BUSHFIRE THREAT ASSESSMENT REPORT

PORT MACQUARIE HOSPITAL POD 4 AND 5 ADDITION

Date:	**12 September 2011** **(amended 10 November 2011)**
Reference:	**11186**
Subject Property:	**Port Macquarie Base Hospital** **Lot 23 DP 1099567 Wrights Road** **Port Macquarie NSW**
Prepared By:	**Peter Thornton** **BPAD – A Certified Practitioner**

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1.0 EXECUTIVE SUMMARY

The existing Port Macquarie Base Hospital (PMBH) is an approved Class 9a Health Care Building pursuant to Part A3.2 of the Building Code of Australia 2011. The proposed additions to the existing building is classified as Infill Special Fire Protection Purpose (SFPP) development as defined by Planning for Bushfire Protection 2006. The existing SFPP facility was approved prior to 1st August 2002.

The existing development is not known to have any specific bushfire protection measures at the time of reporting with regard to construction standards apart from that required by Part C of the Building Code of Australia. A minimum asset protection zone (APZ) width of 22m to the north and 12m to the west and northwest of the proposed addition is capable of being maintained in accordance with Planning for Bushfire Protection 2006. It is noted that the recommended APZ to the west is to the boundary which is shown as being 16.9m – 28.9m from the proposed building addition.

The proposed building works will not be capable of complying with Table A2.6 of Planning for Bushfire Protection 2006 for a Special Fire Protection Purpose (SFPP) given the location of the western side boundary and the limitation to clearing on the subject site. Although the new building works will not comply with Table A2.6 of PBP 2006 the development does comply with the exceptional circumstance provisions of PBP2006 and AS 3959-2009. In turn compliance with Planning for Bushfire Protection 2006 has been demonstrated.

The following table and summary of recommendations are provided identifying each head of consideration and the method of assessment used within the report.

MEASURE	RECOMMENDATION	ASSESSMENT METHOD
APZ Required	22m North and 12m west, northwest to the property boundary or whichever is the greater	Acceptable Solution Exceptional Circumstance
Water Supply	Fire hydrants on site provide coverage.	Acceptable Solution
Electricity Supply	Proposed electricity supply is to be located below ground level.	Acceptable Solution
Gas Supply	No gas supply proposed PBP2006.	Acceptable Solution
Construction Standards	BAL 40 AS 3959-2009	Acceptable Solution.
Landscape	Landscaping is to comply with Appendix 5 of PBP2006.	Acceptable Solution
Access	Access to the proposed building works is available.	Acceptable Solution

1. The following table provides the recommended construction standards and asset protection zones for the addition. The asset protection zones are to be monitored and managed in accordance with Planning for Bushfire Protection 2006 and the 'Standards for Asset Protection Zones' (RFS 2005) and Appendix 5 of PBP2006. To ensure continual maintenance of bushfire measures the conditions of the BFSA shall be included in the Fire Safety Schedule.

Construction Standards & APZ's for Proposed Class 9a Addition

Aspect	APZ Required	BAL AS 3959-2009
North	22m	BAL 40
West	12m or to the property boundary whichever is the greater	BAL 40

2. Should any gas service is to be installed the following aspects will require consideration:
    - Reticulated or bottled gas installed and maintained in accordance with AS 1596 with metal piping used.
    - Fixed gas cylinders to be kept clear of flammable material by a distance of 10m and shielded on the hazard side of the installation
    - Gas cylinders close to the building are to have the release valves directed away from the building and at least 2m from flammable material with connections to and from the gas cylinder being of metal.
    - Polymer sheathed flexible gas supply lines to gas meters adjacent to the buildings are not used.

3. An emergency evacuation procedure and detailed plans of all Emergency Assembly Areas (onsite and offsite) are to be prepared in accordance with the RFS Guidelines for the Preparation of Emergency/Evacuation Plan.

    The emergency evacuation plan is to be submitted to the Consent Authority for approval prior to the occupation certificate being issued. The owners are to provide a copy of the above document to the local Bush Fire Management Committee for their information prior to the occupation of the proposed building works.

    Consideration should be given to the following;

    The building is staffed 24 hours a day and is air-conditioned with the windows generally closed. Given the extent of the extensions it is considered reasonable and performance achieved to negate ember penetration for the evacuation procedure to include ensuring all windows are closed when alarm is raised of potential bushfire or high Fire Danger Index day. However any external vents, air-conditioning intakes etc. that may allow ember attack to impact the internal areas of the building may need consideration for protection. It is also advisable that should an upgrade measures be proposed that they be included on the Fire Safety Schedule to ensure ongoing maintenance assessments.

4. It is recommended that the staff included in the Bushfire Management Procedure familiarise themselves with the relevant bushfire preparation and survival information located on the NSW Rural Fire Service website. This website should be accessed periodically to ensure the staff are aware of the latest information. The RFS website is www.rfs.nsw.gov.au.

5. Fire hydrants to comply with AS 2419.1-2005.

6. The construction standards i.e. BAL 40 AS 3959-2009, asset protection zones and emergency evacuation procedures are to be identified on the Fire Safety Schedule to ensure that adequate maintenance of this items is provided. Asset protection zones should be checked for compliance on a fortnightly basis, construction standards on a monthly basis and evacuation procedures reviewed annually.

2.0 INTRODUCTION

2.1 GENERAL

The following report has been prepared at the request of Mid-North Coast Local Health District to provide supporting information to be referred to the Rural Fire Service pursuant the requirements of clause 44 of the *Rural Fires Regulation* for an application for a Bush Fire Safety Authority.

Under the provisions of section 100B of the *Rural Fires Act 1997* as amended, a Bushfire Safety Authority (BFSA) is required from the Commissioner of the NSW Rural Fire Service given that the site is designated bushfire prone land as identified in Figure 4, Port Macquarie-Hastings Council bushfire prone land map.

The report has been prepared to address the requirements of clause 44 of the *Rural Fires Regulation*, application for *Bush Fire Safety Authority and Environmental Planning and Assessment Act 1979* and addresses the following:

- description (including the address) of the property on which the development the subject of the application is to be carried out,
- classification of the vegetation on and surrounding the property (out to a distance of 140 metres from the boundaries of the property) in accordance with the system for classification of vegetation contained in *Planning for Bush Fire Protection*,
- an assessment of the slope of the land on and surrounding the property (out to a distance of 100 metres from the boundaries of the property),
- a bush fire assessment for the proposed development (including the methodology used in the assessment) that addresses the following matters:
- the extent to which the development is to provide for setbacks, including asset protection zones,
- the siting and adequacy of water supplies for fire fighting,
- the capacity of public roads in the vicinity to handle increased volumes of traffic in the event of a bush fire emergency,
- whether or not public roads in the vicinity that link with the fire trail network have two-way access,
- the adequacy of arrangements for access to and egress from the development site for the purposes of an emergency response,
- the adequacy of bush fire maintenance plans and fire emergency procedures for the development site,
- the construction standards to be used for building elements in the development,
- the adequacy of sprinkler systems and other fire protection measures to be incorporated into the development,
- an assessment of the extent to which the proposed development conforms with or deviates from the standards, specific objectives and performance criteria set out in Chapter 4 (Performance Based Controls) of *Planning for Bush Fire Protection*.

The proposed building works will not be capable of complying with Table A2.6 of Planning for Bushfire Protection 2006 for a Special Fire Protection Purpose (SFPP). The report however notes Section 4.2.5 of Planning for Bushfire Protection 2006 which requires SFPPs that are classified as infill development have

"an appropriate combination of bush fire protection measures and compliance with the intent and performance criteria of each measure within Section 4.3.5." and

"seek to achieve a better outcome (such as improved construction standards) than if the development did not proceed" and

"The new building work should comply with AS 3959-2009'

In the above regard the development meets these criteria.

Section 4.2.5 acknowledges that in some existing circumstances the preferred standards are difficult to achieve and in these circumstances the specific objectives in Section 4.2.3 are to be followed. In this regard the building has many external required exits that will be shielded from the hazard and will allow emergency personnel to assist people without significant exposure to the hazard.

Further, there are a number of fire compartments with the building that will allow for horizontal evacuation which is generally the preferred means of escaping the effects of fire in a hospital development.

The recommendations within this report will detail general compliance with Section 3.3, Section 4.2.7 and the aim and objectives of Planning for Bushfire Protection 2006 to reduce the risk of ignition of the building in a bushfire event. It is noted however that bushfire is a natural phenomenon and there can never be any guarantee that a building or occupants will not be adversely affect by bushfire.

2.2 SIGNIFICANT ENVIRONMENTAL FEATURES

An assessment is to be undertaken with regard to:

- State Environmental Planning Policy No. 44 (Koala Habitat Protection).
- Threatened Species Conservation Act (1995).
- Environmental Protection and Biodiversity Conservation Act (1999).
- National Parks and Wildlife Act, 1974 (Wildlife Atlas)
- Native Vegetation Act 2003

This report **does not** consider the above legislation and in this regard this report should be read in conjunction with the Statement of Environmental Effects submitted with the application and form part of the BFSA application or advice application.

