Northern Beaches Health Service Redevelopment
A new wave in healthcare

Northern Beaches Hospital

Stage 1: Concept Design, Site Clearance & Preparatory Works

Appendix E

Bushfire Constraints Assessment

BUSHFIRE CONSTRAINTS ADVICE

Proposed Northern Beaches Hospital
Corner of Frenchs Forest Road, Wakehurst Parkway and Warringah Road, Frenchs Forest

Prepared for
Johnstaff Projects Pty Ltd

28 February 2011

Bushfire Constraints Advice

Proposed Northern Beaches Hospital:

Corner of Frenchs Forest Road, Wakehurst Parkway and Warringah Road, Frenchs Forest

PREPARED FOR	**Johnstaff Projects Pty Ltd**
PROJECT NO	**11SGBBUS-0026**
DATE	**February 2011**

DOCUMENT TRACKING

ITEM	DETAIL
Project Name	Bushfire Constraints Advice, Proposed Northern Beaches Hospital, Corner of Frenchs Forest Road, Wakehurst Parkway and Warringah Road, Frenchs Forest
Project Number	11SGBBUS-00026
File location	T:\Projects\11SGBBUS\11SGBBUS-0026 Frenchs Forest, Bantry Bay Rd\Report\Final Reports\11SGBBUS-0026 Bushfire Constraints Advice Northern Beaches Hospital (after DP).doc
Prepared by	Susan Courtney
Reviewed by	David Peterson
Approved by	 David Peterson
Status	Final
Version Number	1
Last saved on	28 February 2011

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd.

Contents

List of Figures

List of Tables

1 Property and proposal

Name:	Johnstaff Projects Pty Ltd		
Postal address:	Level 8, 16 O'Connell Street, Sydney NSW 2000		
Street or property Name:	Corner of Frenchs Forest Road East, Wakehurst Parkway and Warringah Road		
Suburb, town or locality:	Frenchs Forest	**Postcode:**	2086
Lot/DP no:	Lots 12-15 DP 792918 and Lots 1-11 DP 26087		
Local Government Area:	Warringah Council		
Type of area:	Urban		
Type of development:	Special Fire Protection Purpose development – Master Planning stage		

1.1 DESCRIPTION OF PROPOSAL

Johnstaff Pty Ltd commissioned Eco Logical Australia Pty Ltd (ELA) to prepare bushfire constraints advice for the future development of the Northern Beaches Hospital, on the corner of Frenchs Forest Road, the Wakehurst Parkway and Warringah Road – Lots 12-15 DP 792918 and Lots 1-11 DP 26087 (hereafter referred to as the subject land).

The following bushfire constraints advice has been prepared by Senior Bushfire Planner, Susan Courtney and GIS Officer, Steve Edwards, from desktop information including the 'Northern Beaches – Feasibility Study Presentation' (MAAP 2010), aerial photography and other GIS data.

1.2 LOCATION AND DESCRIPTION OF SUBJECT LAND

The proposed Northern Beaches Hospital development site is located approximately 13 km from the Sydney CBD in the Warringah Council suburb of Frenchs Forest as shown in Figure 1. The proposed Hospital site is bounded by The Forest High School to the west, Frenchs Forest Road West to the north, Wakehurst Parkway to the east and Warringah Road to the south as shown in Figure 2.

