BUSHFIRE PROTECTION ASSESSMENT

FOR THE

SYDNEY ADVENTIST HOSPITAL MASTERPLAN, WAHROONGA.

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SYDNEY ADVENTIST HOSPITAL MASTERPLAN, WAHROONGA.

Assessment Number	Document	Preparation Date	Issue Date	Directors Approval
B09974 - 4	Final	30.6.2010	7.7.2010	*G.L.Swain*

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EXECUTIVE SUMMARY

Australian Bushfire Protection Planners Pty Limited, at the request of the *Sydney Adventist Hospital Ltd*, has undertaken the bushfire consultancy to inform the Development Application, under Part 3A [State Environmental Planning Policy – Major Projects SEPP] of the *Environmental Planning & Assessment Act 1979,* on the bushfire protection measures required for Staging Plan of the proposed upgrade and extensions to the Sydney Adventist Hospital within Lot 621 in DP 1128314, Fox Valley Road, Wahroonga.

The Staging Plan prepared by Morris Bray Architects provides for upgrade and extensions to be undertaken over three stages.

Stage 1A development consists of the following works:

- An expansion of the Clinical Services Building;
- A new multi storey Carpark structure to the north of the existing and proposed Clinical Services Building;
- A new 'on-ground' Carpark to the north of the multi-storey Carpark building;
- A temporary 'on-ground' Carpark for 258 cars on the existing 'paddock' to the northeast of the Hospital Precinct;
- New on-ground' Carparks to the west and southwest of the existing Beattie Building; and
- New whole of site static fire fighting water supply tanks and Oxygen Tank.

Stage 1B development consists of the following works:

- Construction of the Clinical Service Building expansion.

Stage 2 development consists of the following works:

- A new Concourse Building located between the existing San Clinic Building and the Clinical Services Building [CSB];
- A new arrival podium to the north of the existing SAN Clinic, existing Clinical Services Buildings and the extension to the CSB undertaken as part of the Stage 1 development;
- A new entry road from Fox Valley Road; and
- Construction of the Facility of Nursing.

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Stage 3 development consists of the following works:

- Relocation of the Museum;
- Construction of the Shannon Ward Building; and
- Construction of the multi-storey Shannon Carpark building.

The Hospital Precinct is zoned SP1 – Special Activities with the Coups Creek corridor and tributary zoned E2 – Environmental Protection.

The vegetation within the Hospital Precinct consists of managed landscaped gardens/open mown lawns adjoining the existing facilities and within the cleared areas with Open Forest on the E2 zoned land in the Coups Creek and Lane Cove River corridors and the Coups Creek tributary which runs parallel to The Comenarra Parkway.

The Coups Creek corridor and the gully system adjacent to The Comenarra Parkway, to the southwest of the Hospital Precinct contain steep land that forms the riparian corridors to the streams. The topography of the land within the Hospital Precinct forms gently sloping land which slopes from Fox Valley Road towards Coups Creek.

Existing residential development forms the adjoining landuse to the south of the Hospital Precinct, beyond The Comenarra Parkway and to the east of Fox Valley Road. The existing Seventh Day Adventist Church and Community Centre and open parking area adjoin the precinct to the east whilst Coups Creek and the existing Retirement Village occupy the land to the north of the Hospital Precinct.

The unmanaged forest vegetation within the Coups Creek corridor and the vegetation to the east of Fox Valley Road have been mapped by Ku-ring-gai Council, in accordance with Section 146 of the *Environmental Planning & Assessment Act 1979,* as Category 1 Bushfire Prone Vegetation with the 100 metre wide buffer zone to this vegetation extending across much of the Hospital Precinct.

The Director Generals Environmental Assessment Requirements for the Part 3A Concept Plan Application for the redevelopment of the entire Wahroonga Estate included, under Key Assessment Requirements, subheading 7 – Bushfire, the following requirements:

- Demonstrate compliance with *Planning for Bushfire Protection 2006,* with particular regard to ensuring Special Fire Protection purpose developments are located away from the bushland interface; and
- Identify vegetation types, ownership and ongoing management of any proposed Asset Protection Zone.

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The DGRs also required that an appropriate and justified level of consultation should be undertaken with the NSW Rural Fire Service during the preparation of the environmental assessment for the Concept Plan, having regard to any previous consultation. This requirement was addressed with the NSW Rural Fire Service and an initial meeting took place on the 4th July 2008, with an onsite inspection and meeting held on the 16th July 2008.

A further meeting was held at the NSW Rural Fire Service Headquarters on the 23rd September 2008 to discuss the Staging Plan proposal for the redevelopment of the Hospital Precinct and the Revised Concept Plan for the redevelopment of the whole of the Estate.

Agreement was reached with the NSW Rural Fire Service that the development within the Hospital Precinct could be identified as 'core' and 'non-core' hospital use with the core use being identified as Patient Wards, Operating Theatres and areas of Patient Care, Non-core use was identified as Offices, Doctors Consulting Rooms and other non-patient care areas.

The significance of this separation of use is that the 'core' hospital use is to be assessed under the provisions of *Special Fire Purpose Development* as defined by *Planning for Bushfire Protection 2006* and all other uses on the site can be assessed using the requirements of the specific landuse classification as defined by the Building Code of Australia and are to address the specific requirements of this classification as defined by *Planning for Bushfire Protection 2006.*

These design changes, including the fact that the new entry to the Hospital faces the Coups Creek corridor and therefore the bushfire threat were discussed with the NSW Rural Fire Service during a meeting held on the 11th March 2009 and again on the 1st April 2009. The Rural Fire Service accepted the location of the new entry provided that emergency exits were available which discharged into the forecourt to the existing Tower Building. The Staging Plan design satisfies this requirement.

The Director Generals Requirements [DGRs] for the Sydney Adventist Hospital – Staged Alterations & Additions [MP 10_0070] issued on the 10th June 2010 require, under Item 14 'Bushfire' of 'Key Issues', that the Staging Plan demonstrate compliance with the relevant provisions of *Planning for Bushfire Protection 2006.* The DGRs also require that an appropriate and justified level of consultation in accordance with the Departments Major Project Community Consultation Guidelines October 2007.

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To address this requirement a meeting was held with the NSW Rural Fire Service on the 11th June 2010 to review the Staging Plan documents for the expansion of the Hospital Precinct. This meeting concluded that the proposed multi level carpark building is a non-core hospital use and also a Class 7 Building as defined by the Building Code of Australia and can be located as shown, intruding into the flame zone setback provided that the building is fitted with a shielding device and mesh which reduces the radiant heat levels and the entry of embers inside the building.

The meeting also confirmed that the Stage 1B Clinical Services Building shall not encroach into the 100 metre wide Asset Protection Zone setback and that the location of the Facility of Nursing is acceptable with the outer part of the Asset Protection Zone occupying the existing managed land to the west of the last dwelling on The Comenarra Parkway.

This report undertakes an assessment to review compliance with the Director General's Requirements [DGRs] issued for the Estate Concept Plan and for the Staged Alterations & Additions and determines the deemed-to-satisfy bushfire protection requirements for the Stage 1A, 1B, Stage 2 and Stage 3 redevelopment of the Hospital Precinct, in accordance with the provisions of *Planning for Bushfire Protection 2006,* and provides recommendations on the provision of Asset Protection Zones to the buildings; emergency access/egress; fire-fighting access and water supplies; construction standards of the buildings, the management of the Asset Protection Zones/residual vegetation and evacuation protocols necessary to address the bushfire risk to the future occupants of the Hospital and to address the aim and objectives of *Planning for Bushfire Protection 2006* and the advice provided by the NSW Rural Fire Service.

Graham Swain,
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Australian Bushfire Protection Planners Pty Limited.

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SECTION 1

INTRODUCTION

1.1 Development Proposal.

The *Sydney Adventist Hospital Ltd* proposes to submit to the Department of Planning [DoP] a Part 3A Development Application for the Staging Plan of the proposed upgrade and extensions to the Sydney Adventist Hospital within Lot 621 in DP 1128314, Fox Valley Road, Wahroonga.

The Architectural Drawings prepared by Morris Bray Architects provides for the upgrade and extensions to be undertaken over three stages.

Stage 1A development consists of the following works:

- An expansion of the Clinical Services Building;
- A new multi storey Carpark structure to the north of the existing and proposed Clinical Services Building;
- A new 'on-ground' Carpark to the north of the multi-storey Carpark building;
- A temporary 'on-ground' Carpark for 258 cars on the existing 'paddock' to the northeast of the Hospital Precinct;
- New on-ground' Carparks to the west and southwest of the existing Beattie Building; and
- New whole of site static fire fighting water supply tanks and Oxygen Tank.

Stage 1B development consists of the following works:

- Construction of the Clinical Service Building expansion.

Stage 2 development consists of the following works:

- A new Concourse Building located between the existing San Clinic Building and the Clinical Services Building [CSB];
- A new arrival podium to the north of the existing SAN Clinic, existing Clinical Services Buildings and the extension to the CSB undertaken as part of the Stage 1 development;
- A new entry road from Fox Valley Road; and
- Construction of the Facility of Nursing.

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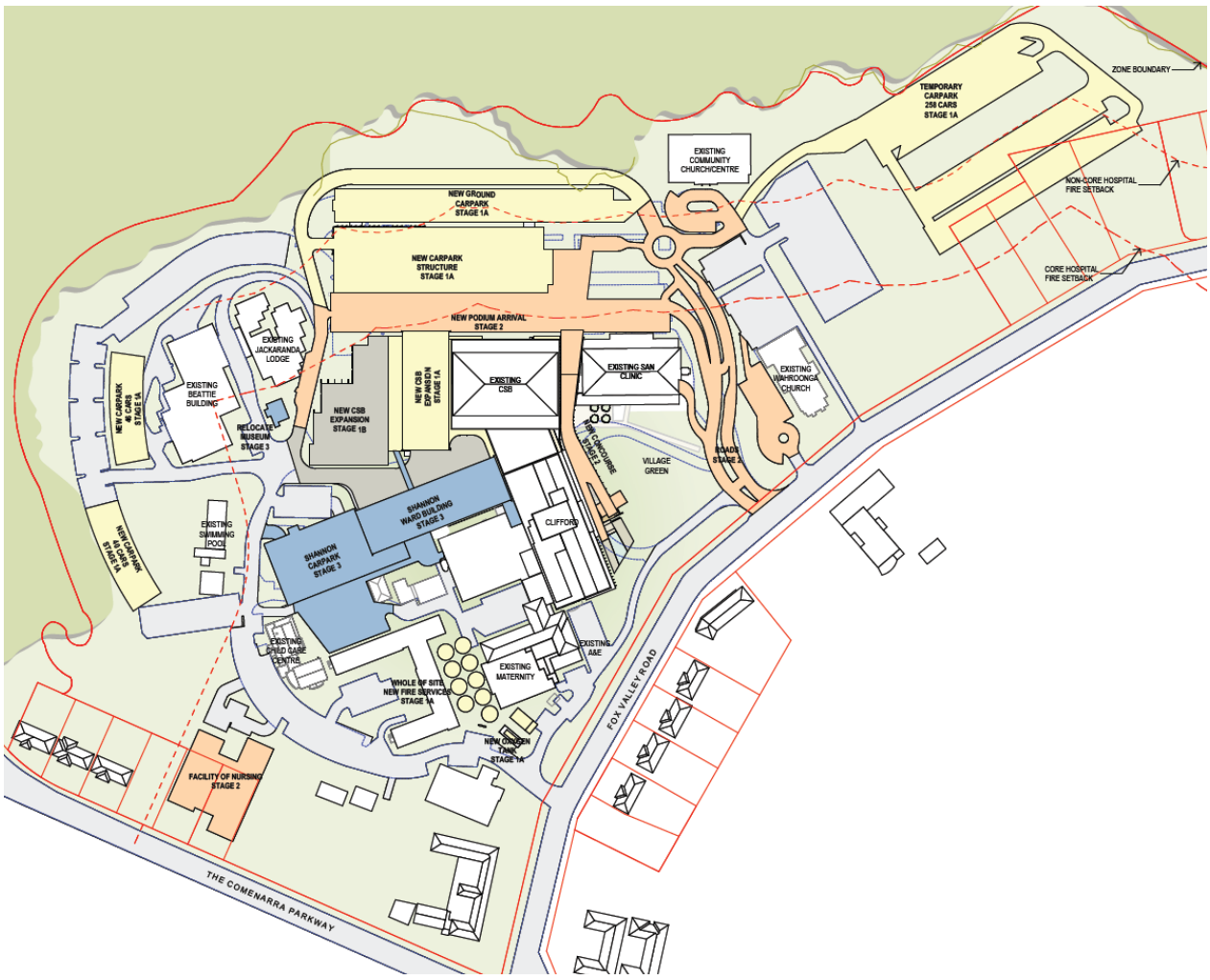
Stage 3 development consists of the following works:

- Relocation of the Museum;
- Construction of the Shannon Ward Building; and
- Construction of the multi-storey Shannon Carpark building.

