26 -< 100
	Tall Heath	< 17	17 -< 22	22 -< 32	32 -< 44	44 -< 100
	Short Heath	< 10	10 -< 13	13 -< 20	20 -< 29	29 -< 100
	Arid-Shrublands (acacia and chenopod)	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
	Freshwater Wetlands	< 5	5 -< 7	7 -< 11	11 -< 16	16 -< 100
	Alpine Complex	< 6	6 -< 8	8 -< 12	12 -< 18	18 -< 100
	Grassland	< 8	8 -< 12	12 -< 17	17 -< 25	25 -< 50
> 15 > 20 DEGREES – DOWNSLOPE	Rainforest	< 13	13 -< 17	17 -< 26	26 -< 36	36 -< 100
	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 26	26 -< 34	34 -< 47	47 -< 63	63 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 14	14 -< 19	19 -< 28	28 -< 38	38 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 7	7 -< 15	15 -< 23	23 -< 32	32 -< 100
	Tall Heath	< 19	19 -< 25	25 -< 36	36 -< 49	49 -< 100
	Short Heath	< 11	11 -< 15	15 -< 23	23 -< 32	32 -< 100
	Arid-Shrublands (acacia and chenopod)	< 7	7 -< 10	10 -< 16	16 -< 23	23 -< 100
	Freshwater Wetlands	< 6	6 -< 8	8 -< 13	13 -< 18	18 -< 100
	Alpine Complex	< 7	7 -< 9	9 -< 14	14 -< 21	21 -< 100
	Grassland	<10	10 -< 13	13 -< 20	20 -< 28	28 -< 50

Table A1.12.8

Vegetation formation details.

VEGETATION	SURFACE AND ELEVATED (t/ha)	OVERALL FUEL LOAD INCLUDING BARK AND CANOPY (t/ha)	VEGETATION HEIGHT (m)
Rainforest	10	13.2	NA
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	22	36.1	NA
Grassy and Semi-Arid Woodland (including Mallee)	10.5	20.2	NA
Forested Wetland (excluding Coastal Swamp Forest)	8.2	15.1	NA
Tall Heath	36.9	36.9	3
Short Heath	15	15	1.5
Arid-Shrublands (acacia and chenopod)	6.2	6.2	1.5
Freshwater Wetlands	4.4	4.4	1
Alpine Complex	5.8	5.8	1
Grassland	6	6	NA

APPENDIX 2

SUBMISSION REQUIREMENTS, PERFORMANCE BASED SOLUTIONS AND BUSH FIRE DESIGN BRIEFS

This appendix details the information requirements for the range of DAs on BFPL and the submission requirements where a performance based solution is proposed.

A2.1 Submission requirements for a BFSA

The detailed information to be contained within a Bush Fire Assessment Report submitted to the NSW RFS as outlined in RF Reg cl.44 is:

(a) a description (including the address) of the property on which the development the subject of the application is proposed to be carried out;

(b) a classification of the vegetation on and surrounding the property (out to a distance of 140 metres from the boundaries of the property) in accordance with the system for classification of vegetation contained in Planning for Bush Fire Protection;

(c) an assessment of the slope of the land on and surrounding the property (out to a distance of 100 metres from the boundaries of the property);

(d) identification of any significant environmental features on the property;

(e) the details of any threatened species, population or ecological community identified under the *Threatened Species Conservation Act 1995* that is known to the applicant to exist on the property;

(f) the details and location of any Aboriginal object (within the meaning of the *National Parks and Wildlife Act 1974*) or Aboriginal place (within the meaning of that Act) that is known to the applicant to be situated on the property;

(g) a bush fire assessment for the proposed development (including the methodology used in the assessment) that addresses the following matters:

(i) the extent to which the development is to provide for setbacks, including Asset Protection Zones;

(ii) the siting and adequacy of water supplies for fire fighting;

(iii) the capacity of public roads in the vicinity to handle increased volumes of traffic in the event of a bush fire emergency;

(iv) whether or not public roads in the vicinity that link with the fire trail network have two-way access;

(v) the adequacy of arrangements for access to and egress from the development site for the purposes of an emergency response;

(vi) the adequacy of bush fire maintenance plans and fire emergency procedures for the development site;

(vii) the construction standards to be used for building elements in the development;

(viii) the adequacy of sprinkler systems and other fire protection measures to be incorporated into the development;

(h) an assessment of the extent to which the proposed development conforms with or deviates from the standards, specific objectives, performance criteria and acceptable solutions set out in Chapters 5-8 of PBP; and

(i) identify any fire trails that exist on the property that are on the Register of Certified Fire Trails under RF Act s.62O.

A2.1.1 Subdivisions

The submission requirements given above for a BFSA are applicable to subdivision on BFPL. Additional considerations for subdivision are outlined below.

In order to allow for flexibility at the building design stage of development, building envelopes are not always identified at the subdivision stage. A conceptual plan drawn to scale identifying building envelopes may be requested to demonstrate that individual lots are capable of providing a suitable APZ and compliant BALs. Unless otherwise specified, a building envelope of 15m by 15m will be assumed.

Where staged development is proposed, the bush fire assessment report must explain how the provisions of this document will be satisfied for each stage of the development. This is particularly important to ensure that appropriate APZs will be provided at all stages of development. Special attention must also be given to the provision of emergency access and egress and the provision of water supplies.

In relation to significant environmental features, threatened species, endangered populations, endangered ecological communities and Aboriginal heritage issues, sufficient information is required to ascertain that environmental issues are not a constraint to development. Approval for the loss or removal of environmental assets is the role of the consent authority.

A2.2 Submission requirements for infill development

Infill development proposals on BFPL must be accompanied by bush fire assessments and reports demonstrating compliance with PBP.

In particular, the following must be addressed:

- a statement that the site is BFPL;
- the location, extent and vegetation formation of any bushland on or within 140 metres of the site;
- the slope and aspect of the site and of any BFPL within 100 metres of the site;
- any features on or adjoining the site that may mitigate the impact of a bush fire on the proposed development;
- a statement assessing the likely environmental impact of any proposed BPMs;
- a site plan showing access, water supplies, APZs, BAL requirements and building footprint in relation to the bush fire hazards; and
- calculated BAL construction levels.

For smaller proposals, this can be done relatively simply using the NSW RFS *Single Dwelling Application Kit* which can be found on the NSW RFS website www.rfs.nsw.gov.au and is to be accompanied by a diagram identifying the requirements detailed above.

For more complex applications or performance based solutions, a recognised consultant should be engaged to prepare a bush fire assessment report and a Bush Fire Management Plan. (see A2.6).

A2.3 Submission requirements for Complying Development

Some SEPPs and LEPs permit certain development on BFPL where the appropriate standards are met.

Complying Development may be undertaken on lower risk BFPL where the appropriate construction requirements for BFPL and all other relevant development standards have been met. It should however be noted that the NSW RFS is not a participant in any part of this approval process.

For Complying Development, a BAL Certificate from the local council or a recognised consultant stating that the BAL of the development is not BAL-40 or BAL-FZ as applicable must be obtained prior to the issue of a Complying Development Certificate (CDC). Although not required, the NSW RFS encourages BAL Certificates to state the relevant BAL that applies to the Complying Development in question.

Complying Development is not permitted on BAL-40 or BAL-FZ. If a development is assessed as being in BAL-40 or BAL-FZ then a DA will need to be lodged with the local council.

Specific development requirements and development standards have been added to the relevant SEPPs and LEPs that apply to new development, including alterations and additions, on lower risk BFPL.

A2.4 Submission requirements and assessment methods for performance based solutions

To achieve compliance with PBP, proposals must comply with either the acceptable solutions or a performance criteria.

For performance based applications, it must be demonstrated how the product, design or material can meet the performance criteria of this document including the intent of measures and also, the aim and objectives. All performance based solutions should be accompanied by a Bush Fire Management Plan (see A2.6).

A performance based solution will only comply with PBP when the assessment methods used satisfactorily demonstrate compliance with the performance criteria.

Performance based solutions must be assessed using one or more of the assessment methods. In some cases, the development of a performance based solution will include the BFDB process.

Assessment methods

Assessment methods are the means by which a proponent demonstrates that a solution achieves the performance criteria.

The assessment methods described below are applicable to the assessment of performance based solutions to determine that they comply with the relevant performance criteria, as appropriate.

a. Evidence to support that the use of a material, form of construction or design meets the performance criteria as described in PBP;
b. Verification methods such as a test, inspection, calculation or other method that determines whether a performance-based solution complies with the relevant performance criteria; and
c. Comparison with the acceptable solutions.

All Verification Methods must be acceptable to the appropriate authority. NCC 2019 contains new Verification Methods that can be used to demonstrate compliance with the relevant NCC Performance Requirements for buildings in bush fire prone areas.

Where Verification Methods GV5 of Volume One or V2.7.2 of Volume Two of the NCC are used to demonstrate compliance with NSW GP5.1 (Volume One) or NSW P2.7.5 (Volume Two), this is considered to be a performance solution for the purposes of PBP and the proposal must be referred to the NSW RFS.

A2.5 Bush Fire Design Brief (BFDB)

A BFDB is the first step in a performance based solution and forms the basis of the ensuing analysis.

It is the process that defines the scope of work for the bush fire analysis and report. One of the main reasons for the BFDB is to translate performance criteria into objective parameters and criteria that can then be evaluated in the bush fire analysis.

The BFDB requires involvement of all relevant stakeholders and their agreement on the ground rules for the ensuing bush fire analysis. It is important to note that the BFDB usually precedes the detailed analysis and report, but may occur after the analysis has been completed as long as all relevant stakeholders agree on the parameters and criteria used. However, in order to minimise design risk, the BFDB should be undertaken before detailed analysis and documentation occurs.

The BFDB is an important part of the performance based design process, as it allows the objectives, proposed design, analysis methods, assumptions and acceptance criteria to be agreed on in order to validate the bush fire analysis. The compliance approach needs to be agreed on as part of the BFDB. The approach may be based on equivalency to the acceptable solutions, direct compliance with the performance criteria, or a combination.

The complexity of the BFDB will vary depending on the complexity of the bush fire issues being considered.

The process by which the BFDB is undertaken shall be documented as part of the bush fire analysis report.

The BFDB is not in itself an agreement as to the acceptability of the proposed solution. Rather, it focuses on the methods of analysis which will be used in evaluating whether the proposed design is adequate and appropriate.

The process undertaken for a BFDB should follow that for a Fire Engineering Brief described in the *International Fire Engineering Guidelines (2005)*

A2.6 Bush Fire Management Plan

Preparation of a Bush Fire Management Plan (BFMP) is recommended for developments in bush fire prone areas.

A BFMP should detail all bush fire safety aspects of the proposed development including:

- APZ locations and management details;
- Landscaping requirements including indicative design layout and vegetation density thresholds;
- Access provisions such as locations, passing bays and alternate emergency access;
- Water supplies and bush fire suppression systems (including drenching systems, static water supply, natural water sources etc.);
- Schedule of the BAL requirements and building footprints as well as any specific construction details (i.e. bush fire shutter operating instructions);
- Details regarding the Bush Fire Emergency Management and Evacuation Plan; and
- Any other essential bush fire safety requirements.

A2.7 Qualified consultants

EP&A Act 1979 s.4.14 and certain SEPPs allow councils and certifiers to utilise persons recognised by the NSW RFS as a qualified consultant in bush fire risk assessment.

Given the complexity of performance based solutions, it is recommended that they are undertaken and fully justified by qualified consultants.

In order for a consultant to be recognised by the NSW RFS as being qualified, they must demonstrate a number of requirements as part of a recognised accreditation scheme.

A2.8 Pre-DA advice

The NSW RFS provides a pre-DA advice service as a means for proponents of development to seek information and obtain clarity about the NSW RFS position on a proposal before a formal DA is lodged with the consent authority.

The pre-DA advice service is intended for more complex proposals which raise issues in relation to compliance with this document. This may involve instances where a performance based solution is proposed or where bush fire protection issues are raised in strategic or rezoning planning processes.

Further information on the pre-DA advice service can be found online at NSW RFS website www.rfs.nsw.gov.au.

APPENDIX 3

ACCESS

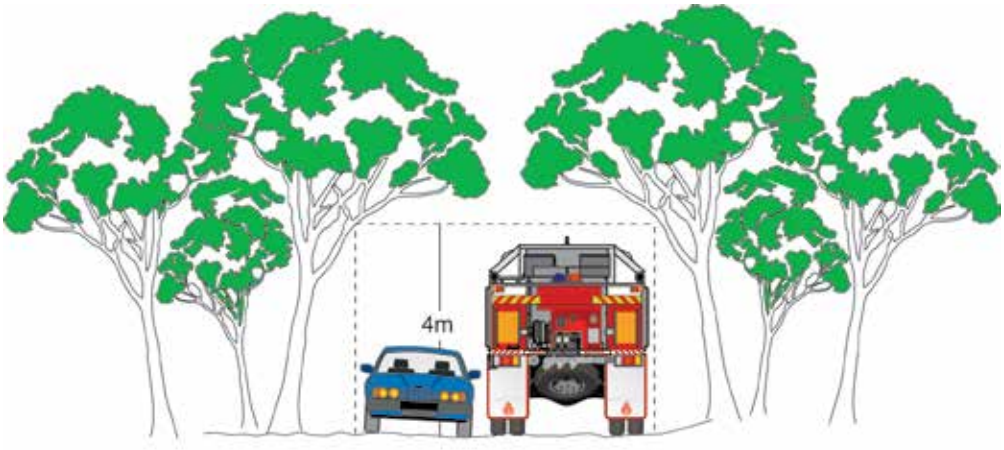
This appendix provides design principles for emergency service vehicle access.

A3.1 Vertical clearance

An unobstructed clearance height of 4 metres should be maintained above all access ways including clearance from building construction, archways, gateways and overhanging structures (e.g. ducts, pipes, sprinklers, walkways, signs and beams). This also applies to vegetation overhanging roads.

Figure A3.1

Vertical clearance.



A3.2 Vehicle turning requirements

Curved carriageways should be constructed using the minimum swept path as outlined in Table A3.2.

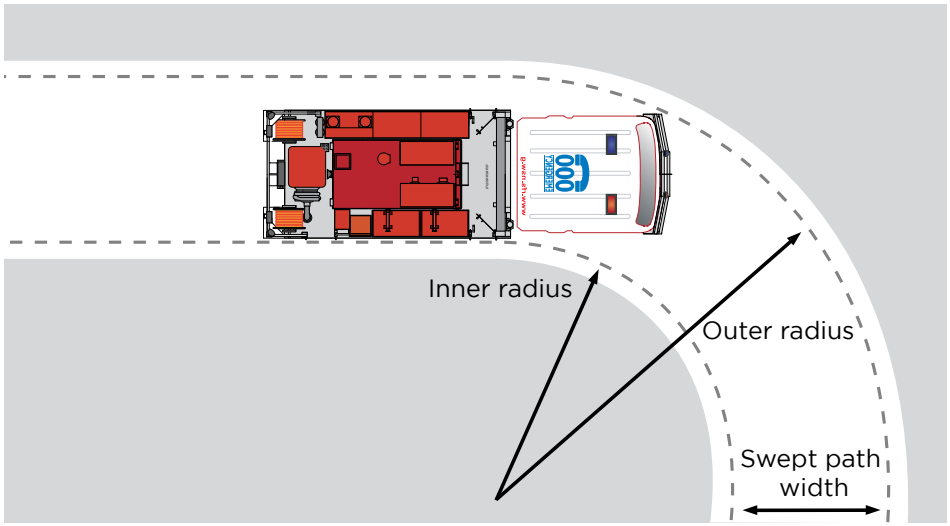
Table A3.2

Minimum curve radius for turning vehicles.

Curve radius (inside edge in metres)	Swept path (metres width)
< 40	4.0
40 - 69	3.0
70 - 100	2.7
> 100	2.5

Figure A3.2a

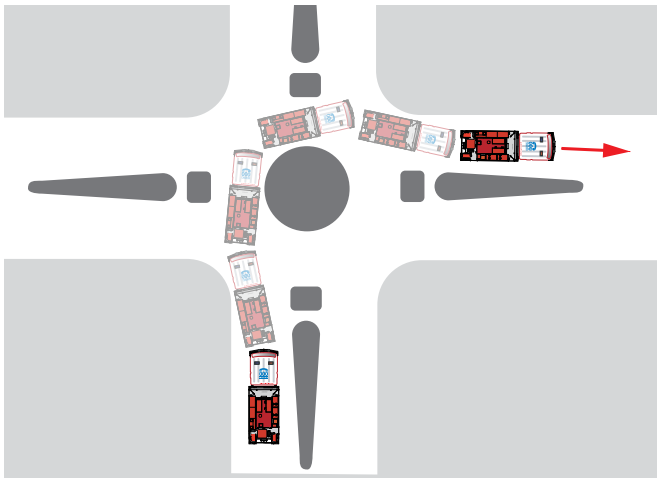
Swept path width for turning vehicles.



The radius dimensions given are for wall to wall clearance where body overhangs travel a wider arc than the wheel tracks (vehicle swept path). The swept path shall include an additional 500mm clearance either side of the vehicle.

Figure A3.2b

Roundabout swept path.



Example of a swept path as applied to a roundabout. The distance between inner and outer turning arcs allows for expected vehicle body swing of front and rear overhanging sections (the swept path).

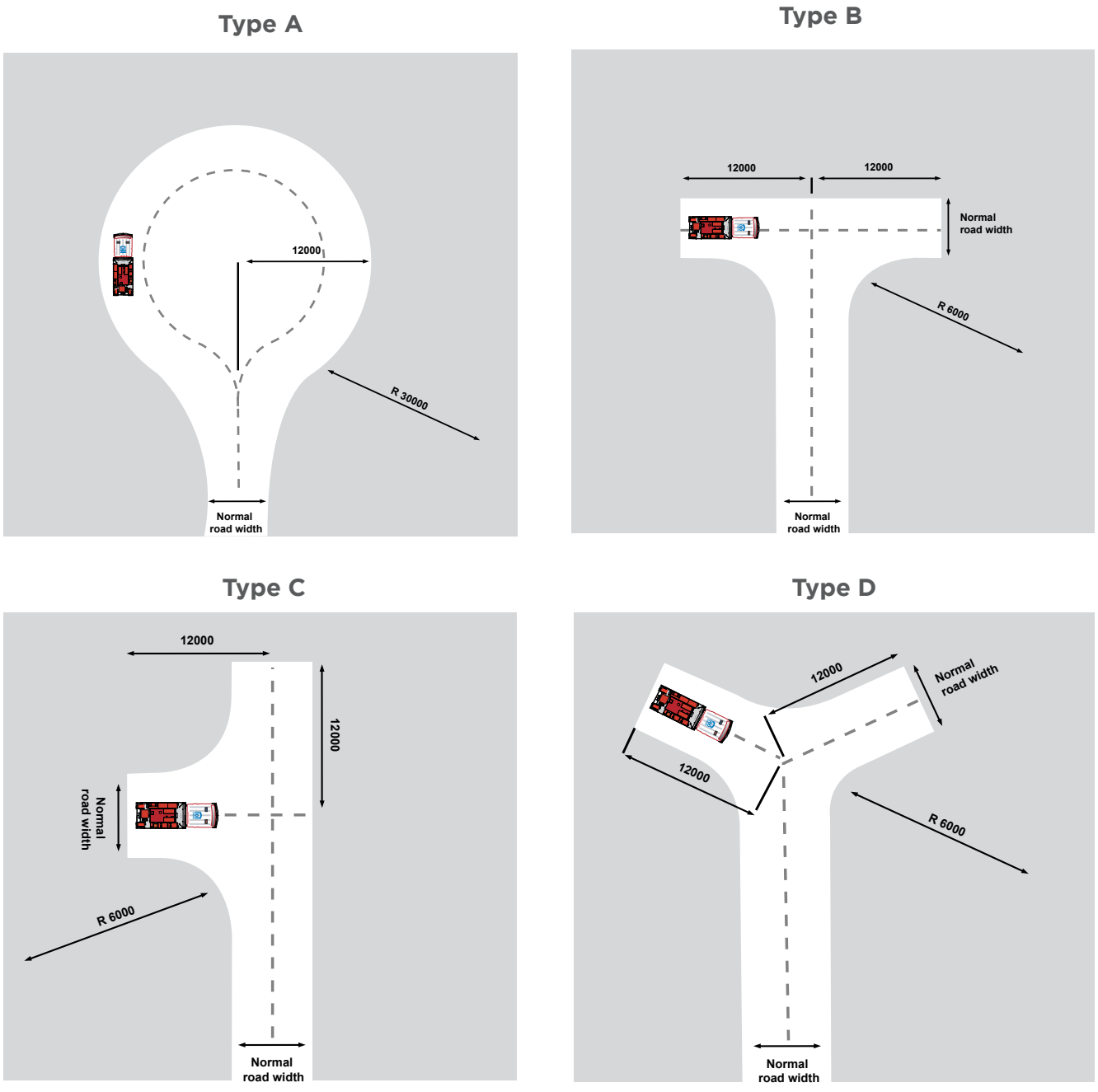
A3.3 Vehicle turning head requirements

Dead ends that are longer then 200m must be provided with a turning head area that avoids multipoint turns. “No parking” signs are to be erected within the turning head.