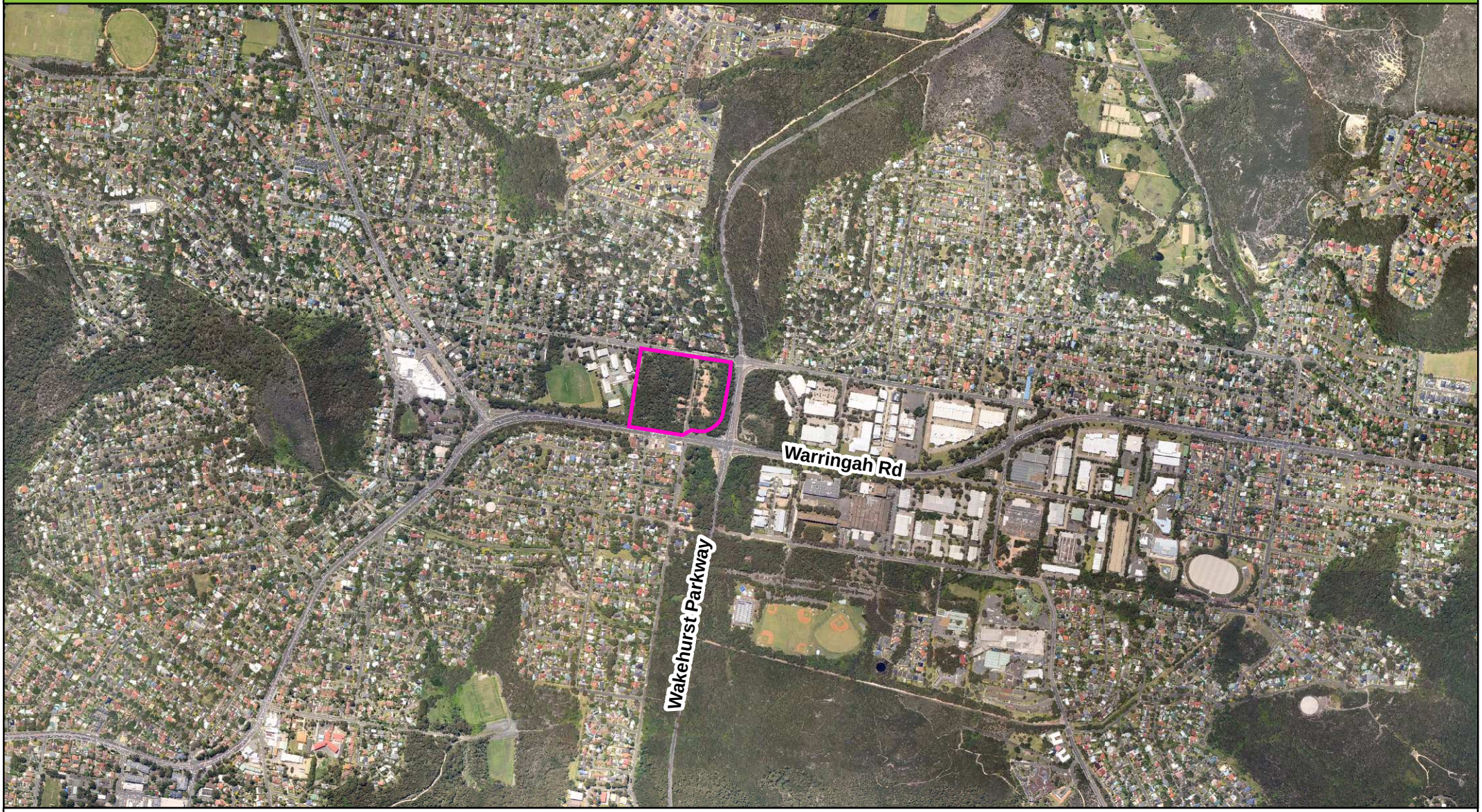
Figure 2 also shows bush fire prone vegetation within the proposed Hospital site, to the north-west beyond Frenchs Forest Road East, to the east within the proposed French Forest Town Centre development and to the south and south-east beyond Warringah Road.

1.3 STUDY OBJECTIVES

The client has requested that this bushfire constraints analysis address the following objectives to guide the future development of the Northern Beaches Hospital:

1. The Northern Beaches Hospital site is mapped as Bush Fire Prone Land (BFPL) as per the 2010 Warringah Bush Fire Prone Land Map. How does this BFPL mapping affect the proposed Hospital development?
2. What are the responsibilities of the owner of the proposed Hospital site as a responsible land owner in relation to bushfire and what specific actions does this mandate?
3. Provide any other information necessary in relation to the bushfire protection requirements for the proposed Hospital development.