Figure 1 – SAN Hospital Staging Plan.



Source – Morrisbray – Architects

1.2 Aim of this Report.

The aim of this report is to:

- Demonstrate compliance with the relevant provisions of *Planning for Bushfire Protection 2006;*
- Provide an appropriate and justified level of consultation with the NSW Rural Fire Service during the preparation of the environmental assessment, having regard to any previous consultation.

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1.3 Statutory Requirements.

This report has been prepared having regard to the following legislative and planning requirements:

1.3.1 Legislation.

***Environmental Planning and Assessment Act - 1979* (EPA Act)**

Planning and development within NSW is regulated by the *Environmental Planning & Assessment Act, 1979* (EPA Act). Part 3A [Major Projects] of the Act commenced on the 1st August 2005 and consolidated the assessment and approval regime for all major projects previously addressed under Part 4 [Development Assessment] or Part 5 [Environmental Assessment] of the Act.

1.3.2 Planning Policies.

***Planning for Bushfire Protection – 2006.* [Rural Fire Service]**

This document provides guidance on the planning and development control processes in relation to bushfire protection measures for rural residential and residential subdivision, *"Special Fire Protection"* and Class 5 – 8 and 10 buildings in bushfire prone areas.

The document provides deemed-to-satisfy specifications on the provision of Asset Protection Zones to residential and *"Special Fire Protection"* developments; defendable space requirements to other developments and access/water supply provisions for developments in bushfire prone areas.

Provision for the assessment of construction standards to buildings and management / maintenance of the Asset Protection Zones/defendable space to buildings is also provided.

1.4 Documentation reviewed in this Assessment.

To achieve the aim of this report, a review of information relevant to the property was undertaken. Information sources reviewed included the following documents:

- Site Survey Plans prepared by Whelans Insites: Job Ref. F691, Drawings No. 1 – 19 dated 5.4.2009 ;
- The Wahroonga Estate Concept Plan compiled by Urbis;
- Flora & Fauna Assessment prepared by Conacher Travers Pty Ltd, 2004;
- Bushfire Protection Report prepared by Conacher Travers Pty Ltd, 2004;
- Bushfire Management Plan prepared by Australian Bushfire Protection Planners Pty Limited, May 2005;
- Bushland Plan of Management prepared by Keystone Ecological, May 2005;
- Weed Management Plan prepared by Urban Bushland Management Consultants, April 2005;
- Ku-ring-gai Council Riparian Policy, December 2004;

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- Plan of Vegetation Communities prepared by Cumberland Ecology;
- Plan of Hollow Bearing Trees prepared by Cumberland Ecology;
- Slope Analysis prepared by Urbis;
- Staging Plan of the Hospital Precinct prepared by Morrisbray Architects dated 23.6.2010;
- Wahroonga Estate Gazetted Zoning Plan;
- Ku-ring-gai Council Bushfire Prone Land Map;
- *Planning for Bushfire Protection 2006* prepared by the NSW Rural Fire Service;
- Australian Standard AS3959 *Construction of Buildings in Bushfire Prone Areas*;
- *Rural Fires Regulation 2008.*

1.5 Site Inspection.

Graham Swain of *Australian Bushfire Protection Planners Pty Limited* first inspected the site and surrounding areas in October 2002 with follow up inspections in November / December 2003 and numerous inspections undertaken since that date as part of the preparation of previous reports including the April 2004 Conacher Travers Bushfire Report and the preparation of the Fire Management Plan prepared by Australian Bushfire Protection Planners Pty Limited [2005].

Additional site inspections have been completed as part of the preparation of the Estate Concept Plan with an inspection of the site undertaken with the NSW Rural Fire Service on the 16.7.2008.

Further site inspections have been undertaken as part of the preparation of this report – in particular on the 5th, 11th and the 19th March 2009 to re-examine the location of the riparian corridor and the siting of the proposed Concourse Building.

General slopes were assessed using an inclinometer and portable Global Positioning System [GPS] plotted relevant positions within the estate. Field assessment was undertaken to determine the landform, slopes, aspect, drainage, vegetation types and adjoining landuse. The identification of existing bushfire protection measures and visual appraisal of bushfire hazard and potential fire paths were also undertaken.

1.6 Authority Consultation.

To address the Director Generals Requirements for the preparation of the Environmental Assessment for the Estate Concept Plan a meeting with officers of the Development Control Division of the NSW Rural Fire Service was held on the 4th July 2008.

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This consultation occurred between Ms Nika Foman and Mr Corey Shackleton, Development Control Officers. A follow up meeting was held with the NSW Rural Fire Service Development Control Officers Mr Lew Short & Mr Corey Shackleton on site on the 16th July 2008.

The site meeting included an inspection of the site and discussions on the proposed land uses and their locations relevant to the provision of Asset Protection Zones; access provisions and the matter of evacuation of the site during bushfire events in the local area.

A further meeting took place at the NSW Rural Fire Service Headquarters on the 23.9.2008 to review the preliminary Staging Plan for the Hospital Precinct and the revised Concept Plan for the Estate. General consensus was reached on the extensions to the Hospital Precinct and the various land uses within this precinct.

Meetings were held with the NSW Rural Fire Service on the 11th March 2009 and again on the 1st April to discuss the design changes to the Staging Plan, including the fact that the new entry to the Hospital faces the Coups Creek corridor and therefore the bushfire threat. The Rural Fire Service accepted the location of the new entry provided that emergency exits were available which discharged into the forecourt to the existing Tower Building.

A meeting was held on the 11th June 2010 with Ms. Nika Foman to discuss the latest Staging Plan for the Hospital Precinct and determined that the multi storey Carpark could extend into the flame zone setback, provided that radiant heat shields and ember protection were installed. Further agreement was reached that the Stage 1B Clinical Services Building is to be located beyond the 100 metre Asset Protection Zone and that the Asset Protection Zone to the west of the Facility of Nursing can include the managed curtilage to the existing dwelling on The Comenarra Parkway.

The recommendations within this report reflect the result of the meetings with the NSW Rural Fire Service and conform to the recommendations provided by the Development Control Officers.

The Staging Plan layout, prepared by Morris Bray Architects, satisfies these requirements and the earlier established requirements regarding the setbacks to core and non-core buildings.

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SECTION 2
HOSPITAL PRECINCT DESCRIPTION

2.1 Location and Adjoining Landuse.

The Hospital Precinct is located within the central southern portion of Lot 621 in DP 1128314 and is bounded to the southeast by the alignment of Fox Valley Road, to the south by The Comenarra Parkway and to the northwest by the Coups Creek corridor and the E2 – Environmental Protection Zone boundary.

The north-eastern extent of the Hospital Precinct is bound by the existing Church and Conference Centre.

The landuse to the southeast consists of existing residential buildings/Media Centre and vacant land within the Estate whilst to the south and southwest of The Comenarra Parkway private residential development extends further to the southwest and south. Vacant land within the Coups Creek E2 zoned corridor adjoins the north-western aspect of the Hospital Precinct with a retirement village and existing residential development, within the Estate, extending further to the north and northwest.

Figure 2 – Aerial Photograph of Estate.

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Figure 3 – Aerial Photograph of the Hospital Precinct.

2.2 Precinct Description.

The Hospital Precinct is irregular in shape and contains land to the southeast of the E2 zoned land within the Coups Creek corridor, extending to Fox Valley Road and south to The Comenarra Parkway. The precinct is mostly cleared of vegetation except for remnant shade trees and landscaped gardens.

2.2.1 Topography & Drainage:

The Hospital Precinct has mostly undulating topography within the existing development precincts with some steep areas falling into the riparian corridor to Coups Creek. Slopes within the riparian corridor to Coups Creek, between The Comenarra Parkway to behind the Community Centre building, exceed 18 degrees.

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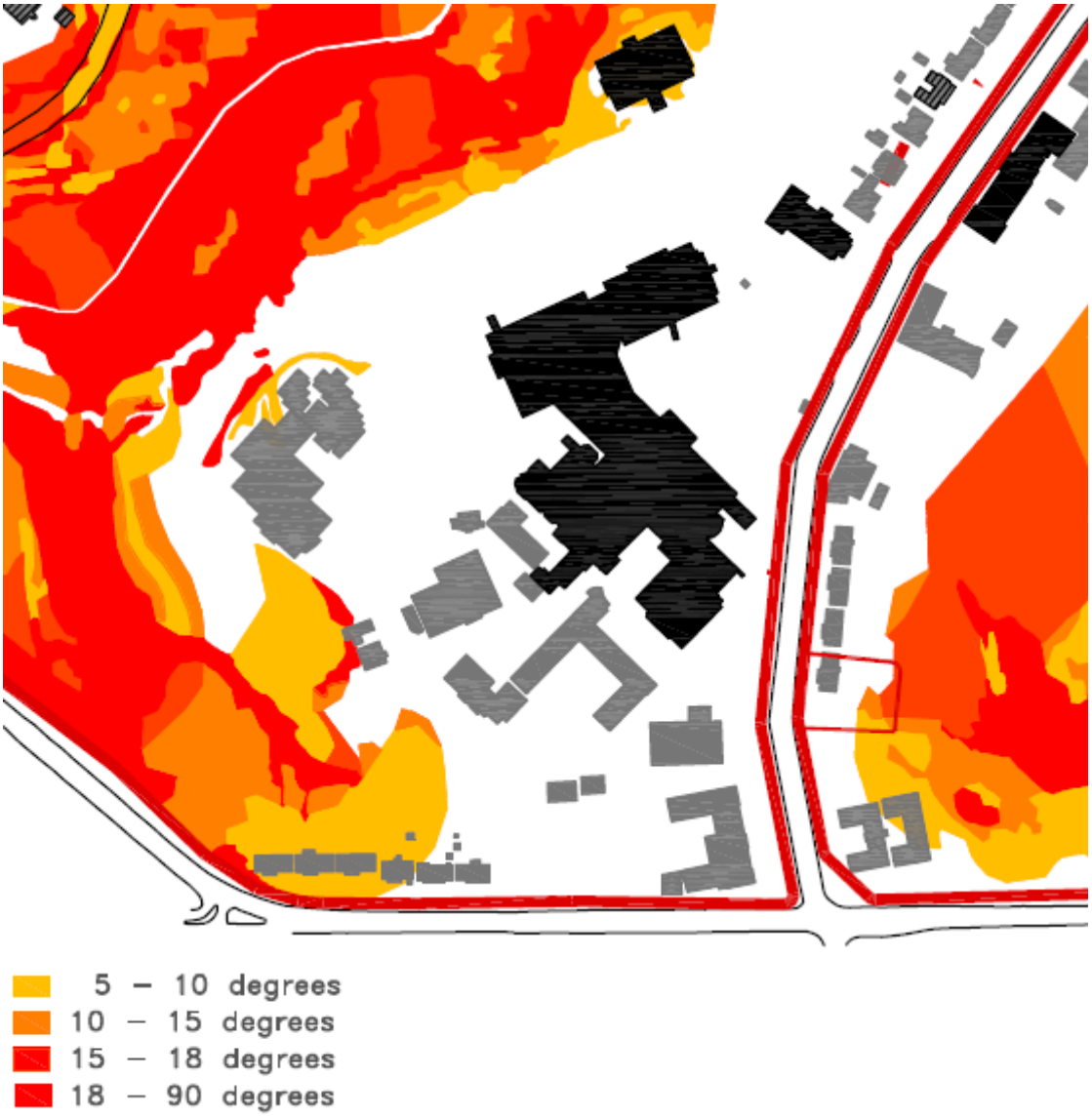
Slopes beyond the riparian corridor, across the developed area of the precinct, range from 5 – 10 degrees with localised pockets of 10 – 15 degree slopes *[Refer to Figure 4 – Slope Analysis].*

The topography of the land to the southeast of the Hospital Precinct falls from Fox Valley Road, gradually increasing in slope as it falls into the gully system in the south-eastern corner of the Estate. Slopes within the gully line exceed 18 degrees with extensive areas of 10 – 18 degree slopes bordering the northern and southern aspects of the riparian corridor.