The minimum turning radius shall be in accordance with Table A3.2. Where multipoint turning is proposed the NSW RFS will consider the following options:

Figure A3.3

Multipoint turning options.



A3.4 Passing bays

The construction of passing bays, where required, shall be 20m in length and provide a minimum trafficable width at the passing point of 6m.

Figure A3.4

Passing bays can provide advantages when designed correctly. Poor design can and does severely impede access.

A3.5 Parking

Parking can create a pinch point in required access. The location of parking should be carefully considered to ensure fire appliance access is unimpeded. Hydrants shall be located outside of access ways and any parking areas to ensure that access is available at all times.

Figure A3.5

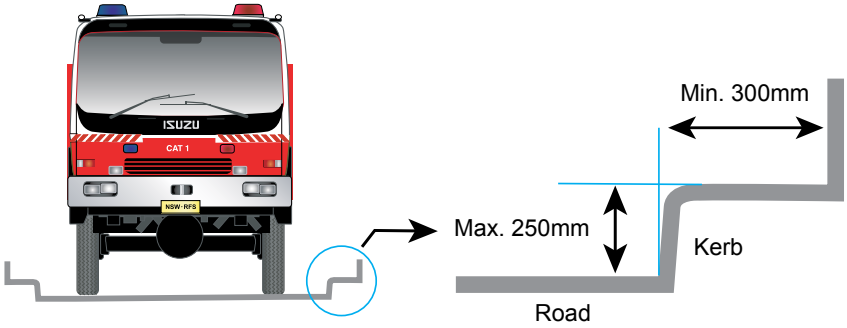
Hydrants and parking bays.

A3.6 Kerb dimensions

All kerbs constructed around access roads should be no higher than 250mm and free of vertical obstructions at least 300mm back from the kerb face to allow clearance for front and rear body overhang.

Figure A3.6

Carriageway kerb clearance dimensions.



A3.7 Services

Hydrant services should be located outside the carriageway and parking bays to permit traffic flow and access. Setup of standpipes within the carriageway may stop traffic flow. Hydrant services shall be located on the side of the road away from the bush fire threat where possible.

A3.8 Local Area Traffic Management (LATM)

The objective of LATM is to regulate traffic an acceptable level of speed and traffic volume within a local area.

Traffic engineers and planners should consider LATM devices when planning for local traffic control and their likely impact on emergency services. LATM devices by their nature are designed to restrict and impede the movement of traffic, especially large vehicles.

Where LATM devices are provided they are to be designed so that they do not impede fire vehicle access.

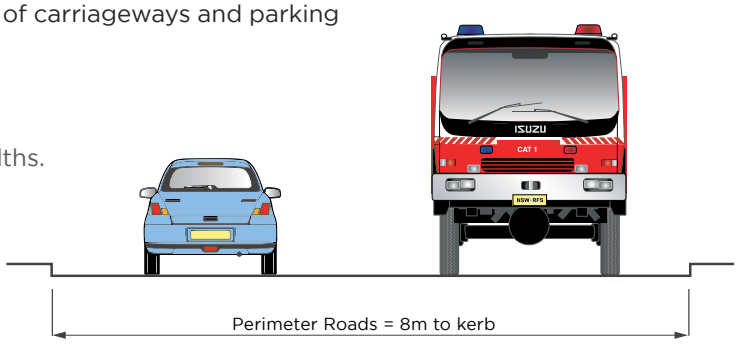
A3.9 Road types

A3.9.1 Perimeter Roads

Perimeter roads are to be provided with a minimum clear width of 8m. Parking and hydrants are to be provided outside of carriageways. Hydrants are to be located outside of carriageways and parking areas.

Figure A3.9a

Perimeter road widths.

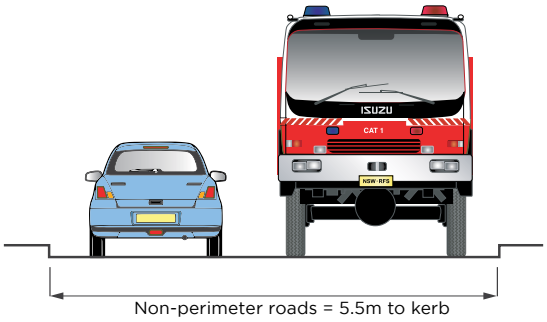


A3.9.2 Non-perimeter Roads

Non-perimeter roads shall be provided with a minimum clear width of 5.5m. Parking is to be provided outside of the carriageway and hydrants are not to be located in carriageways or parking areas.

Figure A3.9b

Non-perimeter road widths.



A3.9.3 Property access

Property access roads are to be a minimum of 4m wide.

Figure A3.9c

Property access road widths.

APPENDIX 4

ASSET PROTECTION ZONE REQUIREMENTS

In combination with other BPMs, a bush fire hazard can be reduced by implementing simple steps to reduce vegetation levels. This can be done by designing and managing landscaping to implement an APZ around the property.

Careful attention should be paid to species selection, their location relative to their flammability, minimising continuity of vegetation (horizontally and vertically), and ongoing maintenance to remove flammable fuels (leaf litter, twigs and debris).

This Appendix sets the standards which need to be met within an APZ.

A4.1 Asset Protection Zones

An APZ is a fuel-reduced area surrounding a building or structure. It is located between the building or structure and the bush fire hazard.

For a complete guide to APZs and landscaping, download the NSW RFS document *Standards for Asset Protection Zones* at the NSW RFS Website www.rfs.nsw.gov.au.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset;
- an area of reduced bush fire fuel that allows for suppression of fire;
- an area from which backburning or hazard reduction can be conducted; and
- an area which allows emergency services access and provides a relatively safe area for firefighters and home owners to defend their property.

Bush fire fuels should be minimised within an APZ. This is so that the vegetation within the zone does not provide a path for the spread of fire to the building, either from the ground level or through the tree canopy.

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

- direct flame contact on the building;
- damage to the building asset from intense radiant heat; and
- ember attack.

The methodology for calculating the required APZ distance is contained within Appendix 1. The width of the APZ required will depend upon the development type and bush fire threat. APZs for new development are set out within Chapters 5, 6 and 7 of this document.

In forest vegetation, the APZ can be made up of an Inner Protection Area (IPA) and an Outer Protection Area (OPA).

A4.1.1 Inner Protection Areas (IPAs)

The IPA is the area closest to the building and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and act as a defendable space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous.

In practical terms the IPA is typically the curtilage around the building, consisting of a mown lawn and well maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

Trees

- tree canopy cover should be less than 15% at maturity;
- trees at maturity should not touch or overhang the building;
- lower limbs should be removed up to a height of 2m above the ground;
- tree canopies should be separated by 2 to 5m; and
- preference should be given to smooth barked and evergreen trees.

Shrubs

- create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;
- shrubs should not be located under trees;
- shrubs should not form more than 10% ground cover; and
- clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

Grass

- grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and
- leaves and vegetation debris should be removed.

A4.1.2 Outer Protection Areas (OPAs)

An OPA is located between the IPA and the unmanaged vegetation. It is an area where there is maintenance of the understorey and some separation in the canopy. The reduction of fuel in this area aims to decrease the intensity of an approaching fire and restricts the potential for fire spread from crowns; reducing the level of direct flame, radiant heat and ember attack on the IPA.

Because of the nature of an OPA, they are only applicable in forest vegetation.

When establishing and maintaining an OPA the following requirements apply:

Trees

- tree canopy cover should be less than 30%; and
- canopies should be separated by 2 to 5m.

Shrubs

- shrubs should not form a continuous canopy; and
- shrubs should form no more than 20% of ground cover.

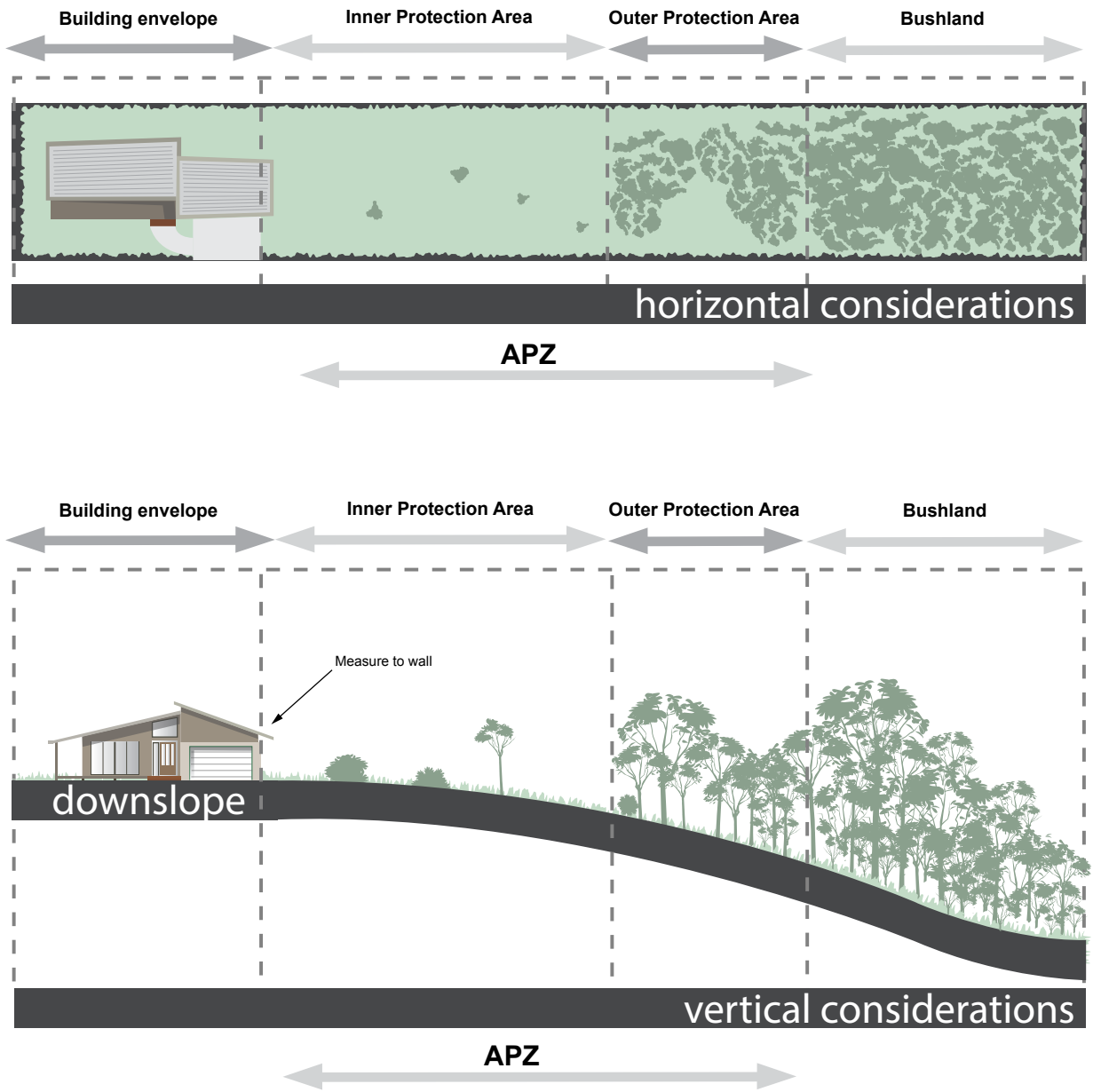
Grass

- grass should be kept mown to a height of less than 100mm; and
- leaf and other debris should be removed.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA and OPA as described above should be undertaken regularly, particularly in advance of the bush fire season.

Figure A4.1

Typical Inner and Outer Protection Areas.



ABBREVIATIONS, DEFINITIONS AND REFERENCES

Abbreviations

AS 3959
Australian Standard AS 3959:2018 *Construction of buildings in bush fire-prone areas*

AS 2419.1:2005
Australian Standard AS 2419.1:2005 *Fire hydrant installations System design, installation and commissioning*

AS/NZS 1221:1997
Australian Standard AS/NZS 1221:1997 *Fire hose reels*

AS 2441:2005
Australian Standard AS 2441:2005 *Installation of fire hose reels*

AS 3745:2010
Australian Standard AS 3745:2010 *Planning for emergencies in facilities*

AS/NZS 1530.8.1
Australian Standard AS 1530.8.1:2018 *Methods for fire tests on building materials, components and structures - Tests on elements of construction for buildings exposed to simulated bush fire attack - Radiant heat and small flaming sources*

AS/NZS 1530.8.2
Australian Standard AS 1530.8.2:2018 *Methods for fire tests on building materials, components and structures - Tests on elements of construction for buildings exposed to simulated bush fire attack - Large flaming sources*

AS/NZS 1596:2014
Australian Standard AS/NZS 1596:2014 *The storage and handling of LP Gas*

APZ	Asset Protection Zone
BAL	Bush Fire Attack Level
BCA	Building Code of Australia
BFPL	Bush fire prone land
BFPL Map	Bush fire prone land map
BFDB	Bush Fire Design Brief
BPM	Bush fire protection measure
BFSA	Bush fire safety authority
DA	Development application
DCP	Development Control Plan
DPIE	NSW Department of Planning, Industry and Environment
EP&A Act	*Environmental Planning and Assessment Act 1979*
FDI	Fire Danger Index
FFDI	Forest Fire Danger Index
GFDI	Grassland Fire Danger Index
IPA	Inner Protection Area
kW/m²	Kilowatts per metre squared
LEP	Local Environmental Plan
NASH	National Association of Steel Framed Housing (2014) Steel Framed Construction in Bush Fire Areas
NCC	National Construction Code
OPA	Outer Protection Area
PBP	*Planning for Bush Fire Protection 2019*
RF Act	*Rural Fires Act 1997*
RF Reg	*Rural Fires Regulation 2013*
NSW RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special fire protection purpose
SFR	Short fire run
SSD	State significant development
SSI	State significant infrastructure
URA	Urban Release Area

Definitions

A word or expression used in this document has the same meaning as it has in the *EP&A Act* or the Standard Instrument – Principal Local Environmental Plan, unless otherwise defined in this document.

References in this document to legislation or a policy, guideline or standard are taken to be references to that legislation or a policy, guideline or standard as amended from time to time.

Acceptable solution
Measures which have been deemed to meet the specified performance criteria.

Assembly point
An area or building or structure that is used to assemble people or that have evacuated from a site in an emergency situation.

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

Australian Standard AS 3959 (AS 3959)
AS 3959:2018 *Construction of buildings in bush fire-prone areas*, Standards Australia, 2018.

BAL certificate
A certificate issued to identify the BAL of a proposed development in the complying development process.

Bush fire assessment report
A report submitted with the DA which establishes compliance with PBP. The report determines the extent of bush fire attack and the proposed mitigation measures. See also RF Reg cl.44.

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

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

Bush fire attack
Attack by burning embers, radiant heat or flame generated by a bush fire.

Bush fire hazard
Any vegetation that has the potential to threaten lives, property or the environment.

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

Bush fire prone land map (BFPL)
A map prepared in accordance with NSW RFS requirements and certified by the Commissioner of the NSW RFS under EP&A Act 1979 s.10.3(2).

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

Bush fire risk
Is the likelihood and consequence of a bush fire igniting, spreading and causing life loss or damage to buildings of value to the community.

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

Certifier
As defined in the *EP&A Act 1979,* those with authority to issue Part 6 certificates and Complying Development Certificates (CDCs).

Complying development
Complying Development is a combined planning and construction approval for specified development that can be determined through a assessment by a council or private accredited certifier.

Consent authority
As defined in the *EP&A Act 1979*, in relation to development consents, usually the local council.

Defendable space

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

Development

As defined in the *EP&A Act 1979*.

Development application (DA)

An application for consent to carry out development such as building, subdivision, or the use of a building or land.

Applications are normally made to the local council.

Development footprint

The building envelope or area shown on a plan on which buildings and associated APZs are proposed to be located.

Ecologically sustainable development

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

Effective slope

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

Exit

A doorway opening to a road or open space, as defined in the NCC.

Fire Danger Index (FDI)

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

PBP refers to the Forest Fire Danger Index calculated by the McArthur Mk 5 Forest Fire Danger Meter using the equations published by Noble, I.R., Bary, G.A.V., and Gill, A.M., 1980.

Grassland Fire Danger Index (GFDI) values are calculated by the McArthur Mk 4 Grassland Fire Danger Meter using the equations published by Purton, C.M., 1982.

Flame zone

The distance from a bush fire at which there is considered to be significant potential for sustained flame contact to a building. The flame zone is determined by the calculated distance at which the radiant heat from the design fire exceeds 40kW/m^2.

Grasslands

Grassed areas capable of sustaining a fire. Under AS 3959, this is identified as low open shrubland, hummock grassland, closed tussock grassland, tussock grassland, open tussock, sparse open tussock, dense sown pasture, sown pasture, open herbfield, and sparse open herb field.

Grass, whether exotic or native, which is regularly maintained at or below 10cm in height (including maintained lawns, golf courses, maintained public reserves, parklands, nature strips and commercial nurseries) is regarded as managed land.

Grassland Deeming Provisions

An acceptable solution applying to properties in grassland hazard areas which can be used instead of the site assessment procedure in AS 3959.

Infill development

Refers to the development of land by the erection of or addition to a building, which is within an existing allotment and does not require the spatial extension of services. Existing services may include public roads, electricity, water or sewerage.

Inner Protection Area (IPA)

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

Integrated development

As referred to under EP& A Act s.4.46 (formerly s.91), an integrated development is one that requires development consent and approval from one or more government agencies, and is not a State Significant Development (SSD) or Complying Development.

Isolated development

Development which is located predominantly in native bushland or is considered to be within a remote area. Access and evacuation may be challenging due to distances that are required to be travelled through bush fire prone areas.

