Port Macquarie Hospital Expansion

Fire Engineering Strategy

NSW GOVERNMENT Health Infrastructure

HEALTH INFRASTRUCTURE NSW HEALTH

Report No S.PMH-0103/R001
Date 12th December 2011

engineering sustainable environments

REPORT AUTHORISATION

PROJECT: **PORT MACQUARIE HOSPITAL EXPANSION**
FIRE ENGINEERING STRATEGY

REPORT NO: **S.PMH-0103/R001**

Date	Rev	Comment	Prepared by	Checked by	Authorised by
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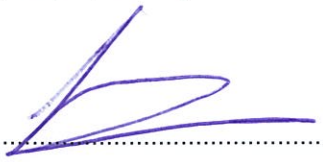

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EXECUTIVE SUMMARY

This report presents a fire safety strategy for the design of the proposed expansion to Port Macquarie Base Hospital.

The aim of this report is to provide a preliminary fire engineering strategy so that the design team may use it as a guide to develop aspects of their designs that may be affected. It is expected the building design will continue to change and the fire engineering strategy continue to be developed and refined.

The Building Certifier has conducted a preliminary review of the building design and has indicated items requiring a fire engineered Alternative Solution. The proposed fire safety strategy for client consideration to mitigate the risks associated with the variations to the National Construction Code Building Code of Australia 2011 (BCA) [1] Deemed-to-Satisfy (DtS) provisions have been identified in this report.

The fire engineering strategy for the proposed expansion is provided in Section 3.0 of this report.

CONTENTS

1.0 INTRODUCTION

Umow Lai has been appointed by Health Infrastructure, NSW Health to conduct a fire engineering assessment for the expansion of the Port Macquarie Base Hospital.

The aim of this report is to provide a preliminary fire engineering strategy so that the design team may use it as a guide to develop aspects of their designs that may be affected. It is expected that the building design will continue to change and the fire engineering strategy to continue to be developed and refined.

1.1 STAKEHOLDERS

Table 1 lists the stakeholders in the current project.

Table 1 *Project Stakeholders*

Role	Company	Main Contact/s
Client	Health Infrastructure, NSW Health	Nick Brooker
Project Manager	Aurecon	David Jones
Architect	Hassell	Graeme Spencer & Matthew Davies
Building Certifier	Davis Langdon	Rob Briant
Hydraulic Services	Acor	Robert Gruber
Mechanical Services	Umow Lai	Anthony Matthews
Electrical Services	Wood & Grieve	Mark Mulholland
Fire Safety Engineer	Umow Lai	Dr Weng Poh & Andy Fung
Fire Brigade	Fire and Rescue New South Wales	TBC

1.2 GENERAL OBJECTIVES

The life safety objectives to be satisfied are those of the Building Code of Australia (BCA). The BCA lists objectives and functional statements as the guidance levels in building design. The objectives of the BCA can be summarised as:

- Life safety of the occupants
- Facilitate fire brigade operations
- Protection of adjacent buildings

The objectives of the BCA are met when the Performance Requirements are satisfied.

1.3 ARCHITECTURAL DRAWINGS

Table 2 presents a list of referenced architectural drawings, provided by the Architect. These drawings describe the building and assist with the understanding of the issues considered in this report. The report has been based on information contained in these drawings. Some of these drawings are reproduced in Appendix A.

Table 2 *Architectural Drawings*

Drawing	Title	Date
0120	Fire compartments – Level 1	30-11-2011
0121	Fire compartments – Level 2	30-11-2011
0122	Fire compartments – Level 3	30-11-2011

1.4 QUALIFICATIONS

This evaluation is limited to addressing fire safety under the legislation of the NSW Environmental Planning and Assessment Act, 1979 and the NSW Environmental Planning and Assessment Regulation, 2000 and associated subordinate regulations, codes and standards.

Compliance of the building design with the Disabled Discrimination Act, Dangerous Goods Act, and Occupational Health and Safety Act as well as their associated regulations is not the subject of this evaluation. It is recommended that the client or their agent commission an appropriately qualified professional in the relevant field where necessary.

The focus of this evaluation is an outbreak of fire due to accidental initiation, with limited consideration given to deliberate fire starts. This report is consistent with the objectives and limitations of the BCA and therefore, the effect of explosive devices, terrorism, arson (e.g. multiple fire starts), or deliberate sabotage of fire safety systems is considered outside the scope of this study.