Figure 1: Aerial photograph showing location of subject land



Hospital site

0 0.125 0.25 0.5
Kilometres

Datum/Projection:
GDA 1994 MGA Zone 56

Data Sources:
PhotoMap by nearmap.com

N

www.ecoaus.com.au

Client: Johnstaff Projects Pty Ltd
Project Number: 11SGBBUS-0026
Prepared by: SE
Approved by: SC
Status: Draft
Date: 28/02/11

Figure 2: Aerial photograph showing subject land and surrounding vegetation

Hospital site

0 50 100 200
Metres

Datum/Projection:
GDA 1994 MGA Zone 56

Data Sources:
PhotoMap by nearmap.com

N

www.ecoaus.com.au

Client: Johnstaff Projects Pty Ltd
Project Number: 11SGBBUS-0026
Prepared by: SE
Approved by: SC
Status: Draft
Date: 28/02/11

Figure 3: APZs and Bushfire Attack Levels for proposed Northern Beaches Hospital site

Hospital site

APZ

BAL 12.5

0 25 50 100

Metres

Datum/Projection:
GDA 1994 MGA Zone 56

Data Sources:
PhotoMap by nearmap.com

N

www.ecoaus.com.au

Client: Johnstaff Projects Pty Ltd

Project Number: 11SGBBUS-0026

Prepared by: SE

Approved by: SC

Status: Draft

Date: 28/02/11

2 Legislative Requirements

The subject land is identified as Bush Fire Prone Land by Warringah Council (Warringah Council 2010). Bush Fire Prone Land mapping must be undertaken at least every 5 years by each Local Authority (Local Council) and each BFPL Map is ratified by the Commissioner of the NSW Rural Fire Service.

Bush Fire Prone Land Maps provide the trigger for the various development assessment provisions. In the case of Part 3A Major Project applications under the *Environmental Planning and Assessment Act 1979* (EP&A Act), the Director-General of the NSW Department of Planning requires consideration of the requirements of PBP Section 74F (4) of the EP&A Act:

> *In preparing the environmental assessment requirements, the Director-General is to consult relevant public authorities and have regard to the need for the requirements to assess any key issues raised by those public authorities.*

The following requirements of the NSW Director-General are those normally requested by the RFS for development being assessed as a Part 3A Major Project:

> *The NSW Rural Fire Service advises that the site has been mapped as bush fire prone. Therefore, the following key issues and assessment requirements regarding bush fire protection shall be included in the Director-Generals environmental assessment requirements:*
>
> 1. *The development shall consider the aims and objectives of 'Planning for Bush Fire Protection 2006' in relation to matters such as:*
>
>   a. *Public access roads – both internal and external to the site;*
>   b. *Water supplies and other services;*
>   c. *Evacuation and emergency management/planning; and*
>   d. *Asset Protection Zones and areas of defendable space*
>   e. *Vegetation management and landscaping.*

The following constraints advice has been developed with the above DGR in mind and has been prepared in accordance with Section 100B of the *Rural Fires Act 1997*, Clause 44 of the *Rural Fires Regulation 2008*, and 'Planning for Bushfire Protection 2006' (RFS 2006) herein referred to as PBP.

2.1 GENERAL COMMENT ON SFPP DEVELOPMENT

PBP outlines the specific objectives that must be achieved for both residential development and Special Fire Protection Purpose (SFPP) development. Development is considered SFPP where the development includes one of the following:

- *a school;*

- *a child care centre;*
- *a hospital (including a hospital for the mentally ill or mentally disordered);*
- *a hotel, motel or other tourist accommodation;*
- *a building wholly or principally used as a home or other establishment for mentally incapacitated persons;*
- *housing for older people or people with disabilities within the meaning of State Environmental Planning Policy No 5— housing for Older People or People with a Disability (now SEPP (Seniors Living));*
- *a group home within the meaning of State Environmental Planning Policy No 9— Group Homes;*
- *a retirement village; or*
- *any other purpose prescribed by the regulations.*

The proposed Northern Beaches Hospital is classified as a SFPP development by PBP. The nature of SFPPs is such that the occupants may be more vulnerable to bushfire attack for a variety of reasons including a reduced capacity to evaluate risk and to respond to the bush fire threat, and the fact that the logistical arrangements for the numbers of occupants may be complicated.

In particular, hospitals have the potential to accommodate many infirm patients and a considerable number of visitors at any time and these occupants are likely to require assistance with evacuation during a bushfire event. Consequently, SFPPs need to meet a more stringent set of bushfire protection requirements than residential development.