Local Environmental Plan (LEP)

An environmental planning instrument prepared under Part 3 of the *LEPs* guide planning decisions and the ways in which land is used through zoning and development controls.

Managed land

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

Multi-storey buildings

Buildings exceeding three storeys in height are considered to be multi-storey buildings. The rise in storeys should be the calculated as per the definition within Volume 1 of the NCC 2019.

National Construction Code (NCC)

The National Construction Code, published by the Australian Building Codes Board, comprising the Building Code of Australia as Volumes One and Two, and the Plumbing Code of Australia as Volume Three.

Outer Protection Area (OPA)

The outer component of an APZ, where fuel loads are maintained at a level where the intensity of an approaching bush fire would be significantly reduced. Applies to forest vegetation only.

Performance based solution

A method of complying with the performance criteria other than by an acceptable solutions.

Primitive camping

A site which is part of a commercially operated venture where there may already be a site for a tent and a fire pit.

Setback

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

Short fire run

A parcel or area of vegetation which is considered to be of lower risk than the design fire associated with that in AS 3959 due to its size, shape, and orientation to buildings. This has a design fire head width of less than 100m.

Special fire protection purpose (SFPP) developments

Developments where the vulnerable nature of the occupants means that a lower radiant heat threshold needs to be accommodated for in order to allow for the evacuation of occupants and emergency services.

State Environmental Planning Policy (SEPP)

An environmental planning instrument prepared under Part 3 of the *EP&A Act 1979*.

Subdivision

As defined in the *EP&A Act 1979*.

Suitably qualified consultant

A consultant providing bush fire assessments and BAL Certificates who has been accredited by a recognised accreditation scheme.

Tourist accommodation

A building or place that provides temporary or short-term accommodation on a commercial basis including backpackers accommodation, bed and breakfast accommodation, farmstay accommodation, hotel or motel accommodation and serviced apartments.

Vegetation classification

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

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15.2 FACT SHEET FOR BUSH FIRE MANAGEMENT PLANS (RFS)

MINING INDUSTRY

FACT SHEET FOR BUSH FIRE MANAGEMENT PLANS **September 2018**

Bush Fire Management Plans

Overview

Bush fires are a natural part of the Australian environment and occur regularly. A bush fire can be a terrifying situation and can cause significant hazard and health effects on the community, such as:

- Strong gusty winds, intense heat and flames will make you tired quickly;
- Thick, heavy smoke will sting your eyes and choke your lungs;
- It will be difficult to see and breathe;
- The roaring sound of the fire approaching will deafen you;
- Embers will rain down, causing spot fires all around you;
- Power and water may be cut off;
- You may be isolated; and
- It will be dark, noisy and extremely physically and mentally demanding.

The main risk to the mining industry is from airborne burning embers from nearby bush fires falling onto buildings, stockpiles, infrastructure or gardens and setting them alight. These embers have been known to travel up to 30km. There is also some risk of bush fires in adjacent bush land spreading onto the site. The sites' best defence against bush fires is preparedness.

While bush fires might not affect large holes in the ground, it can affect infrastructure, employees and contractors, access to the site and Company perception by the general public. When planning, consideration should be given to the business continuity of the site.

The statutory bush fire danger period for the Singleton and Muswellbrook Local Government Areas begins 1st September every year and usually ends on the 31st March

Legislation

Under Section 63 of Rural Fires Act

> *"It is the duty of the owner or occupier of land to take notified steps (if any) and any other practical steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from, that land"*

- This applies to all land that mines own/occupy including:
  - Mines sites
  - Residential/commercial
  - Offset lands

There could be requirements under other legislation or conditions on approvals that require the organisation to maintain a Bush Fire Management Plan.

Plan details

The objective of your Bush Fire Management Plan should detail how your organisation is reducing the risk of bush fire occurring on the land that is owned/managed and when it was done. The plan should include:

- A map of the site identifying:
  - Emergency assembly area
  - Evacuation Route
  - Stay in Place refuge
  - Access and egress points
  - Infrastructure and assets
  - Hazard Materials
  - Control points
  - Water points (vehicle and helicopter suitable)
  - Trails and vehicle capacity for the trail
  - Locked gate and restricted access areas
- Risks identified
- Hazards identified
- Assets identified
- Suitable treatments to reduce risk to assets on site and neighbouring properties
- Treatment schedules and recording of treatments
- Actions to be taken on days of increased fire danger
- Actions to be taken on Total Fire Ban days

Please ensure that you have the correct contact details for the NSW Rural Fire Service, that the Bush Fire Danger Period is correct for the area and that any reference to local committees have the correct name and it is relevant to the location of you site.

The plan should flow and be easy to read and understandable. The plan should also note for any clearing that has been undertaken to provide fire protection the environmental approval obtained for those works.

Recommendations – Bush Fire Management Plans

- A Bush Fire Management Plan be developed, implemented and reviewed for all land holdings
- The plan identifies assets at risk of bush/grass fire
- The plan details strategies and treatments to be implemented to assets to reduce the risk of bush fire, the frequency of the treatments, and how the treatments are recorded
- The plan is reviewed annually prior to the commencement of the Bush Fire Danger period and after a bush fire incident

Example treatments

- Create, maintain Asset Protection Zones and the frequency of treatments
- Maintain fire trails/access roads and the frequency of inspections and works
- Limit, restrict or manage access to potential ignition areas on days of high fire potential
- Hot Works permits for Total Fire Ban Days detailing how the works meet the exemption requirements
- Hazard Reduction by prescribed burning, mechanical removal, grazing
- Fire Danger Rating checked each day and communicated to all staff
- Retrofit structures to reduce the impact of ember attack

- Development of an Emergency Management Plan that addresses a response to bush/grass fires
- All staff/contractors aware of Bush Fire Management Plan and their role within the plan

Recommended Documents

Building Best Practise Guide - https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0018/4365/Building-Best-Practice-Guide.pdf

Standards for Asset Protection Zones - https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0010/13321/Standards-for-Asset-Protection-Zones.pdf

Standards for Low Intensity Bush Fire Hazard Reduction Burning - https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0011/13322/Standards-for-Low-Intensity-Bush-Fire-Hazard-Reduction-Burning.pdf

Standards for Pile Burning - https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0012/13323/Standards-for-Pile-Burning.pdf

Fire trail Standards - https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0009/69552/Fire-Trail-Standards.pdf

Short Fire Run - https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0005/58424/Short-Fire-Run.pdf

Bush Fire Emergency Management and Evacuation Plan - https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0003/29271/DPP1079-Emergency-management-and-evacuation-plan-FORM.pdf

CFA Grass Curing Guide - http://www.cfa.vic.gov.au/fm_files/attachments/Publications/curingguide.pdf

Forest Fire Management Victoria - Overall Fuel Hazard Guide Third Edition - https://www.ffm.vic.gov.au/__data/assets/pdf_file/0014/21056/Report-47-Overall-Fuel-Hazard-Guide.pdf

Example Asset and Treatment Register (simplified)

ASSET	TREATMENT	FREQUENCY
Rail Corridor	Create/maintain APZ to width of 10m each side	Before 1st Sept Twice or as required during BFDP
Haulage Rd	Create/maintain APZ to width of 10m each side	Before 1st Sept Twice or as required during BFDP
Admin Buildings	Create/maintain APZ to width of 20m	Before 1st Sept Twice or as required during BFDP
	Retrofit structures to reduce the impact of ember attack	
Explosive storage	Create/maintain APZ to width of 20m	Before 1st Sept Twice or as required during BFDP
Gas Wells	Create/maintain APZ to width of 20m	Before 1st Sept Twice or as required during BFDP

Regen Area	Maintain fire trails	Before 1st Sept or as required
	Restrict access on days of high fire potential	Toban declared
Endangered Ecological Community	Maintain fire trails	Before 1st Sept or as required
	Monitor fuel level and conduct Low Intensity Hazard Reduction	Fuel level reaches ##
	Restrict access on days of high fire potential	Toban declared
Boundary Fence	Maintain boundary fence line by reduction of fuel using mechanical removal for a width of 6m	Before 1st Sept Twice or as required during BFDP
	Restrict access on days of high fire potential	Toban declared
Grass land area	Maintain fuel level by grazing XX head of cattle	Grass fuel level reaches ##
Tyre store	Create/maintain APZ to width of 10m each side	Before 1st Sept Twice or as required during BFDP
	Manual removal of fuel build up	As required
Mobile power output	Create/maintain APZ to width of 20m	Before 1st Sept Twice or as required during BFDP

For further information, please contact NSW Rural Fire Service – Hunter Valley District Office on 6575 1200 or email **huntervalley.team@rfs.nsw.gov.au.** For after hours, contact the Duty Officer on 6575 1222

15.3 AUSTRALIAN STANDARD AS 3745 PLANNING FOR EMERGENCIES IN FACILITIES

AS 3745—2010
(Incorporating Amendment Nos 1 and 2)

AS 3745—2010

Planning for emergencies in facilities

This Australian Standard® was prepared by Committee FP-017, Emergency Management Procedures. It was approved on behalf of the Council of Standards Australia on 27 October 2010.
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- Association of Consultants in Access, Australia
- Australasian Fire and Emergency Service Authorities Council
- Australia Post
- Australian Bomb Data Centre
- Department of Defence
- Department of Human Services, Vic.
- Fire Protection Association Australia
- Physical Disability Council of Australia
- Property Council of Australia
- Safety Institute of Australia
- University of Western Sydney

This Standard was issued in draft form for comment as DR 10029.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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AS 3745—2010
(Incorporating Amendment Nos 1 and 2)

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Planning for emergencies in facilities

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PREFACE

This Standard was prepared by the Standards Australia Committee FP-017, Emergency Management Procedures, to supersede AS 3745—2002, *Emergency control organization and procedures for buildings, structures and workplaces*.

This Standard incorporates Amendment No. 1 (May 2014) and Amendment No. 2 (June 2018). The changes required by the Amendments are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of this Standard is to enhance the safety of people in facilities, by providing a framework for emergency planning, utilizing the built facilities as appropriate.

The objective of this revision is to make a greater distinction between emergency plans and emergency/evacuation procedures. It also includes expanded and revised sections on—

(a) developing the emergency plan;

A1 (b) the duties of the emergency planning committee (EPC) and emergency control organization (ECO);

(c) provisions for occupants with a disability;

(d) education and training; and

(e) guidance on how to determine the size of the emergency control organization.

A1 Changes have been made to the indemnity clauses affecting members of both the EPC and the ECO.

Facility owners, managers, occupiers and employers should obtain professional advice on the level of indemnity provided to EPC and ECO members. The EPC and ECO members should be advised of the level of indemnity provided.

A1 Where AS 4083, *Planning for emergencies—Health care facilities*, is used in conjunction with this Standard, it should be noted that the nomenclature of the ECO personnel is different for patient or resident occupied areas.

Notes and examples integrated in the text of a document are used for giving additional information intended to assist the understanding or use of the document. These elements do not contain requirements or information considered indispensable for the use of the document.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

CONTENTS

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FOREWORD

The development and implementation of emergency plans and procedures are essential for the effective and efficient management of any emergency in a facility.

The requirements and recommendations in this Standard have been kept general so that they can be adapted to suit most facilities. Regardless of size and complexity of a facility, continual effort is needed to ensure that the arrangements are effective in an emergency.

All occupants and visitors regardless of their abilities have some obligation to take responsibility for their own safety and prepare a plan for evacuation during an emergency.

This Standard concerns emergency planning at the level of individual facilities. The emergency plan created using this Standard may form part of higher level emergency management or disaster management plan.

This Standard applies only to the human/life safety aspects of emergencies within facilities. Organizations may be assisted by taking into account how their emergency planning interacts with their other internal organizational strategies. These include the relationship between security and emergencies, management of different types of risk, and the business resilience of an organization following an emergency or disaster.

Standards Australia has published a range of Standards and Handbooks that may provide assistance in developing an understanding of the broader context in which emergency procedures may function. These include:

AS/NZS ISO 31000, *Risk management—Principles and guidelines*

AS/NZS 5050, *Business continuity—Managing disruption-related risk*

A1 | AS 4421, *Guard and patrol security services*

AS 3806, *Compliance programs*

HB 327, *Communicating and consulting about risk*

HB 293, *Executive guide to business continuity management*

HB 292, *A practitioner's guide to business continuity management*

HB 167, *Security risk management*

STANDARDS AUSTRALIA

Australian Standard
Planning for emergencies in facilities

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard outlines the minimum requirements for the establishment, validation and implementation of an emergency plan for a facility to provide for the safety of occupants of that facility and its visitors leading up to, and during an evacuation.

It includes the following:

(a) The formation, purpose, responsibility and training of the emergency planning committee.

(b) Emergency identification.

(c) The development of an emergency plan.

(d) The development of emergency response procedures.

(e) The establishment, authority and training of an emergency control organization.

(f) The testing and validation of emergency response procedures.

(g) Emergency related training.

This Standard does not cover facility operational incidents, community disaster management, business continuity, security management or major environmental impacts beyond the facility.

NOTES:

1 Guidance on planning and response for fire and smoke emergencies is given in Appendix A.

2 Guidance on planning and response for bomb threat is given in Appendix B.

3 Guidance on planning and response for civil disorder and illegal occupancy is given in Appendix C.

4 The information and guidance in Appendices A, B and C is not comprehensive enough to adequately plan for fire and smoke emergencies, bomb threat, and civil disorder and illegal occupancy.

1.2 APPLICATION

This Standard applies to buildings, structures or workplaces occupied by people, with the exception of Class 1a buildings as defined in the Building Code of Australia, unless that dwelling is also used as a workplace.

This Standard does not attempt to over-ride legislative obligations in providing for the safety of occupants and visitors in facilities.

It does, however, provide guidance for the planning and implementation of effective emergency planning committee (EPC) and emergency control organization (ECO) procedures, covering emergency situations up until the appropriate Emergency Service arrives to manage the situation, at which time, the ECO shall work in conjunction with that service.

The emergencies referred to in this Standard do not exclusively represent the likely range of emergencies that may occur in a facility. The range of specific emergencies shall be identified for each facility.

1.3 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS
2700 Colour Standards for general purposes

AS/NZS
1841 Portable fire extinguishers
1841.1 Part 1: General requirements

Australian Bomb Data Centre, Bombs, Defusing the Threat

A1 National Construction Code (NCC)

Commonwealth *Disability Discrimination Act 1992* (DDA)

1.4 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

1.4.1 Assembly area(s)

The designated place or places where people assemble during the course of an evacuation.

1.4.2 Bomb

A device of any size or shape, which can look obvious or be camouflaged, may vary in its sophistication, and may not necessarily explode (i.e. incendiaries, toxic/noxious substances, sharps, animals/reptiles). May be referred to as an improvised explosive device (IED).

NOTE: Specific types of bombs are described in Appendix B, Paragraph B8.

1.4.3 Bomb threat

A threat, written or verbal, delivered by electronic, oral, or other medium, threatening to place or use an explosive, chemical, biological, or radiological device at a time, date, place or against a specific person or organization. It is not necessary for any other action to be taken by the offender.

1.4.4 Class 1a buildings

A single dwelling being—

(a) a detached house; or

(b) one of a group of two or more attached dwellings, each being a building, separated by a fire-resisting wall, including a row house, terrace house, town house or villa unit.

NOTE: This definition is taken from the Building Code of Australia.

1.4.5 Competent person

A person who has acquired through training, education, qualification, experience, or a combination of these, the knowledge and skill enabling him/her to correctly perform the required task.

1.4.6 Emergency

An event that arises internally, or from external sources, which may adversely affect the occupants or visitors in a facility, and which requires an immediate response.

1.4.7 Emergency control organization (ECO)

A person or persons appointed by the emergency planning committee to direct and control the implementation of the facility's emergency response procedures.

1.4.8 Emergency mitigation

Measures taken to decrease the likelihood of emergencies occurring and the associated impacts on people, the facility and the environment.

1.4.9 Emergency plan

The written documentation of the emergency arrangements for a facility, generally made during the planning process. It consists of the preparedness, prevention and response activities and includes the agreed emergency roles, responsibilities, strategies, systems and arrangements.

1.4.10 Emergency planning committee (EPC)

Persons responsible for the documentation and maintenance of an emergency plan.

A1

1.4.10A Emergency planning consultant

A person who has acquired through training, education, qualification and experience the knowledge and skill enabling him/her to advise on human behaviour, fire safety systems, evacuation methodology, emergency preparedness and response and the development of an emergency plan.

1.4.11 Emergency preparedness

The arrangements made to ensure that, should an emergency occur, all those resources and services that are needed to cope with the effects can be efficiently mobilized and deployed.

NOTE: Examples of emergency preparedness are: the membership, structure and duties of the EPC; emergency identification; the appointment of an ECO; development and maintenance of emergency procedures; training; organizing the temporary removal of people and property from a threatened location; facilitating timely and effective rescue.

1.4.12 Emergency prevention

The measures taken to eliminate the incidence of emergencies. These include the regulatory and physical measures to ensure that emergencies are prevented.

NOTE: Examples of emergency prevention are the implementation of suitable policies and procedures, regular maintenance and servicing of appliances, alarm systems, plant and equipment; training in the safe use of installed equipment; correct storage practices; good house keeping measures such as the reduction or removal of excessive fuel loads.

1.4.13 Emergency response exercise

A site-specific exercise implemented to determine the effectiveness of the emergency response procedures.

1.4.14 Emergency response procedures

A documented scheme of assigned responsibilities, actions and procedures within a designated section of the emergency plan, to respond to and manage emergencies.

A2

1.4. 14A Emergency Service(s)

The State or Territory authority responsible for emergency response or recovery.

1.4.15 Emergency response team (ERT)

Specialist personnel, appointed to attend specific incidents, to contain, control or eliminate the emergency using emergency response equipment.

1.4.16 Evacuation

The orderly movement of people from a place of danger.

1.4.17 Evacuation diagram

Emergency and evacuation information about the facility, comprising a pictorial representation of a floor or area and other relevant emergency response information.

1.4.18 Evacuation exercise

An emergency response exercise in which the exercise simulates an emergency that requires an evacuation.

1.4.19 Facility

A building, structure or workplace that is, or may be, occupied by people (occupants).

NOTE: See also 'workplace' (Clause 1.4.34).

1.4.20 Facility operational incidents

Facility operational incidents are non-life threatening and may not require the activation of the ECO, e.g. computer failure, escalator failure, blocked toilets.

A2

1.4. 20A First-attack firefighting equipment

Portable fire extinguishers, fire hose reels and fire blankets, which are used to fight fires in their early stages.

1.4. 20B First-response emergency equipment

Resources, such as automatic external defibrillators (AEDs), spill kits and first aid kits, which are used to address various emergency scenarios in their early stages.

1.4.21 May

Indicates the existence of an option.

1.4.22 Occupant

A person attending a facility on a permanent or temporary basis, such as an employee, contractor, student or resident, but not a visitor.

1.4.23 Occupant warning equipment

Systems and devices that operate to alert people within a facility to an emergency.

NOTES:

1 Examples of occupant warning equipment are emergency warning and intercommunication systems (EWIS), sound systems for emergency purposes (s.s.e.p.), smoke alarms, pagers, visual warning systems including strobe lights, hand-held alarm devices, and intercom systems.

2 Occupant warning equipment may operate as part of a fire detection and alarm system and may function in conjunction with other emergency detection systems, such as those for storms, earthquakes and bomb threats.

1.4.24 Occupant/visitor with a disability

A person who requires–

(a) more time or different forms of communication, compared with other occupants, to respond to an emergency; or

(b) assistance to respond to an emergency or evacuate from a facility.