2.3 REPORT DETAILS

Report Reference No.:	11186
Property Address:	Lot 23 DP 1099567 Wrights Road, Port Macquarie
Local Government Area:	Port Macquarie-Hastings Council
Proposal:	4th & 5th Pod addition to Port Macquarie Base Hospital
Drawings:	Hassell Architects (see site plan in Appendix)
Report Prepared By:	Peter Thornton MFireSafeEng
	Building Surveyor (MAIBS)
	BPAD – A Certified Practitioner

3.0 PROPOSED DEVELOPMENT

The proposed additions are located in the west precinct of the site which has been surveyed by the architect as being the only reasonable area to locate the building given the use of the proposed building and functionality with the existing hospital. As requested by the RFS this has been specifically documented in Appendix C of this report. Egress from the proposed addition will be to the north, west, east and south thereby allowing egress in the opposite direction to the location of the hazard.

The existing building is provided with fire safety measures that are consistent with that required by the Building Code of Australia (BCA) and includes items such as fire hydrants, fire hose reels, fire and smoke compartmentation, portable fire extinguishers and smoke detection and alarm system etc.

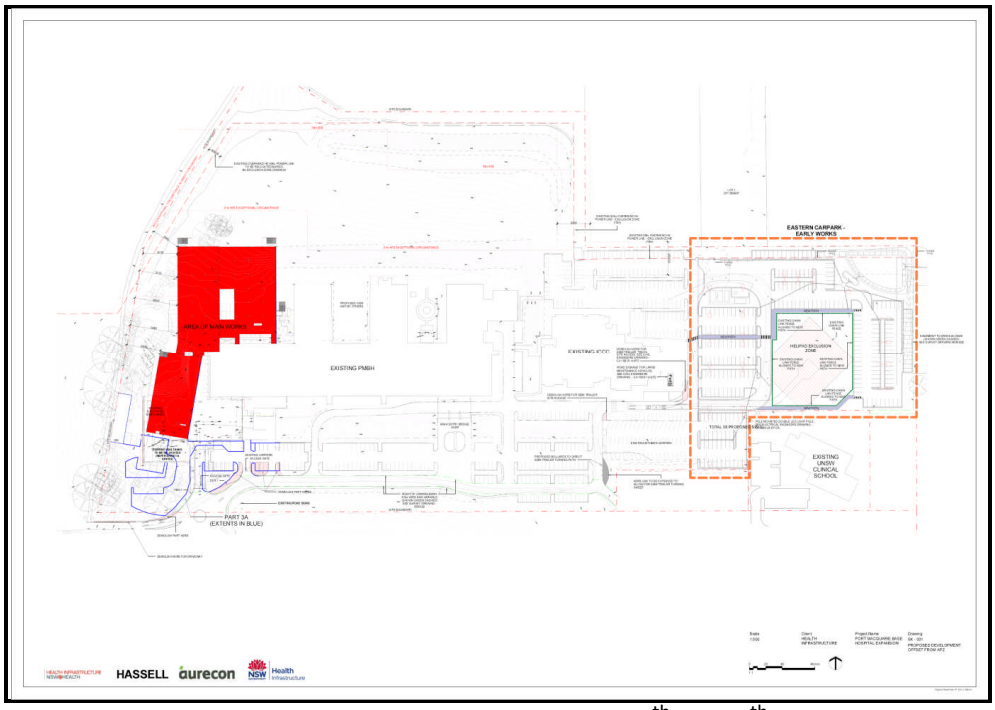


Figure 1 – Site plan and location of the proposed 4th and 5th Pod addition
(See Appendix A for additional clarity of nominated setbacks).

Proposed location of the additions

Figure 2 – Proposed location of the building addition

4.0 BUSHFIRE THREAT ASSESSMENT

The bushfire threat is primarily location to the north, northwest and west of the proposed addition. The vegetation to the west has a direct fire run to the proposed development is approximately 50m it being noted that a pathway is located on the adjoining Council owned land adjacent to the side boundary. To the southwest there are small areas of fire run that angle for a distance of approximately 60m however the primary direct fire runs for a 100m wide fire front are approximately 50m.

This has been confirmed in the survey as shown in Figure 3 which shows the slope and width of the vegetation to the west. The survey has been taken from the western property boundary to the trunks of the furthest tree adjacent to the road reserve to establish the width of the vegetation it being noted that the canopy of the trees adjacent to the road reserve will not be involved in fire given this is the initiation point.

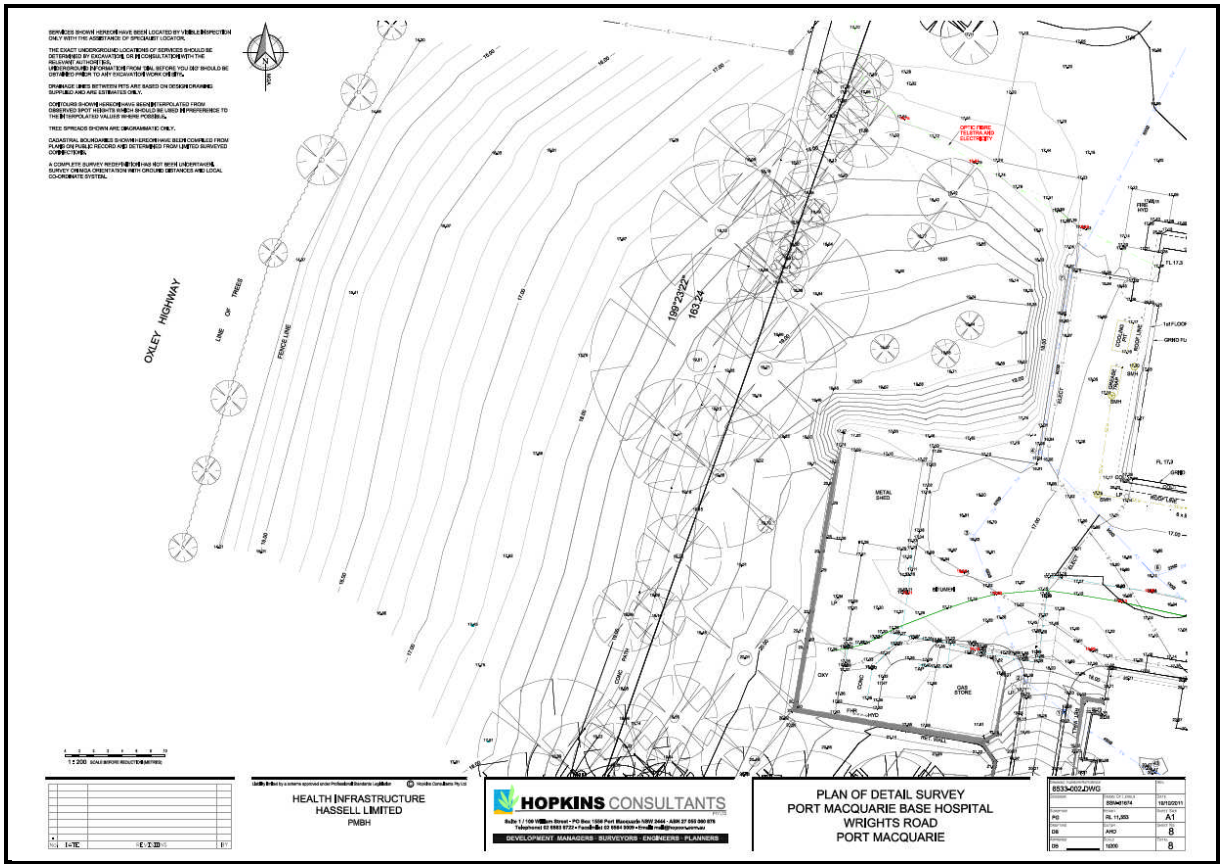


Figure 3 – Survey of vegetation to the west of the proposed development.

The vegetation is in a ribbon shape that is runs north/south adjacent to the western boundary and therefore the concession outlined in A2.3 of Planning for Bushfire Protection 2006 can reasonably be applied. It is also noted that the bushfire prone land mapping identifies the hazard as being Category 2 vegetation.

Figure 4 – Aerial photograph identifies the shape of the hazard and disconnection from large areas of vegetation.

It is noted however that the fire run to the north the fire run is approximately 120m in length given the location of vegetation within the site and therefore the hazard will be assessed as Open Forest for the purpose of the assessment.

The slope to the north has been measured over the entire fire run within the vegetation to the north, the slope most likely to be significant to bushfire behaviour will be 0-5^0 downslope. The vegetation to the southeast is remnant vegetation however it is completely shielded by the existing building and greater than 50m from the development. The vegetation to the west is generally on a downslope of 0-5^0 however some areas have slopes that slightly exceed 5^0 i.e. (7^0) and in turn the analysis will be based on a 5-10^0 downslope.