2.2 DESKTOP ASSESSMENT ASSUMPTIONS

A number of assumptions been made to provide this desktop analysis of the proposed Northern Beaches Hospital which will need to be verified by a site inspection prior to the preparation of a full Bushfire Protection Assessment for the proposed Hospital. These assumptions are:

(i) all of the vegetation within the proposed Hospital site will be removed or managed such that it does not constitute bush fire prone vegetation; and

(ii) all of the vegetation within the proposed Town Centre to the east of the Hospital site will be removed or managed such that it does not constitute bush fire prone vegetation; and

(iii) The band of vegetation running from west to east along the southern boundary of The Forest High School to the west of the Hospital site is managed and does not constitute bush fire prone vegetation; and

(iv) The band of vegetation running south to north on the western side of Wakehurst Parkway to the north of the Hospital site is managed and does not constitute bush fire prone vegetation; and

(v) The predominant vegetation within 140 m of the proposed Hospital site is a combination of wet and dry sclerophyll forest.

3 Site Data

3.1 VEGETATION TYPES AND SLOPES

The vegetation and slope have been assessed in all directions adjacent the subject land. In accord with PBP the predominant vegetation class has been calculated for a distance of at least 140 m out from the boundary of the subject land, and the slope class 'most significantly affecting fire behaviour having regard for vegetation found [on it]' determined for a distance of at least 100 m in all directions.

There are areas of bush fire prone vegetation to the north-east of the site on the north-eastern corner of Wakehurst Parkway and Frenchs Forest Road East. There are also areas of bush fire prone vegetation to the south and south-east of the Hospital site on the south-western and south-eastern corners respectively of the intersection of Wakehurst Parkway and Warringah Road as shown in Figure 2. The predominant vegetation within each of these 3 areas consists of a combination of wet and dry sclerophyll forest. This vegetation is classified as 'forest' by PBP.

The effective slope under the forest to the north-west of the Hospital site is downslope in the PBP slope category 'downslope >10-15 degrees' while the slopes under the forest to the south and south-east both fall within the PBP slope category 'downslope >0-5 degrees'.

In all other directions, there are/ will be managed lands as follows:

(i) to the west – the managed grounds of The Forest High School;

(ii) to the north and south – existing residential development; and

(iii) to the east – existing/future commercial development within the proposed Town Centre.

4 Asset Protection Zones (APZs)

The intent of Asset Protection Zones (APZs) is to provide sufficient space and maintain reduced fuel loads, to ensure radiant heat levels at building are below critical limits and to prevent direct flame contact with a building. In relation to SFPP development such as the proposed Northern Beaches Hospital, APZs must also provide sufficient space for firefighters and other emergency services personnel, ensuring radiant heat levels permit operations under critical conditions of radiant heat, smoke and embers, while supporting or evacuating occupants.

Figure 3 shows the minimum Asset Protection Zones that will be required for the proposed Northern Beaches Hospital adjacent surrounding bush fire prone land. The subject land is capable of accommodating the required APZs as outlined in Table 1 below.

Table 1: Threat assessment, APZ and category of bushfire attack

Direction	Slope[1]	Vegetation[2]	PBP required APZ[3]	Comment
North-west	>0-5° downslope	Forest	70 m	Up to 55 m of the APZ is located within the Hospital site with the remaining 45 m located within the adjoining road reserves of the Wakehurst Parkway and Frenchs Forest Road
South and south-east	>10°-15° downslope	Forest	100 m	Approximately 30 m of the APZ is located within the Hospital site with the remaining 40 m located within Warringah Road reserve
All other directions	Managed lands			

[1] Slope most significantly influencing the fire behaviour of the site having regard to vegetation found. Slope classes are according to PBP.

[2] Predominant vegetation is identified, according to PBP and *"Where a mix of vegetation types exist the type providing the greater hazard is said to be predominate".*

[3] Assessment according to PBP for SFPP development.

The minimum APZ for SFPP development is greater than that required for residential development. This reflects the need for assisted evacuation of SFPP development such as hospitals and the requirement to keep radiant heat, ember and smoke levels down around these developments to a level where staff, occupants and emergency services workers can still safely move around outdoors.

5 Construction standard

The category of bushfire attack and required Bushfire Attack Level for buildings within the Hospital site as per Australian Standard AS 3959-2009 'Construction of buildings in bushfire-prone areas' for future buildings is shown in Figure 4. There is only a small portion of the southern side of the proposed Hospital site where buildings will require construction to Bushfire Attack Level BAL-12.5

BAL-12.5 is primarily concerned with protection from ember attack and radiant heat up to and including 12.5 kW/m^2 where the site is less than 100 m from the source of bushfire attack. BAL-12.5 predominantly consists of ember protection measures and will need to be applied to any Northern Beaches Hospital buildings either partially or wholly contained within the blue hatched area shown in Figure 4.