For further information see Clause 4.2.11.

NOTES:

1 The definition above is taken from the Commonwealth *Disability Discrimination Act 1992* (DDA).

2 'Disability' includes but is not limited to the meaning given in Section 4.(1), sub-sections (a) to (h) for 'Disability', within the Commonwealth *Disability Discrimination Act 1992* (DDA).

3 'Occupant/visitor with a disability' also includes an associate of a person with a disability as defined in the DDA, or a companion animal.

1.4.25 Personal emergency evacuation plan (PEEP)

An individualized emergency plan designed for an occupant with a disability who may need assistance during an emergency.

1.4.26 Refuge

An area on a floor or area that is specifically designed to protect people from heat, smoke and toxic gases and which provides direct access to an exit.

NOTES:

1 An area of refuge is intended to facilitate a safe delay in egress from the floor or area, thus constituting a space for people to await assistance for their evacuation.

2 Refuges are normally nominated by the relevant certifier.

1.4.27 Shall

Indicates that a statement is mandatory.

1.4.28 Should

Indicates a recommendation.

1.4.29 Staging area

An area in a facility where occupants and visitors are intended to gather in preparation for an evacuation.

1.4.30 Structure

1 A building (fixed or transportable), mast, tower, a steel or reinforced concrete construction, structural cable or telecommunications structure, underground works (including shafts and road, rail, telecommunications and interconnecting tunnels).

2 A railway line, airfield, dock or harbour, water storage or supply system, electricity or gas generation facility, transmission or distribution facility; or production, storage or distribution facilities for heavy industries; or fixed plant.

1.4.31 Test

Confirmation of correct function or performance of a component or system.

1.4.32 Visitor

A person who is within a facility who is temporarily visiting the facility and is not—

(a) employed at or for the facility, either on a permanent casual, temporary, contracting basis;

(b) a resident/inmate; or

(c) studying at the facility.

NOTE: Visitors include customers and clients.

1.4.33 Warden intercommunication point (WIP)

The location on a floor or evacuation zone, that includes a handset provided through which instructions can be received from the intercommunication panel via the emergency intercom system.

1.4.34 Workplace

Any place where work is, or is to be, performed by—

(a) a person engaged for work for gain or reward, or on a voluntary basis;

(b) a person conducting a business or undertaking; or

(c) as defined by the relevant Commonwealth, State and Territory occupational health and safety statutes for the definition of 'workplace.'

NOTES:

1 See also 'facility' (Clause 1.4.19).

2 For example, offices, shops, factories, construction sites, stadiums and hospitals. It also includes many other types of less obvious workplaces, such as mines, underground tunnels, railway stations, care facilities, gaols, etc.

1.5 LIST OF ABBREVIATIONS

The following abbreviations are used in this Standard or are commonly used in emergency planning literature:

ABDC	Australian Bomb Data Centre
AS	Australian Standard
AS/NZS	Joint Australian/New Zealand Standard
BCA	Building Code of Australia
DDA	Commonwealth *Disability Discrimination Act 1992*
ECO	emergency control organization
ECP	emergency call point (white)
EPC	emergency planning committee
ERT	emergency response team
EWIS	emergency warning and intercommunication system
FIP	fire indicator panel
HB	handbook
IED	improvised explosive device
MCP	manual call point (red)
PA	public address system
PEEP	personal emergency evacuation plan
s.s.e.p.	sound system for emergency purposes
WIP	warden intercommunication point

SECTION 2 EMERGENCY PLANNING COMMITTEE

2.1 GENERAL

An emergency planning committee (EPC) shall be formed for each facility by the person or persons responsible for the facility or its occupants and visitors. Depending on the nature of the particular facility(ies), the EPC may be formed either for an individual facility, or group of facilities. The EPC shall be appropriate for the particular facility(ies).

Those responsible for a facility or its occupants shall ensure that the EPC has adequate resources to enable the development and implementation of the emergency plan.

NOTES:

1 The EPC should ensure applicable legislative requirements are met.

2 Those responsible for a facility or its occupants should ensure that leases include obligations to participate in emergency activities, including evacuation exercises.

3 Resources include time, finance, equipment and personnel.

4 Building/facility owners, agents, occupiers, lessors, or employers are typically those responsible for a facility or its occupants.

5 Due to regulatory and other local factors, it may not be appropriate to form an EPC covering a group of facilities in different States/Territories.

6 The EPC should consider the need for appointment of specialist advice.

2.2 RESPONSIBILITIES

The EPC, where necessary in collaboration with facility owners, managers, occupiers and employers, shall be responsible for the development, implementation and maintenance of the emergency plan, emergency response procedures and related training. This may be undertaken in conjunction with relevant external organizations.

NOTE: If the EPC becomes aware of features of the facility that could jeopardize the evacuation of the occupants and visitors, the EPC should notify the persons responsible for the facility.

The duties of the EPC shall include the following:

(a) Identifying events that could reasonably produce emergency situations.

(b) Developing an emergency plan in accordance with Section 3.

(c) Ensuring that resources are provided to enable the development and implementation of the emergency plan.

NOTE: Resources include time, finance, equipment and personnel.

(d) Nominating the validity period for the emergency plan and the evacuation diagram.

NOTE: The validity period should not exceed 5 years but may be less than 5 yearly, depending on the requirements of a maintenance cycle, a major change to the facility or an accreditation regime.

(e) Ensuring that the emergency plan is readily identifiable and available to the appropriate persons.

(f) Establishing an emergency control organization (ECO) to operate in accordance with the emergency plan.

(g) If deemed necessary, establishing a specialist emergency response team (ERT).

(h) Authorizing, or having authorized, the release and implementation of the emergency plan. The following shall apply to the implementation process:

(i) *Awareness of the emergency response procedures* Information about the procedures shall be disseminated to occupants. The information shall be in a suitable format.

NOTE: Suitable formats are listed in Clause 6.7.

(ii) *Training* A formalized training schedule shall be developed to ensure that relevant training is provided to ECO members and facility occupants. The training program shall be based on the emergency response procedures and be in accordance with Section 6.

(iii) *Testing the emergency procedures* The EPC should ensure that the emergency procedures are tested in accordance with Clause 7.2.

(iv) *Review of procedures* The effect of the procedures on an organization should be monitored at all stages of the implementation process. Amendments shall be made to rectify any deficiencies or inaccuracies that are identified in the procedures.

(i) Establishing arrangements to ensure the continuing operation of the ECO.

NOTE: For example, resignation, holidays, training of deputies, etc.

(j) Ensuring that the register of ECO members is current and readily available.

(k) Establishing strategies to ensure visitors are made aware of emergency response procedures.

(l) Ensuring that the emergency response procedures remain viable and effective by reviewing, and testing the emergency response procedures at least annually.

(m) Ensuring that the emergency plan is reviewed at the end of the validity period, after an emergency, an exercise, or any changes that affect the emergency plan.

(n) Ensuring that a permanent record of events for each emergency is compiled and retained.

(o) Identifying and rectifying deficiencies and opportunities for improvement in the emergency plan and emergency response procedures.

2.3 MEMBERSHIP

The EPC shall consist of not less than two people who shall be representative of the stakeholders in a facility one of which shall be management, unless the facility is owned or occupied and operated by a single person, in which case the EPC may be the sole person who is the owner/occupant.

At least one member of the EPC shall be a competent person (as defined in Clause 1.4.5).

NOTES:

1 In most facilities, the EPC would comprise senior management, tenants, chief warden and specialist facility personnel, such as the maintenance engineer and, where reasonably available, an occupant with a disability. The effectiveness of an emergency planning committee with respect to all occupants includes the extent to which it provides for occupants with a disability.

2 External contractors, consultants or others engaged by the facility to provide specialist advice should not be members of the EPC but may attend EPC meetings.

2.4 MEETINGS

The EPC shall meet at least annually.

A record of EPC meetings shall be made and retained in accordance with the relevant legislative requirements.

NOTE: This may include minutes of meetings, communication, financial position, reports and specialist advice.

2.5 INDEMNITY

Facility owners, managers, occupiers and employers should obtain professional advice on the level of indemnity provided to EPC members. The EPC members should be advised of the level of indemnity provided.

SECTION 3 EMERGENCY PLAN

3.1 GENERAL

An emergency plan shall be developed and maintained for each facility.

The emergency plan shall document the organizational arrangements, systems, strategies and procedures relating to the response and management of emergencies. The EPC in collaboration with the facility owners, managers, occupiers and employers shall determine which types of emergencies warrant specific emergency response procedures within the emergency plan (see Clause 3.2).

A1 The EPC, in collaboration with the ECO, the management of the facility and nominated staff shall participate in the implementation and maintenance of the emergency plan, as appropriate to their role within the organization.

Maintenance and review of the emergency plan shall be in accordance with Section 8.

NOTES:

1 Advisors for the emergency planning process should hold recognized qualifications/competencies in a relevant discipline.

2 Where security officers occupy or are engaged by a facility, their security operating procedures/site instructions should reflect, and be consistent with the emergency plan.

3 The EPC should consider its emergency plan in conjunction with all emergency plans/procedures developed by neighbouring facilities and other relevant agencies, for example, local municipal council and Emergency Services. The use and location of the facility may determine how the EPC will integrate its procedures with those developed by other agencies.

4 Consideration should be given to developing the emergency plan in conjunction with appropriate specialist advice, including advice on provisions for occupants with a disability.

The emergency plan shall include, but not be limited to, the following:

(a) Emergency prevention (see Clause 1.4.12).

(b) Emergency preparedness (see Clause 1.4.11).

(c) Emergency mitigation (see Clause 1.4.8).

(d) Activities for preparing for, and prevention of emergencies, such as training, and maintenance.

(e) Overall control and coordination arrangements for emergency response (see Section 4). This shall include evacuation strategies for occupants with a disability.

(f) The agreed roles and responsibilities of the emergency control organization and occupants of the facility in preparation for, during and after an emergency.

3.2 EMERGENCY IDENTIFICATION AND ANALYSIS

Identification and analysis of potential emergencies likely to impact on the facility shall be undertaken for each individual facility to determine which events require consideration as emergencies in the emergency plan.

The emergency identification and analysis shall include the following:

(a) Identifying specific emergency events and scenarios that might affect the people in a facility.

NOTES:

1 This should include emergency events and scenarios arising from sources—

(a) internal to the facility;

(b) external to the facility; and

(c) within the facility that affect other facilities.

2 The following are examples of types of emergencies to be considered:

(a) *Human* Bomb; bomb threat; building invasion/armed intrusion; personal threat; chemical, biological and radiological/nuclear incidents; civil disorder; medical emergency; arson, explosion; suspect object.

(b) *Natural* Bushfire/grass fire; cyclones, including storm surge; earthquake; explosion; fire and smoke; flood; severe weather/storm damage.

(c) *Technological* Hazardous substances incidents; industrial incidents; structural instability; transport incidents; toxic emissions.

(b) Identifying the possible consequences of each emergency to people within the facility and their vulnerability before, during and after the emergency.

(c) After following the steps(a) and (b) above, deciding which types of potential emergencies are to be included in the emergency plan.

Potential emergencies for inclusion in the emergency plan may also be identified from documentation such as fire safety engineers' reports, fire safety plans, other safety reports and risk assessment reports.

3.3 KEY CONSIDERATIONS

In identifying potential emergencies and developing and maintaining the emergency plan, the following shall be taken into account:

(a) The size and complexity of the facility.

(b) Fire engineered or life safety features of the facility.

NOTE: The regulatory approval process, fire engineering reports, occupant evacuation analyses, fire safety plans and other building reports should be used to determine the fire engineered or life safety features of the facility.

(c) Security systems, procedures and protocols.

(d) The number and nature of occupants and visitors.

(e) The hours of occupancy.

3.4 STRUCTURE OF THE EMERGENCY PLAN

The emergency plan shall include, but not be limited to, the following elements:

(a) A clear statement of purpose and scope.

(b) Information on the structure and purpose of the EPC.

(c) Identification of the facilities to which it applies.

A1 | (d) Descriptions of the emergency features (safety, fire and security) of the facility.

(e) The organisational arrangements for the facility.

(f) Separate sections for the following:

(i) The emergency identification outcomes.

(ii) The emergency response procedures, in accordance with Section 4.

(iii) The evacuation diagram, in accordance with Clause 3.5.

(iv) Training arrangements, in accordance with Section 6.

A1 (v) Emergency response exercises, in accordance with Section 7.

(vi) Review and routine servicing, in accordance with Section 8.

(g) A statement of the extent of distribution of the emergency plan or excerpts from the emergency plan.

(h) A record of distribution, including where personal emergency evacuation plans (PEEPs) for people with disabilities are held. For example PEEPs should be held by the relevant warden.

(i) Details of the hours of occupancy of the facility.

(j) The EPC nominated validity period for the emergency plan.

(k) The date of issue or amendment date on each page of the emergency plan.

If an electronic format is used for the emergency plan, at least one printed copy shall be available on site.

NOTE: Figure 3.1 provides a representation of the broad structure of an emergency plan.

A1 A2

FIGURE 3.1 STRUCTURE OF THE EMERGENCY PLAN

3.5 EVACUATION DIAGRAMS

3.5.1 General

Evacuation diagrams that provide emergency and evacuation information shall be displayed in all facilities in accordance with Clauses 3.5.2, 3.5.3, 3.5.4 and 3.5.5.

A2 Where emergency and evacuation information is included on the evacuation diagram, this information shall reflect the facility emergency and evacuation information as documented in the emergency plan.

NOTES:

1 Optional elements of the evacuation diagram are given in Clause 3.5.6.

A1 2 Examples of evacuation diagrams and symbols are shown in Appendix E.

3 Where emergency and evacuation information is included on the evacuation diagram, this information should reflect the facility emergency and evacuation information as documented in the emergency plan.

A2 4 For facilities with larger floor areas such as hospitals, tunnels, large office floors, warehouses, universities, shopping centres, etc., the pictorial representation should be prepared in sections or areas so that no more than two exits are shown on each pictorial representation.

3.5.2 Number and location

Evacuation diagrams shall be displayed in locations where occupants and visitors are able to view the diagrams. The location within the facility and number of evacuation diagrams shall be determined by the EPC.

A2 NOTE: Evacuation diagrams should not be fitted to fire doors, smoke doors or other fire resistant elements of construction unless this has been tested or a formal opinion has been obtained from an appropriate authority (e.g. a testing laboratory or professional engineer).

3.5.3 Position

A2 The evacuation diagram should be positioned with the bottom edge of the diagram at a height not less than 1200 mm or the top edge not more than 1600 mm above the plane of the finished floor.

3.5.4 Orientation

Individual evacuation diagrams shall have the correct orientation with regard to the direction of egress and its location to the 'YOU ARE HERE' point. Where an assembly area diagram is included, the assembly diagram area shall have the same orientation to the rest of the diagram.

3.5.5 Minimum elements

The following shall be included in each evacuation diagram:

A1 A2 (a) A pictorial representation of the floor or area.

NOTE: External elements, such as fences, roads, landscaping, external buildings, etc., should be excluded from the pictorial representation unless part of the exit pathway.

(b) The title 'EVACUATION DIAGRAM'.

(c) The 'YOU ARE HERE' location.

(d) The designated exits in the facility, which shall be green.

(e) The following communications equipment, where installed:

(i) Warden intercommunication points (WIPs), which shall be red.

A2 (ii) Manual call points (MCPs), which shall be red, and emergency call points (ECPs), which shall be white with a black border.

(iii) Main controls/panels for the occupant warning equipment.

(f) Hose reels, which shall be red.

A1 (g) **'Text deleted'**

(h) Extinguishers, which shall be red with an additional appropriate colour as specified in AS/NZS 1841.1.

A2 (i) Fire blankets, which shall be red.

(j) Fire indicator panel (FIP), if provided.

(k) Refuges, if present.

(l) Validity date.

(m) Location of assembly area(s), either stated in words or pictorially represented.

(n) A legend, which shall reflect the symbols used.

A2 (o) Paths of travel, which shall be green.

(p) Location of facility, including address, postcode, location of access street(s), nearest cross street and name of facility (if available), either stated in words or pictorially represented.

3.5.6 Optional elements

The following additional information may be considered by the EPC for inclusion on the evacuation diagram:

(a) Direction of opening of doors on designated exits.

(b) North.

(c) First aid stations and kits (denoted by a white cross on a green background).

(d) Hazardous chemical store.

(e) Spill response kits.

A1 A2 (f) Emergency information as documented in the emergency plan.

NOTE: For example, emergency telephone numbers, emergency response procedures, fire orders, and procedures for use of lifts in an evacuation during a fire emergency (where regulatory approval has been obtained).

(g) **'Text deleted'**

(h) Specialized evacuation devices, including stairwell evacuation devices, if provided.

(i) Fire and smoke doors.

(j) Hydrants, which shall be red.

A2 (k) Automatic external defibrillator(s) (AED).

(l) Electrical switchboard location(s).

(m) Solar power isolation point(s).

3.5.7 Size

A1 **3.5.7.1** *Diagram with only minimum elements*

The minimum size of the evacuation diagram shall be A4 (i.e. 210 mm × 297 mm) with a pictorial representation of the floor or area, which shall be as a minimum—

(a) 200 mm × 150 mm; or

(b) an area of 30 000 mm^2.

A1 **3.5.7.2** *Diagram with minimum and optional elements*

The minimum size of the evacuation diagram shall be A3 (i.e. 297 mm × 420 mm) with a pictorial representation of the floor or area, which shall be as a minimum—

(a) 300 mm × 200 mm; or

(b) an area of 60 000 mm^2.

3.6 DISTRIBUTION OF THE EMERGENCY PLAN

The emergency plan shall be distributed to members of the EPC. As a minimum, distribution of sections within the emergency plan shall comply with the following:

(a) Sufficient information from the emergency response procedures shall be distributed to members of the ECO to enable them to carry out their required duties.

(b) Sufficient information from the emergency response procedures shall be distributed to facility occupants to explain the actions they are to take with regard to an emergency.

(c) The evacuation diagram shall be displayed in the facility, in accordance with Clause 3.5.

(d) The information shall be distributed in an appropriate format that can be comprehended by the recipient.

NOTE: Examples of formats are listed in Clause 6.7.

The EPC shall determine whether any additional distribution is needed.

A1 **'Text and Figure deleted'**

3.7 REVIEW AND AMENDMENT OF THE EMERGENCY PLAN

A1 The emergency plan should be routinely serviced in accordance with Section 8.

SECTION 4 EMERGENCY RESPONSE PROCEDURES

4.1 GENERAL

A1 An emergency response procedure for each emergency identified in accordance with Clause 3.2 shall be developed for all facilities addressing the following:

(a) Responsibilities and duties of the ECO and the actions they are to take during an emergency, including those roles and duties set out in Clause 5.7.

(b) The responsibilities of facility occupants and the actions they are to take in an emergency.

A1 (c) The arrangements for emergency preparedness and response.

(d) The arrangements for evacuating the facility.

(e) The current emergency contact details.

4.2 KEY ELEMENTS AND CONSIDERATIONS FOR INCLUSION IN THE EMERGENCY RESPONSE PROCEDURES

4.2.1 General

The specific information included in the emergency response procedures shall be determined by the EPC in collaboration with the facility owners, managers, occupiers and employers in accordance with this Clause (4.2). The EPC shall also determine any other information that is to be included, as appropriate to each specific facility.

NOTES:

1 Several key elements and considerations to be taken into account by the EPC when developing and maintaining the emergency response procedures are listed in this Clause however the list is not exhaustive.