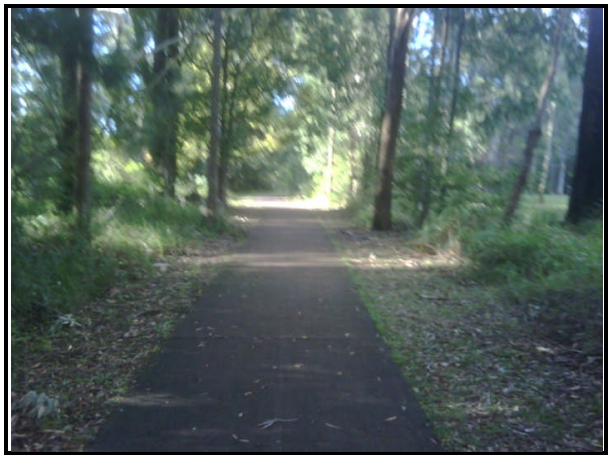
Table 1: Summary Bushfire Threat Assessment, APZs and Construction Standards

ASPECT	VEG. CLASS (Table A2.1 PBP2006)	SLOPE	APZ	BUSHFIRE ATTACK LEVEL (BAL) AS 3959-2009
North	Open Forest.	0-5$^{0\ d/s}$	22m	BAL 40
West	Remnant forest	5-10$^{0\ d/s}$	12m	BAL 40

Whilst to comply with Appendix 3 of PBP2006 the minimum APZ to the west will be 12m the landscaping plan indicates that the building is setback from the west boundary 16.9m to 28.9m with the majority of the building being approximately at least 20m from the western boundary and in essence capable of complying with BAL 29.

It is recommended that the APZ extend to the boundary subject to provide additional redundancy to ensure that the building will not be within the flame zone. The architect has advised that verbally the ecologist did not object to the APZ. Although the extended APZ may reduce the level of construction to BAL 29 it is recommended that the Bushfire Attack Level (BAL) remain as BAL 40 AS 3959-2009.

Vegetation on the subject property to the north is reasonably well maintained at surface level.



Council pathway adjacent to the western boundary of the subject property

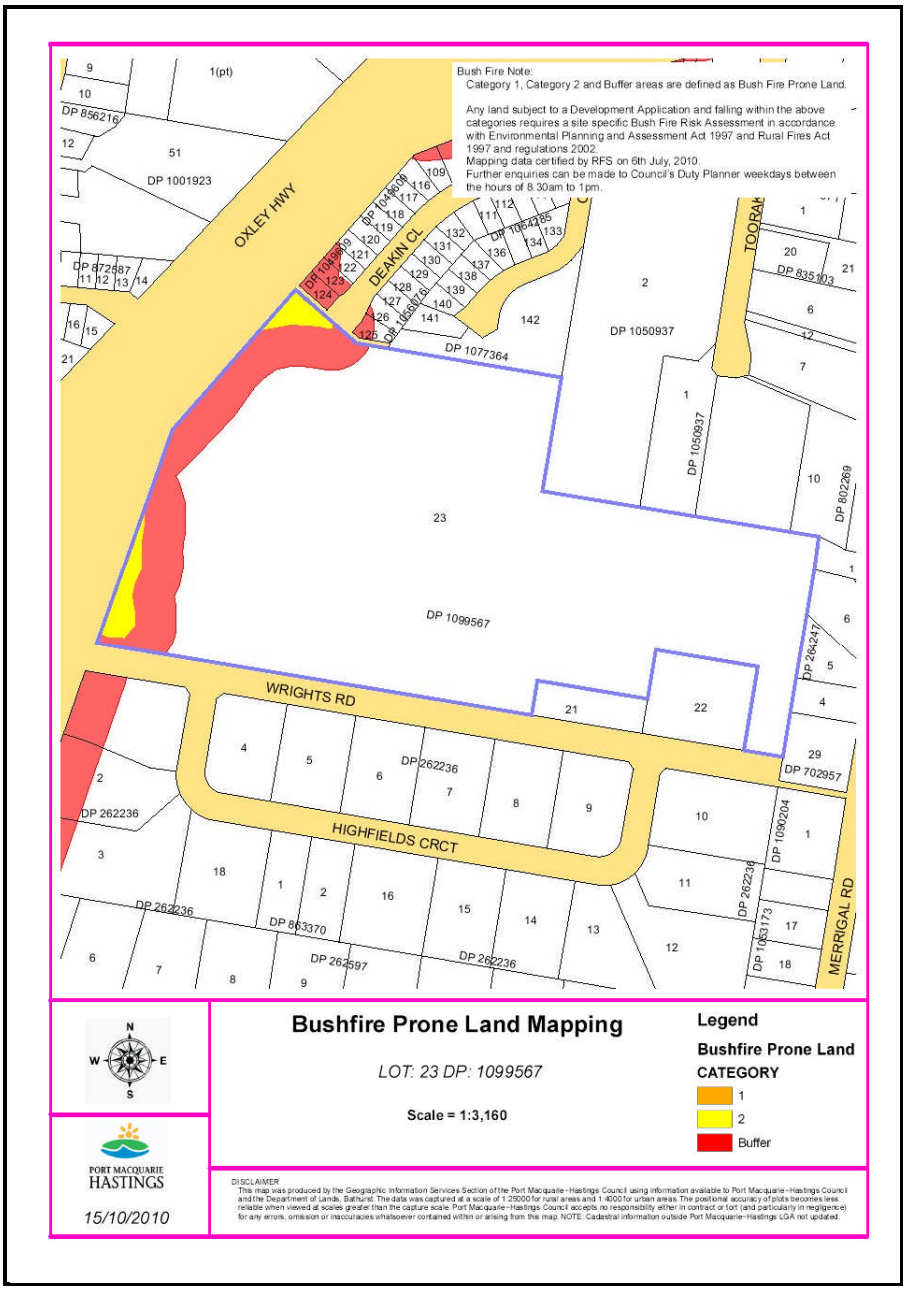


Figure 5 – Port Macquarie-Hastings Council bushfire prone land map

As required by Planning for Bushfire Protection 2006 exceptional circumstances is applicable given that the development has been established as an infill special fire protection purpose. The APZ's are required by Table A2.6 PBP2006 cannot be achieved due to limitations to clearing beyond the location of the western boundary which will in turn not allow these APZ's on the subject property.

SECTION 4.2.5 – SFPPs AS INFILL

Section 4.2.5 of Planning for Bushfire Protection 2006 identifies alterations and additions to existing SFPP's which may involve an increase in size and footprint of the building are considered to be infill development.

Section 4.2.5 states that;

'This type of development should also seek to achieve a better bush fire outcome (such as improved construction standards) than if the development did not proceed. The new building work should comply with AS 3959-2009 (and appendix 3 of PBP) ***or*** *be no closer to the hazard than the existing building. Existing facilities such as water supply should also be upgraded'.*

BUILDING ACHIEVES A BETTER OUTCOME THAN IF THE DEVELOPMENT DID NOT PROCEED

The existing development does not have any significant bushfire safety protection measures, with exception to a fire hydrant system, which would be considered sufficient to reduce the risk of ignition or provide adequate protection to the occupants and emergency service personnel.

It is acknowledged that the bushfire threat to the existing health care facility is relevant and an opportunity is available to implement a number of bushfire safety measures with the development. The proposed development will provide the Rural Fire Service an opportunity to specifically require and asset protection zone and the preparation of an Evacuation Plan and Fire Management Plan thereby creating a more controlled and safer environment during a bushfire event should the development proceed.

The proposed building will be provided with construction standards that will limit the risk of ignition as required by the relevant performance standard of Part G of the Building Code of Australia 2011, Appendix 3 of Planning for Bushfire Protection 2006 and AS 3959-2009.

The assessment ensures that the facility in general will have a higher level of bushfire safety with the development proceeding as outlined in the following points.

- The recommended asset protection zone (Table A3.4 PBP2006) and landscaping complying with Planning for Bushfire Protection 2006.
- Evacuation plans/procedures are to be prepared and submitted to the RFS for approval prior to occupation.
- The proposed building will have construction standards that will limit the risk of ignition i.e. compliance with AS 3959-2009 for BAL 40

- Upgrading the existing buildings for ember protection to external openings i.e. vents may be considered and is at the discretion of the RFS however it is recommended that as a minimum there must be procedures in the evacuation plan to ensure all windows and doors are closed in a local bushfire event.

THE NEW BUILDING WORK SHOULD COMPLY WITH AS 3959-2009 AND APPENDIX 3 PBP

The building generally have sufficient asset protection zones to allow the building to be constructed to BAL 29 however the recommendation, given the building type will be for construction to BAL 40 + Appendix 3 PBP2006. In turn the building will be constructed in accordance with AS 3959-2009 (NSW Variation) and will comply with the requirement of s4.2.5 of PBP2006.

