



Bushfire Assessment

**Light Horse Interchange
Business Hub, Eastern Creek
(SSD 9667)**

**Western Sydney Parklands
Trust**

28 March 2019

(Ref: 19014)

report by
david peterson

0455 024 480
david@petersonbushfire.com.au
po box 391 terrigal nsw 2260
petersonbushfire.com.au

FPA AUSTRALIA (NO.BPAD18882)
BPAD LEVEL 3 ACCREDITED PRACTITIONER
ABN 28 607 444 833

Contents

1 Introduction3

2 Bushfire hazard7

3 Bushfire protection measures.....11

4 Conclusion and recommendations.....15

References17

Appendix 1 - Photographs18

1 Introduction

Street address:	165 Wallgrove Road & 475 Ferrers Road	
Suburb:	Eastern Creek	Postcode: 2766
Lot/DP no:	Part Lot 10 DP 1061237 and Part Lot 5 DP 804051	
Council:	Blacktown City Council	

1.1 Background

The Western Sydney Parklands Trust commissioned Peterson Bushfire to prepare a Bushfire Assessment Report for the Light Horse Interchange Business Hub State Significant Development (SSD) at the above site. The subject lots are identified as 'bushfire prone land', therefore the Environmental Impact Statement (EIS) prepared for the SSD application must address any potential bushfire hazards that may be adjacent the proposed development.

This report presents the assessment and recommendations to ensure compliance with the relevant bushfire protection legislation for development proposals on bushfire prone land.

This bushfire assessment has been prepared by a consultant accredited by the Fire Protection Association of Australia's BPAD scheme (Accreditation No. BPD-L3-18882).

1.2 Location and land description

As shown in Figure 1, the site is located at Light Horse Interchange where the M7 and M4 Motorways intersect in Eastern Creek, Western Sydney. At 29.5 hectares in size, the site is situated between a large riparian corridor to the east and south (consisting of Eastern Creek, Reedy Creek and Eskdale Creek), the M7 Motorway corridor to the west, and the M4 Motorway corridor to the north. The riparian vegetation to the east and south supports the bushfire prone vegetation.

Part of the Western Sydney Parklands corridor, the site is largely cleared due to its previous use as Defence land. Horse and cattle agistment keep vegetation from regenerating outside of the riparian corridors. Few scattered trees are on the site with the only extensive vegetation being that associated with the riparian areas along both the eastern and southern boundaries of the site.

1.3 Development proposal

The SSD (9667) application seeks approval for a Concept Proposal for the future land use of general industrial, light industrial, and warehouse and distribution centres. Concurrently, approval is also sought for the Stage 1 development application which will facilitate the subdivision works and associated infrastructure works. Figure 2 is a concept masterplan showing the proposed lot layout and intended future use of the site.

1.4 Assessment requirements

This assessment has been prepared to inform the preparation of an EIS for the proposal. Secretary's Environmental Assessment Requirements (SEARs) have been issued under Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* and Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*, listing 'bushfire' as a Key Issue:

SEAR Application Number SSD 9667 (Issued 7 November 2018):

Key Issue: Bushfire – including an assessment against the requirements of Planning for Bushfire Protection 2006, particularly access and provision of water supply for fire-fighting purposes.

Development proposals on bushfire prone land are required to be assessed against the NSW Rural Fire Service (RFS) document *Planning for Bushfire Protection 2006* (NSWRFS 2006), referred to as 'PBP' within this report. As the proposal does not involve habitable dwellings (Class 1, 2 or 3) or Special Fire Protection Purpose (SFPP) development, the proposal is only required to comply with the aim and objectives of PBP.

As stated within Section 4.3.6.f of PBP, the National Construction Code (NCC) does not provide for any bushfire specific performance requirements for the development type proposed. As such the Asset Protection Zone and building construction requirements of PBP and AS 3959-2009 *Construction of buildings in bushfire-prone areas* (AS 3959) do not apply as deemed-to-satisfy provisions for bushfire protection. However, the aim and objectives of PBP still apply in relation to other matters such as access and the provision of water for fire-fighting.



Legend

 Site Boundary



Date: 28/03/2019

0 250 500 1,000
Metres

Figure 1: The Location of the Subject Land

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap



Legend

 Site Boundary



Date: 28/03/2019

0 100 200 400
Metres

Figure 2: Concept Masterplan

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

2 Bushfire hazard

In accordance with PBP, the bushfire hazard has been evaluated through an analysis of a combination of slope and vegetation, as discussed in this section. Site assessment occurred on 6th February 2018. Photographs are included in Appendix 1.