Slopes of 5 – 10 degrees are located adjacent to Fox Valley Road. Drainage is by overland flow and formed stormwater systems that flow into Coups Creek.

Figure 4 – Slope Analysis



Source - Urbis

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2.2.2 Vegetation Communities:

The forest vegetation within the Hospital Precinct is predominantly Dry Sclerophyll Open Forest on the dryer escarpment to Coups Creek and the gully line in the southwest of the Estate and Wet Sclerophyll Open Forest within the damper riparian corridor of the watercourses. Management of exotic weed species is ongoing in both corridors.

Landscaped gardens and lawn areas occupy the cleared/developed sections of the Hospital Precinct. *[Refer to Figure 5 – Vegetation Communities].*

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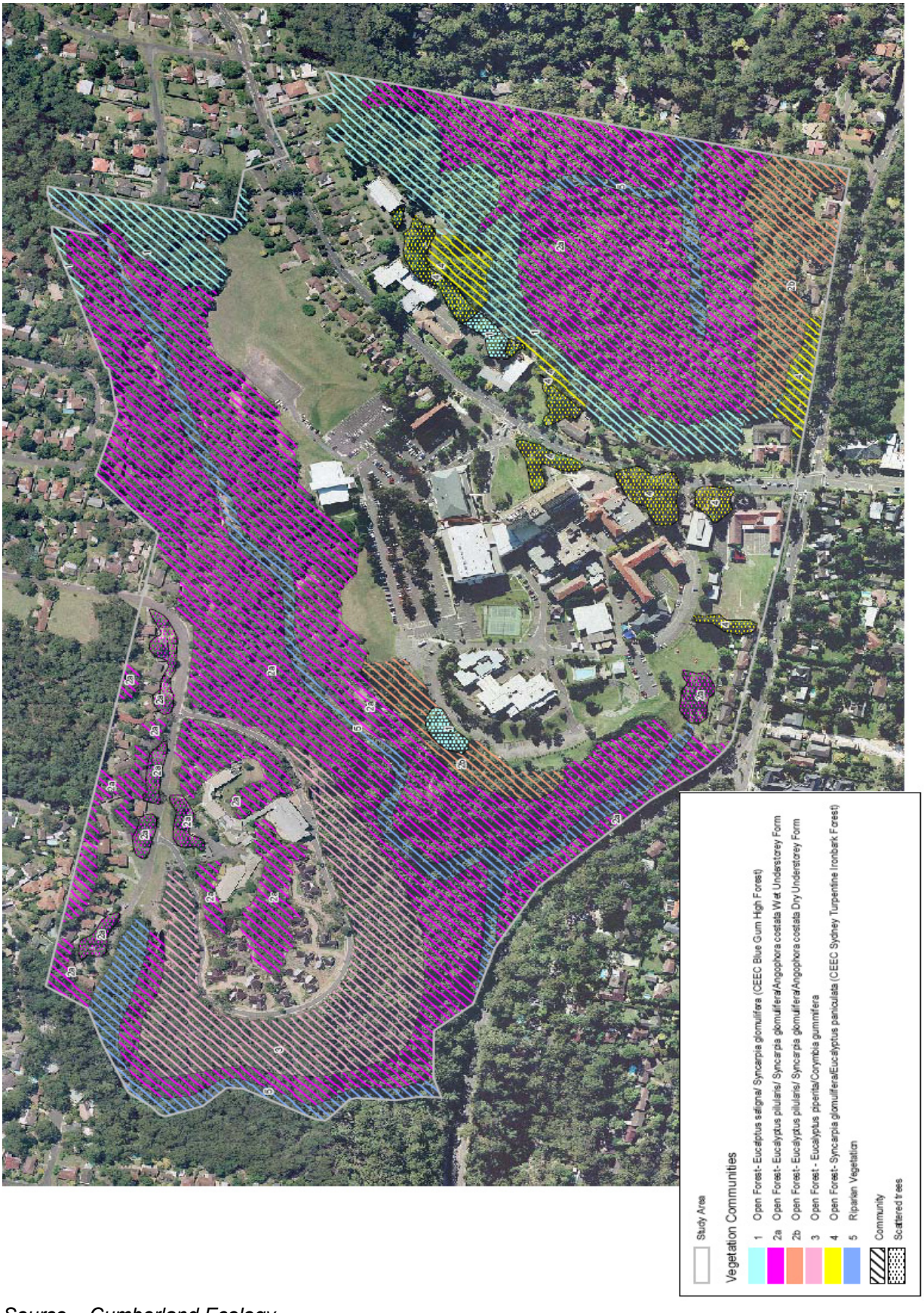
Figure 5 – Vegetation Communities within the Estate.



Source – Cumberland Ecology

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2.3 Significant Environmental Features within the Hospital Precinct.

The Hospital Precinct does not contain areas of SEPP 14 Wetland; SEPP 44 Koala Habitat; land of geological interest; land slip areas, or National Parks Estate.

2.4 Known Threatened Species, Population or Ecological Community within the Estate.

Conacher Travers Pty Ltd undertook a detailed Flora & Fauna Assessment within the Estate in 2004 which identified six vegetation communities within the site.

Further examination of the Flora and Fauna within the Estate was undertaken by Cumberland Ecology for the Estate Concept Plan Environmental Assessment with six similar vegetation communities identified within the Estate. These are shown on Figure 5 – Vegetation Communities and include the following communities:

- 1 - Open Forest – *Eucalyptus saligna and Syncarpia glomulifera* - [CEEC Blue Gum High Forest];
- 2a - Open Forest – *Eucalyptus pilularis / Syncarpia glomulifera / Angophora costata* – wet understorey form;
- 2b - Open Forest – *Eucalyptus pilularis / Syncarpia* – dry understorey form;
- 3 - Open Forest – *Eucalyptus piperita / Corymbia gummifera;*
- 4 - Open Forest – *Syncarpia glomulifera / Eucalyptus paniculata* - [CEEC Sydney Turpentine Ironbark Forest]; and
- 5 - Riparian Vegetation.

Cumberland Ecology redefined the extent of these communities on the site. *[Refer to Cumberland Ecology Flora & Fauna Report].*

Within the Hospital Precinct the small pocket of Blue Gum High Forest to the northwest of Jacaranda Lodge and the pockets of remnant Sydney Turpentine Ironbark adjacent to Fox Valley Road have been retained.

2.5 Details and location of Aboriginal relics or Aboriginal place.

The AMBS heritage report prepared for the Estate Concept Plan Environmental Assessment states:

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‘Site 45-6-2040 is regarded as being of low archaeological significance.

However, the study area has numerous sandstone shelter outcrops within vegetated creekline areas. These have been subject to relatively low levels of disturbance, particularly in comparison to the surrounding region. Therefore, there is potential for relatively intact archaeological deposits to be present, particularly beneath shelters’.

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SECTION 3

BUSHFIRE MANAGEMENT RESPONSIBILITIES

Bushfire management within the Estate [& the Hospital Precinct] is the responsibility of:

3.1 Ku-ring-gai and Hornsby Council.

The Ku-ring-gai & Hornsby Council have responsibility, under Section 66 of the *Rural Fires Act*, to issue a notice in writing requiring an owner / occupier of any land within their LGA to carry out bushfire hazard reduction works on that land. Section 100E of the *Rural Fires Act* requires Councils to issue bushfire hazard reduction certificates for hazard reduction to be undertaken on private lands.

3.2 New South Wales Rural Fire Service.

The NSW Rural Fire Service (RFS) has the responsibility for undertaking fire suppression activities, hazard management activities and other functions relative to emergency management, within its areas of operation. *Section 73* of the *Rural Fires Act (1997)* enables the Commissioner to carry out bush fire hazard reduction works on any land as required by a bush fire risk management plan if the work has not been carried out satisfactorily. Incurred costs can be recovered as a debt owed to the Crown. *[Note: The Estate is not located within a NSW Rural Fire Service Fire District].*

3.3 New South Wales Fire Brigade.

The NSW Fire Brigade has the responsibility for undertaking fire suppression activities, and other functions relative to emergency management, within the Estate and through Mutual Aid Agreements, receive assistance from the NSW Rural Fire Service, particularly for hazard reduction operations within the site. Hazmat management within New South Wales is the responsibility of the NSW Fire Brigade.

3.4 Hornsby / Ku-ring-gai Bush Fire Management Committee.

The Hornsby / Ku-ring-gai Bushfire Management Committee has the responsibility for planning for co-ordinated bushfire fighting activities / hazard management activities on a local government level. It is not an operational organization, a fire fighting organization or a funding source for fire management activities.

The Bush Fire Management Committee is supported by the following provisions of the Rural Fires Act 1997:

- ***Section 52*** *requires each Bush Fire Management Committee to prepare a draft bush fire management plan for their local areas which includes a plan of operations and a bush fire risk management plan.*

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- ***Section 54*** *of the Act specifies that a draft bush fire risk management plan is to 'set out schemes for the reduction of bush fire hazards in the rural fire district or other part of the State'.*

  A draft bush fire risk management plan may also restrict or prohibit the use of fire or other fire hazard reduction activities in all or specified circumstances or places to which the plan applies.

3.5 Public Authorities & owners/occupiers of land.

The Rural Fires Act, 1997 provides several legislative opportunities to require Public Authorities, land owners and occupiers to manage hazardous fuels. These are listed below:

- ***Section 63(1)*** states that it is the duty of a public authority to take any practicable steps to prevent the occurrence of bushfires on, and to minimise the danger of the spread of a bushfire on or from:

  (a) any land vested in or under its control or management, or

  (b) any highway, road, street, land or thoroughfare, the maintenance of which is charged on the authority.

- ***Section 63(2)*** states that *'it is the duty of the owner or occupier of land to take the notified steps (if any) and any other practicable steps to prevent the occurrence of fires on, and to minimise the danger of the spread of fires on or from that land'.*

- ***Section 65A*** states that the *'Commissioner may nominate a member of the Service as a hazard management officer'.*

- ***Section 65(2)*** states that *'an authorised person may, with the permission of the fire fighting authority or other authority responsible for unoccupied Crown land or managed land or a person nominated by the authority to give such permission, enter the land and carry out bushfire hazard reduction work with the assistance of such other persons as the authorised person considers to be necessary for the purpose'.*

- ***Section 65(3)*** states that *'the authority responsible for unoccupied Crown land or managed land is to be taken to have given the permission under this section to the extent necessary to give effect to a bushfire risk management plan'.*

- ***Section 65(4)*** states that *'if permission under this section is given subject to conditions, the conditions must be complied with'.*

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- ***Section 66(1)*** states that *'a hazard management officer may, by notice in writing, require the owner or occupier [not being a public authority] of any land to carry out bushfire hazard reduction work specified in the notice on the land'.*

- ***Section 66(2)*** states that *'a hazard management officer must serve a notice under this section if required to do so by a bushfire risk management plan applicable to the land that is in force'.*

- ***Section 66(3)*** states that *'a hazard management officer must issue a bushfire hazard reduction certificate in respect of any bushfire hazard reduction work required by a notice issued in accordance within section (2)'.*

- ***Section 66(6)*** states that *'the requirements and conditions so specified must include any requirements in a bushfire risk management plan that is applicable to the land and is in force and may include a requirement or condition that the burning of fire breaks or of combustible material;*

  (a) *must in fire district constituted under the Fire Brigades Act 1989 be carried out by or under the supervision of the fire brigade or an officer in charge of the fire brigade;*

  (b) *must outside a fire district, be carried out by or under the supervision of the rural fire brigade specified in the notice or an appropriate officer of the rural fire brigade or any hazard management officer.*

- ***Section 66(7)*** states that *'a notice requiring the establishment of a firebreak cannot require an occupier or owner to kill or remove any trees that are reasonably necessary for shade, shelter, windbreak or fodder purposes or the protection of threatened species, populations, ecological communities or critical habitats within the meaning of the 'Threatened Species Conservation Act 1995'.*

- ***Section 66(8)*** states that *'an occupier or owner to whom a bushfire hazard reduction notice is given must, despite the fact that a fire permit has not been granted under Division 5, comply with the requirements specified in the notice'.*

- ***Section 70(2)*** states that *'if within the time specified in the relevant notice the owner or occupier to whom it is given fails to comply with any requirement of the notice, the Commissioner may, without prejudice to liability of the owner or occupier, enter on the land and carry out the bushfire hazard reduction work the owner or occupier was required to do under the notice'.*

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- ***Section 70(3)*** states that *'any costs incurred by the Commissioner in carrying out such work may be recovered from the owner or occupier of the land as a debt due to the Crown in a court of competent jurisdiction'.*

- ***Section 87*** allows the removal of hazards in the bush fire danger period by the provision of a permit system. The permits are valid for 21 days, excluding TOBAN days.