5.0 ASSET PROTECTION ZONES AND CONSTRUCTION STANDARDS

Performance Criteria	Acceptable Solutions	Comment
The intent may be achieved where:		
Radiant heat levels of greater than 10kW/m^2 will not be experienced by occupants or emergency services workers entering or exiting a building	An APZ is provided in accordance with the relevant tables and figures in Appendix 2 of PBP2006. Exits are located away from the hazard side of the building. The APZ is wholly within the boundaries of the development site. Exceptional circumstances may apply (see section 3.3)	Exceptional circumstances demonstrated. Compliance with AS 3959-2009 achieved. Complies Complies
Applicants demonstrate that issues relating to slope are addressed: maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.	Mechanisms are in place to provide for the maintenance of the APZ over the life of the development. The APZ is not located on lands with a slope exceeding 18 degrees	To be included as a condition of approval Complies
APZs are managed and maintained to prevent the spread of a fire towards the building.	In accordance with the requirements of 'Standards for Asset Protection Zones (RFS 2005).	Capable of compliance.
Vegetation is managed to prevent flame contact and reduce radiant heat to buildings, minimise the potential for wind driven embers to cause ignition and reduce the effects of smoke on residents and fire fighters.	Compliance with Appendix 5 of PBP2006	To be conditioned for compliance.

Asset Protection Zones are areas established and maintained to ensure that bushfire fuels are progressively reduced between the development and the bushfire hazard. The Asset Protection Zone incorporates an Inner Protection Area (IPA).

6.0 WATER AND UTILITY SERVICES

Adequate water supply is a critical requirement for fire-fighting purposes in the event of a bushfire. Electrical and gas supply can also have an impact in a bushfire event by increase the risk of ignition to a building and to personal safety during suppression or evacuation stages. Electrical supply is to be placed underground.

Fire hydrants are located throughout the hospital grounds and will provide coverage to the buildings pursuant to the requirements of Part E of the BCA and AS 2419.1. Fire hose reels are provided within the facility and together with the fire hydrants have been included on a fire safety schedule and therefore assumed to have received the required maintenance and meet the required performance standards.

Should a gas service be installed the following aspects will require consideration:

- Reticulated or bottled gas installed and maintained in accordance with AS 1596 with metal piping used.
- Fixed gas cylinders to be kept clear of flammable material by a distance of 10m and shielded on the hazard side of the installation.
- Gas cylinders close to the building are to have the release valves directed away from the building and at least 2m from flammable material with connections to and from the gas cylinder being of metal.
- Polymer sheathed flexible gas supply lines to gas meters adjacent to the building is not used.

New electrical works will be required to be underground it being noted that part of the existing electrical network is being buried where within 10m of the building for safety purposes however it is not proposed to bury the entire existing electrical system.

7.0 ACCESS

The proposed building is located within close proximity of the public road and access for fire –fighters is considered to be functional for fire fighting vehicles. The carparking area and access road is located on the southern side of the building. The building will be supported with a ring hydrant system and booster to allow fire fighting intervention to be staged at the front of the hospital building.

8.0 EMERGENCY AND EVACUATION PLANNING

Emergency and evacuation planning is a critical measure for a Special Fire Protection Purpose to provide a higher level of co-ordination and safety for the occupants in a bushfire event. It is extremely important that the emergency plan is constantly monitored and amended when required and that training of staff, participants and stakeholders is sustained at a high level.

The following table outlines the requirements and comments, it being noted that the development is to fully comply with the acceptable solutions in consultation with the Rural Fire Service.

Performance Criteria	Acceptable Solutions	Comment
Intent achieved where:		
An Emergency and Evacuation Management Plan is approved by the relevant fire authority for the area	An emergency/evacuation plan is prepared consistent with the RFS Guidelines for the Preparation of Emergency/Evacuation Plan. Compliance with AS 4083-1997 and the relevant provisions of AS 3745-2002 'Emergency control organization and procedures for buildings, structures and workplaces' for residential accommodation'. NB: The developer should provide a copy of the above document to the local Bush Fire Management Committee for their information prior to the occupation of any accommodation of a SFPP.	To comply and to be approved prior to occupation
Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan	An Emergency Planning Committee is established to consult with staff in developing and implementing an Emergency Procedures Manual. Detailed plans of all Emergency Assembly Areas including "onsite" and "offsite" arrangements as stated in Compliance with AS 4083-1997 AS 3745-2002 are clearly displayed, and an annual (as a minimum) trial emergency evacuation is conducted.	To comply and to be approved prior to occupation

Compliance with the acceptable solutions is capable of being achieved and in this regard an emergency evacuation procedure is to be prepared and submitted to the Consent Authority for approval prior to the occupation of the building.

An emergency evacuation procedure and detailed plans of all Emergency Assembly Areas (onsite and offsite) are to be prepared in accordance with the RFS Guidelines for the Preparation of Emergency/Evacuation Plan, AS 4087-1997 and AS 3745-2002.

The emergency evacuation plan is to be submitted to the Consent Authority or Certifier and approved prior to the occupation of the building. A copy of the approved document is to be provided to the local Bush Fire Management Committee for their information prior to occupation of the building. Consideration should also be given to the existing bushfire evacuation plan and the existing risks outlined in the recommendations with in this report

9.0 CONCLUSION

The report has established that:

- The proposed development is classified as and meets the intent of an infill Special Fire Protection Purposed development.
- The proposed building is to be constructed pursuant to AS 3959-2009
- The development based on the recommendation in this report will create a safer environment during a bushfire event than currently exists.
- The required asset protection zones are capable of being achieved to the new building additions.
- A water supply exists in the form of on-site hydrants and hose reels.

The recommendations in this report and the executive summary are made to the Rural Fire Service for advice purposes.

Disclaimer
This report was prepared for the purposes and exclusive use of the stated client to accompany a specific written referral to the NSW Rural Fire Service for advice for a proposed Special Fire Protection Purpose, and is not to be used for any other purpose or by any other person or Corporation. BCA Check Pty Ltd accepts no responsibility for any loss or damage suffered howsoever arising to any person or Corporation who may use or rely on this report in contravention of the terms of this clause.

As identified in Planning for Bushfire Protection 2006 and the Building Code of Australia the report is to provide recommendations to reduce the risk of ignition of the proposed additions and does not guarantee the complete building and occupant protection of the building in the event of bush fire. It is noted that the existing building is not considered to be capable of adequately withstanding the impact of a potential bushfire even though the report endeavours to reduce the risk to that currently achieved.

Reporting has been based on the relevant Council and Rural Fire Service Guidelines, however, recommendations given in this report are based on our site investigation at the time of reporting. In some cases site conditions may change dramatically within a few years due to rapid vegetation re-growth and invading weed species.

References:

ABCB, (2011), The Building Code of Australia, *Australian Building Codes Board Canberra,* Volume 1.

NSW Rural Fire Service and Planning NSW (2006), *Planning for bushfire protection, A guide for councils planners fire authorities developers and homeowners.* Rural Fire Service NSW Australia.

Standards Australia, (2009), AS3959 *Construction of buildings in bushfire prone areas,* Australian Standards, Sydney.

Legislation.

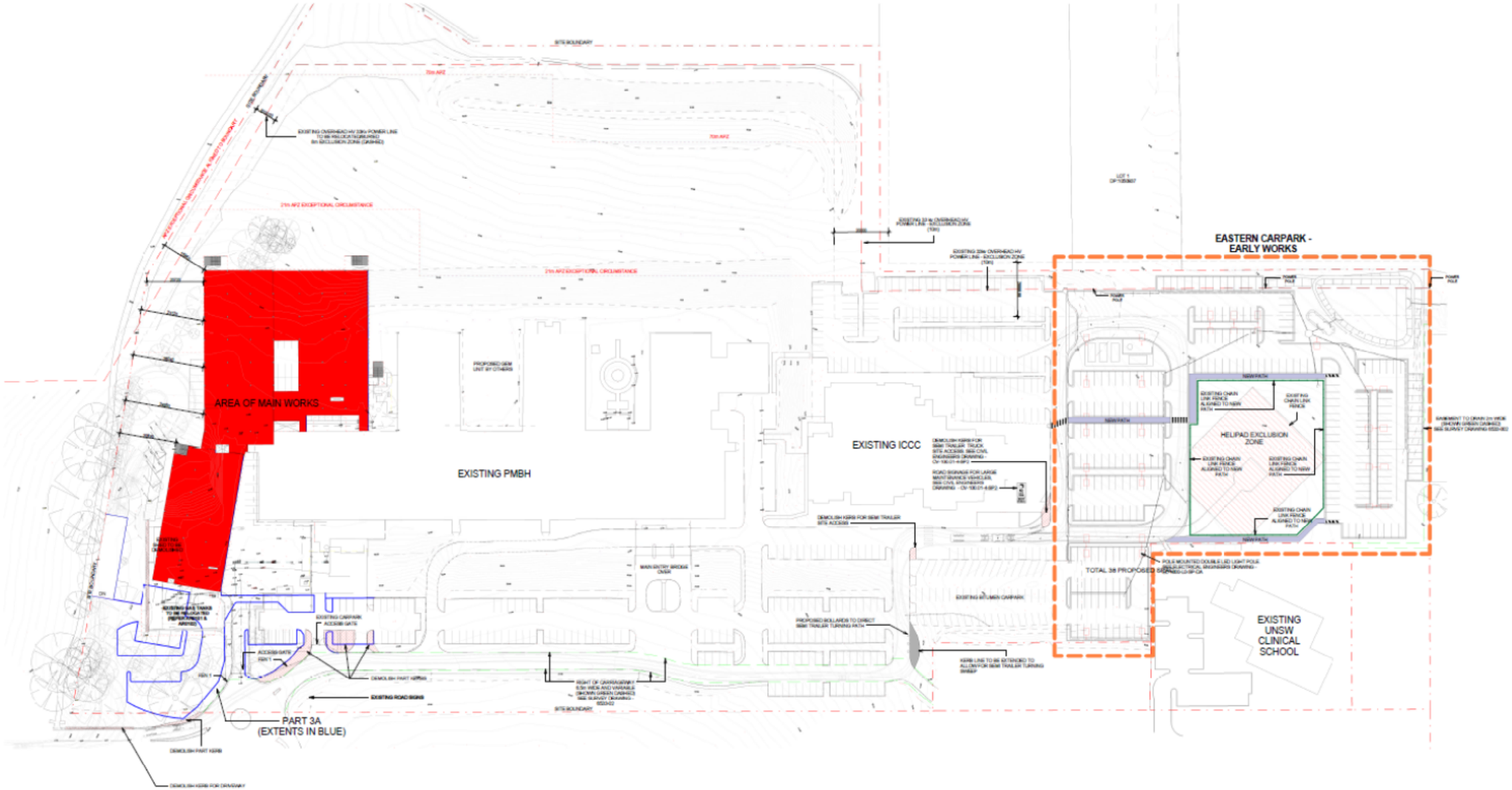
Environmental Planning and Assessment Act 1979 and Regulations 2000. *New South Wales.* Parliamentary Counsel's Office, NSW Government Information Service.