Furthermore, the provisions of Section 3 'Construction General' of AS3959-2009 and the ember protection provisions outlined on Page 10 of the 2010 Appendix 3 Addendum to PBP are also required for the proposed Hospital buildings where applicable.

6 Water supply

The subject land will be serviced by reticulated water. The furthest point from any future buildings to a hydrant is to be less than 70 m. The reticulated water supply is to comply with the following acceptable solutions within Section 4.1.3 of PBP:

- Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads;
- Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005 'Fire hydrant installations – System design, installation and commissioning' (Standards Australia 2005). Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles;
- Hydrants are not located within any road carriageway;
- All above ground water and gas service pipes external to the building are metal, including and up to any taps; and
- The [PBP] provisions of parking on public roads are met.

7 Gas and electrical supplies

In accordance with PBP, electricity should be underground wherever practicable. Where overhead electrical transmission lines are installed:

- lines are to be installed with short pole spacing, unless crossing gullies, and
- no part of a tree should be closer to a powerline than the distance specified in "Vegetation Safety Clearances" issued by Energy Australia (NS179 April 2010).

Any gas services are to be installed and maintained in accordance with AS/NZS 1596:2008 (Standards Australia 2008).

8 Access

8.1 CAPABILITY OF PUBLIC ROADS

In the event of a bush fire emergency the public roads servicing the subject land (Frenchs Forest Road, Wakehurst Parkway and Warringah Road) are to have the capacity to handle the increased volume of traffic associated with the future Hospital development of the subject land. Future public roads within the proposed Hospital development will need to comply with the PBP design specifications shown in Table 2.

8.2 PROPERTY ACCESS ROADS

Provided that the proposed Hospital development of the subject land is serviced by reticulated water as outlined in Section 5, and the speed limit within the development and surrounding public roads is less than 70 kph, there will be no specific bushfire requirements for property access roads (as per Table 3).

However, it is important to ensure that there is adequate access/egress to and from the proposed Hospital such that occupants can evacuate in a direction(s) away from the adjacent bushfire hazards located to the north-west, south and south-east.

8.3 PERIMETER ROADS

Perimeter roads are already in place around the proposed Hospital site and Frenchs Forest Road, Wakehurst Parkway and Warringah Road provide separation from surrounding bushfire hazards.

Table 2: Performance criteria for proposed public roads*[1]

Performance Criteria	Acceptable Solutions
The intent may be achieved where:	
▪ firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)	▪ public roads are two-wheel drive, all weather roads
▪ public road widths and design that allows safe access for firefighters while residents are evacuating an area	▪ 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 Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle) ▪ 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 have a cross fall not exceeding 3 degrees ▪ 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
▪ the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles	▪ 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
▪ roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered	▪ 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
▪ there is clear access to reticulated water supply	▪ 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
▪ parking does not obstruct the minimum paved width	▪ 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

*[1] PBP page 21

Table 3: Performance criteria for proposed internal roads for SFPP development*[2]

Performance Criteria	Acceptable Solutions
The intent may be achieved where:	
▪ internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle	▪ internal roads are two-wheel drive, sealed, all-weather roads; ▪ internal perimeter roads are provided with at least two traffic land widths (carriageway 8 metres minimum kerb to kerb) and shoulders on each side, allowing traffic to pass in opposite directions; ▪ roads are through roads. Dead end roads are not more than 100 metres in length from a through road, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end; ▪ traffic management devices are constructed to facilitate access by emergency services vehicles; ▪ a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches, is provided; ▪ curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress; ▪ the minimum distance between inner and outer curves is six metres; ▪ maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees; ▪ crossfall of the pavement is not more than 10 degrees; ▪ roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge); ▪ roads are clearly sign-posted and bridges clearly indicate load ratings ▪ the internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).