  Section 10 permits are not required to adhere to *Part V* provisions of the EPA Act 1979 in the assessment of impact, except for public authorities. An owner/occupier of private land must obtain from the NSW Rural Fire Service, a bushfire hazard reduction certificate before undertaking hazard reduction works on that land (Section 100E of the *Rural Fires Act 1997*).

3.6 Fuel Management within the Hospital Precinct.

The Estate & Hospital Precinct contain, and will continue to retain, areas of vegetation which will be subject to the risk of a future bushfire event.

A Fire Management Plan was prepared by *Australian Bushfire Protection Planners Pty Limited* [April 2005] and has been adopted by the Australasian Conference Association [the Estate owners] in recognition of its legislative responsibilities to minimise the chance of fire starting in the bushfire prone vegetation on the Estate and spreading through this vegetation and endangering the adjoining neighbours.

The need is also recognised for the revision of the plan in recognition of the changing nature of future development within the site, which will in turn reduce the area of unmanaged vegetation and potential levels of bushfire threat and therefore the area which will require on-going fuel management.

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SECTION 4

BUSHFIRE RISK

4.1 Introduction.

Risk has two elements: Likelihood, which is the chance of a bushfire occurring and consequence, the impact of a bushfire when it occurs. Risk reduction can be achieved by reducing the likelihood of a bushfire, the opportunity for a bushfire to spread or the consequence of a bushfire (on natural and built assets). Bushfires will always occur within unmanaged Australian native bushland. Bushfire Management should have a clear objective to reduce both the likelihood of bushfires and reduce the negative impacts of bushfires. It should also consider the costs, inconvenience and dangers of measures taken to reduce the risk of bushfires.

Many options are available to reduce the risk of bushfires starting, spreading and causing damage; reducing the unintended negative consequences of options taken to control risk; and the failure to achieve bushfire management programs.

The Australian Standard AS/NZS 4360:2004, and the Emergency Management Australia (EMA) emergency risk management process provide the framework for establishing the context, analysis, evaluation, treatment, monitoring and communication of risk.

Bushfire risk is defined as the chance of a bushfire occurring that will have harmful consequences to human communities and the environment. Bushfire risk is usually assessed through consideration of the likelihood of ignition and consequences of a bushfire occurring. The consequences of bushfire management activities alone and the failure to implement programs also need to be considered. A range of factors influence bushfire risk – these include:

- The likelihood of human and natural fire ignitions, as influenced by time, space and demographics;

- The potential spread and severity of a bushfire, as determined by fuel, topography and weather conditions;

- The proximity of assets vulnerable to bushfire fuels, and likely bushfire paths; and,

- The vulnerability of assets including natural assets, or their capacity to cope with, and recover from bushfire.

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Planning to reduce the likelihood and consequence of bushfires must take into account the full range from small local fires within the riparian corridors/retained vegetation to landscape-wide severe fires that may occur in the Lane Cove National Park to the southwest of the Estate and Hospital Precinct. Historically, there are patterns and trends in which fires, especially severe fires that cause significant damage to built and/or natural assets, start and spread.

For the purpose of analysing fire risk, a dangerous and damaging fire has the potential to occur when the following conditions prevail:

- Continuous available fuel – fuel at moisture content sufficiently low to enable rapid combustion, arising from drought effects or the maturing and drying, of combustible fuels;

- Exposure of vulnerable assets;

- A combination of weather conditions that generate a forest danger index of Very High or greater. Typically, within the Hospital Precinct, prevailing adverse fire weather will have a strong south-westerly influence as the precinct will not be affected by major fire events burning from the northwest and west due to the adjoining residential development and small areas of retained vegetation within the Coups Creek and Lane Cove River corridors.

4.2 Bushfire Risk to the development within the Hospital Precinct.

The level of Bushfire Risk on a development is determined by undertaking an assessment of Fire History, Ignition/Fire Sources, Weather and the availability of Bushfire Fuels.

4.2.1 Fire History.

Natural fires have not impacted the bushland areas within the Hospital Precinct for many years. The January and November 1994 Lane Cove National Park bushfires did not impact upon the site. Two recent bushfires which have burnt up to The Comenarra Parkway occurred in December 1997 and January 2002.

The December 1997 bushfire started in the area of Dawson Avenue at Thornleigh and burnt across to the Browns Road area with a spot fire burning approximately 0.5 hectares of vegetation between the Hospital and Coups Creek. The January 2002 bushfire started at Pennant Hills Park, burning out the entire upper Lane Cove Valley.

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A bushfire, which was started by a children's campfire, occurred within the Estate in October 2002, burning out a small area of vegetation in the upper reaches of the Lane Cove River, west of the Retirement Village, northwest of the Hospital Precinct and was quickly brought under control for fire authorities.

A hazard reduction burning program was undertaken in 1996 & 1997 in the bushland in the south-eastern corner of the Estate, to the southeast of the Hospital Precinct. This hazard reduction burn was undertaken within the framework of the Hornsby/Ku-ring-gai Bushfire Management Committee's Bushfire Risk Management Plan with future hazard reductions planned, as recommended in the Fire Management Plan.

4.2.2 Ignition / Fire Sources.

Causes of bushfire ignition are either natural or by human activity. Human activity can be categorised as:

- Malicious – including arson;
- Careless – such as escaped campfires, children and burning off without a permit; and
- Accidental – uncommon, but includes motor vehicle accidents/ignition by farm machinery/work operations [welding etc.].

The only natural cause of bushfire ignition is lightning.

A review of the causes of bushfire ignitions within the Lane Cove National Park has found that this natural phenomenon has a negligible incidence within the vegetation to the southwest of The Comenarra Parkway. However, arson has been found to be the likely cause of the most recent bushfire occurrences.

4.2.3 Climate.

- ***Temperatures & Humidity.***

The fire season in the Sydney Metropolitan Area corresponds with the summer months' high temperatures and low rainfall, and can occur from September to April with a proclaimed bushfire danger period from October to March. There is significant variability in temperature and rainfall from year to year. Fire seasons may be serious in three out of every 15 years, but this can also vary considerably.

Bushfire risk management, planning and operations must take into account the likelihood of severe fire weather and the challenges it presents. Extreme and uncontrollable bushfires typically occur when the fire danger rating is over 50, a rating of Extreme.

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Many of the major property loss events in NSW have occurred at fire danger ratings over 70, on a scale of 0 to 100. The Very High and Extreme Forest Fire Danger conditions mainly occur between November and March. Among the projected changes in climate, as a result of global warming, is that southern Australia will see greater variability in its climate with hotter and drier droughts are possible.

As the temperatures increase, the Forest Fire Danger indices will also increase, perhaps leading to a trend of larger, more intense fires in the landscape. Climate change remains a complex issue and only one of a range of factors that may be creating an environment conducive to large-scale fires.

- ***Wind.***

Wind is also an important factor in bushfire behaviour as it influences the rate of spread of the fire front and spreads burning embers / sparks, providing ignition sources for spot fires ahead of the main fire front.

The shape of the Lane Cove River corridor and Coups Creek valley and the adjoining land-form influences the direction and speed of the prevailing wind and therefore the speed and direction of fire runs within these valleys. Strong southwest winds have the potential to spread embers into these vegetated corridors from fires burning in the Lane Cove National Park, south of The Comenarra Parkway.

However, these are not the prevailing summer winds with this wind direction occurring mostly during the cooler winter months of June/July with the winds in August shifting to the west thence northwest during the summers months.

Whilst south-westerly winds do occur during the summer bushfire danger season, they are notably for short periods of duration – normally under 30 minutes, during which time they have the ability to change the direction of a run of a fire burning under predominant north-westerly or westerly winds. It is this short period that the vegetation within the Coups Creek corridor is most at risk of ignition from a major fire event in the National Park Estate to the south of The Comenarra Parkway as there is the potential for fire and embers to breach the separation that this road provides to the vegetation in the Lane Cove River and Coups Creek corridors within the Estate.

4.2.4 Slope.

Slope is a critically important factor when assessing fire risk and likely fire behaviour. The rate of fire propagation doubles up a slope of 10 degrees (18%) and increases almost fourfold up a slope of 20 degrees (40%).

The rate of progress downslope tends to slow at a corresponding rate however wind direction in the lee of the hills/ridgelines tends to be unpredictable and can cause fires to change direction unpredictably.

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The average slope of the Lane Cove River/Coups Creek corridors is < 5 degrees) to the south and southwest, however gully lines to the river/creek increase the slope to each side of the corridor to 15 - >18 degrees. Bushfires entering the Coups Creek riparian corridor, from the southwest, will spread upslope, initially impacting upon the land to the southwest of the Retirement Village thence extending along the Coups Creek corridor.

4.2.5 Potential Fire Paths.

The following figures provide an indication of the potential direction of fire which may occur within the Lane Cove River / Coups Creek corridors.

Figure 7 – Potential Southwest Fire Path.

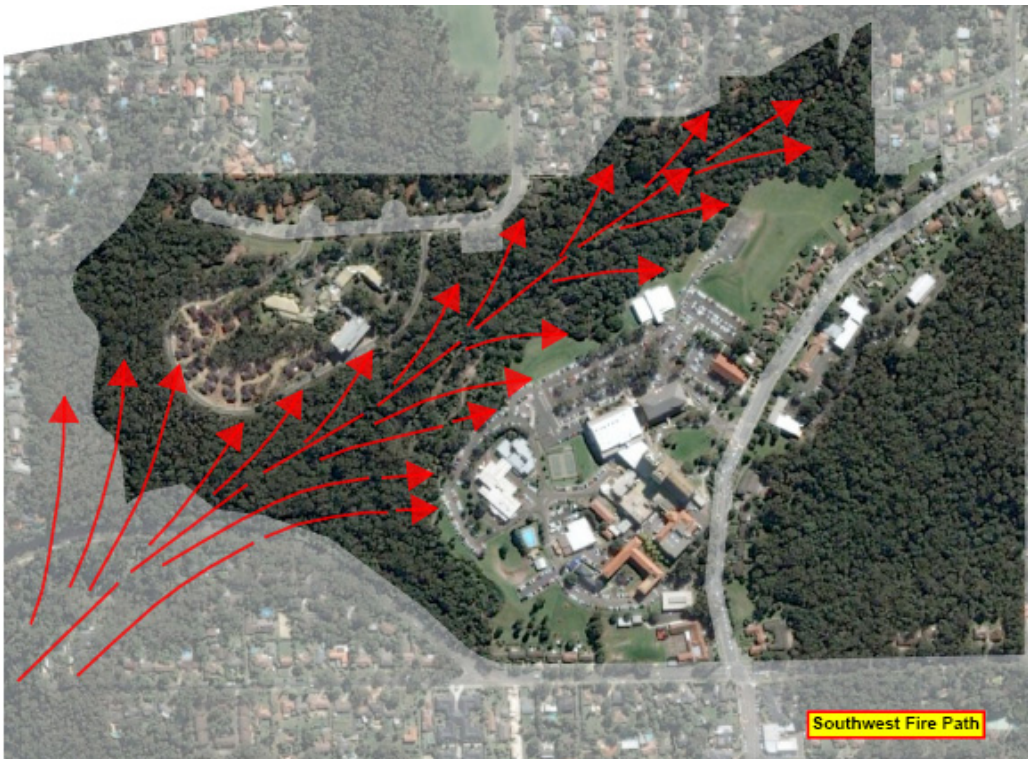

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Figure 8 – Potential Northwest Fire Path

4.2.6 Bushfire Fuels.

Combustible fuel is a critical element in bushfire risk management, as it is the one factor relating to fire behaviour that can be managed. It is for this reason that the ACA commissioned the preparation of the Fire Management Plan for the whole of the Estate with the aim to manage and minimise the amount of combustible fuels which are available in the retained vegetation within the Estate.