Rural Fires Act 1997. *New South Wales.* Parliamentary Counsel's Office, NSW Government Information Service.

Rural Fires Regulation. *New South Wales.* Parliamentary Counsel's Office, NSW Government Information Service.

APPENDIX A

Building location in relation to Asset Protection Zones



Scale	Client	Project Name	Drawing
1:500	HEALTH INFRASTRUCTURE	PORT MACQUARIE BASE HOSPITAL EXPANSION	SK - 001 PROPOSED DEVELOPMENT OFFSET FROM APZ

0 20 40 80mm
1:1

HEALTH INFRASTRUCTURE NSW HEALTH
HASSELL
aurecon
NSW Health Infrastructure

APPENDIX B

Standards for Asset Protection Zones (RFS 2005)

standards

for asset protection zones

protection

NSW RURAL FIRE SERVICE

STANDARDS FOR ASSET PROTECTION ZONES

INTRODUCTION

For thousands of years bush fires have been a natural part of the Australian landscape. They are inevitable and essential, as many Australian plants and animals have adapted to fire as part of their life cycle.

In recent years developments in bushland areas have increased the risk of bush fires harming people and their homes and property. But landowners can significantly reduce the impact of bush fires on their property by identifying and minimising bush fire hazards. There are a number of ways to reduce the level of hazard to your property, but one of the most important is the creation and maintenance of an Asset Protection Zone (APZ).

A well located and maintained APZ should be used in conjunction with other preparations such as good property maintenance, appropriate building materials and developing a family action plan.

WHAT IS AN ASSET PROTECTION ZONE?

An Asset Protection Zone (APZ) is a fuel reduced area surrounding a built asset or structure. This can include any residential building or major building such as farm and machinery sheds, or industrial, commercial or heritage buildings.

An APZ provides:

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

Potential bush fire fuels should be minimised within an APZ. This is so that the vegetation within the planned zone does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy.

WHAT WILL THE APZ DO?

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

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

WHERE SHOULD I PUT AN APZ?

An APZ is located between an asset and a bush fire hazard.

The APZ should be located wholly within your land. You cannot undertake any clearing of vegetation on a neighbour's property, including National Park estate, Crown land or land under the management of your local council, unless you have written approval.

If you believe that the land adjacent to your property is a bush fire hazard and should be part of an APZ, you can have the matter investigated by contacting the NSW Rural Fire Service (RFS).

There are six steps to creating and maintaining an APZ. These are:

1. Determine if an APZ is required;
2. Determine what approvals are required for constructing your APZ;
3. Determine the APZ width required;
4. Determine what hazard reduction method is required to reduce bush fire fuel in your APZ;
5. Take measures to prevent soil erosion in your APZ; and
6. Landscape and regularly monitor in your APZ for fuel regrowth.

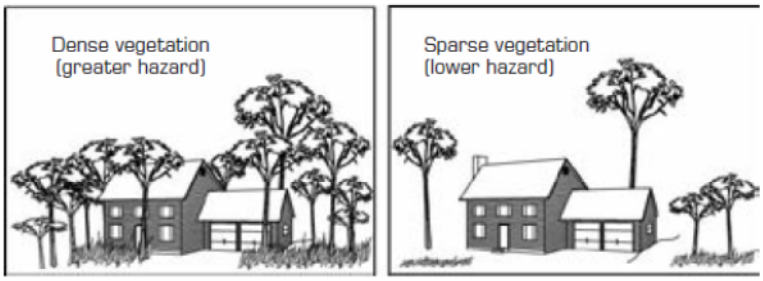
STEP 1. DETERMINE IF AN APZ IS REQUIRED

Recognising that a bush fire hazard exists is the first step in developing an APZ for your property.

If you have vegetation close to your asset and you live in a bush fire prone or high risk area, you should consider creating and maintaining an APZ.

Generally, the more flammable and dense the vegetation, the greater the hazard will be. However, the hazard potential is also influenced by factors such as slope.

- A large area of continuous vegetation on sloping land may increase the potential bush fire hazard.
- The amount of vegetation around a house will influence the intensity and severity of a bush fire.
- The higher the available fuel the more intense a fire will be.



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Isolated areas of vegetation are generally not a bush fire hazard, as they are not large enough to produce fire of an intensity that will threaten dwellings.

This includes:

- bushland areas of less than one hectare that are isolated from large bushland areas; and
- narrow strips of vegetation along road and river corridors.

If you are not sure if there is a bush fire hazard in or around your property, contact your local NSW Rural Fire Service Fire Control Centre or your local council for advice.

STEP 2. DETERMINE WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING YOUR APZ

If you intend to undertake bush fire hazard reduction works to create or maintain an APZ you must gain the written consent of the landowner.

Subdivided land or construction of a new dwelling
If you are constructing an APZ for a new dwelling you will need to comply with the requirements in *Planning for Bushfire Protection*. Any approvals required will have to be obtained as part of the Development Application process.

Existing asset
If you wish to create or maintain an APZ for an existing structure you may need to obtain an environmental approval. The RFS offers a free environmental assessment and certificate issuing service for essential hazard reduction works. For more information see the RFS document *Application Instructions for a Bush Fire Hazard Reduction Certificate* or contact your local RFS Fire Control Centre to determine if you can use this approval process.

Bear in mind that all work undertaken must be consistent with any existing land management agreements (e.g. a conservation agreement, or property vegetation plan) entered into by the property owner.

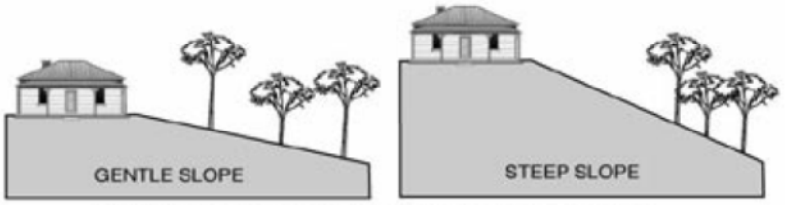
If your current development consent provides for an APZ, you do not need further approvals for works that are consistent with this consent.

If you intend to burn off to reduce fuel levels on your property you may also need to obtain a Fire Permit through the RFS or NSW Fire Brigades. See the RFS document *Before You Light That Fire* for an explanation of when a permit is required.

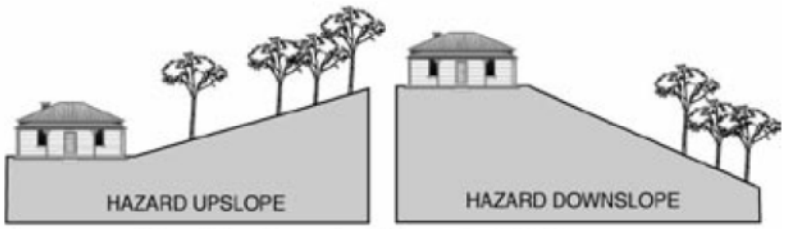
STEP 3. DETERMINE THE APZ WIDTH

The size of the APZ required around your asset depends on the nature of the asset, the slope of the area, the type and structure of nearby vegetation and whether the vegetation is managed.

Fires burn faster uphill than downhill, so the APZ will need to be larger if the hazard is downslope of the asset.



Gentle slopes require a smaller APZ distance than steep slopes



A hazard downslope will require a greater APZ distance then a hazard upslope of the asset

Different types of vegetation (for example, forests, rainforests, woodlands, grasslands) behave differently during a bush fire. For example, a forest with shrubby understorey is likely to result in a higher intensity fire than a woodland with a grassy understorey and would therefore require a greater APZ width.