2 The list is arranged in alphabetical order.

A1 3 **'Note deleted'**

4.2.2 After-hours procedures

The specific needs of people who may be present outside the normal hours of business/operation shall be considered.

4.2.3 Communication

4.2.3.1 *Communicating the emergency*

The emergency procedures shall address the method of warning and communication to be used during an emergency.

The needs of occupants and visitors with a disability shall be considered when developing procedures for emergency warning. This may entail alternative means of communicating emergency information and warnings.

4.2.3.2 *Neighbouring facilities*

Consideration should be given to communications with neighbouring facilities.

4.2.3.3 *Communications equipment*

For continuity of communications in an emergency, consideration shall be given to the following:

(a) The utilization of multi-modal communication systems for emergency responses.

NOTE: Multi-modal communication systems are intended to ensure continuity of communication in the event of the failure of the primary communication system. Examples are—

(a) s.s.e.p (e.g., EWIS);
(b) visual and tactile signals;
(c) telephones (including mobile and satellite telephones);
(d) two-way radio;
(e) paging systems;
(f) public address systems; and
(g) runners.

(b) The limitations of transmitting equipment technology in certain types of emergencies.

(c) The potential effects of using equipment producing electromagnetic radiation in situations where such signals could have adverse effects on explosive devices or essential equipment, such as sensitive medical equipment, that may be in the same location.

NOTE: Equipment producing electromagnetic radiation includes mobile phones, radio sets and appliances using wireless technology transmission.

(d) Any battery-powered equipment that needs fully charged batteries available.

(e) The potential failure of equipment that is mains-powered without battery backup.

4.2.4 Control and coordination

The procedures should identify an appropriate location from which the chief warden can establish control, communication and coordination, and liaise with the Emergency Services.

NOTE: This is sometimes referred to as the 'emergency control point'.

An alternative location(s) should be nominated in the emergency response procedures to allow for contingencies.

4.2.5 Emergency response equipment

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The procedures should include appropriate information and instructions on the use of any first-attack firefighting equipment and first-response emergency equipment that is in place in a facility.

NOTE: [Text deleted].

4.2.6 Evacuation

4.2.6.1 *General*

The emergency response procedures shall address the actions that are to be taken to evacuate the facility by members of the ECO, occupants and visitors.

NOTE: As appropriate to the facility, the emergency response procedures should include requirements that the ECO members—

(a) check their area of responsibility to determine whether all persons have been evacuated; and
(b) report the result of the check to the chief warden, including whether any refuge is occupied.

This function is of greater importance than a later physical count of those evacuated.

4.2.6.2 *Occupants and visitors with a disability*

The evacuation arrangements for persons with a disability shall be considered in the development of the emergency response procedures.

4.2.6.3 *Evacuation options*

The procedures shall address the extent of evacuation from a facility that is necessary for different types of emergencies. Consideration shall be given to the following evacuation options, as appropriate to the facility:

(a) *Full evacuation* This measure is used to clear a building or facility of all occupants (see Notes 1 and 2).

(b) *Partial evacuation* This measure is an alternative to a total evacuation in some buildings such as hospitals, aged care facilities and multi-storey buildings.

NOTE: Partial evacuation may—

(a) include evacuation into or through smoke and fire compartments;

(b) be used to evacuate individuals closest to a situation and to prevent congestion in the stairways; or

(c) be utilized when evacuation of several floors is sufficient to protect occupants while the hazard is being eliminated, i.e., to move people away from a localized emergency within a building or facility (see Note 3).

(c) *Shelter in place (no evacuation)* This measure is an emergency response option that allows occupants and visitors to remain inside a facility on the basis that an evacuation to an external-to-building location might reasonably expose evacuating people to a greater level of danger.

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NOTE: Shelter in place (no evacuation) may be the appropriate option in response to threats to safety, such as lightning storms, severe storms, floods, dust, smoke from adjacent structures, bushfires or grass fires, air-borne toxic agents, gas leaks or dangerous animals.

(d) *Escape, Hide, Tell* Where immediate escape from the facility is not considered personally safe, then occupants should hide out of sight and remain silent, or alternatively take other action to protect their safety.

NOTE: For further assistance and the latest information about the Escape, Hide, Tell methodology, see the Australian National Security website (www.nationalsecurity.gov.au) to access the Australian-New Zealand Counter-Terrorism Committee publication, *Active Armed Offender Guidelines for Crowded Places*.

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(e) *Lockdown* The process of securing a facility (full or partial) or an area to protect its occupants in response to an occurring or imminent threat that may have the potential to cause harm.

An assessment of the shelter or refuge to determine the suitability and sustainability of the shelter should be carried out for certain emergencies, where shelter in place option is being considered.

The success of this strategy will depend, to a large extent, on the degree to which premises have been prepared. The most appropriate decision will be made after the assessment of all the available information. Decision-makers should seek and evaluate expert advice (see Note 4).

NOTES:

1 Full evacuation would normally be carried out in response to a potentially catastrophic, life-threatening situation or where the building cannot function due to a severe services malfunction.

2 In some buildings, the alarm system is automatically set to the evacuate tone without utilizing an alert tone facility. Emergency response procedures should reflect these situations.

3 Examples of where a partial building evacuation may be carried out include a localized fire, a localized flood, a chemical spill, or a bomb threat specified for a certain area.

4 Numerous situations can occur that make it advisable for those inside a building to remain inside for their own protection. These procedures may be warranted if, for example, an industrial strike action that is taking place outside the building turns violent.

4.2.6.4 *Evacuation routes*

The likely effect that a particular emergency may have on evacuation routes and normal paths for leaving the facility shall be considered.

4.2.6.5 *Assembly area(s)*

Assembly areas shall, so far as is reasonably practicable, be sufficiently distant from the emergency for the protection of evacuees.

NOTES:

1 Ideally the areas selected should be sheltered from the affected facility and should allow for further movement away from the emergency. Consideration should be given to dangers such as smoke and flying/falling debris and other objects.

2 An assembly area should be accessible by a route suitable for people who walk with difficulty or use mobility aids, including walking frames and wheelchairs, and prams.

3 The movement of large numbers of people has its inherent dangers, particularly in heavy traffic. Careful thought should be given to determine the safest routes from the facility to the nominated places of assembly, including alternatives, and to ensure access for emergency vehicles is not hindered.

4 Evacuation may be to another nominated internal or external area, such as another floor or refuge.

5 Alternative assembly area(s) may be necessary if the nominated assembly area is unsuitable.

4.2.7 External sources

The characteristics of, and hazards from, external sources shall be considered.

4.2.8 First aid officers

Where first aid officers exist, their duties during an emergency should be considered by the EPC.

The roles of the first aid officers and wardens should be separate and distinct.

4.2.9 Lifts and escalators

Lifts and escalators should not be relied upon as a means of evacuation from fire unless their suitability for that purpose has been nominated through a regulatory approval process.

NOTE: Lifts and escalators may be appropriate for use in other types of emergencies and in some circumstances, particularly in emergencies other than fire.

A1 In developing the regulatory approval, a team including a fire safety engineer, a mechanical services engineer, a lift engineer, an emergency planning consultant and an access consultant should jointly produce a strategy document that would be both part of the documentary evidence and of the emergency plan.

4.2.10 Media response

Restrictions should be placed on contacting print or electronic media during the emergency. All media statements should be provided, released and authorized by nominated persons.

4.2.11 Occupants and visitors with a disability

When developing emergency response procedures, consideration shall be given to occupants and visitors who for one reason or another may need assistance or are unlikely to be able to act optimally in an emergency. This would include but not be limited to occupants and visitors who—

(a) are accompanied by an assistant;

(b) have a guide or companion animal;

(c) use alternative forms of information and communication;

A1 (d) have a vision impairment;

(e) have a hearing impairment;

(f) have an ambulatory impairment;

(g) use a wheeled mobility appliance, including wheelchair or scooter;

(h) are easily fatigued;

(i) easily experience acute anxiety in an emergency; or

(j) easily experience extreme confusion in an emergency.

NOTES:

1 A current list of the names, workplaces and other necessary information about occupants with a disability should be kept at the locations where the chief warden exercises control.

2 Suitable strategies in an emergency or evacuation should be discussed with those occupants of the facility who have a disability and a personal emergency evacuation plan (PEEP) developed for each of those persons.

3 Should the use of lifts for evacuation during a fire emergency have regulatory approval, procedural information should be included in the PEEP.

Information on the PEEP shall be disseminated to all people responsible for its implementation.

NOTE: An example of a PEEP is given in Appendix D.

4.2.12 Organization of the facility

The organizational arrangements for each facility shall be considered. This includes the human resources aspects of the facility's organization.

4.2.13 People unfamiliar with the emergency response procedures

The needs of people who may be within a facility and are not familiar with the emergency response procedures shall be considered.

4.2.14 Personal effects

When being evacuated, occupants and visitors may be asked to take their immediately available personal effects such as handbags, wallets and car keys if it is safe to do so.

4.2.15 Refuges

Refuges are areas where occupants and visitors may wait for their delayed independent evacuation, or assisted evacuation by Emergency Services or other nominated personnel.

NOTE: Refuges are normally nominated by the relevant certifier.

Occupants who have a disability should be attended in the refuge by another person.

4.2.16 Specialist staff

The roles of security guards, receptionists/switchboard operators and other specialist staff shall be considered.

4.2.17 Stairway evacuation device

Consideration should be given to the use and suitability and storage arrangements of stairway evacuation devices for people who use wheelchairs or who otherwise would need to be carried down the stairway.

NOTE: Any stairway evacuation device should be operated by a competent person.

4.2.18 Use and characteristics of the facility

The use and characteristics of each facility and the appropriateness and adequacy of physical facilities shall be considered. This includes the physical construction and layout as well as the type of activity that takes place within the facility.

4.2.19 Vehicle entry points

Consideration shall be given to imposing restrictions on vehicular movement during an emergency.

NOTES:

1 Persons should be nominated by the chief warden to restrict vehicle movements into the facility.

2 Persons should be nominated by the chief warden to be at entry points to the facility to meet responding Emergency Service(s).

4.3 EMERGENCY COLOUR CODES

A standardized colour code for notification, identification and response activation may be used in the emergency response procedures:

(a) Where colour codes are used for specific emergencies the colours should—

(i) be as shown in Column 2 of Table 4.1; and

(ii) approximate those listed in Table 4.1, either from AS 2700, or the colour settings for printing (see Notes 1, 2 and 3).

(b) For the verbal 'all clear' notification, the relevant colour code shall be stated followed by the words 'ALL CLEAR'.

NOTES:

1 These colour codes are consistent with those used in AS 4083.

2 The correlations between the AS 2700 codes and the RGB and CMYK codes are approximations only.

3 CMYK values are highly device-dependent, therefore their values in Table 4.1 are not suitable for careful colour rendition.

4 The colour green is reserved for uses related to safety and first-aid.

5 Using colour codes other than those listed in Table 4.1 may lead to confusion.

TABLE 4.1

EMERGENCY COLOUR CODES

Emergency	Colour	AS 2700 Code	Colour Settings for printing	
			RGB	CMYK
Fire and/or smoke	Red	R13	227, 66, 52	0, 71, 77, 11
Bomb threat	Purple	P12	128, 0, 128	66, 87, 0, 0
Medical emergency	Blue	B22	0, 47, 167	98, 84, 0, 0
Personal threat*	Black	N61	0, 0, 0	0, 0, 0, 100
Internal emergency†	Yellow	Y26	255, 215, 0	0, 16, 100, 0
External emergency	Brown	X54	150, 75, 0	0, 50, 100, 41
Evacuation	Orange	X13	255, 127, 0	0, 50, 100, 0

* For example, armed or unarmed persons threatening injury to others or to themselves.

† For example, failure or threat to essential services.

SECTION 5 EMERGENCY CONTROL ORGANIZATION (ECO)

5.1 GENERAL

The ECO shall be appropriate to the facility and to the emergency response procedures as determined by the EPC.

The titles of 'chief warden', 'communications officer', 'floor warden' or 'area warden' and 'warden' should be used when these positions are included in the ECO. Titles for other positions may be determined by the EPC.

5.2 POSITIONS ON THE ECO

The ECO shall consist of a chief warden or equivalent as a minimum. The following positions shall be included if they are deemed necessary by the EPC and in accordance with the requirements of this Standard:

(a) Deputy chief warden.

(b) Communications officer and deputy.

(c) Floor/area wardens and deputies.

(d) Wardens and deputies.

Other ECO positions may be incorporated into the ECO, for example, runners, stair wardens, roll call wardens, traffic wardens, section wardens.

An up-to-date register of all ECO members shall be kept readily available, with or via the chief warden.

5.3 NUMBER OF ECO MEMBERS

The number of ECO members shall be determined in accordance with—

(a) the size of the facility, floor or area;

(b) the number of occupants and visitors; and

(c) the installed occupant warning equipment.

(d) the fire engineered and life safety features of the facility.

The positions and number of ECO members shall be considered by the EPC.

NOTES:

1 Guidance on determining ECO numbers is given in Appendix F.

2 In single tenancies, the ECO may consist of one person, who would be the 'chief warden'.

5.4 AUTHORITY

During emergencies, instructions given by the emergency control organization (ECO) personnel shall take precedence over the normal management structure.

NOTES:

1 Nothing in this clause is intended to over-ride or change the legislative responsibility of the facility owners, managers, occupiers and employers in ensuring the safety of all occupants and visitors to the facility.

2 Authority given to the ECO to act during an Emergency must be acknowledged by the facility owners, managers, occupiers and employers as part of the Emergency planning activities.

3 The EPC should ensure that the appropriate people, such as senior management, have been advised of the authority of the ECO during emergencies.

4 This authority is intended to ensure that, during an emergency situation, life safety takes precedence over asset protection, environmental considerations, production operations and business continuity.

5.5 INDEMNITY

Facility owners, managers, occupiers and employers should obtain professional advice on the level of indemnity provided to ECO members. The ECO members should be advised of the level of indemnity provided.

5.6 SELECTION CRITERIA FOR ECO MEMBERS

5.6.1 Chief warden

The person appointed as chief warden should—

(a) be capable of performing their duties;

(b) be capable of leading and taking command;

(c) display effective decision-making skills;

(d) demonstrate the capability to remain calm under pressure;

(e) be available to undertake their appointed duties;

(f) be capable of effectively communicating with occupants and visitors;

(g) be familiar with the facility; and

(h) be able to undergo relevant training.

5.6.2 Communications officer

The person appointed as communications officer should—

(a) be capable of performing their duties;

(b) display effective decision-making skills;

(c) demonstrate the capability to remain calm under pressure;

(d) be available on-site to undertake their appointed duties;

(e) be capable of effectively communicating with occupants and visitors; and

(f) be able to undergo relevant training.

5.6.3 Floor or area wardens

Floor or area wardens should be appointed consistent with the level of their day-to-day responsibilities.

The floor or area warden responsibilities should be attached to a specific position, to ensure where possible, that the person appointed to the position, in either a permanent or temporary capacity, carries out the necessary functions.

Persons appointed as floor/area wardens should—

(a) be capable of performing their duties;

(b) have leadership qualities and the ability to command authority;

(c) display effective decision-making skills;

(d) demonstrate the capability to remain calm under pressure;

(e) be available on-site to undertake their appointed duties;

(f) be capable of effectively communicating with occupants and visitors;

(g) be capable of deputizing for other positions on the ECO; and

(h) be able to undergo relevant training.

5.6.4 Wardens

Persons appointed as wardens should—

(a) be capable of performing their duties;

(b) have leadership qualities and command authority;

(c) be available to undertake their appointed duties;

(d) be capable of communicating with occupants and visitors;

(e) be capable of deputizing for other positions; and

(f) be able to undergo relevant training.

5.6.5 Deputies

The appointment of deputies shall be considered, to ensure the effective functioning of the ECO. Persons appointed as deputies shall have the same capabilities and personal attributes as required for the substantive position.

5.7 PRIMARY ROLES AND DUTIES

5.7.1 General

The primary role of the ECO is to give top priority to the safety of the occupants and visitors of the facility during an emergency. Life safety shall take precedence over asset protection during an emergency.

The ECO should have clearly documented pre-emergency, emergency and post-emergency duties and responsibilities.

This Clause lists the duties of each member of the ECO, when it comprises the full range of roles. In cases, where the ECO does not include all of the roles defined in this Standard, the duties listed in Clauses 5.7.2 to 5.7.4 shall be addressed in the emergency response procedures and assigned to the existing ECO membership, as appropriate to the organizational structure of the facility.

5.7.2 Pre-emergency

The actions to be undertaken by the ECO prior to an emergency event should be as set out in the emergency response procedures and may include the following:

(a) *Chief warden*:

  (i) Maintain a current register of ECO members.

  (ii) Replace ECO members when a position becomes vacant.

  (iii) Conduct regular exercises.

  (iv) Ensure the emergency response procedures are kept up-to-date.

  (v) Attend meetings of the EPC, as appropriate.

  (vi) Attend training and emergency exercises, as required by the EPC.

  (vii) Ensure personal ECO identification is available.

(b) *Communications officer*:

(i) Ensure personal proficiency in operation of facility communication equipment.

(ii) Maintain records and logbooks and make them available for emergency response.

(iii) Ensure that ECO members are proficient in use of the facility communication equipment.

(iv) Ensure that emergency communication contact details are up-to-date.

(v) Attend training and emergency exercises, as required by the EPC.

(c) *Floor/area warden*:

(i) Confirm sufficient wardens for area of responsibility.

(ii) Coordinate the completion of PEEP documentation.

(iii) Report on deficiencies of emergency equipment.

(iv) Ensure that wardens have communicated the emergency response procedures to all occupants within their nominated areas.

(v) Ensure that occupants are aware of the identity of their wardens.

A2 (vi) Coordinate safety practices (e.g., clear egress paths, access to first-attack firefighting equipment and disposal of rubbish) by wardens throughout their area of responsibility.

(vii) Attend training and emergency exercises, as required by the EPC.

(viii) Ensure personal ECO identification is available.

(d) *Wardens*:

(i) Ensure that all occupants are aware of the emergency response procedures.

A2 (ii) Carry out safety practices (e.g., clear egress paths, access to first-attack firefighting equipment and disposal of rubbish).

(iii) Ensure personal ECO identification is available.

(iv) Attend training and emergency exercises, as required by the EPC.

(e) *Emergency response team*:

(i) Attend regular training.

(ii) Practise use of specialized equipment.

(iii) Maintain specialised equipment as per manufacturers' specifications.

NOTE: Examples of specialized equipment include spill-kits and breathing apparatus.

(iv) Ensure that personal protective equipment is maintained and available.

(v) Ensure personal ERT identification is available.

(vi) Pre-emergency planning.

(vii) Attend training and emergency exercises, as required by the EPC.

5.7.3 Emergency

The actions to be undertaken by the ECO in the event of an emergency shall include, but not be limited to, the following:

(a) *Chief warden* On becoming aware of an emergency, the chief warden shall take the following actions:

(i) Respond and take control, as appropriate.

(ii) Ascertain the nature of the emergency and implement appropriate action.

(iii) Ensure that the appropriate Emergency Service has been notified.

(iv) Ensure that floor or area wardens are advised of the situation, as appropriate.

A1 (v) If necessary, after evaluation of the situation, initiate an action plan in accordance with the emergency response procedures and control entry to the affected areas.

(vi) Monitor the progress of the evacuation and record any action taken in an incident log.

(vii) Brief the Emergency Services personnel upon arrival on type, scope and location of the emergency and the status of the evacuation and, thereafter, act on the senior officer's instructions.