In an unmanaged landscape there are three 'types' of fuel that contribute to bushfire hazard. They relate to the distribution and nature of combustible material within a vegetated environment and are defined by the Overall Fuel Hazard Guide – Third Edition (NRE May 1999), as:

- Elevated fuel load
- Surface fine fuels; and
- Bark.

Elevated material is defined as shrubs, heath and suspended material greater than 0.5 metres above ground. The level of bushfire hazard depends on fuel continuity, height, amount of dead material, foliage thickness and flammability of live foliage. Flammability of vegetation is at the highest when composition is fine, it contains a lot of dead material, is dense vertically and horizontally and has low moisture content.

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Surface fine fuels are defined as the litter bed and vegetation up to 0.5 metres above the ground. Grasses add to the surface fine fuels and therefore need to be taken into account when assessing the hazard. The risk is higher where greater depth and volume of litter and surface material are present – where there is no active fuel management program in place to reduce the availability of dry, combustible fuels within the landscape.

Bark has the potential to travel significant distances in a fire situation (spotting) and act as a ladder between surface fuels and the forest crown. Bark contributes to fire hazard when it is loose and fibrous, present in large quantities and in long loose ribbon forms.

An overall Fuel Hazard for vegetation within the Coups Creek corridor can be determined, based on the combination of these three contributing fuel hazards. However, the level of hazard will vary significantly over time and will depend on the cycle of fuel management undertaken as defined by the Fire Management Plan.

The Fuel Hazard will therefore vary from low – moderate to moderate – high, dependant on the time lapsed since the last management activity.

The aim of the Estate Fire Management Plan is to minimise the amount of combustible fuels available to burn within the retained vegetation on the site whilst recognizing the ecological constraints that exist to management practices in some of the vegetation communities [e.g. Blue Gum High Forest].

4.3 Assessment of Bushfire Risk to the Estate.

Major Bushfires have occurred in the Lane Cove National Park, to the southwest of the residential development to the south of The Comenarra Parkway in 1994, 1997 and 2002. Neither the 1994 or 2002 bushfire impacted the site directly or the facilities on the site. The 1997 bushfire ignited a spot fire in the area between the Hospital and Coups Creek, burning approximately 0.5 hectares of vegetation.

A small localised fire occurred in the Lane Cove River corridor to the west of the Retirement Village in October 2002 and was attributed to an escape from a children's camp fire. This fire was quickly brought under control and did not threaten buildings or residents.

Whilst there is a bushfire risk to the Estate, it is difficult to quantify the level.

The Hospital Precinct is separated from direct impact of a fire event in the Lane Cove National Park by the managed landscaped gardens which occupy the residential development to the southwest and south of The Comenarra Park. The potential impact from a fire event in the National Park to the south of the existing residential development will be burning embers and smoke.

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Fires occurring in the Coups Creek corridor, burning under south-westerly wind influences, will “push” the fire along the creek corridor, rather than towards the Hospital Precinct. The risk of such fires, on this precinct, will be low as the impact will be from smoke. Should a fire burn from the west or northwest, across the Coups Creek riparian corridor, the risk from such fire event will be moderate with resultant moderate – high levels of radiant heat, smoke and ember attack with the level of risk dependant on weather conditions and available fuels.

The provision of fire protection measures such as appropriate widths of Asset Protection Zones / Defendable Spaces [dependant on landuse] and construction standards to future buildings will reduce the potential bushfire risk to this precinct.

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SECTION 5

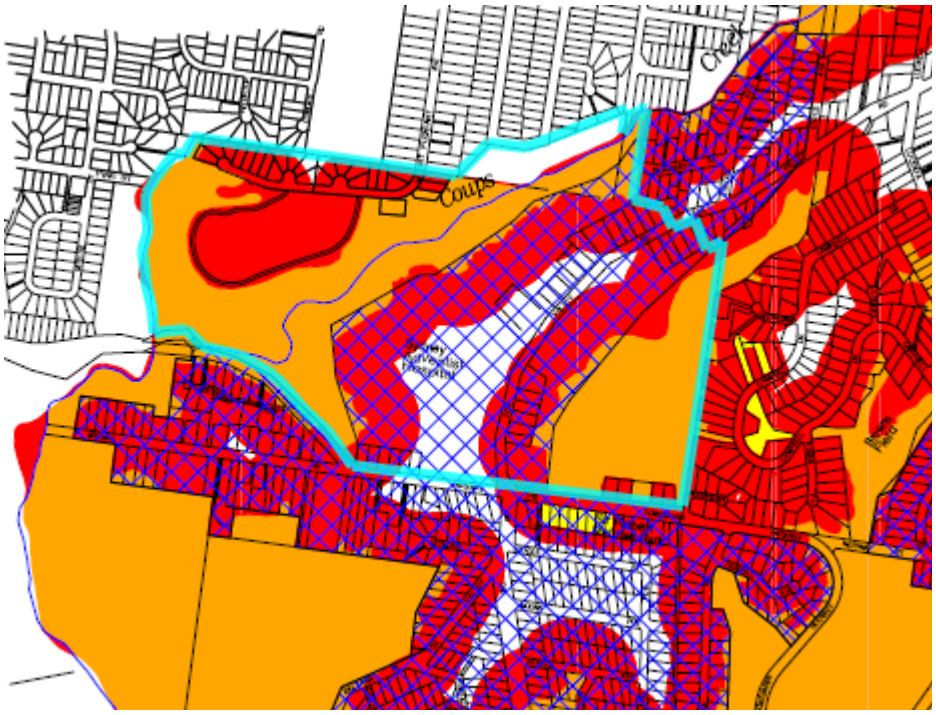
BUSHFIRE PRONE LAND MAP

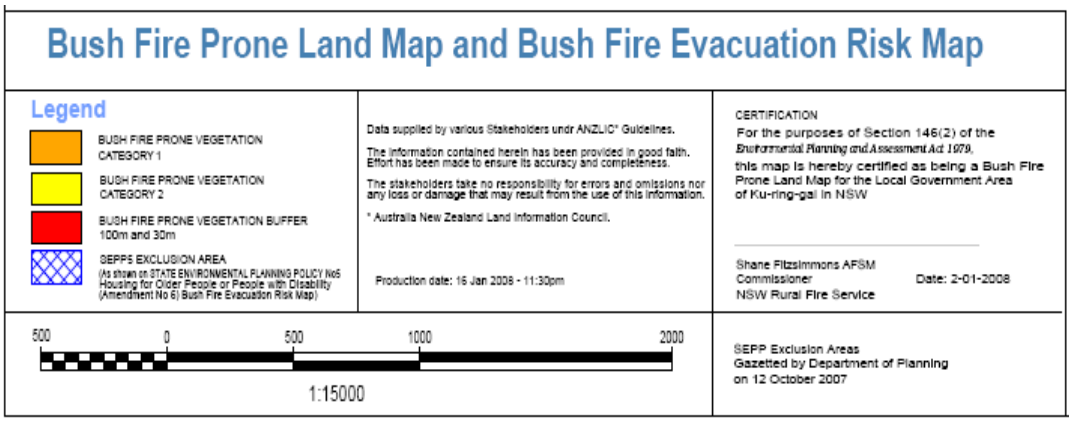
5.1 Introduction.

The Commissioner of the NSW Rural Fires Service certified, in accordance with Section 146 of the *Environmental Planning & Assessment Act 1979,* the Ku-ring-gai Bushfire Prone Land Map on the 2nd January 2008.

This map identifies the areas which have been determined by Ku-ring-gai Council to contain either Category 1 or 2 Bushfire Prone Vegetation and are therefore deemed to be bushfire prone. An extract of the Ku-ring-gai BFPLM showing the Estate is shown as Figure 9 below.

Figure 9 – Extract of the Ku-ring-gai Bushfire Prone Land Map.





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The map also records the extent to which the 100 metre wide buffer zone to the Category 1 Bushfire Prone Vegetation extends beyond the line of the vegetation which is deemed to be bushfire prone and also triggers the necessity for the development on the site to comply with the deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006.*

5.2 SEPP 5 [Seniors Living] Exclusion Area.

The Certified Bushfire Prone Land Map identifies an area within the site, shown as the blue cross hatching, which is identified as a "SEPP 5 Exclusion Zone" – "As shown on State Environmental Planning Policy No. 5 – Housing for Older People with Disability (Amendment No. 6) Bushfire Evacuation Risk Map)".

The hatching restricts development of SEPP Seniors Living Developments [only] within the hatched area, therefore the construction of Hospital facilities and School of Nursing are not excluded by the hatching on the Bushfire Prone Land Map [provided that they incorporate Asset Protection setbacks which are compliant with *Planning for Bushfire Protection 2006*.

5.3 Evacuation.

One of the specific objectives identified by *Planning for Bushfire Protection* 2006 for *'Special Fire Protection Purpose Developments'* is the provision of safe emergency evacuation procedures.

The bushfire risk assessment in Section 4 of this report identifies the potential level of risk from a bushfire event to development within the Hospital Precinct.

The Hospital Precinct is shielded from direct impact of a fire occurrence in the Lane Cove National Park by the adjoining residential development, within the Estate and to the south of The Comenarra Parkway, providing a separation of more than 250 metres to the closest bushfire prone land within the Lane Cove National Park.

The topography of the land to the south of The Comenarra Parkway [and the Hospital Precinct] falls steeply to the south with the bushfire prone vegetation in the Lane Cove National Park located below the "crest" of the ridgeline which is located to the south of the precinct, therefore shielding the buildings within the Hospital Precinct from direct impact of radiant heat given off by a bushfire burning in the Lane Cove National Park.

The Hospital Precinct will contain "non-core" Hospital uses such as carparking, services buildings, offices, Doctors Consulting Rooms and out-patients which will be located between the core Hospital Buildings and the Coups Creek corridor, thus reducing the bushfire risk to the patients within the 'core' Hospital buildings, from a fire occurrence in this corridor.

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The School of Nursing is classified by the NSW Rural Fire Service as a *'special fire protection purpose development'*. The siting of this building has therefore been determined so as to provide a separation to the bushfire prone vegetation in the Coups Creek tributary which satisfies the wider Asset Protection Zone widths required by the NSW Rural Fire Service.

The carpark and ancillary buildings will be generally located beyond the defined flame zone length and will be designed and constructed to withstand the potential levels of radiant heat at this setback distance. These protection measures will provide security to the occupants, removing the need for evacuation of these buildings.

The location of the 'core' and 'non-core' Hospital land-uses and the School of Nursing with separation distances which comply with or exceed the deemed-to-satisfy widths of the NSW Rural Fire Service, combined with the protection measures incorporated in the construction of the buildings, including the provision of smoke filters to the fresh air intakes to the air-conditioning, will provide a reduced level of bushfire risk to the patients, visitors and staff and is likely to remove the need for the evacuation of the Hospital and other land-uses located in the Hospital Precinct, during bushfire events in the local area.

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SECTION 6

ASSESSMENT OF FIRE PROTECTION MEASURES TO THE SAN HOSPITAL STAGING PLAN DEVELOPMENT – STAGES 1A & 1B; STAGE 2 and STAGE 3.

6.1 Introduction.

The Director General of the Department of Planning [DoP] issued DGRs for the Environmental Assessment for the Estate Concept Plan. These DGRs required, on the advice of the NSW Rural Fire Service, that the development demonstrate compliance with the requirements of *Planning for Bushfire Protection 2006,* including:

- Ensuring Special Fire Protection purpose developments are located away from the bushland interface;

- Identify vegetation types, ownership and ongoing management of any proposed Asset Protection Zones.

The Director General of the Department of Planning [DoP] issued on the 10th June 2010 DGRs for the Environmental Assessment for the Sydney Adventist Hospital – Staged Alterations & Additions. These DRGs, under 'Key Issues' - Item 14 *'Bushfire'* – that the staged development demonstrate compliance with the relevant provisions of *Planning for Bushfire Protection 2006.*

The following sections of this report examine these requirements specifically for the Hospital Staging Plan.

6.2 Compliance with the requirements of *Planning for Bushfire Protection 2006:*

The objectives of *Planning for Bushfire Protection 2006* are:

(i) Afford occupants of any building adequate protection from exposure to a bushfire;

(ii) Provide for a defendable space to be located around buildings;

(iii) Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;

(iv) Ensure that safe operational access and egress for emergency service personnel and residents is available;

(v) Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in the asset protection zones; and

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(vi) Ensure that utility services are adequate to meet the needs of fire-fighters and others assisting in bushfire fighting.