2.2 Predominant vegetation

Bushfire fuel is the vegetative material in the landscape that burns during a bushfire. Bushfire behaviour is influenced by fuel load, and the availability of the fuel which is mostly determined by the arrangement of the fuel and its moisture content. Fuel load and availability affects the intensity of a bushfire.

In accordance with PBP the predominant vegetation class has been determined for a distance of at least 140 m out from the boundary of the development site. Vegetation classification has been determined by inspection and analysis of vegetation mapping completed by Ecoplaning (2019).

The bushfire hazard is located along the adjacent riparian corridors to the east and south as shown on Figure 4. The vegetation has been predominantly mapped as Alluvial Woodland (Ecoplaning 2019), which is commonly called Cumberland River-flat Forest. The vegetation at this site can take on a variety of forms from grassy woodland, to forested wetland and dry sclerophyll forest (shrubby sub-formation) depending on location relative to the creek channels and active flood benches. Due to the predominantly shrubby understorey, the vegetation has been appropriately classified as 'forest'.

Significant bushfire hazards are not present within 140 m of the northern and western boundaries of the site. The motorway corridors form the boundaries in these directions, and the only vegetation consists of road-side plantings in narrow formation confined to verges along the various on and off ramps associated with Light Horse Interchange. The plantings act as screening and buffers between traffic and adjoining properties. They are not wide enough or have connectivity to sustain a fire that would threaten adjoining development.