A key benefit of an APZ is that it reduces radiant heat and the potential for direct flame contact on homes and other buildings. Residential dwellings require a wider APZ than sheds or stockyards because the dwelling is more likely to be used as a refuge during bush fire.

Subdivided land or construction of a new dwelling
If you are constructing a new asset, the principles of *Planning for Bushfire Protection* should be applied. Your Development Application approval will detail the exact APZ distance required.

Existing asset
If you wish to create an APZ around an existing asset and you require environmental approval, the Bush Fire Environmental Assessment Code provides a streamlined assessment process. Your Bush Fire Hazard Reduction Certificate (or alternate environmental approval) will specify the maximum APZ width allowed.

For further information on APZ widths see *Planning for Bushfire Protection* or the *Bush Fire Environmental Assessment Code* (available on the RFS website), or contact your local RFS Fire Control Centre.

STEP 4. DETERMINE WHAT HAZARD REDUCTION METHOD IS REQUIRED TO REDUCE BUSH FIRE FUEL IN YOUR APZ

The intensity of bush fires can be greatly reduced where there is little to no available fuel for burning. In order to control bush fire fuels you can reduce, remove or change the state of the fuel through several means.

Reduction of fuel does not require removal of all vegetation, which would cause environmental damage. Also, trees and plants can provide you with some bush fire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns. Some ground cover is also needed to prevent soil erosion.

Fuels can be controlled by:

1. raking or manual removal of fine fuels
Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark should be removed on a regular basis. This is fuel that burns quickly and increases the intensity of a fire.

Fine fuels can be removed by hand or with tools such as rakes, hoes and shovels.

2. mowing or grazing of grass
Grass needs to be kept short and, where possible, green.

3. removal or pruning of trees, shrubs and understorey
The control of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation.

Prune or remove trees so that you do not have a continuous tree canopy leading from the hazard to the asset. Separate tree crowns by two to five metres. A canopy should not overhang within two to five metres of a dwelling.

Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

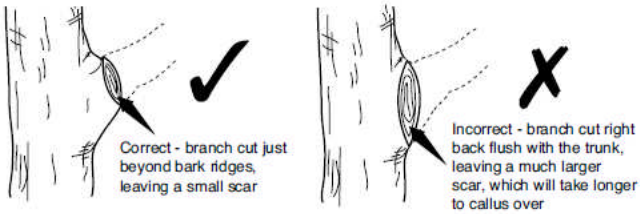
When choosing plants for removal, the following basic rules should be followed:

1. Remove noxious and environmental weeds first. Your local council can provide you with a list of environmental weeds or 'undesirable species'. Alternatively, a list of noxious weeds can be obtained at **www.agric.nsw.gov.au/noxweed/**;
2. Remove more flammable species such as those with rough, flaky or stringy bark; and
3. Remove or thin understorey plants, trees and shrubs less than three metres in height

The removal of significant native species should be avoided.

Prune in acordance with the following standards:

- Use sharp tools. These will enable clean cuts and will minimise damage to the tree.
- Decide which branches are to be removed before commencing work. Ensure that you maintain a balanced, natural distribution of foliage and branches.
- Remove only what is necessary.
- Cut branches just beyond bark ridges, leaving a small scar.
- Remove smaller branches and deadwood first.



There are three primary methods of pruning trees in APZs:

1. Crown lifting (skirting)
Remove the lowest branches (up to two metres from the ground). Crown lifting may inhibit the transfer of fire between the ground fuel and the tree canopy.

2. Thinning
Remove smaller secondary branches whilst retaining the main structural branches of the tree. Thinning may minimise the intensity of a fire.

3. Selective pruning
Remove branches that are specifically identified as creating a bush fire hazard (such as those overhanging assets or those which create a continuous tree canopy). Selective pruning can be used to prevent direct flame contact between trees and assets.

Your Bush Fire Hazard Reduction Certificate or local council may restrict the amount or method of pruning allowed in your APZ.

See the *Australian Standard 4373 (Pruning of Amenity Trees)* for more information on tree pruning.

4. Slashing and trittering
Slashing and trittering are economical methods of fuel reduction for large APZs that have good access. However, these methods may leave large amounts of slashed fuels (grass clippings etc) which, when dry, may become a fire hazard. For slashing or trittering to be effective, the cut material must be removed or allowed to decompose well before summer starts.

If clippings are removed, dispose of them in a green waste bin if available or compost on site (dumping clippings in the bush is illegal and it increases the bush fire hazard on your or your neighbour's property).

Although slashing and trittering are effective in inhibiting the growth of weeds, it is preferable that weeds are completely removed.

Care must be taken not to leave sharp stakes and stumps that may be a safety hazard.

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5. Ploughing and grading
Ploughing and grading can produce effective firebreaks. However, in areas where this method is applied, frequent maintenance may be required to minimise the potential for erosion. Loose soil from ploughed or graded ground may erode in steep areas, particularly where there is high rainfall and strong winds.

6. Burning (hazard reduction burning)
Hazard reduction burning is a method of removing ground litter and fine fuels by fire. Hazard reduction burning of vegetation is often used by land management agencies for broad area bush fire control, or to provide a fuel reduced buffer around urban areas.

Any hazard reduction burning, including pile burns, must be planned carefully and carried out with extreme caution under correct weather conditions. Otherwise there is a real danger that the fire will become out of control. More bush fires result from escaped burning off work than from any other single cause.

It is YOUR responsibility to contain any fire lit on your property. If the fire escapes your property boundaries you may be liable for the damage it causes.

Hazard reduction burns must therefore be carefully planned to ensure that they are safe, controlled, effective and environmentally sound. There are many factors that need to be considered in a burn plan. These include smoke control, scorch height, frequency of burning and cut off points (or control lines) for the fire. For further information see the RFS document *Standards for Low Intensity Bush Fire Hazard Reduction Burning*, or contact your local RFS for advice.

7. Burning (pile burning)
In some cases, where fuel removal is impractical due to the terrain, or where material cannot be disposed of by the normal garbage collection or composted on site, you may use pile burning to dispose of material that has been removed in creating or maintaining an APZ.

For further information on pile burning, see the RFS document *Standards for Pile Burning*.

In areas where smoke regulations control burning in the open, you will need to obtain a Bush Fire Hazard Reduction Certificate or written approval from Council for burning. During the bush fire danger period a Fire Permit will also be required. See the RFS document *Before You Light that Fire* for further details.

STEP 5. TAKE MEASURES TO PREVENT SOIL EROSION

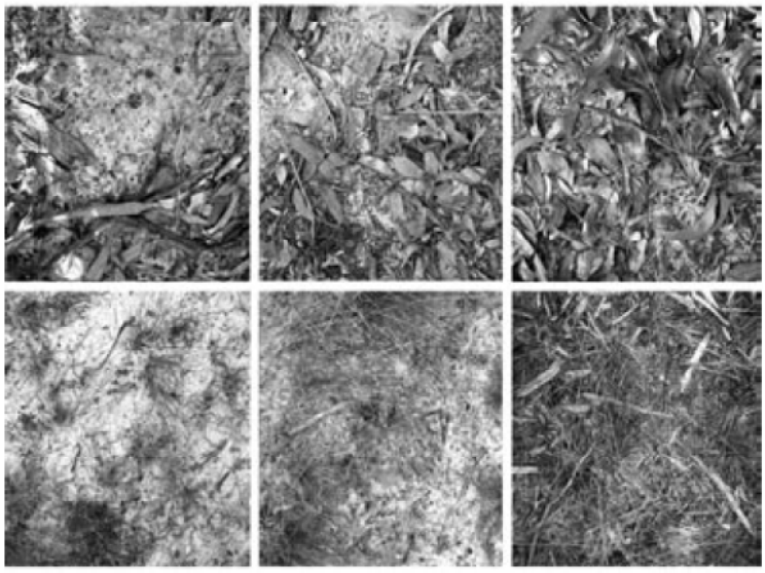
While the removal of fuel is necessary to reduce a bush fire hazard, you also need to consider soil stability, particularly on sloping areas.

Soil erosion can greatly reduce the quality of your land through:

- loss of top soil, nutrients, vegetation and seeds
- reduced soil structure, stability and quality
- blocking and polluting water courses and drainage lines

A small amount of ground cover can greatly improve soil stability and does not constitute a significant bush fire hazard. Ground cover includes any material which directly covers the soil surface such as vegetation, twigs, leaf litter, clippings or rocks. A permanent ground cover should be established (for example, short grass). This will provide an area that is easy to maintain and prevent soil erosion.

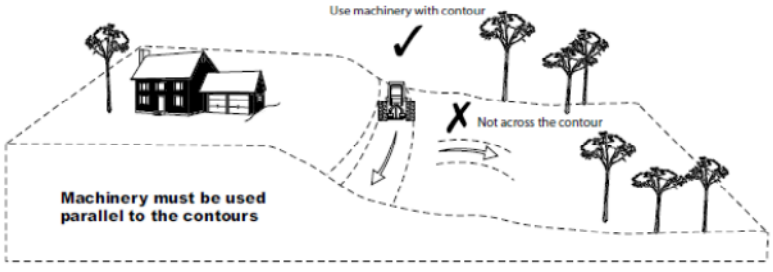
When using mechanical hazard reduction methods, you should retain a ground cover of at least 75% to prevent soil erosion. However, if your area is particularly susceptible to soil erosion, your Hazard Reduction Certificate may require that 90% ground cover be retained.