The document identifies six core bushfire protection requirements. These are:

(1) Provision of Asset Protection Zones / Defendable Spaces in accordance with the specific landuse, the predominant bushfire prone vegetation type within 140 metres of the development and the topography of the land containing the bushfire prone vegetation;

(2) Access for fire fighting operations;

(3) Water Supplies for fire fighting operations;

(4) Construction standards of buildings located within 100 metres of the bushfire hazard interface, dependant on specification landuse, the predominant bushfire prone vegetation type within 140 metres of the development and the topography of the land containing the bushfire prone vegetation;

(5) Emergency Planning;

(6) Landscape Management – in particular the management of the Asset Protection Zones / Defendable Spaces and residual bushfire prone vegetation.

The document also identifies types of development and provides deemed-to-satisfy fire protection measures for residential development [Class 1, 2 & 3 buildings]; *"Special Fire Protection Purpose Developments"* [Hospitals, Nursing Homes / Retirement Villages / Schools / Colleges / Childcare Centres & Tourist Accommodation]; Industrial / Commercial Development and residential and Special Fire Protection Purpose "infill" development.

Alterations and additions to the existing buildings within the Hospital Precinct are defined as "infill development" within the meaning of Section 4.2.5 of *Planning for Bushfire Protection 2006.* However, the Rural Fire Service, in these circumstances, seeks to achieve a better outcome than the present circumstance may provide and has identified 'core' and 'non-core' hospital uses with core hospital use needing to complying with the *'Special Fire Protection Purpose Development'* provisions of *Planning for Bushfire Protection 2006.*

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The protection of 'non-core' Class 5 – 10 buildings is also considered under Section 4.3.6(f) of *Planning for Bushfire Protection 2006*, with general fire safety construction standards required under the provisions of the Building Code of Australia taken as acceptable solutions to construction of this type of building, however, the aim and objectives of *Planning for Bushfire Protection 2006* apply in relation to the provision of fire fighting access and water supplies, emergency planning and landscape / vegetation management.

6.2.1 Provision of Asset Protection Zones / Defendable Spaces:

Appendix 2 of *Planning for Bushfire Protection 2006* provides a methodology to determine the Asset Protection Zones for development located within, or within 100 metres of bushfire prone vegetation. This methodology includes the following matters to be assessed for each landuse within the Estate:

(a) Determine vegetation formations as follows:

- Identify all vegetation in all directions from the development for a distance of 140 metres;
- Consult Table A2.1 to determine the predominant vegetation type; and
- Select the predominant vegetation formation as described in Table A2.1.

(b) Determine the effective slope of the land under the predominant vegetation Class.

(c) Determine the appropriate fire [weather] area in Table A2.2.

(d) Consult Table A2.4 for residential development and Table A2.5 for Special Fire Protection Purpose developments and determine the appropriate setback [Asset Protection Zone / Defendable Space] for the assessed land use, vegetation formation and slope range.

The following section examines these prerequisites and provides a summary of this assessment and the resultant widths of the Asset Protection Zones / Defendable Spaces for the 'core' and 'non-core' development within the Hospital Staging Plan as shown on the Architectural Plans prepared by Morrisbray Architects.

The Fire Danger Index [FDI] for the site is 100.

(a) Core Hospital Buildings:

The proposed Stage 1A & 1B expansion to the Clinical Services Building; the Stage 2 Concourse Building and the Stage 3 Shannon Ward Building contain Operating Theatres, Medical Wards, Critical Care and Maternity / Nursery / Birthing Rooms. These buildings are therefore core hospital use and deemed to be a *'Special Fire Protection Purpose'* buildings.

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The only direct exposure that these buildings have to a future bushfire threat is from the vegetation in Coups Creek and its tributary. The vegetation within the Coups Creek corridor and its tributary consists of Wet & Dry Sclerophyll Open Forest on slopes which range from 15 to in excess of 18 degrees, within the section of the corridor between the Hospital Precinct and the Retirement Village/Nursing Home precinct.

The potential fire paths have been described in Figures 7 & 8.
The northern façade of the new Concourse [Stage 2] and the Stage 1A & 1B expansion to the Clinical Services Building is located more than 100 metres from the unmanaged bushfire prone vegetation on the E2 zoned land within the Coups Creek corridor – therefore exceeding the maximum Asset Protection Zone width required by Table A2.6 *[Special Fire Protection Purpose Development]* of *Planning for Bushfire Protection 2006.*

The Stage 1B expansion of the Clinical Services Building and the Stage 3 Shannon Ward Building are also located beyond the 100 metre wide setback to the bushfire prone vegetation in the Coups Creek corridor, west from these buildings – therefore exceeding the maximum Asset Protection Zone width required by Table A2.6 *[Special Fire Protection Purpose Development]* of *Planning for Bushfire Protection 2006.*

[Refer to Figure 10 below – extract from the Morrisbray Staging Plan Drawing showing the location of the proposed Stage 2 Concourse Building; the Stage 1A & 1B expansion to the Clinical Service Building and the Stage 3 Shannon Ward Building and the Asset Protection Zone setback distance to the bushfire prone vegetation within the Coups Creek corridor/ E2 zoned land.

The internal modifications to the existing San Clinic, Clinical Services Building and existing Main Tower Block will not compromise the current protection to these buildings [These buildings are located more than 100 metres from the bushfire prone vegetation in the Coups Creek corridor].

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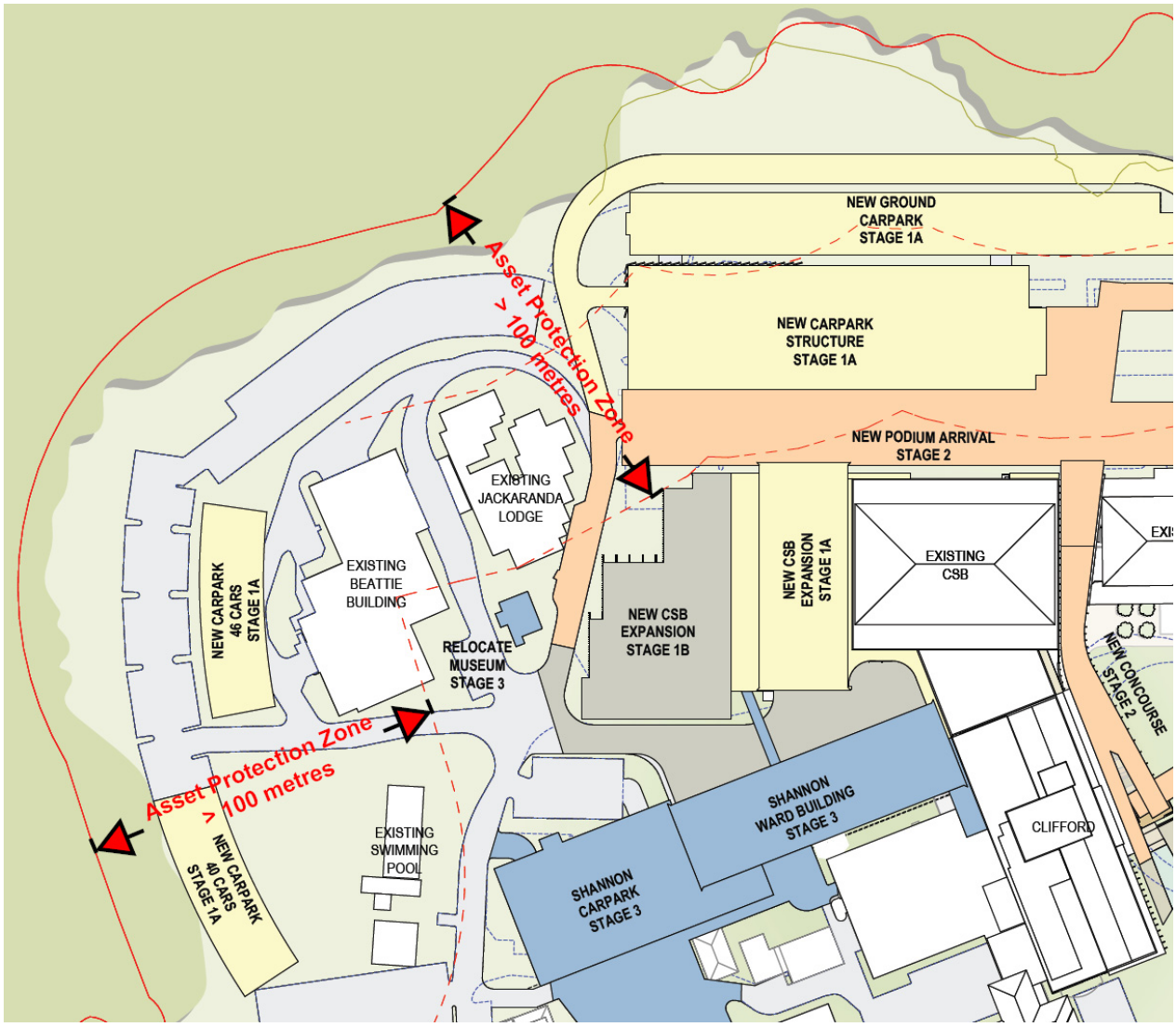
Figure 10 – Extract from the Morrisbray Staging Plan Drawing showing the Asset Protection Zones setbacks to the 'core' Hospital Buildings.



(b) Non-Core Hospital Buildings:

The Stage 1A Development provides for the construction of a multi storey Carpark building to the north of the existing and proposed Clinical Services Building and Stage 2 provides for the construction of an elevated deck which forms the fore-court to the new Main Entry within the Concourse Building [Stage 2]. This elevated deck extends across the northern elevation of the existing San Clinic, new Concourse Building and the existing and proposed Clinical Services Building, connecting to the proposed multi level Car Park building which is located to the north.

Neither of these structures contain 'core' hospital use and they are deemed to be Class 7 buildings as defined by the Building Code of Australia [BCA]. They therefore fall within the requirements of Section 4.3.6(f) of *Planning for Bushfire Protection 2006* which states:

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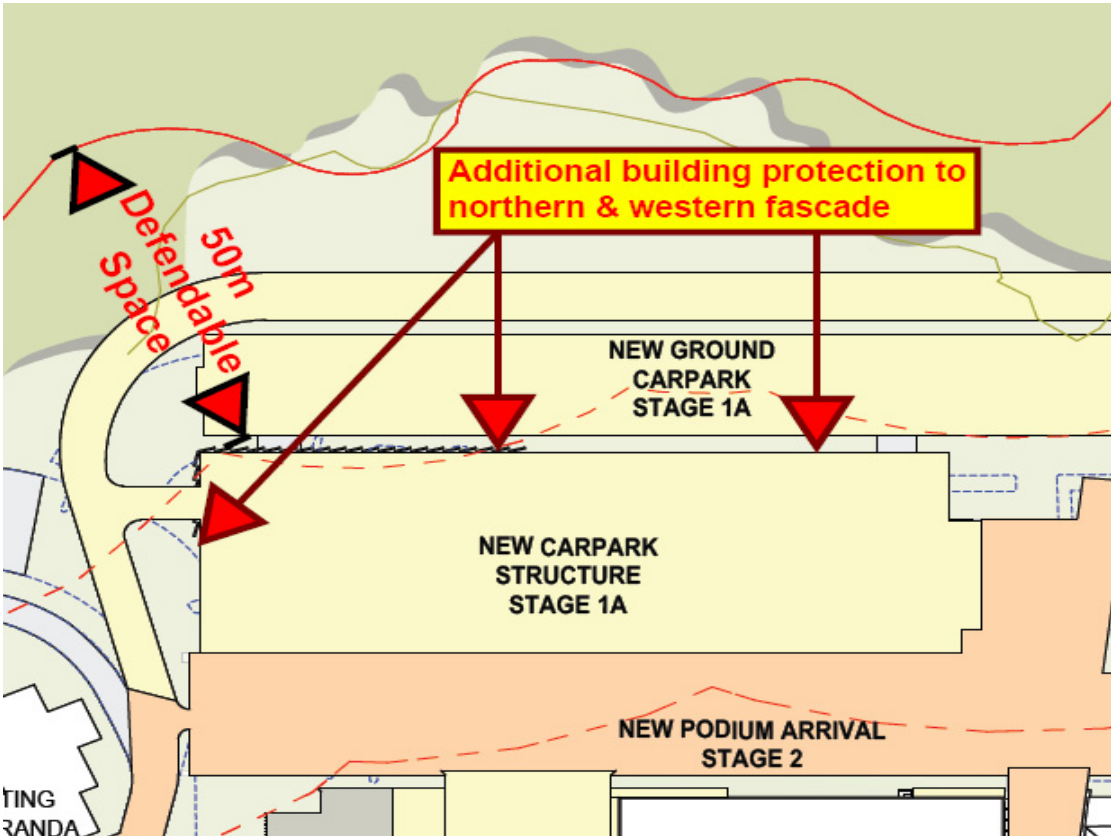
'The general fire safety construction provisions are taken as acceptable solutions, but the aim and objectives of Planning for Bushfire Protection 2006 apply in relation to such matters as access, water and services, emergency planning and landscaping/vegetation management'.