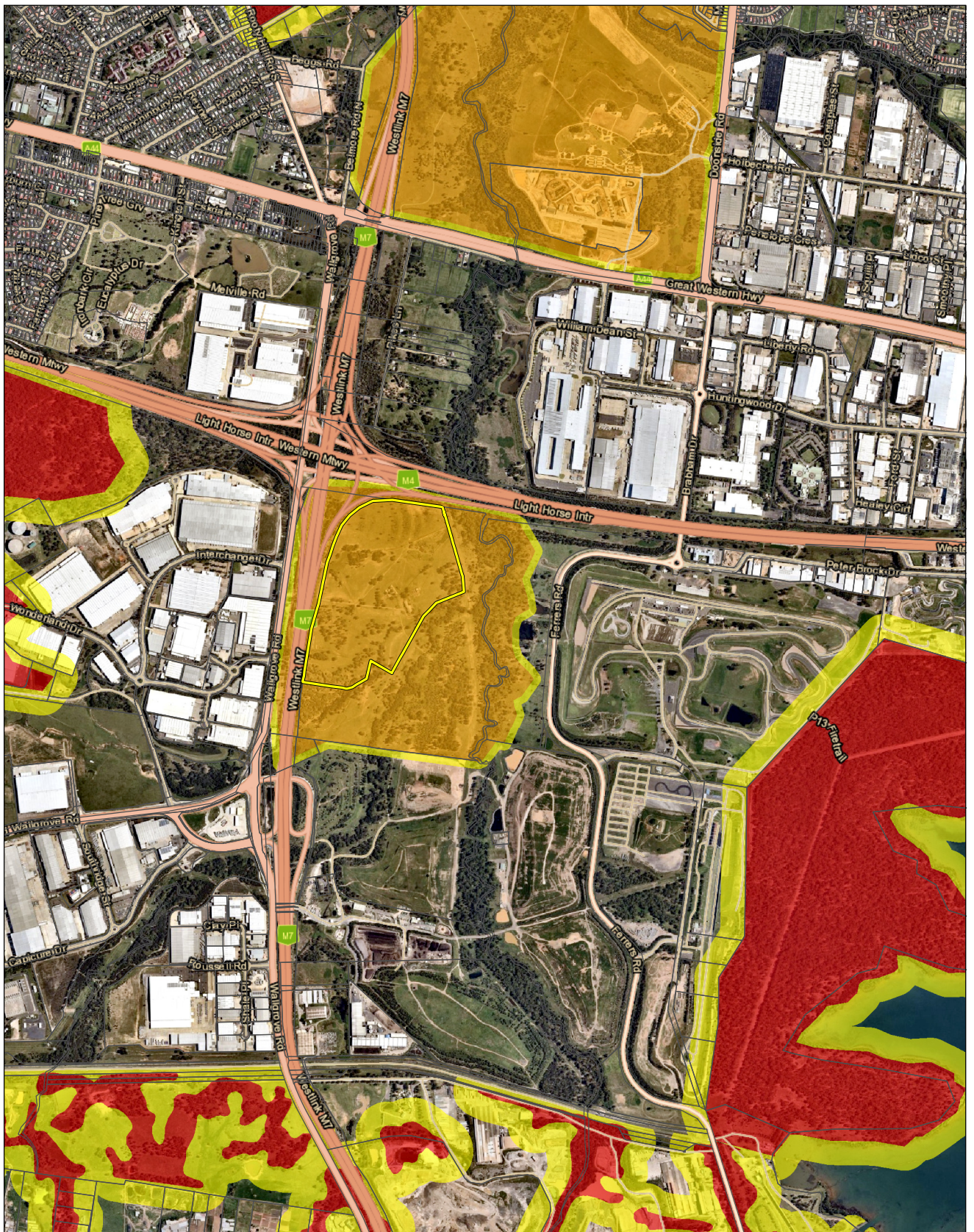
2.3 Effective slope

Steeper slopes can significantly increase the rate of spread of fires, and it has been shown that with each 10 degree increase or decrease in slope a corresponding doubling or halving, respectively, in the rate of spread can be expected (McArthur 1967). Slope is a major factor determining the direction and rate of fire spread.

The 'effective slope' influencing fire behaviour has been assessed in accordance with the methodology specified within PBP. This is conducted by measuring the slope that would most significantly influence fire behaviour where the hazard occurs within 100 m of the development site. The slope was determined using a 2 m contour layer as shown on Figure 4.

In accordance with PBP the effective slope underneath the riparian forest to the east and south is within the PBP slope class of 'downslope 0-5 degrees'. The gentle gradient underneath the

vegetation along the flood benches and channels equates to a lesser rate of fire spread influenced by topography. Variables such as fuel distribution, and wind direction and speed would therefore be the primary factors influencing rate of spread at this site.



Legend

	Site Boundary	Bush Fire Prone Land		Vegetation Category 3
	Cadastre			Vegetation Category 1
				Vegetation Category 2
				Vegetation Buffer



Date: 28/03/2019

0 250 500 1,000
Metres

Figure 3: Bushfire Prone Land

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap



Legend

Site Boundary

Contour - 2m

Cadastre

Defendable Space

Vegetation Communities (EcoPlanning 2018)

Alluvial Woodland, Good

Alluvial Woodland, Under-scrubbed

Alluvial Woodland, Revegetation

Shale Plains Woodland, Good

Shale Plains Woodland, Revegetation

Shale Plains Woodland, Under-scrubbed



Date: 28/03/2019

0 50 100 200
Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

Figure 4: Bushfire Hazard Analysis

3 Bushfire protection measures

PBP requires the assessment of a suite of bushfire protection measures that in total provide an adequate level of protection for development proposals on bushfire prone land. The measures required to be assessed for the development types proposed are listed in Table 1 below and are discussed in detail in the remainder of this section.

Table 1: PBP bushfire protection measures for developments other than dwellings and SFPP

Bushfire protection measures	Considerations
Defendable space	Providing fire-fighter access between buildings and the hazard.
Construction standards	Consideration of ember protection to new building works.
Access	Assessment to include access and egress for emergency response, perimeter access and design standards of internal roads.
Water supply and other utilities	List requirements for reticulated water supply and hydrant provisions, and any static water supplies for fire-fighting.

3.1 Defendable space

For habitable development types such as dwellings, the application of a bushfire hazard building setback (i.e. Asset Protection Zone) is related to the vulnerability of an asset typically in terms of combustibility of external materials or the nature of the occupants. The resulting Asset Protection Zone dimension would stipulate a building construction standard under Australian Standard AS 3959-2009 *Construction of buildings in bushfire-prone areas* (AS 3959).

As the proposal does not include a dwelling or habitable building, PBP does not prescribe an Asset Protection Zone dimension. The general fire safety requirements of the NCC are accepted as adequate bushfire protection for the development of building Class 5 to 8 which includes industrial facilities, warehouses and office space.

However, PBP does require the consideration of a managed hazard-separation area for fire-fighting purposes referred to as 'defendable space'. A defendable space is an area between the building and the bushfire hazard that provides an environment in which fire-fighters can undertake property protection after the passage of a bushfire with some level of safety. The defendable space dimension is defined by the ability to gain access around an asset and conduct defensive fire-fighting operations. Relying on a defendable space in lieu of an APZ is deemed acceptable whereby construction materials are typically non-combustible and meet NCC building and structural fire requirements.