50% **75%** **100%**

Ground Cover

To reduce the incidence of soil erosion caused by the use of heavy machinery such as ploughs, dozers and graders, machinery must be used parallel to the contours. Vegetation should be allowed to regenerate, but be managed to maintain a low fuel load.

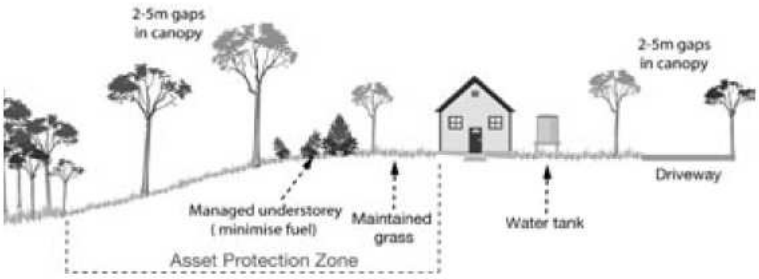


STEP 6. ONGOING MANAGEMENT AND LANDSCAPING

Your home and garden can blend with the natural environment and be landscaped to minimise the impact of fire at the same time. To provide an effective APZ, you need to plan the layout of your garden to include features such as fire resistant plants, radiant heat barriers and windbreaks.

Layout of gardens in an APZ
When creating and maintaining a garden that is part of an APZ you should:

- ensure that vegetation does not provide a continuous path to the house;
- remove all noxious and environmental weeds;
- plant or clear vegetation into clumps rather than continuous rows;
- prune low branches two metres from the ground to prevent a ground fire from spreading into trees;
- locate vegetation far enough away from the asset so that plants will not ignite the asset by direct flame contact or radiant heat emission;
- plant and maintain short green grass around the house as this will slow the fire and reduce fire intensity. Alternatively, provide non-flammable pathways directly around the dwelling;
- ensure that shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low-flammability plants and non flammable ground cover such as pebbles and crush tile; and
- avoid erecting brush type fencing and planting "pencil pine" type trees next to buildings, as these are highly flammable.



Removal of other materials
Woodpiles, wooden sheds, combustible material, storage areas, large quantities of garden mulch, stacked flammable building materials etc. should be located away from the house. These items should preferably be located in a designated cleared location with no direct contact with bush fire hazard vegetation.

Other protective features
You can also take advantage of existing or proposed protective features such as fire trails, gravel paths, rows of trees, dams, creeks, swimming pools, tennis courts and vegetable gardens as part of the property's APZ.

PLANTS FOR BUSH FIRE PRONE GARDENS

When designing your garden it is important to consider the type of plant species and their flammability as well as their placement and arrangement.

Given the right conditions, all plants will burn. However, some plants are less flammable than others.

Trees with loose, fibrous or stringy bark should be avoided. These trees can easily ignite and encourage the ground fire to spread up to, and then through, the crown of the trees.

Plants that are less flammable, have the following features:

- high moisture content
- high levels of salt
- low volatile oil content of leaves
- smooth barks without "ribbons" hanging from branches or trunks; and
- dense crown and elevated branches.

When choosing less flammable plants, be sure not to introduce noxious or environmental weed species into your garden that can cause greater long-term environmental damage.

For further information on appropriate plant species for your locality, contact your local council, plant nurseries or plant society.

If you require information on how to care for fire damaged trees, refer to the Firewise brochure *Trees and Fire Resistance; Regeneration and care of fire damaged trees.*

WIND BREAKS

Rows of trees can provide a wind break to trap embers and flying debris that could otherwise reach the house or asset.

You need to be aware of local wind conditions associated with bush fires and position the wind break accordingly. Your local RFS Fire Control Centre can provide you with further advice.

When choosing trees and shrubs, make sure you seek advice as to their maximum height. Their height may vary depending on location of planting and local conditions. As a general rule, plant trees at the same distance away from the asset as their maximum height.

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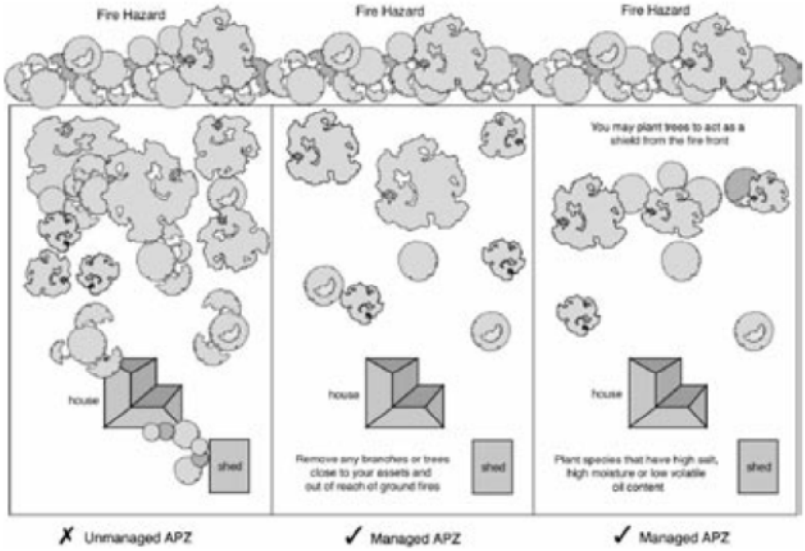
When creating a wind break, remember that the object is to slow the wind and to catch embers rather than trying to block the wind. In trying to block the wind, turbulence is created on both sides of the wind break making fire behaviour erratic.



HOW CAN I FIND OUT MORE?

The following documents are available from your local Fire Control Centre and from the NSW RFS website at **www.rfs.nsw.gov.au.**

- Before You Light That Fire
- Standards for Low Intensity Bush Fire Hazard Reduction Burning
- Standards for Pile Burning
- Application Instructions for a Bush Fire Hazard Reduction Certificate

If you require any further information please contact:

- your local NSW Rural Fire Service Fire Control Centre. Location details are available on the RFS website or
- call the NSW RFS Enquiry Line 1800 679 737 (Monday to Friday, 9am to 5pm), or
- the NSW RFS website at **www.rfs.nsw.gov.au.**

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APPENDIX C

Master Planning Document

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Communication

Project	PORT MACQUARIE BASE HOSPITAL EXPANSION	
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	Peter Thornton	BCACheck
Copy	Nick Brooker	NSW HI
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This paper is a summary of the master planning for the expansion of the Port Macquarie Base Hospital to provide an understanding of the processes that were undertaken in arriving at a Preferred Development Option that has subsequently been refined through feasibility and concept design stages.

Methodology

The following methodology has been used in developing the master plan:

- Confirm clinical requirements to support service delivery needs
- Establish functional requirements – schedule of accommodation
- Review site constraints – existing building
- Develop and evaluate master plan options
- Confirm preferred development options

Clinical Requirements

The clinical service planning has determined that the expansion will provide the following:

- Expanded Operating Theatre Suite and Day Surgery
- Expanded Emergency Department
- 24 Bed Critical Care Unit
- 30 additional Medical Inpatient Beds
- 12 additional Surgical Inpatient beds
- Support areas
- Expansion areas
- Engineering services

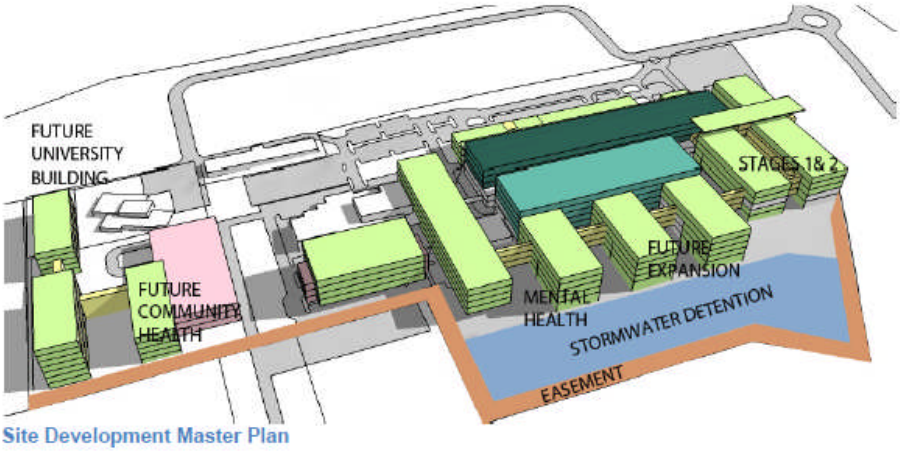
Functional Requirements

Schedules of Accommodation have been developed for a gross building floor area of 13,740m2. The requirement for clinical adjacencies between acute care areas is most appropriately addressed by co-locating the Operating Theatre Suite and Day Surgery, Emergency Department and Critical Care Unit as a "hot floor", however given the required floor plate exceeding the available site area, a "hot block" with vertical stacking of some acute functions has been adopted.