A defendable space of > 50 metres has been provided, based on the advice of the NSW Rural Fire Service that the non-core buildings should be located beyond the flame zone length [the effective slope of the land in the Coups Creek corridor is < 15 degrees downslope in the direction of the fire path from the southwest], between the multi storey Car Park Building and the unmanaged bushland in the riparian corridor to Coups Creek – except for a minor encroachment in the north-western corner of the building.

This encroachment has been approved by the NSW Rural Fire Service, provided that radiant heat shields and ember protection are incorporated into the design of the northern and western facade of the building

[Refer to Figure 11 below showing an extract from the Morrisbray Staging Plan Drawing, showing the location of the proposed Car Park Building and the width of the defendable space setback.

Figure 11 - Showing an extract from the Morrisbray Staging Plan drawing showing the location of the proposed Car Park Building and the defendable space.



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(c) Future Facility of Nursing [Stage 2]:

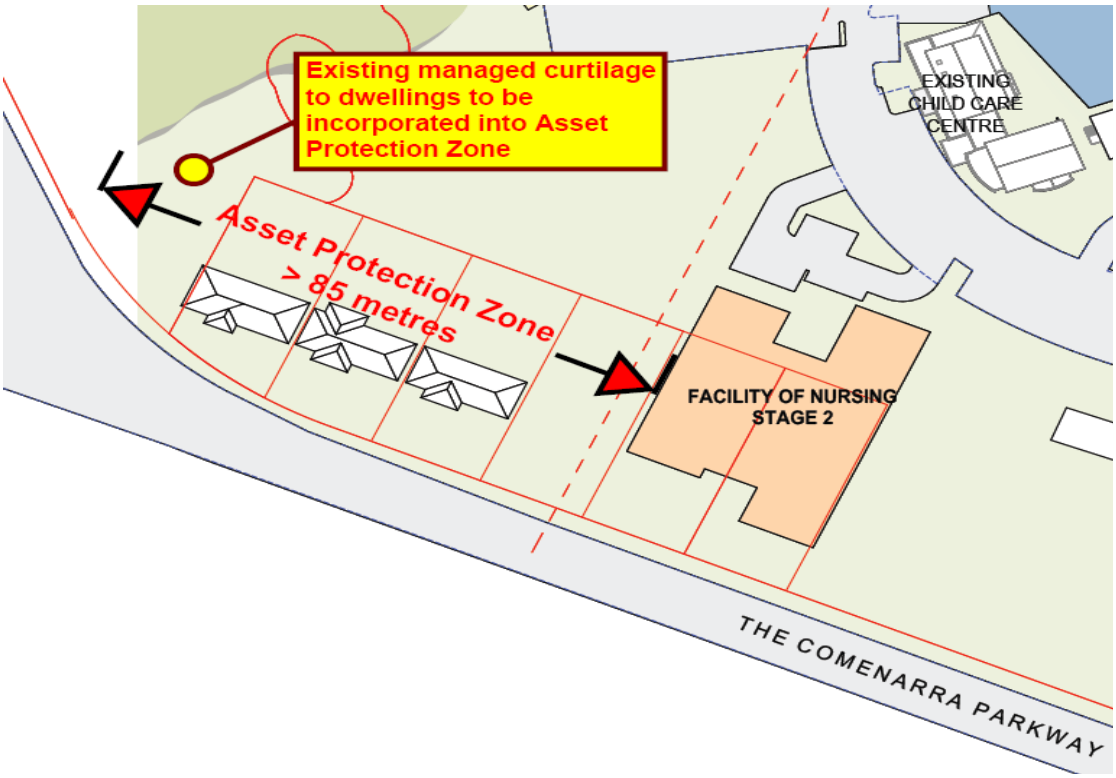
This building forms part of the Stage 2 development and is sited to the west of the existing School grounds, replacing two of the existing residential dwellings along the northern side of The Comenarra Parkway. The NSW Rural Fire Service has classified the proposed building as a *'special fire protection purpose'* development and therefore the building has been located 85 metres to the east of the eastern edge of the bushfire prone vegetation in the tributary to Coups Creek [western aspect of the building].

This width complies with the deemed-to-satisfy Asset Protection Zone separation required by Table A2.6 of *Planning for Bushfire Protection 2006,* for a vegetation formation of *'Forest',* on land with an 'effective slope' of 7 – 8 degrees, being the gradient of the land within the Coups Creek tributary.

The remaining aspects are not exposed to bushfire prone vegetation and no Asset Protection Zone separation is required.

[Refer to Figure 12, being an extract from the Morrisbray Staging Plan Drawing showing the location of the proposed Facility of Nursing and the position of the Critical Riparian Zone/Buffer Zone in the tributary to Coups Creek].

Figure 12 - Showing an extract from the Morrisbray Staging Plan drawing the location of the Facility of Nursing and the Asset Protection Zone to the west.



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6.2.2 Access for Fire-Fighting Operations.

The existing Public Road access to the Hospital Precinct is from Fox Valley Road.

Fox Valley Road is a two-way arterial road which connects the Pacific Highway with The Comenarra Parkway. Fox Valley Road is constructed to the deemed-to-satisfy public road specifications as defined by Section 4.1.3(1) of *Planning for Bushfire Protection 2006.*

Fox Valley Road currently accommodates parking along both sides of the road however the re-development of the Hospital Precinct [and the Estate will provide off-street carparking which will enable Fox Valley Road to be extended to four traffic lanes with an improved intersection at The Comenarra Parkway. These new traffic arrangements will improve emergency access to the Hospital [and neighbouring areas] and improve evacuation routes for residents living in the area to the south of The Comenarra Parkway.

The Stage 1A Hospital redevelopment proposal includes the retention of the current internal road network plus the construction of a new 'perimeter' access road to the north of the existing open car park and new multi storey Car Park building, therefore improving fire-fighting access to the facilities within the Hospital Precinct. This perimeter road will form part of the future perimeter access road identified in the Estate Concept Plan with alternate egress from the new Car Park building provided to the southeast, via the existing internal road network thus ensuring an alternate egress route during fire events in the Coups Creek corridor.

The new 'perimeter' road shall be constructed to the deemed-to-satisfy standards of Section 4.1.3(1) of *Planning for Bushfire Protection 2006,* including the following specifications:

- Have a minimum formed width of 8.0 metres, kerb to kerb;
- Traffic management devices are constructed to facilitate access by emergency services vehicles;
- Have a cross fall not exceeding 3 degrees;
- The minimum inner radius to corners shall be 6.0 metres and the distance between the inner and outer curves is six metres;
- There shall be a minimum vertical clearance of four [4.0] metres above the finished road surface;
- The construction of road surfaces shall be capable of carrying a fully laden firefighting appliance of approximately 15 tonnes [in areas with reticulated water supply].

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6.2.3 Water Supplies for Fire-Fighting Operations:

The existing facilities within the Hospital Precinct are serviced from a water main located on Fox Valley Road. A fire service main is provided to the Hospital Precinct.

The proposed redevelopment of the Hospital Precinct will also include the upgrade of the existing potable water supply and fire-fighting water supply.

Stage 1A of the Staging Plan development includes for the installation of four new Potable Water Tanks and four Fire Tanks each with a capacity of 120,000 litres. In addition to the Fire Tanks a 120,000 litre tank is provided, as part of Stage 1A, for bushfire fighting. The 'tank bank' is located between the existing Nurses Accommodation building and the main Hospital Building with access from Fox Valley Road, via the internal road network *[Refer to Figure 13 below]*.

Stage 1A of the redevelopment also includes an upgrade of the hydrant supply to address the structural fire-fighting provisions of the Building Code of Australia and also includes for the installation of a hydrant ring main supply to the perimeter of the Hospital Precinct, fed from the RFS static water supply tank, specifically for bushfire fighting operations.

Figure 13 below shows the layout of the 'tank bank', the auxiliary pumps and the proposed hydrant supply lines. The tanks are inter-connected so that additional water supplies can be utilized from all tanks for either structural or bushfire fighting operations. Hydrant locations within road carriageways shall be delineated by blue markers placed on the hydrant side of the centreline of the road pavement.

Figure 13 – Location of Static Water Supply Tanks.

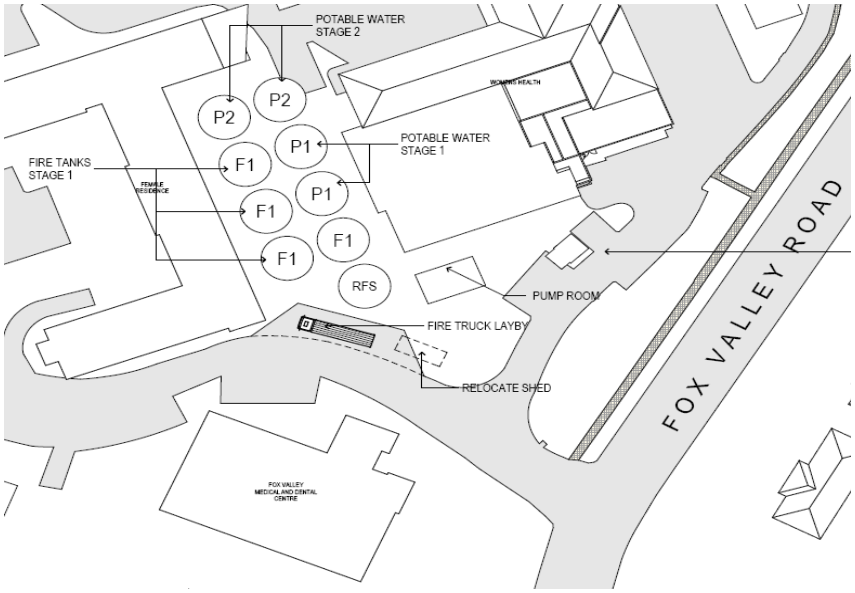

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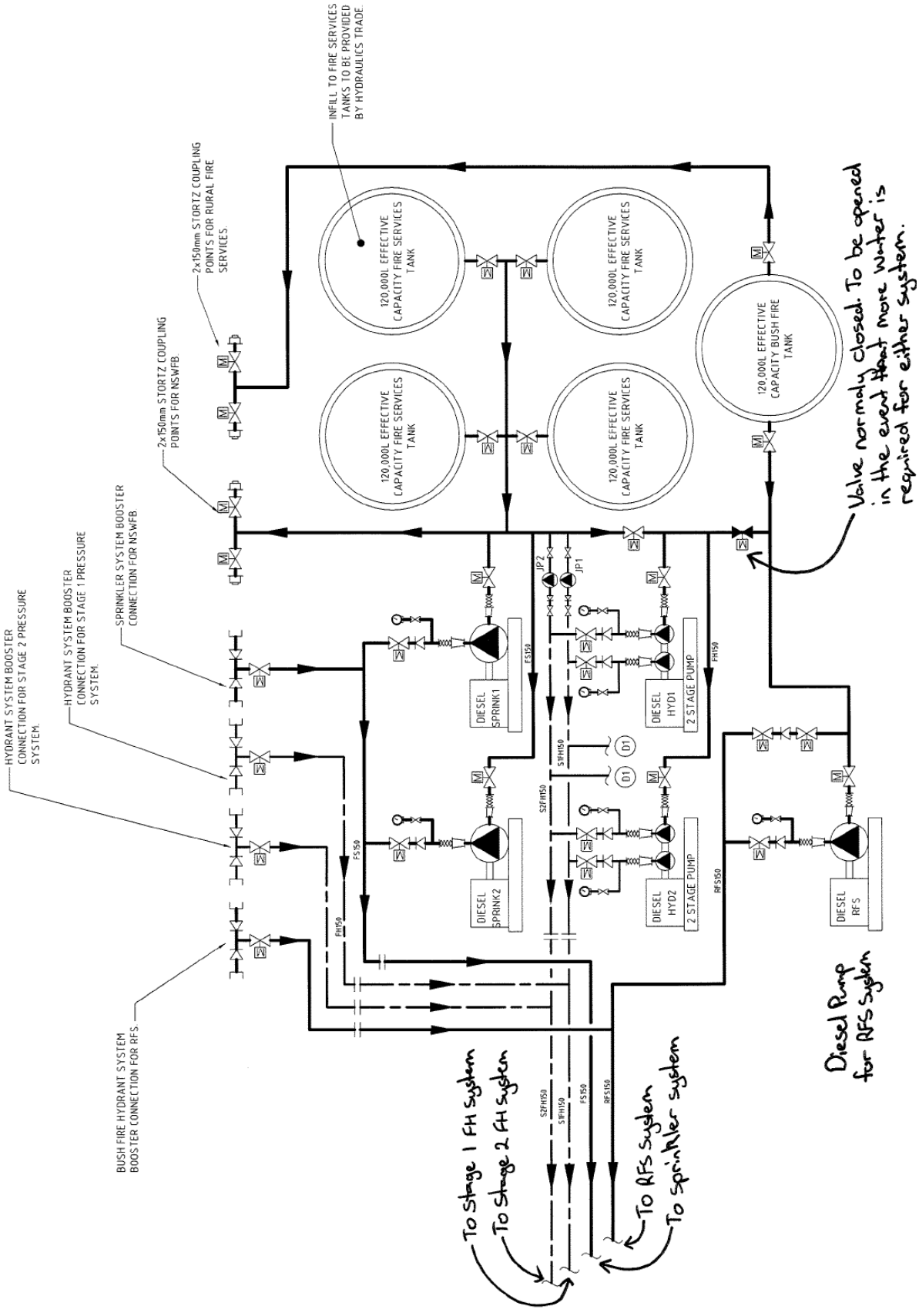
Figure 14 – Diagram of 'Tank Bank' showing static potable and fire-fighting water supply tanks.