The business hub will have a defendable space between future buildings and the hazard to the east and south. The defendable space will consist of the minimum 6 m wide fire access road that is required around the site boundary (refer to Figure 4). Although not required, the zone of defendable space increases beyond the minimum 6 m in areas where buildings will be setback

further from the boundary, such as at the southern end of the site and the north-eastern boundary where a detention basin is proposed. In addition, an internal access road will provide defensible space along the northern and western boundaries of the site to the motorway corridors.

The defensible space will allow continuous thoroughfare around the perimeter of the business hub ensuring fire-fighters can gain access to conduct property defence if required. The defensible space is also required to ensure fire-fighters can access all sides of the buildings for structural fire control. The design requirements for roads are specified in Section 3.4.

The defensible space will be clear of vegetation and will therefore satisfy the fuel management performance requirements of an Asset Protection Zone (APZ) as described by PBP. Additional vegetation management is not required.

3.2 Landscaping

Vegetation and landscaping across the Business Hub is to comply with the performance objectives of an Inner Protection Area (IPA) standard as described by PBP. The site will be cleared and subject to bulk earthworks resulting in the removal of all vegetation. Future vegetation will only consist of accent landscaping to internal roads, landscape treatment to the detention basin, and eventually within each individual lot. As such, the site will comply with IPA requirements.

3.3 Building construction

As introduced in Section 1.4 and 3.1, building construction provisions for bushfire protection within Australian Standard *AS 3959-2009 Construction of buildings in bushfire-prone areas* (AS 3959) do not apply to developments of the type proposed as a deemed-to-satisfy requirement under the NCC. Due to the type of development and compliance with NCC requirements for building and structural fire, it is generally accepted that buildings will survive bushfire attack. In addition, staff will not reside at the site and will be familiar with the access routes should an evacuation be necessary (refer to Section 3.4 for access requirements).

Consideration of building construction provisions should be made at the development application stage for each individual building based on the following parameters:

- Proximity of the building to the hazard (e.g. buildings greater than 100 m from the hazard do not require consideration);
- Vulnerable elements exposed to the hazard (e.g. pre-cast concrete walls on warehouses are not a concern as compared to large expanses of glazing facing the hazard); and
- The NCC general fire requirements do not incorporate building protection from ember attack, which may be a concern to particular building types or uses. Measures such as ember mesh screening to vents and weepholes and ember guards around vehicle access doors may be recommended for individual buildings.

The assessment of building construction is not a matter for consideration required at this stage in the planning process.

3.4 Access

The assessment of access is to consider the adequacy of public road access, property access roads and defensible space. The following information demonstrates that the proposed access design complies with PBP.

Adequacy of access and egress

The primary access will be a new public road provided from Ferrers Road to the east, that will culminate as a central access road within the site. An emergency access point will be provided to the west under the M7 corridor and linking to Wallgrove Road.

Internal access

The primary road that will access the proposed lots within the Business Hub will be constructed to meet or exceed a 'public road' standard as described by PBP (see Table 2). The access roads have been designed to cater for large truck movements and will therefore be suitable for fire and emergency authorities as well as evacuation if required. The roads will comply with the PBP design requirements as listed within Table 2.

Perimeter access

The eastern and southern sides of the site will have perimeter access within the defensible space described in Section 3.1. At a minimum, the access will be a 6 m wide fire access road designed suitable for the thoroughfare of Fire & Rescue NSW pumpers. The northern and western sides of the site will have perimeter access by way of a 6 m wide emergency access road.

3.5 Water supply and utilities

Water supply

The development will require fire hydrants to be installed to comply with *AS 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (AS 2419) so that all sides of a building envelope are within 70 m of a hydrant by lay of the hose (or 90 m with a tanker parked in-line maximum 20 m from the hydrant).

Electrical supply

Where overhead electrical transmission lines are installed, the vegetation clearance distances are to comply with *ISSC 3 Guideline for Managing Vegetation Near Power Lines* (Industry Safety Steering Committee 2005).

Gas supply

Any gas services are to be installed and maintained in accordance with *AS/NZS 1596-2008 The storage and handling of LP gas*.