A key aspect of planning has been to provide for logical future expansion of hospitals services, in particular for services not forming part of the current project.

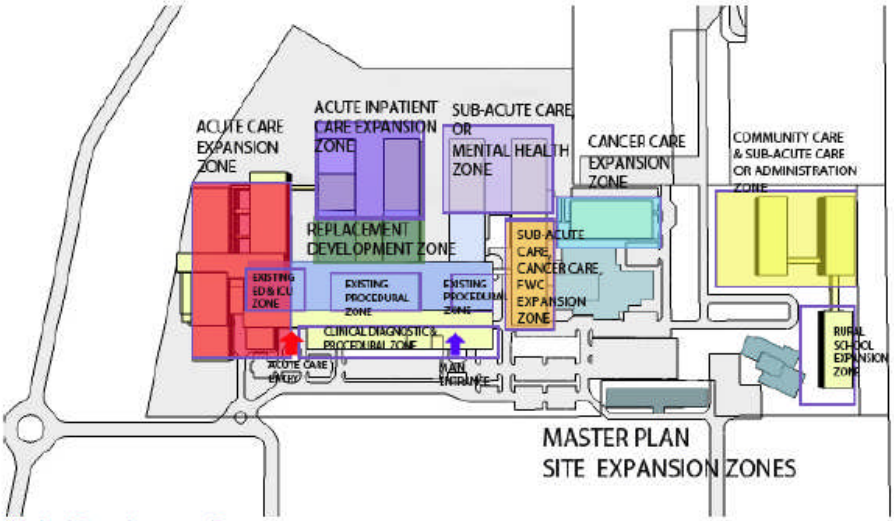
Site Analysis

The site analysis process has considered the overall development potential of the site. In the long term the site area available for expansion of clinical services indicates that future development will be capable of being extended potentially to a height of 3-4 storeys and that some point in the future the replacement of the existing 2 storey Hospital building would need to considered. This has informed the development of the long-term Site Master Plan. The Concept Master Plan has been developed to ensure that the current planning is consistent with the long-term development of the site.



Site Development Master Plan

A review of existing clinical zones has been carried out to ensure appropriate expansion potential is established for acute care, acute and sub-acute inpatient, diagnostic and ambulatory zones within the main hospital clinical services building.



Clinical Development Zones

Options Development and Evaluation

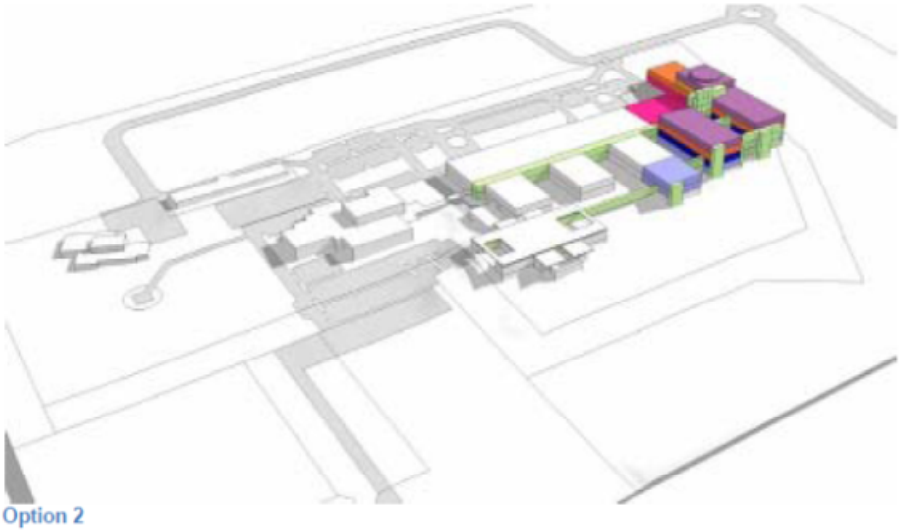
Four Concept Master Plan options were developed in response to the Clinical Services Plan for review. Following the initial workshop, the project clinical and planning assumptions and principles were reviewed and confirmed to enable the concept options to be developed..

These options were subject to a structured assessment process to determine the Preferred Concept Master Plan Option using the following evaluation criteria:

- Response to Model of Care stated in Service Plan
- Future Expansion/Development Potential
- Costs
- Impact on Operations
- Staging/Constructability
- Design/Urban Design

Option 0 is the base case, being no change to the existing facilities.

Option 1 and Option 2 are similar concepts, with variation only in the proposed building footprint for the development at the western end of the site. Following a review of the potential building footprint available in the development zone, the "Hot Floor" concept embodied in the CSP has been refined into a "Hot Block", with Interventional Suite and Perioperative areas being located on a separate level to the other acute care areas.

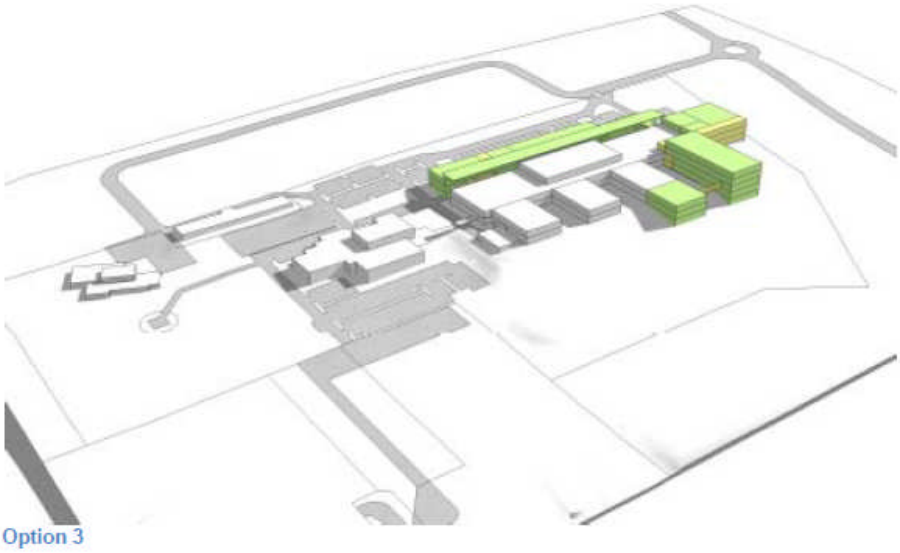


Option 2

Both Options 1 and 2 were considered to satisfy the Clinical Services Plan recommendations and support the agreed health planning principles. Option 1 maintains the urban form of the existing building footprint, whereas Option 2 by extending the footprint closer to Wrights Road frontage improves the access to the Emergency Department. Both Options will require the relocation of the LPG gas tank farm and bulk oxygen VIE to maintain separation distances.

Following the assessment process it was agreed that Option 2 would form the basis of the Preferred Master Plan Option. While generally very similarly ranked on most criteria, the principal advantage of Option 2 over Option 1 was the building footprint. At Level 3 in particular, the Interventional Suite would be consolidated into a single rectilinear block offering the most flexible and efficient layout to be developed. The option to bring the Emergency entry closer to the street, with a dedicated ambulance access directly off Wrights Road was also considered to be a strong feature.

Option 3 proposed the development of a 3 level building to the south of the existing hospital in addition to a reduced expansion at the western end of the Hospital. This allows the Day Surgery and Perioperative area to be developed in close proximity to the main entry by expanding the existing Operating Theatre areas on Level 2.



Option 3

While Option 3 satisfied the physical requirements of the CSP, the location of the Interventional suite and Perioperative area on the south of the clinical block, effectively separates the Critical Care cluster and Emergency and therefore are not developing the desired 'Hot Floor'/ Hot Block' concept that underpins the proposed model of care for these services.

The retention of the existing Operating Theatres provides limited expansion potential for Medical Imaging, which impacts adversely on the identified need to expand these services to meet additional demand. To provide areas for Day Surgery services will require the relocation of the existing private provider Pathology and Pharmacy services into new build areas at Level1.

The construction of a new building extending the existing theatre complex would effective remove any access to natural light for the existing ECCC, Rehabilitation and Therapy areas and adversely impact on the Ambulatory Care areas which are proposed to be located in refurbished space on Level 1.

In additional to additional capital cost, Option 3 introduced additional construction staging and had the potential for significant disruption to the operation of critical clinical services. As a result Option 3 was ranked lower than both Options 1 and 2 on all assessment criteria and was not supported for further investigation.

Preferred Option

Concept Master Plan Option 2 has been agreed through the assessment process as the Preferred Master Plan as it best addressed all evaluation criteria and has been subsequently developed in more detail through the Feasibility Study and Concept Design stages.

The arrangements have been reviewed to ensure that the overall Master Plan can be implemented in a scalable manner to meet available funding, and be expanded in a logical manner in the future.

It should be noted that as part of Concept Design the northern part of the building footprint has been consolidated into a single block which has improved the distance from the western boundary and addresses constraints imposed by the existing HV cable and service access requirements.