*[2] PBP page 35

9 Emergency Management

9.1 EVACUATION AND EMERGENCY PROCEDURES

The nature of SFPP development means that occupants may be potentially more vulnerable to bushfire attack. In the case of the proposed Hospital, patients and carers who visit and/or stay at the facility will potentially have a poor understanding of bushfire and may have impaired mobility.

Therefore, SFPP development requires an evacuation/emergency plan to be prepared consistent with the RFS Guidelines for the 'A Guide to Develop a Bushfire Evacuation Plan' (RFS 2004). The plan should be prepared to as soon as practicable and updated with specific management details prior to occupation of the Northern Beaches Hospital. The evacuation/emergency plan should include the following:

- An evacuation plan;
- A bushfire response plan; and
- Annual audit procedures.

9.2 ANNUAL AUDIT PROCEDURES

The bushfire protection measures recommended by this report achieve the protection levels required by PBP 2006 and AS 3959-2009. Maintenance of these protection measures is critical to their longer term effectiveness.

Heavily weathered or damaged building materials may increase a building's vulnerability to bushfire attack to an extent where it no longer complies with the original BAL construction standard. The gutters and other areas of leaf litter and other debris accumulation on and against buildings also require regular cleaning.

Similarly, APZ must be maintained to ensure the fuel loads, vegetation structure, along with the size and juxtaposition of the APZ, is compliant with that approved at the time of construction. As vegetation grows back after initial removal, and leaf litter and other debris is continuously accumulating, the APZ must be regularly maintained.

The frequency of maintenance is dependent upon the fuel type and the seasonal growing conditions. Moister warmer years and seasons result in faster accumulation of finer fuels and very hot, windy or drought periods, result in heavier litter fall.

Annual auditing of the APZ, building maintenance and firefighting equipment is therefore required. This should be undertaken by a BPAD qualified bushfire consultant prior to August each year. Any work required by the audit should be completed prior to September each year.

10 Conclusion

Based on this initial bushfire constraints assessment, the subject land is capable of accommodating the proposed Northern Beaches Hospital provided that the development is designed with consideration of APZs along those boundaries within 100 m of bushland, Bushfire Attack Levels for construction of the hospital buildings where required, appropriate road design, installation of water and other services and effective emergency management planning.

Susan Courtney
Senior Bushfire Planner

11 References

Energy Australia. 2010. *Network Standard NS 179 (Vegetation Safety Clearances),* Sydney.

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

NSW Rural Fire Service (RFS). 2006. *Building in Bush Fire Prone Areas: Guidelines for Subdivision Applications.* Australian Government Publishing Service, Canberra.

Standards Australia. 2000. *Construction of buildings in bushfire-prone areas*, AS 3959, Second edition 1999 and Amendment 1, 2000, Standards Australia International Ltd, Sydney

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. *Construction of buildings in bushfire-prone areas*. Standards Australia International Ltd, Sydney.

HEAD OFFICE
Suite 4, Level 1
2-4 Merton Street
Sutherland NSW 2232
T 02 8536 8600
F 02 9542 5622

SYDNEY
Level 6
299 Sussex Street
Sydney NSW 2000
T 02 9993 0566
F 02 9993 0573

ST GEORGES BASIN
8/128 Island Point Road
St Georges Basin NSW 2540
T 02 4443 5555
F 02 4443 6655

CANBERRA
Level 2
11 London Circuit
Canberra ACT 2601
T 02 6103 0145
F 02 6103 0148

GOSFORD
Suite 5, Baker One
1-5 Baker Street
Gosford NSW 2250
T 02 4302 1220
F 02 4322 2897

HUNTER
Suite 17, Level 4
19 Bolton Street
Newcastle NSW 2300
T 02 4910 0125
F 02 4910 0126

NAROOMA
5/20 Canty Street
Narooma NSW 2546
T 02 4476 1151
F 02 4476 1161

COFFS HARBOUR
35 Orlando Street
Coffs Harbour Jetty NSW 2450
T 02 6651 5484
F 02 6651 6890

ARMIDALE
92 Taylor Street
Armidale NSW 2350
T 02 8081 2681
F 02 6772 1279

WESTERN AUSTRALIA
Suite 3,
29 Ord Street
West Perth WA 6005
T 08 9227 1070
F 08 9324 3538

WOLLONGONG
Level 2
25 Atchison Street
Wollongong NSW 2500
T 02 8536 8615
F 02 4254 6699