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6.2.4 Construction Standards of Buildings:

Part 2.3.4 of the Building Code of Australia [BCA] states that Class 1 buildings that are constructed in a *designated bushfire prone area* must be designed and constructed to reduce the risk of ignition from a bushfire while the fire front passes. Part GF5.1 of the BCA states that a Class 2 or 3 building constructed in a *designated bushfire prone area* is to provide a resistance to bushfires in order to reduce the danger to life and minimize the risk of the loss of the building.

Australian Standard A.S. 3959 - 2009 is the enabling standard that addresses the performance requirements of both Parts 2.3.4 and Part GF5.1 of the Building Code of Australia.

A review of the construction standards to the future buildings within the Hospital Precinct has been undertaken in cooperation with the NSW Rural Fire Service with the following levels of construction identified:

- ***Core Hospital Buildings [e.g. Wards]***
  Radiant heat rating on exterior of building not more than 10kW/m2 or building shielded by a non core building which provides protection against radiant heat from a bushfire fire source feature;

- ***Non-Core Hospital Buildings [e.g. Consulting Rooms / Administration / Offices]***
  Radiant heat rating on exposed elevations shall not exceed Flame Zone levels of radiant heat.

- ***Ancillary, Non-Core Hospital Buildings [e.g. Carparking buildings / Service Buildings]***
  Non combustible construction with defendable space provided.

The core hospital component of the Stage 1A, 1B; Stages 2 & 3 Hospital development consists of buildings which are located more than 100 metres from the unmanaged vegetation within the Coups Creek riparian zone/E2 Environmental Protection Zone. This separation width reduces the radiant heat rating on the exposed elevations of these buildings to less than 10kW/m2 – therefore complying with the maximum levels of radiant heat permitted for a *'Special Fire Purpose Development'.*

As these proposed buildings will be fully air-conditioned, with automatic closing doors and windows which will be closed at all times, there is no requirement to provide additional protection against burning ember impact on the structure however, smoke filters shall be fitted to any new air-conditioning system.

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The non-core Car Park building and access link will be constructed from non-combustible materials and located more than 50 metres from the unmanaged vegetation within the Coups Creek riparian zone [with the exception of the minor encroachment in the north-western corner]. This setback provides a 'defendable space' setback which complies with the aim and objectives of *Planning for Bushfire Protection 2006* and reduces the radiant heat levels at the northern and western elevations of the Car Park building to less than 29kW/m^2.

6.2.5 Emergency Planning.

Each of the individual land uses on the Estate will be required to prepare a site specific Evacuation Plan.

Evacuation principles have been addressed in Section 5.3 of this report.

In the Bushfire Report prepared for the Estate Concept Plan it was recommended that, upon approval of the Estate Concept Plan, an Emergency Liaison Committee be established by the Australian Conference Association [ACA]. The purpose of the committee shall be to co-ordinate the preparation of the various Estate Evacuation Plans, including the Hospital Evacuation Plan, implement evacuation drills and reviews of the individual Evacuation Plans.

It was also recommended that the Chair Person of the Committee shall also attend the Local Emergency Management Committee meetings and bring to those meetings and the Emergency Service Combat Agencies/support Welfare Agencies the emergency planning protocols and issues related to the various land uses within the Estate.

The Committee/Chair Person shall also be responsible for implementing annual inspections of the facilities on the Estate by the Emergency Service Combat Agencies.

6.2.6 Landscape Management - in particular the management of the Asset Protection Zones / Defendable Spaces and residual bushfire prone vegetation.

The intention of landscape management is to prevent flame contact with a structure, reduce radiant heat to below the ignition thresholds for various elements of a building, to minimize the potential for wind driven embers to cause ignition and to reduce the effects of smoke on residents / patients / visitors and fire-fighters.

Careful attention shall be given to species selection of landscaping within the Hospital Precinct, their location relative to their flammability, avoidance of continuity of vegetation [separation horizontally and vertically] and ongoing maintenance to remove flammable fuels.

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Methods of bushfire hazard management include mowing of lawns and manual removal of combustible material, particularly within the landscaped areas and within the pockets of vegetation which adjoin the E2 zoned Environmental Protection Zone. This vegetation shall be managed as an Outer Asset Protection Zone.

The existing maintenance protocols for the gardens and open lawn areas within the Hospital Precinct provides managed areas which comply with the prescriptions of an Inner Asset Protection Zone as defined by Appendix 5 of *Planning for Bushfire Protection 2006* and the NSW Rural Fire Service's *'Standards for Asset Protection Zones'.*

These maintenance protocols shall incorporate those areas of the precinct which have been identified as providing the Asset Protection Zones / defendable spaces to the future buildings planned to be constructed within the Hospital Precinct.

Ground covers shall be used in preference to mulch and the combustible ground litter shall be managed to a maximum dry fuel weight of 8 tonnes / hectare. This management shall be undertaken in accordance with the protocols of the Estate Fire Management Plan.

The fuel management of the residual vegetation in the Coups Creek E2 Environmental Protection zone will form part of the Estate Fire Management Plan.

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SECTION 7

CONCLUSION

A Project Application approval is being sought, under Part 3A [Major Projects] of the *Environmental Planning & Assessment Act 1979* for the staged redevelopment of the Sydney Adventist Hospital, Wahroonga.

The Director General issued on the 10th June 2010, under Major Project No. MP10_0070, the requirements for the preparation of the Environmental Assessment for the Project Application for the alterations & additions to the Sydney Adventist Hospital.

The DGRs included, under 'Key Issues' – Item 14 – *'Bushfire'* compliance with the relevant provisions of *Planning for Bushfire Protection 2006.*

This report has therefore reviewed the proposed Staging Plans prepared by Morris Bray Architects for the alterations and additions to the Sydney Sanitarium Hospital against the deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006*.

Consultation has also occurred with the Development Control Officers of the NSW Rural Fire Service to obtain their advice on the classification of the core and non-core Special Fire Purpose Development within the Hospital Precinct and the requisite Asset Protection Zone setbacks to the proposed expansion of the Clinical Services Building; the Concourse Building; the Shannon Ward building; the Shannon Carpark building; the multi storey Car Park Building, the new Carpark Arrival Deck and the Facility of Nursing.

This consultation has occurred over a number of meetings and resolved that the 'core' hospital use is defined as those areas which are occupied by incapacitated/ill persons [i.e. medical wards, theatres etc.]. These core use areas are deemed to be *'special fire protection purpose'* development and shall therefore be located with separation widths to bushfire prone vegetation which comply with Table A2.6 of *Planning for Bushfire Protection 2006*.

Those areas ancillary to the core hospital areas [i.e. Administration Offices, Doctors Rooms, Carparking buildings etc.] are not deemed to be *'special fire protection purpose'* developments and can therefore be located so as to provide a 'defendable space' setback width to bushfire prone vegetation.

The siting of the 'core' and 'non-core' functions within the Hospital Precinct acknowledges the advice provided by the NSW Rural Fire Service and provides Asset Protection Zones / Defendable Spaces which either comply with or exceed the widths required by *Planning for Bushfire Protection 2006.*

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The report also examines the requirements for the provision of access and water supplies for fire-fighting operations and construction standards to buildings which may be impacted by radiant heat and burning embers.

Emergency management has also been examined and concludes that the fire safety measures incorporated into the proposed redevelopment provides a safe location from which it will not be necessary to relocate patients, staff and visitors, during a bushfire event in the bushland vegetation which will be retained on the Estate.

Table 1 summarises the extent to which the proposed development conforms to the deemed-to-satisfy specifications of *Planning for Bushfire Protection 2006* and the specific advice provided by the NSW Rural Fire Service.

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Table 1. Compliance with the deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006.*

Bushfire Protection Measure	**Compliance with deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006.***
Asset Protection Zone & defendable space setbacks	YES – The widths of Asset Protection Zones comply with Table A2.6 [Special Fire Protection Purpose Development] and Section 4.3.6(f) of *Planning for Bushfire Protection 2006.*
The siting and adequacy of water supplies for fire fighting	YES – Additional static water supply tanks are being installed to provide a potable water supply to the Hospital and also a fire-fighting water supply for structural fires and bushfire events. A hydrant supply is being installed, for structural fire-fighting, in accordance with AS 2419.2 - 2004. A separate hydrant ring main provided to the perimeter of the precinct for bushfire fighting operations.
Design of Public Roads	YES – The existing Public Roads and proposed internal access roads shall comply with the specifications of Section 4.1.3(1) and Section 4.2.7 of *Planning for Bushfire Protection 2006.*
Design of Fire Trail network	No fire trail network required.
Adequacy of emergency response access and egress	YES – Existing and proposed road network provides two-way looped road access throughout the Hospital Precinct, linking to Fox Valley Road. The internal road network provides safe access/egress for emergency service vehicles.
Adequacy of bushfire maintenance plans and fire emergency procedures	YES – The existing Estate Fire Management Plan should be progressively updated to address the provision of Asset Protection Zones to the existing and future development on the site and the fuel management of residual vegetation. A copy of the Estate Fire Management Plan shall be provided to the Hornsby District Office of the NSW Rural Fire Service and the NSW Fire Brigade. A sub-committee shall be established from the members of the Emergency Liaison Committee to over-see the implementations of the recommendations of the Estate Fire Management Plan with the Chair Person of the sub-committee responsible for liaison with the Hornsby Ku-ring-gai Bushfire Management Committee and attendance at Bushfire Management Committee meetings.
Building construction standards	YES – The 'Special Fire Protection Purpose Development' shall not be exposed to radiant heat levels greater than 10kWm2. Class 7 buildings [Car Park buildings/Office Buildings etc] shall be constructed to withstand 29kW/m2 radiant heat loadings on the exterior of the building
Adequacy of sprinkler systems and other fire protection measures to be incorporated into the development	Not applicable

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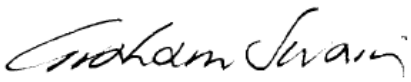
REFERENCES:

- N.S.W Rural Fire Service – *Planning for Bushfire Protection 2006*;
- *Environmental Planning & Assessment Act – 1979;*
- *Rural Fires Act – 1997;*
- *Rural Fires Regulation 2008;*
- NSW Rural Fire Service – *Guideline for Bushfire Prone Land Mapping 2002;*
- *Bushfire Environmental Assessment Code 2003;*
- Building Code of Australia;
- Australian Standard A.S 3959-1999 "*Construction of Buildings in Bushfire Prone Areas".*
- *Ku-ring-gai Bushfire Prone Land Map*



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