(viii) Any other actions as considered to be necessary or as directed by Emergency Services.

(b) *Deputy chief warden* The deputy chief warden shall assume the responsibilities normally carried out by the chief warden if the chief warden is unavailable, and otherwise assist as required.

(c) *Communications officer* The communications officer, on becoming aware of the emergency, shall take the following actions:

(i) Ascertain the nature and location of the emergency.

(ii) Confirm that the appropriate Emergency Service has been notified.

(iii) Notify appropriate ECO members.

(iv) Transmit instructions and information.

(v) Record a log of the events that occurred during the emergency.

(vi) Act as directed by the chief warden.

(d) *Floor/area wardens* On hearing an alarm or on becoming aware of an emergency, the floor or area wardens shall take the following actions:

(i) Implement the emergency response procedures for their floor or area.

(ii) Ensure that the appropriate Emergency Service has been notified.

(iii) Direct wardens to check the floor or area for any abnormal situation.

(iv) Commence evacuation if the circumstances on their floor or area warrant this.

(v) Communicate with the chief warden by whatever means available and act on instructions.

(vi) Advise the chief warden as soon as possible of the circumstances and action taken.

(vii) Co-opt persons as required to assist a warden during an emergency.

(viii) Confirm that the activities of wardens have been completed and report this to the chief warden or a senior officer of the attending Emergency Services if the Chief Warden is not contactable.

(e) *Wardens* Persons selected as wardens shall carry out activities as set out in the emergency response procedures and as directed by the floor or area warden. Wardens' activities may include the following:

(i) Act as floor or area wardens.

(ii) Operate the communication system(s) in place.

(iii) Check that any fire doors and smoke doors are properly closed.

(iv) Close or open other doors in accordance with the emergency response procedures.

(v) Search the floor or area to ensure all people have evacuated. This function is of greater importance than a later physical count of those evacuated.

(vi) Ensure orderly flow of people into protected areas, for example, stairways.

(vii) Assist occupants with disabilities.

(viii) Act as leader of groups moving to nominated assembly areas.

(ix) Report status of required activities to the floor or area warden on their completion.

(f) *Emergency response team* Members of the emergency response team shall carry out activities as set out in the emergency response procedures and the following:

(i) Respond to the emergency as directed by the chief warden.

(ii) Communicate the status of the situation with the chief warden.

(iii) Hand over and brief Emergency Services on arrival.

5.7.4 Post-emergency

The actions to be undertaken by the ECO after an emergency should include, but not be limited to, the following:

(a) *Chief warden*:

(i) When the emergency incident is rendered safe or the Emergency Service returns control, notify the ECO members to have occupants return to their facility, as appropriate.

(ii) Organize a debrief with ECO members and, where appropriate, with any attending Emergency Service.

(iii) Compile a report for the EPC and management.

(b) *Communications officer* Collate records of events during the emergency for the debrief and ensure they are secured for future reference.

(c) *Floor/area wardens and wardens* Compile a report of the actions taken during the emergency for the debrief.

(d) *Emergency response team*:

(i) Clean and service used specialised equipment.

(ii) Replace specialized equipment as necessary.

NOTE: The re-entry and post emergency actions should be done in collaboration with the facility owners, managers, occupiers and employers.

5.8 IDENTIFICATION

The members of the ECO shall be identifiable in accordance with the following:

(a) ECO members shall be identifiable by the use of coloured apparel that shall be at least one of the following:

(a) Helmets.

(b) Caps.

(c) Hats.

(d) Vests.

(e) Tabards.

(b) Where in-house first aid personnel respond with the ECO, they shall be identified by a white cross on a green background

(c) Identification apparel should be prominently marked with the wearer's ECO title (see Note 3).

(d) The type of identification used for each ECO designation shall be consistent throughout the facility.

NOTES:

1 If there is an emergency response team included in the ECO, they should be clearly identified.

2 The identification colours white, yellow and red should approximate the AS 2700, RGB or CMYK colours listed in Table 5.1.

3 The specific floor, area or building may also be identified.

TABLE 5.1

ECO IDENTIFICATION COLOURS

ECO position	Colour	AS 2700	RGB	CMYK
Chief warden	White	N14	255, 255, 255	0, 0, 0, 0
Deputy chief warden	White	N14	255, 255, 255	0, 0, 0, 0
Communications officer	White	N14	255, 255, 255	0, 0, 0, 0
Floor/area warden	Yellow	Y26	255, 215, 0	0, 16, 100, 0
Warden	Red	R13	227, 66, 52	0, 71, 77, 11
First aid officers	Green†	G21	14, 171, 114	62, 0, 22, 33

† White cross on a green background.

SECTION 6 TRAINING

6.1 GENERAL

Training shall be conducted—

A1 (a) for at least one member of the EPC, to enable the EPC to competently execute its obligations;

(b) for the ECO, in accordance with Clauses 6.3 and 6.5; and

(c) for facility occupants, in accordance with Clauses 6.4 and 6.5.

NOTES:

1 The EPC should be trained in accordance with Clause 6.2.

2 ECO training may be carried out over a number of sessions to impart the range of necessary skills and knowledge. This should be done as soon as is reasonably practicable, as determined by the EPC.

3 Training programs may be structured to embrace one or more of the classifications set out in this Section, in order to meet individual organizational needs.

4 A recognized competency standard should be used to develop the training.

All training and skills retention activities shall be conducted or supervised by competent person(s), as defined by Clause 1.4.5. Training shall include information on the subject of occupants and visitors with a disability.

6.2 EPC TRAINING

Training provided to EPC members to enable them to competently execute their obligations in accordance with Clause 6.1a should address, but not necessarily be limited to, the following:

(a) Developing, managing and maintaining an emergency plan.

(b) The duties of the EPC and ECO as described in the emergency response procedures and emergency plan.

(c) The duties of the ERT, where it exists, as described in the emergency response procedures and emergency plan.

(d) The conduct of site-specific emergency identification and analysis.

(e) Establishing and managing an ECO (see Clause 2.2).

(f) The management of appropriate documentation.

(g) The management and development of assessment activities.

(h) The development and implementation of training activities including emergency exercise management.

(i) Emergency mitigation, emergency preparedness and emergency prevention.

(j) The installed fire safety systems, for example, sprinkler systems, fire doors and installed emergency communications, notifications and warnings.

(k) Liaison with Emergency Services.

(l) Post-evacuation management.

6.3 ECO TRAINING

6.3.1 All ECO members

6.3.1.1 *General*

All ECO members, including nominated deputies, shall be trained to develop the skills and knowledge necessary to undertake the duties set out in the emergency response procedures.

There shall be sufficient personnel trained in all positions within the ECO to allow for projected absences.

NOTE: Re-training should be conducted following a revision of the emergency response procedures.

6.3.1.2 *Content*

The training shall address, but not necessarily be limited to, the following:

(a) The duties of the ECO as described in the emergency response procedures and emergency plan.

(b) Procedures for the specific emergencies contained in the emergency plan.

(c) Responding to alarms and reports of emergencies.

(d) Reporting emergencies and initiating the installed emergency warning equipment.

(e) Communication during emergencies.

(f) Pre-emergency activities

(g) Emergency activities.

(h) Post-emergency activities.

(i) Occupants and visitors with disabilities.

NOTE: This may need to include training on personal emergency evacuation plans.

(j) Human behaviour during emergencies.

(k) The use of installed emergency response equipment.

NOTE: Examples include evacuation chairs, evacuation sheets and WIP phones.

(l) The performance of the building and its installations during a fire or other emergency.

NOTE: Examples include fire doors, emergency lights, exit-signage, sprinklers, ventilation and smoke control systems and fire-rated stairs.

The training shall include exercises and assessment.

6.3.2 Chief warden, deputy chief warden, communications officer

In addition to the training for all ECO members listed in Clauses 6.3.1 and 6.3.2, persons appointed to the positions of chief warden, deputy chief warden and communications officer, along with the nominated deputies for each position, shall have additional training, including but not limited to the following:

(a) Their roles and responsibilities within the emergency plan.

(b) Duties of the EPC.

(c) Duties of the ERT, where it exists, as described in the emergency response procedures.

(d) Decision-making, command and control.

(e) Record keeping.

(f) Actions for the specific emergencies contained in the emergency response procedures.

(g) Coordination of communications(s) during emergencies, including use of any installed specialised communications equipment.

(h) Liaison with Emergency Services.

(i) Coordination of evacuation activities.

(j) Implementation of post-emergency activities in accordance with the emergency plan.

6.3.3 First-attack firefighting

Where first-attack firefighting by specific occupants is included in the emergency procedures, these occupants shall be trained to enable them to competently execute their duties.

The training for first-attack firefighting shall address, but not necessarily be limited to, the following:

(a) The duties of the ECO, and ERT, where it exists.

(b) Preparing for site-specific fires.

(c) Reporting fires.

(d) Evacuating from endangered areas.

(e) Identifying, reporting and correcting unsafe conditions.

(f) Responding to fire emergencies.

(g) Identifying the classes of fire.

A2

(h) Selecting the correct first-attack firefighting equipment.

(i) Safe operating procedures for first-attack firefighting equipment.

(j) Determining if it is safe and appropriate to use first-attack firefighting equipment.

(k) Procedures to be followed after first-attack firefighting equipment has been used.

(l) Post evacuation activities.

NOTE: For example, extinguisher re-fill.

6.3.4 Emergency response skills training

Where a specialist ERT has been deemed necessary, training specific to the emergencies identified in the emergency plan shall be developed and carried out. In addition to the training detailed in Clause 6.3.3, response skills training shall address but not necessarily be limited to the following:

(a) Command and control.

(b) Safe, effective actions to take control of workplace emergencies.

(c) Pre-emergency planning.

(d) Reacting safely to emergencies.

(e) Emergencies that may occur.

(f) Procedures for specific emergencies.

(g) Specialized equipment use.

(h) Pre- and post-emergency servicing requirements

(i) Responding to identified emergencies.

6.4 OCCUPANTS AND VISITORS

6.4.1 Occupants working at a facility

All occupants working at a facility shall receive training to enable them to act in accordance with the emergency response procedures.

The training set out in this Clause should be provided for all new occupants including casual occupants/employees, at the commencement of their duties in a workplace or their occupancy of a structure.

The training should include, but not necessarily be limited to, the following:

(a) Occupant responsibilities within the facility emergency response procedures.

(b) The types of emergencies contained in the emergency plan.

(c) How to report emergencies including activation of alarm systems, if installed.

(d) Recognising and reporting unsafe conditions, and correcting unsafe conditions when appropriate.

(e) The authorities, roles, responsibilities and identification of ECO members.

(f) Reacting safely to emergencies and alarms.

(g) Evacuation procedures.

(h) The location of internal and external staging and assembly areas, as contained in the emergency plan.

(i) The location of egress routes.

(j) Post-emergency protocols.

(k) Procedures for specific emergencies.

6.4.2 Occupants not working at a facility

A1 Occupants of a facility, who do not work at that facility, should receive training to enable them to act in accordance with the emergency response procedures. If training is not given, appropriate information should be provided.

6.4.3 Visitors

Visitors at the facility should be provided with appropriate information on the emergency response procedures, as determined by the EPC.

6.5 SKILLS RETENTION

6.5.1 ECO skills retention

6.5.1.1 *General*

ECO members, including nominated deputies, shall attend a skills retention activity at intervals not greater than 6 months.

Skills retention activities shall—

(a) be determined by the EPC, based on the specific requirements for the facility and its emergency plan;

(b) include revision of roles and responsibilities as set out in the emergency response procedures; and

(c) include instruction on the operation of the communications system (if installed).

Skills retention activities may also include, but not necessarily be limited to, table-top exercises and evacuation exercises for the ECO.

6.5.2 Occupant skills retention

In workplaces, occupants should participate in skills retention activities at intervals not greater than 12 months, to enable them to act in accordance with the emergency response procedures.

Occupants' skills retention activities shall address the following:

(a) Responding to alarms and reports of emergencies.

(b) Personal emergency evacuation plans, where these are in place.

(c) Procedures for specific emergencies as contained in the emergency response procedures.

(d) Identification of ECO members.

Occupant skills retention may be delivered by various methods (e.g., verbal, classroom, diagrams and online).

6.5.3 First-attack firefighting

Where first-attack firefighting by specific occupants is included in the emergency procedures, these occupants shall attend a skills retention activity in first-attack firefighting at intervals not greater than two years.

6.5.4 Emergency response

Where a specialist ERT has been deemed necessary, the ERT members shall attend a skills retention activity in their specific procedures at intervals not greater than one year.

6.6 COMMUNICATIONS SYSTEM

All ECO members shall be instructed on the operation of the communication system (if installed).

Regular checks of the communication system should be carried out, either at monthly intervals, or as determined by the EPC. Records shall be retained.

NOTES:

1 Communication systems include EWIS, s.s.e.p., PA systems, paging, portable occupant warning equipment, strobe lights and colour-coded lights.

2 The conduct of regular checks by ECO members provides the necessary practice in the effective use of the system and the timely identification of any system faults.

3 AS 1851 sets out step-by-step requirements and time intervals for the verification of elements and equipment relating to emergency response procedures.

6.7 TRAINING MATERIALS

The ECO and occupants shall be supplied with training materials appropriate to each person's role and level of responsibility as determined by the emergency plan. Training materials shall be site specific.

Materials shall be supplied in a format that can be comprehended by the recipient, which may include, but not be limited to, the following formats:

(a) Printed.

(b) Large print.

(c) Electronic.

(d) Audio.

(e) Braille.

(f) Languages other than English.

(g) Single reference charts/flip charts.

When emergency colour codes are used, they shall be in accordance with Clause 4.3.

SECTION 7 EMERGENCY RESPONSE EXERCISES

7.1 GENERAL

A program of site-specific emergency response exercises shall be developed in collaboration with the facility owners, managers, occupiers and employers each facility to determine the effectiveness of the emergency response procedures, ECO actions and occupants' response, both when first developed and on an ongoing basis.

A1 The initial testing and implementation of the emergency response exercises shall be in accordance with Clause 7.2. The ongoing program of emergency response exercises shall be in accordance with Clause 7.3.

The following should apply for all emergency response exercises (see Note 1):

(a) Emergency response exercises should be consistent with the identified emergencies in the emergency plan.

(b) Simple objectives and outcomes for emergency response exercises should be identified (see Notes 2 and 3).

A1 (c) Observers should be appointed for all emergency response exercises. The observers should use a checklist to record the details of the emergency response exercise (see Notes 4 and 5).

(d) Each emergency response exercise should be prefixed by an announcement that it is an exercise only.

(e) Debriefing sessions should be held in accordance with Clause 7.6.

A1 (f) A report should be forwarded to the EPC following each emergency response exercise. The report should include any deficiencies in the evacuation exercise that were identified at the debriefing session.

NOTES:

1 Emergency response exercises should be conducted during the operating hours of the facility to appropriately test the ECO, emergency response procedures and responses of the occupants and visitors.

2 An example of objectives for an emergency response exercise is to gauge ECO response and to identify and correct any deficiencies in communication system(s), training, emergency response procedures, or their implementation.

3 The outcomes for emergency response exercises should include the following, as appropriate to the emergency response procedures:

(a) ECO initiates the emergency procedure without waiting for instructions.

(b) ECO responds to alarms.

(c) ECO searches their allocated area without delay.

(d) ECO reports the location of any occupants and visitors with a disability.

(e) Simulated calls made to the Emergency Service, as appropriate.

(f) Effective ECO communication.

(g) The designated location for controlling the emergency is staffed immediately by the chief warden.

(h) The evacuation sequence is carried out in accordance with the procedures.

4 An observer's role is to observe and note the action taken by ECO members and occupants during the evacuation exercise.

5 See Appendix G for an example of an observers' checklist.

7.2 INITIAL TESTING AND IMPLEMENTATION

Once the EPC has established that the emergency response procedures are satisfactory and workable and the ECO has been trained, the emergency response procedures should be tested within the first 12 months.

A1 The first emergency response exercise should be an evacuation exercise (see Note 1).

'Text deleted'

The EPC in collaboration with the facility owners, managers, occupiers and employers should arrange for occupants to be notified before the evacuation exercise takes place. Adequate planning time, including the proposed date, shall be given.

All occupants and ECO members shall have participated in an evacuation exercise in the first 12 months of the implementation of the emergency response procedures.

NOTES:

1 If the facility is large or a multi storey building, a partial evacuation may be undertaken to test the emergency response procedures and the ECO in the first instance.

A1 2 The initial emergency response exercise(s) may be a simulation or practical exercise to test all emergency procedures and the ECO members.

3 Notification may be carried out by various members of the ECO facility owners, managers, occupiers and employers thus enabling the occupants to identify their warden(s) and become aware of their responsibilities.

4 Realistic performance targets may be considered as a measure of the procedures' effectiveness.

5 The ECO should be briefed to give extra assistance to staff during the initial evacuations.

6 It should be accepted by management that the emergency response procedures be properly tested and that all ECO members have sufficient practice to ensure their effectiveness in an emergency situation. In less complex facilities this may only be a matter of sounding the alarm, having people walk to the assembly area and accounting for people. With the experience gained from the first evacuation, subsequent evacuation exercises will become more realistic.

7.3 ONGOING PROGRAM

Following the implementation phase, a program of site-specific emergency response
A1 exercises shall be developed for each facility.

The size and configuration of the facility, together with the type of occupancy, will determine the type and time interval between emergency response exercises. These may be conducted either as partial emergency response exercises or a total emergency response
A1 exercise covering the entire facility. All areas of a facility shall participate in at least one emergency response exercise involving an evacuation each year.

All occupants of the floor(s) or area(s) involved in the emergency response exercise shall take part, unless the EPC grants a written exemption prior to conducting the emergency response exercise.

NOTES:

1 The aim of emergency response exercises is to have all occupants participate in at least one emergency response exercise per year consistent with the nature of the facility and its identified emergencies.

2 For training purposes, exemptions may be treated by the ECO as refusals for the emergency response exercise.

3 Where exemptions to remain are given, the ECO should report the exempted occupants to the chief warden.

7.4 ECO BRIEFING

A1 When planning any emergency response exercise, briefing the ECO shall be considered. The briefing may address, but not be limited to the following:

(a) The location of the planned scenario.

(b) The identity of the wardens.

(c) The type of alarms and alarm system, (if installed).

(d) Actions that the ECO is to take in response to the alarm signals.

(e) The method of reporting emergencies.

(f) The location of the staging area on the occupants' floor or area if applicable.

(g) The evacuation routes to be taken.

(h) The location of assembly or designated alternative areas that provide safe refuge, internally or externally.

(i) Occupants who have approved exemptions prior to the exercise.

(j) Notification of any current temporary hazards within the facility and known systems failure relating to systems and equipment.

(k) What is required at the completion of the exercise.

7.5 OBSERVERS' CHECKLIST

A1 An observers' checklist should be prepared for the specific facility where the evacuation exercises take place.

NOTES:

1 The checklist should be completed for each evacuation exercise and should provide the basis for discussion at the debriefing.

2 An example of a checklist is given in Appendix G.

7.6 EMERGENCY RESPONSE EXERCISE DEBRIEFING SESSION

Immediately after an emergency response exercise, the ECO and other key participants shall attend a debriefing session conducted by the chief warden.

Where an evacuation exercise is conducted, the observer's checklist shall be analysed during debriefing sessions and any deficiencies shall be reported to the EPC.

The EPC shall arrange the amendment of the procedures, where necessary, and disseminate the information to all ECO members.