Table 2: Design and construction for 'public roads'

Performance Criteria	Acceptable Solutions
<ul style="list-style-type: none"> • Firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources) 	<ul style="list-style-type: none"> • Public roads are two-wheel drive, all weather roads
<ul style="list-style-type: none"> • Public road widths and design that allows safe access for firefighters while residents are evacuating an area 	<ul style="list-style-type: none"> • Urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with PBP Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle), which is a minimum of 6.5 metre carriageway for two-way road with inside edge curve radius >100 and swept path 2.5 metres. • The perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas • Traffic management devices are constructed to facilitate access by emergency services vehicles • Public roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends 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 and direct traffic away from the hazard • Curves of roads (other than perimeter roads) are a minimum inner radius of six metres • 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 • There is a minimum vertical clearance to a height of four metres above the road at all times
<ul style="list-style-type: none"> • The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles 	<ul style="list-style-type: none"> • The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicated load rating
<ul style="list-style-type: none"> • Roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered 	<ul style="list-style-type: none"> • Public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression • Public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression
<ul style="list-style-type: none"> • There is clear access to reticulated water supply 	<ul style="list-style-type: none"> • Public roads up to 6.5 metres wide provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression • One way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression
<ul style="list-style-type: none"> • Parking does not obstruct the minimum paved width 	<ul style="list-style-type: none"> • Parking bays are a minimum of 2.6 metres wide from kerb to kerb edge to road pavement. No services or hydrants are located within the parking bays • Public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road

4 Conclusion and recommendations

4.1 Conclusion

The proposal consists of a Concept Proposal and Stage 1 DA for the Light Horse Interchange Business Hub located at Eastern Creek in Western Sydney. The proposal involves the master planning of future uses on bushfire prone land, such as warehouse and distribution centres and light industrial development, and subdivision and associated infrastructure works.

The proposal is a State Significant Development (SSD 9667) that will be located adjacent riparian forest situated along Eastern Creek and its tributaries. This Bushfire Assessment Report demonstrates that future industrial development and associated uses can occur at the site with compliant bushfire protection measures. The measures comprise of defensible space around buildings and adequate access and water supply for fire-fighters.

This assessment concludes that the Light Horse Interchange Business Hub can comply with the provisions of *Planning for Bushfire Protection 2006* by adopting the recommendations listed in Section 4.2 below. As such, this assessment demonstrates compliance with the Secretary's Environmental Assessment Requirements (SEARs) Key Issue: *Bushfire - including an assessment against the requirements of Planning for Bushfire Protection 2006, particularly access and provision of water supply for fire-fighting purposes.*

4.2 Recommendations

The recommendations made within this assessment are repeated below:

1. The business hub is to have a defensible space between future buildings and the hazard to the east and south. The defensible space is to consist of a minimum 6 m wide fire access road located between building envelopes and the boundary in the following manner:
 - a. Provides continuous thoroughfare for fire pumpers between the lots and site boundary.
 - b. The fire access roads are to be linked back to the internal access road. The fire access road along the eastern boundary is to link back to the internal spine road at the northern end, southern end, and mid-way between proposed Lots 6 and 7. The fire access road along the southern boundary is to be linked to the southern end of the internal spine road and the southern end of the western boundary emergency access road.
2. The defensible space is to be clear of vegetation.
3. Vegetation and landscaping across the Business Hub is to comply with the performance objectives of an Inner Protection Area (IPA) standard as described by PBP.
4. The primary access road is to satisfy the PBP design requirements for 'public roads'.

5. The development will require fire hydrants to be installed to comply with AS 2419.1 – *2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (AS 2419) so that all sides of a building envelope are within 70 m of a hydrant by lay of the hose (or 90 m with a tanker parked in-line maximum 20 m from the hydrant).
6. Where overhead electrical transmission lines are installed, the vegetation clearance distances are to comply with *ISSC 3 Guideline for Managing Vegetation Near Power Lines* (Industry Safety Steering Committee 2005).
7. Any gas services are to be installed and maintained in accordance with *AS/NZS 1596-2008 The storage and handling of LP gas*.



David Peterson



References

McArthur, A.G. 1967. *Fire behaviour in eucalypt forests*. Australian Forestry and Timber Bureau Leaflet, no. 100.

NSW Rural Fire Service (RFS). 2006. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners*. Australian Government Publishing Service, Canberra.

Standards Australia. 2005. *Fire hydrant installations - System design, installation and commissioning*, AS2419.1, Fourth edition 2005, Standards Australia International Ltd, Sydney.

Standards Australia. 2008. *The storage and handling of LP Gas*, AS/NZS 1596-2008, Fourth edition 2005, Standards Australia International Ltd, Sydney.

Standards Australia. 2009 (Amendment 3). *Construction of buildings in bushfire-prone areas*, AS 3959, Third edition 2009, Standards Australia International Ltd, Sydney.

Appendix 1 - Photographs



Photograph 1: Riparian forest located along the eastern boundary of the development site



Photograph 2: Riparian forest located along the southern boundary of the development site