7.7 AN EMERGENCY DURING AN EMERGENCY RESPONSE EXERCISE

A pre-determined word or phrase, for example, 'NO DUFF' shall be disseminated to all ECO members, for use when an actual emergency incident takes place during an emergency response exercise. The word or phrase shall signify that the emergency response exercise has been terminated and that the ECO are to stand by for further instruction.

NOTE: The word or phrase may be repeated in groups of three to overcome background noise and other distractions.

A1

SECTION 8 REVIEW AND ROUTINE SERVICING

8.1 EMERGENCY PLAN

A1

The EPC shall ensure that the emergency plan and associated elements developed to meet the requirements of this Standard are inspected, tested and routinely serviced.

NOTE: AS 1851 provides guidance on carrying out the emergency plan and the associated elements and inspection, testing and routine servicing activities.

Checking and testing of the emergency plan elements are categorized in AS 1851 into the following two categories:

(a) Critical emergency evacuation system elements.

(b) Other emergency evacuation system elements and procedures.

A1

Any deficiency in the emergency plan or associated elements shall be reported to management or the EPC at the completion of the inspection or testing and shall be rectified with the minimum of delay.

Records shall be kept of all inspection, testing and routine servicing activities.

'Note deleted'

8.2 COMMUNICATION SYSTEM

Regular checks of the communication system shall be carried out, either at monthly intervals, or as determined by the EPC. Records shall be retained.

NOTES:

1 Communication systems include s.s.e.p. (EWIS, PA systems, paging, portable occupant warning equipment), strobe lights and colour coded lights.

2 The conduct of regular checks by ECO members provides the necessary practice in the effective use of the system and the timely identification of any system faults.

APPENDIX A

FIRE AND SMOKE EMERGENCIES

(Informative)

A1 GENERAL

This Appendix provides basic guidance on planning and response for fire and smoke emergencies. The information contained in this appendix is not sufficient, in itself, to adequately plan for a fire/smoke emergency in a facility.

A2 ESSENTIAL STEPS

Fire response within facility-specific emergency response should embrace the following four essential steps, which in most cases will need to be initiated concurrently:

(a) *Life safety* Ensuring the immediate safety of anyone within the facility in a fire situation takes precedence over commercial operations and property/asset protection.

(b) *Call the fire brigade* Calling the fire brigade in all incidents of fire or suspicion of fire (e.g., smell of smoke) as per facility emergency response procedures. There should be no criticism of any person who uses initiative in this respect nor should such action need another person's permission.

It is very important that where the fire brigade has been called by automatic means or by activating a manual call point, this is followed by a telephone call to confirm receipt of alarm and provide further information; for example, confirmation of the fire and its location.

(c) *Evacuation* The emergency response procedures should have specific detail of emergency evacuation actions in a fire situation:

(i) *Effective warning arrangement* A suitable arrangement to advise occupants and visitors of a fire emergency should be available and outlined in the emergency response procedures.

(ii) *Assessment of all evacuation routes* Egress routes should be assessed for safety during the emergency. The effects of smoke in a fire situation may require alternative egress routes. It is important that these assessments include the requirements of occupants and visitors with a disability.

(d) *Fight the fire* Many facilities have fire hose reels or portable fire extinguishers. Where these are installed, information should be provided to cover their selection, use and operation, (see also Section 6 for training requirements); however, immediately it becomes obvious that there are unacceptably high risks associated with attempts to control a fire, occupants should withdraw, closing but not locking doors behind them.

(e) In facilities where layflat hoses are installed, occupants are not to attempt to use them unless specialized training has been provided; for example, to members of designated facility emergency response teams.

APPENDIX B
BOMB THREAT
(Informative)

B1 GENERAL

The information in this Appendix is provided by the Australian Bomb Data Centre (ABDC).

This Appendix provides basic guidance on planning and response in case of a bomb threat. The information contained in this Appendix is not sufficient, in itself, to adequately plan for a bomb threat.

Bomb threats are a serious public concern of recent times. A bomb threat could be either a prank or a genuine warning of an impending bomb attack. The uncertainty creates a risk that cannot be ignored. Usually, bomb threats are committed by individuals seeking to create a state of alarm and confusion in an organization. The disruption may be minimized by proper site-specific planning and nomination of appropriate decision-making authorities.

B2 THREATS

Bomb threats may be in one of the following forms:

(a) *Written threat* If a bomb threat is received in writing, it should be kept, including any envelope or container. Once a message is recognized as a bomb threat, further unnecessary handling should be avoided. Every possible effort has to be made to retain evidence such as possible fingerprints, handwriting or typewriting, paper and postmarks. Such evidence should be protected by placing the evidence in an envelope (preferably a plastic envelope).

(b) *Telephone threat* An accurate analysis of the telephone threat can provide valuable information on which to base recommendations, action and subsequent investigation. The person receiving the bomb threat by telephone should, as soon as possible, complete the information required by a bomb threat checklist. A bomb threat checklist should be held by telephonists and other persons who regularly accept incoming telephone calls.

NOTE: An example of a phone threat and bomb threat checklist is given in Appendix H.

(c) *Suspect object* A suspect object is any object found on the premises and deemed a possible threat by virtue of its characteristics, location and circumstances.

B3 EVALUATION

B3.1 General

Following an analysis of information received, the chief warden, or in his/her absence, the deputy chief warden should categorize the bomb threats, which may be either specific or non-specific as follows:

(a) *Specific threat* The caller will provide more detailed information, which could include statements describing the device, why it was placed, its location, the time of activation and other details. Although less common, the specific threat is the more credible.

(b) *Non-specific threats* An individual may make a simple statement to the effect that a device has been placed. Generally very little, if any, additional detail is conveyed before the caller terminates the conversation.

The non-specific threat is the more common, but neither threat can be immediately discredited without investigation. In other words, every threat has to be treated as genuine until proven otherwise.

B3.2 Actions

The following four options are a guide to action following the evaluation of the threat:

(a) Take no further action.

or

(b) Search without evacuation. (If an item is identified as suspect during the search then evacuation should be considered).

or

A2 (c) Search followed by an evacuation. (If an item matches the description of the threat language or is deemed suspicious then an evacuation should be ordered).

or

(d) Evacuate (without search).

Each of these options will have advantages and disadvantages related to safety, speed of search, thoroughness, productivity and morale, and has to be assessed against the potential risk.

B4 NOTIFICATION

Upon receipt of a threat or discovery of a suspect object, the Police should immediately be advised; however, it should not be assumed that the Police will conduct bomb searches. An advantage to having developed a bomb incident plan is that coordination with public safety organizations will have been arranged with a clear understanding of exactly what services can be provided, by whom and when.

An analysis of a threat or the discovery of a suspect object should determine the requirements to evacuate the building, structure or workplace. In any circumstance where an occupier determines that an evacuation of their area is necessary, the affected occupier should first notify the ECO so that the emergency plan can be implemented.

B5 SEARCH

B5.1 General

The most appropriate personnel to carry out a search, in any given area, are the occupants of the building, structure or workplace because they have the knowledge of 'what belongs' or 'what does not belong' in a location at any given time.

The aim of the search is to identify any object that is not normally found in an area or location, or for which an owner is not readily identifiable or becomes suspect for any other reason, for example—

(a) a suspiciously labelled object;

(b) an object similar to that described in the threat;

(c) an object of unusual size, shape and sound; or

(d) the presence of pieces of tape, wire, string or explosive wrappings, or other unfamiliar materials.

On locating a suspect object, search personnel should not touch, cover or move it.

The location should be conspicuously marked, for example, a paper trail to the nearest exit is most suitable. After ensuring there are no other suspect objects in the vicinity, the area

should be evacuated and isolated. Search of other areas should continue to ensure that there are no other suspect objects.

NOTES:

1 Law enforcement authorities, i.e., the police, do not normally assist occupants of buildings, structures or workplaces in searching for suspect bombs unless a suspect bomb has been located by the site occupants.

2 Care should be exercised with mobile phones, radio sets, wireless technology transmission and any other equipment producing electromagnetic radiation in situations where improvised explosive devices are suspected. Such equipment should not be used until clearance is given by the attending bomb technicians.

B5.2 Search sequence

General priorities for searching should follow the following sequence:

(a) Outside areas including evacuation assembly areas.

(b) Building entrances and exits and, particularly, paths people will use to evacuate.

(c) Public areas within buildings.

NOTE: Most buildings contain public areas that are accessible for the placement of an 'object'. These areas usually provide a means of exit, which evacuees have to pass through, or be in proximity to, during an evacuation.

(d) Other areas.

NOTE: Once external and public areas have been declared clear, a search should be conducted beginning at the lowest levels and continuing upwards until every floor, including the roof, has been searched. Once a floor or room has been searched, it should be distinctively marked to avoid duplication of effort. The ECO members, due to their intimate knowledge of the building, should assist the relevant authorities in these procedures.

B6 EVACUATION OPTIONS

B6.1 General

If the decision to evacuate is made, people should be requested to remove all personal belongings, e.g. handbags, briefcases, shopping or carry bags, when evacuating. This will facilitate the identification of suspect objects.

B6.2 Limitations of total evacuation

At first thought, immediate and total evacuation would seem to be the most appropriate response to any bomb threat. However, the evacuation procedures in response to a bomb threat do not necessarily follow those for a fire, for example, doors and windows should be opened, to lessen blast effect, and not closed as in the case of fire. Additionally, there are significant safety and economic factors associated with a bomb threat, which may weigh against an immediate evacuation, as follows:

(a) *Risk of injury* As a general rule, the easiest area in which to plant an object is in the shrubbery sometimes found outside a building, an adjoining car park or in an area to which the public has the easiest access. Immediate evacuation through these areas might increase the risk of injury and car parks should not normally be used as assembly areas.

(b) *Response limitation* Total and prompt evacuation will remove personnel who may be required to make a search.

(c) *Panic* A sudden bomb threat evacuation may cause panic and unpredictable behaviour, leading to unnecessary risk of injury.

(d) *Essential services* Some evacuations may be precluded by the essential nature of the operations conducted within the building.

(e) *Loss to business services* While the protection of life should outweigh any economic loss, repeated threats may increase loss of business and interruption of services to an unacceptable level.

There are some conditions that make immediate total evacuation an undesirable response to the bomb threat. Total and immediate evacuation, whilst risky, is the easy decision, and having taken the easy way, the hard decision of when to return still has to be made.

B6.3 Partial evacuation

One alternative to total evacuation is a partial evacuation. This response is particularly effective when the threat includes the specific or general location of the placed object or in those instances where a suspect object has been located without prior warning.

Partial evacuation may reduce risk of injury by removing non-essential personnel. Personnel essential to a search may remain, critical services may be continued and, in cases of repeated threat, loss of output will be minimized. Partial evacuation requires a high degree of planning, training, supervision, coordination and rehearsal.

Suspect mail items have many similarities in common with other 'suspect articles', which may be encountered by any enterprise or individual. The philosophy of handling these items varies and is outside the scope of this document, but in the context of this Standard the procedures are the same.

B7 SUSPECT ITEMS

B7.1 Identifying an item as suspect

Suspect items may be encountered by any enterprise or individual. It is not possible to provide a definitive list of indicators that would cause an item to be considered suspect. The following questions provide a means of assessing if an item should be considered suspect:

(a) Is the item unidentified?

(b) Is the item unusual or foreign to its environment? Is the item typical for its environment?

(c) Is the item obviously a bomb?

(d) Is the item hidden or concealed in any way?

(e) Has there been any unauthorized access to the area?

(f) Has there been a perimeter breach?

This series of questions may be remembered using the mnemonic, 'HOT-UP' as shown in Figure B1.

FIGURE B1 'HOT-UP'

B7.2 Actions to be taken

The following actions should be considered for dealing with a suspect item:

(a) The supervisor is to be informed.

(b) Cordon-off immediate area.

(c) Advise ECO/Security who will assess the need to alert Emergency Services.

(d) Respond to the directions of Emergency Services if they are contacted.

A suspect item should not be moved or touched.

B8 SUSPECT MAIL ARTICLES

Suspect mail items have many similarities in common with other 'suspect articles', which may be encountered by any enterprise or individual. The philosophy of handling these items varies and is outside the scope of this document.

All occupants responsible for handling mail should be trained in the identification and subsequent handling of suspect mail items. Where large quantities of mail are received, or where the organization is considered at high risk, then consideration for the installation of specialized equipment has to be a management priority. Where necessary, further information can be obtained through the ABDC.

NOTE: The ABDC has produced a handbook for managers, which provides detailed guidelines for planning for bomb threats and identifying/handling suspect mail items titled, *Bombs Defusing the Threat, Incorporating Mail Bomb Countermeasures*. Organizations may obtain the publication by writing to the Australian Bomb Data Centre, Australian Federal Police Headquarters, Canberra.

B9 TYPES OF BOMB DELIVERY

Types of bomb delivery include the following:

(a) *Courier-delivered bomb* An explosive device delivered by a courier.

(b) *Improvised explosive device (IED)* A device fabricated in an ad hoc manner which contains explosive components designed to, or capable of, causing unlawful injury or damage.

(c) *Mail bomb* An IED sent through the postal system

(d) *Placed bomb* An explosive device hand-delivered or purposefully placed.

(e) *Vehicle bomb* A bomb in which a vehicle is used as the means of delivery. It may be designed to use the vehicle as fragmentation.

APPENDIX C

CIVIL DISORDER AND ILLEGAL OCCUPANCY

(Informative)

C1 GENERAL

This Appendix provides basic guidance on planning and response for civil disorder and illegal occupancy. The information contained in this Appendix is not sufficient, in itself, to adequately plan for civil disorder and illegal occupancy.

Planning for these emergencies may be done in consultation with the police or other specialist advisers and should be specific to the facility. This planning should be consistent with the facility's security standard operating procedure.

There have been many examples where industrial unrest, an emotional international situation or an unpopular political decision, have led to public demonstrations.

Planning for emergencies should include the development of procedures and guidelines aimed at minimizing the danger to facility occupants and visitors, and may include the risks of asset and revenue loss.

The ECO, together with managers and supervisors may be responsible for co-ordinating the response to such incidents, until the arrival of police to whom they should provide such assistance as may be required.

Managers and supervisors can contribute in a practical way to the satisfactory resolution of these emergencies by ensuring withdrawal of their staff where necessary, supervising the locking up of offices, securing records, files, cash and other valuable property while at the same time promoting an air of confidence and calm.

C2 RESPONSE

Immediately the chief warden is aware of civil disorder occurring in, or in the vicinity of, the facility, the imminence of such an event, or an unauthorized entry into the facility by a disaffected person or group, the chief warden or any senior member of the ECO who is in a position to act, should take the following action:

(a) Notify the police and request assistance.

(b) Alert members of the ECO.

(c) Inform facility occupants and visitors of restrictions to be implemented.

(d) Initiate the following actions:

  (i) *For illegal occupants—*

    (A) restrict illegal occupants to affected area;

    (B) restrict facility occupants' and visitors' access to affected area;

    (C) inform occupants and visitors of unaffected areas to remain at their location unless otherwise advised; and

    (D) implement specific facility security protocols.

(ii) *For civil disorder—*

(A) restrict access to and egress from the facility;

(B) inform occupants and visitors of unaffected areas to remain at their location unless otherwise advised;

(C) restrict contact between the demonstrators and the facility occupants;

(D) implement specific facility security protocols;

(E) restrict the use of external non-emergency communication; and

(F) notify managers and supervisors.

APPENDIX D

EXAMPLE OF A PERSONAL EMERGENCY EVACUATION PLAN (PEEP)

(Informative)

PERSONAL EMERGENCY EVACUATION PLAN

Occupant's Name: .....

Location:

Building/Facility .....

Floor .....

Room Number .....

Is an Assistance Animal involved? Yes ☐ No ☐

Are you trained in the emergency response proceduresYes ☐ No ☐
(including the evacuation procedures)?

Preferred method of receiving updates to the emergency response procedures:

(Please state, e.g. text, email, Braille etc.)

.....

Preferred method for Notification of Emergency:

(Please state, e.g. visual alarm, personal vibrating device, SMS, etc. Add lines as necessary)

.....

Type of assistance required:

(Please list procedures necessary for assistance. Add lines as necessary)

.....

.....

.....

Equipment required for evacuation:

(Please list. Add lines as necessary)

.....

.....

.....

Egress procedure:

(Give step by step details. Add lines as necessary)

1. .....
2. .....
3. .....
4. .....

Designated assistants and contact details:

(Please list name, phone, mobile, email. Add lines as necessary)

.....

.....

.....

Are your designated assistants trained in the emergency response procedures (including the evacuation procedures)?

Yes ☐ No ☐

Are your designated assistants trained in the evacuation equipment?

Yes ☐ No ☐

Diagram of preferred route for assisted evacuation:

(Please provide diagram)

Issue Date: ..... / ..... / ..... Review Date: ..... / ..... / .....

Occupant approved: Date: ..... / ..... / .....

.....

(signature)

Chief Warden: Date: ..... / ..... / .....

.....

(signature)

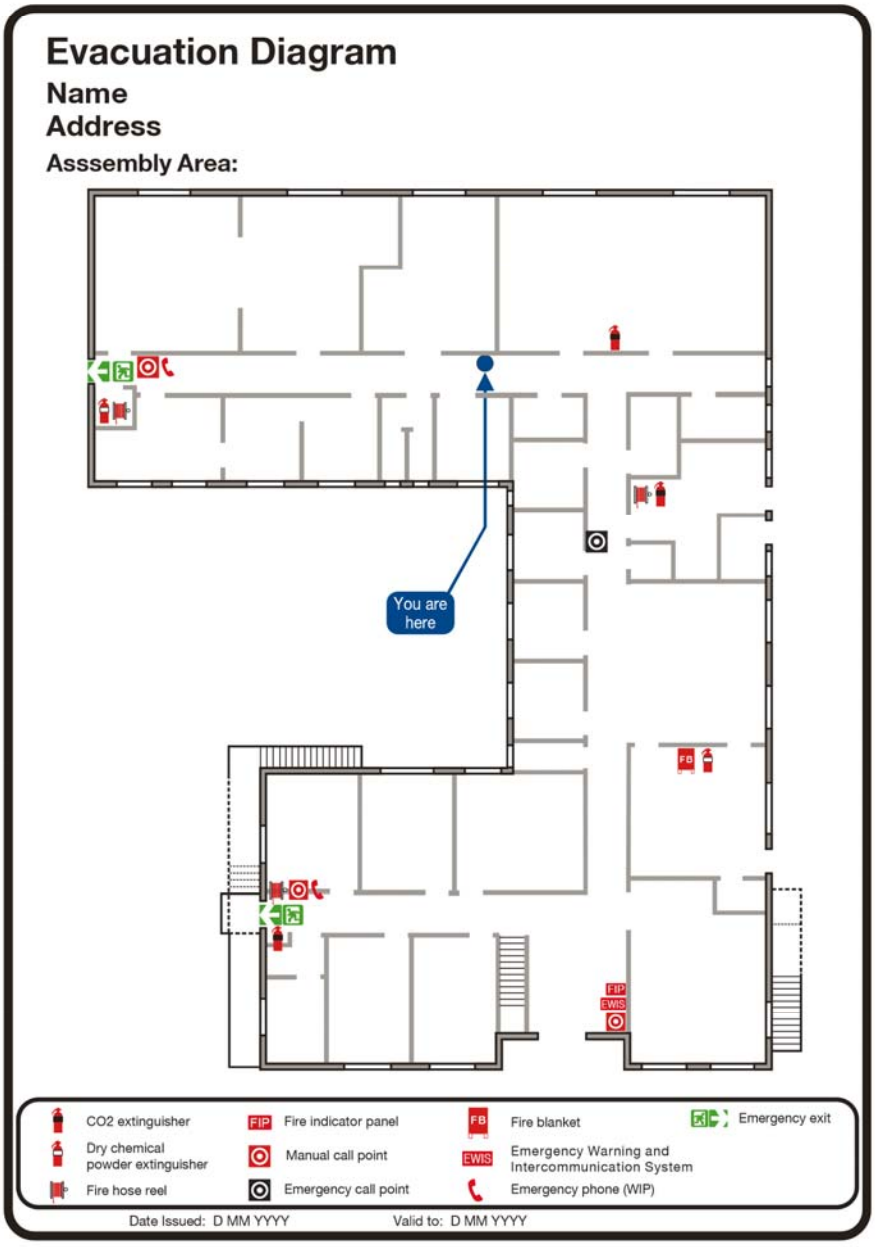
APPENDIX E

EXAMPLE EVACUATION DIAGRAMS

(Informative)

A1 Figure E1 gives an example of an evacuation diagram complying with Clause 3.5.5. Figures E2 gives an example of an evacuation diagram complying with Clause 3.5.6. Neither figure is shown to scale. Figure E3 gives an example of symbols used in evacuation diagrams.

A1



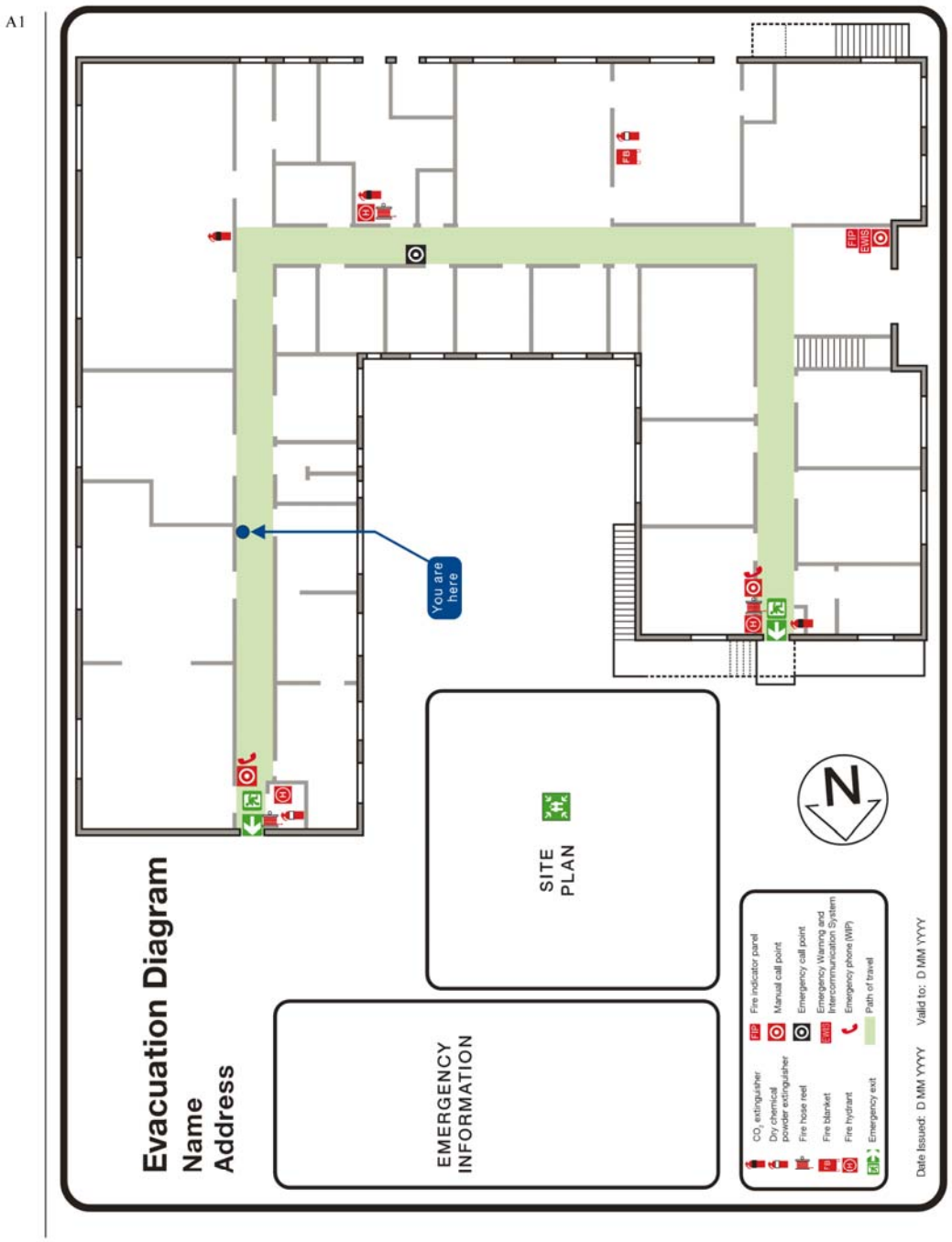
NOT TO SCALE

NOTES:

1 Refer to Clause 3.5.5 for the list of minimum elements to be included on an evacuation diagram.

2 A refuge is not depicted in this diagram. Refuges are included if they are present at the facility.

FIGURE E1 EXAMPLE OF AN EVACUATION DIAGRAM DISPLAYING MINIMUM ELEMENTS—A4 MINIMUM SIZE



NOTE: Refer to Clause 3.5.6 for the list of optional elements that may be included on the evacuation diagram.

FIGURE E2 EXAMPLE OF AN EVACUATION DIAGRAM DISPLAYING MINIMUM AND OPTIONAL ELEMENTS—A3 MINIMUM SIZE

A1

FIGURE E3 EXAMPLES OF SYMBOLS USED IN EVACUATION DIAGRAMS

APPENDIX F

GUIDANCE ON DETERMINING ECO NUMBERS

(Informative)

F1 GENERAL

A sufficient number of ECO members need to be appointed to ensure that whenever the facility is occupied, ECO members are available to respond to a facility emergency and to enable the facility to be checked and evacuated quickly and efficiently without compromising any occupants' and visitors' safety.

The number of ECO members required for a facility will vary depending upon the facility's structural and occupant/visitor characteristics. Characteristics that may impact on the number of ECO members are listed in Paragraphs F2 and F3. In addition, life safety and management and use provisions need to be considered such as—

(a) fire safety audits;

(b) risk assessments;

(c) fire safety engineering reports;

(d) fire safety plans;

(e) method of warning occupants and visitors;

(f) evacuation strategy (staged, horizontal, etc.);

(g) use of evacuation routes; and

(h) use of lifts.

Once all of the necessary information has been collected, an analysis of the needs relating to occupant and visitor evacuation should be made to assist in determining the appropriate number of ECO members to be selected.

The analysis may be based on data from the literature, field studies or simulated evacuations and engineering judgement. In some cases the regulatory approval process may have required a fire engineering report or the analysis of occupant and visitor evacuation and this could be used for this process.

F2 FACILITY STRUCTURAL CHARACTERISTICS

The following facility structural characteristics should be taken into account when determining ECO numbers:

(a) *Occupancy* Including—

  (i) building classification; and

  (ii) facility usage, particularly unusual uses.

(b) *Location* Including—

  (i) proximity to other buildings and boundaries; and

  (ii) proximity to other hazards.

(c) *Size and shape* Including—

  (i) number and size of floors/zones/areas;

  (ii) layout; and

  (iii) egress.

(d) *Structure* Including—

(i) construction materials;

(ii) openings, shafts and ducts; and

(iii) ventilation and air movement.

(e) Unusual features.

(f) Hazards to occupants and visitors.

(g) Fire safety measures.

(h) Management and use.

(i) Training of occupants.

(j) Maintenance frequency and adequacy of maintenance regimes.

(k) Firefighting concerns.

F3 OCCUPANT AND VISITOR CHARACTERISTICS

Occupant and visitor characteristics that should be considered include the following:

(a) Number, gender, age, location and state, e.g. awake or asleep, intoxicated or sober, unconscious or fully conscious.

(b) Physical attributes, e.g. mobility, speed of travel.

(c) Hearing ability.

(d) Vision ability.

(e) Mental attributes.

(f) Level of understanding.

(g) Potential emergency behaviour.

(h) Ability to interpret cues.

(i) Ability to take and implement decisions independently.

(j) Level of assistance required, e.g. requires full assistance, requires some assistance or does not require assistance.

(k) Level of assistance available.

(l) Shift schedules.

(m) Staff , occupant and visitor numbers and type at any time in facility.

(n) Emergency training, for example trained or untrained.

(o) Occupant (group) roles, e.g. parent or child, teacher or student, nurse or patient, staff or customer.

(p) Activity at the outbreak of fire, e.g. asleep or awake.

(q) Working in a noisy environment.

(r) Watching a performance.

(s) Familiarity with the building, i.e. unfamiliar, relatively familiar or familiar.

APPENDIX G

EXAMPLE OF AN EMERGENCY EVACUATION EXERCISE OBSERVERS' CHECKLIST

(Informative)

DATE: .....

ADDRESS: .....

FLOOR OR AREA: .....

EVACUATION SEQUENCE	TIME HOURS	MINUTES
Alarm sounded	.....	.....
Warden(s) respond	.....	.....
Wardens check floor or area	.....	.....
Evacuation commenced	.....	.....
Wardens report floor or area clear	.....	.....
Persons with disabilities accounted for	.....	.....
Arrive at assembly area, safe place	.....	.....
Wardens check personnel present (where appropriate)	.....	.....
Evacuation completed	.....	.....
Exercise terminated	.....	.....

COMMENTS:

.....

.....

.....

.....

.....

.....

OBSERVER: .....

(CAPITALS)

SIGNED: .....

APPENDIX H

EXAMPLE OF A PHONE THREAT CHECKLIST

(Informative)

This Appendix provides an example of a typical phone threat and bomb threat checklist (see next page). It is reproduced from the Australian Bomb Data Centre Bomb Safety Awareness Kit, with the permission of the Australian Bomb Data centre.

PHONE THREAT CHECK LIST©

KEEP CALM

RECIPIENT

Name (print):
Telephone number:
Signature:

GENERAL QUESTIONS TO ASK:

1. What is it ?
2. When is the bomb going to explode ?
   OR
   When will the substance be released ?
3. Where did you put it ?
4. What does it look like ?
5. When did you put it there ?
6. How will the bomb explode ?
   OR
   How will the substance be released ?
7. Did you put it there ?
8. Why did you put it there ?

CHEMICAL / BIOLOGICAL THREAT QUESTIONS

1. What kind of substance is in it ?
2. How much of the substance is there ?
3. How will the substance be released ?
4. Is the substance a liquid, powder or gas ?

BOMB THREAT QUESTIONS

1. What type of bomb is it ?
2. What is in the bomb ?
3. What will make the bomb explode ?

EXACT WORDING OF THREAT:

CALLER'S VOICE

Accent (specify):
Any impediment (specify):
Voice (loud, soft, etc):
Speech (fast, slow, etc):
Diction (clear, muffled):
Manner (calm, emotional, etc):
Did you recognise the caller ?
If so who do you think it is ?
Was caller familiar with the area ?

THREAT LANGUAGE

Well spoken:
Incoherent:
Irrational:
Taped:
Message read by caller:
Abusive:
Other:

BACKGROUND NOISES

Street noises:
House noises:
Aircraft:
Voices:
Music:
Machinery:
Other:
Local Call:
STD Call:

NOTES:

OTHER

Sex of caller: Estimated age:

CALL TAKEN:

Date: Time:
Duration of call:
Number called:

ACTION (OBTAIN DETAILS FROM SUPERVISOR)

Report call immediately to:
Phone number:

AUSTRALIAN BOMB DATA CENTRE
GPO Box 401 CANBERRA ACT 2601
Telephone: 02 6287 0750 Facsimile: 02 6287 0770

BIBLIOGRAPHY

AS
1851 Maintenance of fire protection systems and equipment
4083 Planning for emergencies—Health care facilities

AMENDMENT CONTROL SHEET

AS 3745—2010

Amendment No. 1 (2014)

REVISED TEXT

SUMMARY: This Amendment applies to the Preface, Foreword, Clauses 1.3, 1.4.10A (new), 3.1, 3.4, 3.5.1, 3.5.5, 3.5.6, 3.5.7, 3.6, 3.7, 4.1, 4.2.1, 4.2.6.3, 4.2.9, 4.2.11, 5.7.3, 6.1, 6.4.2, 7.1, 7.2, 7.3, 7.4, 7.5, Section 8, Clause 8.1, Appendix E, and Figures 3.1, 3.2, E1, E2 and E3.

Published on 1 May 2014.

Amendment No. 2 (2018)

REVISED TEXT

SUMMARY: This Amendment applies to the Preface, Clauses 1.4.14A, 1.4.20A, 1.4.20B, 3.5.1, 3.5.2, 3.5.3, 3.5.5, 3.5.6, 4.2.5, 4.2.6.3, 5.7.2, 6.3.3, Appendix B, and Figure 3.1.

Published on 29 June 2018.

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15.4 CONSULTATION WITH NSW RURAL FIRE SERVICE

Chris Knight

From: Leanne Bell <Leanne.Bell@rfs.nsw.gov.au>
Sent: Wednesday, 25 March 2020 12:02 PM
To: Chris Knight
Cc: Leanne Bell
Subject: RE: Bushfire Management Plan- Rix's Creek Mine
Attachments: RCM-SSD6300_Bushfire Management Plan_V1.1_FINAL_to_RFS.pdf; Fact Sheet - Mining Industry - Bush Fire Management Plans.pdf

Hi Chris,
Please find attached the review of RCM Bush Fire Management Plan. I will put together an official response and recommendation document when I have access to the office from later next week. In the meantime, I have made notes and flags within the attached document. My main recommendation would be the inclusion of a detailed list of all assets as risk of bush/grass fire, a detailed list of treatments to those assets, the schedule of treatments for each assets and how the schedule of treatments when completed or not are to be recorded.

I hope that this information is useful and detailed enough that you can incorporate it into your plan to meet development requirements and to provide clarity to mitigate the risk of bush/grass fires on the site.

Regards,
Leanne

Leanne Bell | Operational Officer | Hunter Valley
NSW RURAL FIRE SERVICE

From: Chris Knight <cknight@bloomcoll.com.au>
Sent: Friday, 24 January 2020 1:33 PM
To: Leanne Bell <Leanne.Bell@rfs.nsw.gov.au>
Subject: RE: Bushfire Management Plan- Rix's Creek Mine

Hi Leanne,
Thank you for your recent email containing further information on the development of Bushfire Management Plans for the Hunter Valley. Please find attached updated bushfire management plan for Rix's Creek mine incorporating the information provided.
Sections updated from the draft version are noted in yellow highlight.

The updates include the following

- correction to the bushfire danger period for the Singleton' and Muswellbrook LGA's
- inclusion of information on the bushfire committee,
- inclusion of information on the RFS district and
- inclusion of information on the fire weather area.

There is no rush with any response to this plan. A copy will be placed on our website. Whenever you get a chance we would appreciate any feedback.

Best Regards

Chris Knight
Environment Manager
E: cknight@bloomcoll.com.au | T: 02 6578 8824 | M: 0403 058 777
W: www.bloomcoll.com.au
PO Box 4, East Maitland, NSW 2323
North: Bridgman Road, South: Rixs Creek Lane, Singleton, NSW 2330 Australia

From: Leanne Bell [mailto:Leanne.Bell@rfs.nsw.gov.au]
Sent: Monday, 13 January 2020 11:44 AM
To: Chris Knight <cknight@bloomcoll.com.au>
Cc: Paul Best <Paul.Best@rfs.nsw.gov.au>
Subject: FW: Bushfire Management Plan- Rix's Creek Mine

Hi Chris,

Thanks for a copy of your plan and map for your Bush Fire Management Plan. I have been on deployment since early October and have not seen my desk for some time. I'm not going to have the time to provide feedback on your plan in the near future. It would be beneficial to both organisations that in future, Bush Fire Management Plans are submitted prior to the 1st September, the beginning of Fire Season.

Attached is a fact sheet for the Mining Industry on Bush Fire Management Plans, please review and ensure that the correct details are included in your plan. The most common error in the plans are:

- Bush Fire Danger Period – for the Hunter Valley area (Singleton & Muswellbrook LGA's) this is 1st September to 31 March
- Bush Fire Management Committee name – Hunter Valley Bush Fire Management Committee
- Fire weather area – Greater Hunter
- NSW RFS district – Hunter Valley District
- Contact Phone number business hours – 6575 1200

If you make changes to your plan as a result of this fact sheet, please record them in the consultation section of your plan and then re-send to me for our records.

Thanks and regards
Leanne

Leanne Bell | Operational Officer | Hunter Valley
NSW RURAL FIRE SERVICE
2161 Putty Road Bulga NSW 2330 | PO Box 3111 Singleton NSW 2330
P 02 6575 1200 F 02 6575 1299 M 0428 343 402 E Leanne.Bell@rfs.nsw.gov.au
www.rfs.nsw.gov.au | www.facebook.com/nswrfs | www.twitter.com/nswrfs
PREPARE. ACT. SURVIVE.

From: Hunter Valley Team <HunterValleyTeam@rfs.nsw.gov.au>
Sent: Monday, 13 January 2020 10:57 AM
To: Paul Best <Paul.Best@rfs.nsw.gov.au>; Leanne Bell <Leanne.Bell@rfs.nsw.gov.au>
Subject: FW: Bushfire Management Plan- Rix's Creek Mine

From: Chris Knight <cknight@bloomcoll.com.au>
Sent: Monday, 13 January 2020 10:35 AM

To: Hunter Valley Team <HunterValleyTeam@rfs.nsw.gov.au>
Subject: Bushfire Management Plan- Rix's Creek Mine

Hi Paul,
I hope the New Year finds you well.

Thank you and your team for all of your fantastic work saving the many lives and properties over the last few months. I realise that you will have been far too busy to look at the Rix's Creek Bushfire Management Plan.

This email is just to check in so the Plan does not fall off my list. I look forward to hearing from you whenever you get a chance.

Thank you and your teams again for all your efforts with the recent bushfires.

Best Regards

THE Bloomfield GROUP
WE CARE. WE DELIVER.

Chris Knight
Environment Manager
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W: www.bloomcoll.com.au
PO Box 4, East Maitland, NSW 2323
North: Bridgman Road, South: Rixs Creek Lane, Singleton, NSW 2330 Australia

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From: Chris Knight
Sent: Wednesday, 30 October 2019 12:21 PM
To: 'huntervalley.team@rfs.nsw.gov.au' <huntervalley.team@rfs.nsw.gov.au>
Cc: Chris Quinn <cquinn@bloomcoll.com.au>; Geoff Moore <gmoore@bloomcoll.com.au>; Hannah Lumsden <hlumsden@bloomcoll.com.au>
Subject: Bushfire Management Plan- Rix's Creek Mine

Attn: Paul Best, Team Manager, Hunter Valley Team.

Dear Paul,

The Rix's Creek South Continuation Project was recently approved for a further 21 years. As part of this approval Rix's Creek Mine are required to prepare a Bushfire Management Plan for the development in consultation with RFS. In accordance with this condition, please find attached the Rix's Creek Mine Bushfire Management Plan for your review and comment.

If you have any questions or require any further information please do not hesitate to contact this office.

Best Regards,

THE Bloomfield GROUP
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Environment Manager
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