Property protection and insurance are not considered in this evaluation.

The goal of 'absolute' or '100%' safety is not attainable and there will always be a finite risk of injury, death or property loss. Furthermore, fire and its consequent effects on people and property are both complex and variable. Thus, a fire safety system may not effectively cope with all possible scenarios and this must be understood by all stakeholders.

Umow Lai's evaluation relies on the information obtained from various documents produced by other parties. However, we will not accept liability for the accuracy or otherwise of the information contained in these documents.

This report should not be used by a third party without first contacting Umow Lai for detailed advice that will take into account that party's particular requirements. Umow Lai accept no responsibility or liability where a third party uses this report without consulting our office.

Any alterations to information as contained within this evaluation report could result in different outcomes. Information contained in this document is current at the time, and all future alterations to the design or use of the building should result in another evaluation. Alterations must be brought to the attention of the relevant Building Certifier.

2.0 BUILDING CHARACTERISTICS

2.1 DESCRIPTION OF THE BUILDING

Port Macquarie Base Hospital is located on Wrights Road, Port Macquarie, NSW. The existing hospital is a 2 storey building which provides 24 hour health services ranging from emergency services to mental health services. The current hospital contains 4 operating theatres and can accommodate up to 161 bed-based patients. An aerial photo of the site is shown in the figure below.

Figure 1 *Aerial Photo of Site*

As part of the expansion project, a new building containing bed-based areas, emergency treatment bays, surgical and critical care service areas will be constructed at the south west side of the hospital. The new building will contain 3 storeys and will be interconnected to the existing hospital via the main hospital street. An atrium is proposed to be provided in the new building and will interconnect all 3 storeys. The proposed footprint of the expansion project is shown in the figure below.

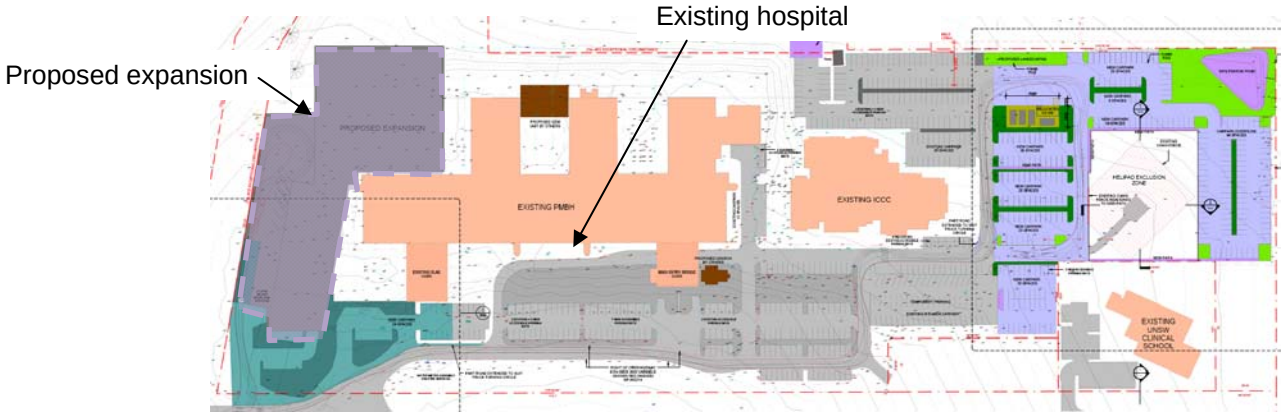


Figure 2 *Site Plan Upon Completion of Works*

General characteristics of the proposed expansion building with reference to the BCA DtS provisions are summarised in Table 1.

Table 1 *BCA Reference Criteria*

BCA Clause		Description/ Requirement
A1.1	Effective Height	<25m
A3.2	Classification	Class 9a Hospital
C1.1	Construction Type	Type A
C1.2	Rise in storeys	3

The new building is proposed to be fire separated from the existing hospital. It will be served by 4 exit stairs (fire isolated stairways and external stairways). The following building floor plans show the proposed fire and smoke compartmentation in the building and also highlight the exits within each level.

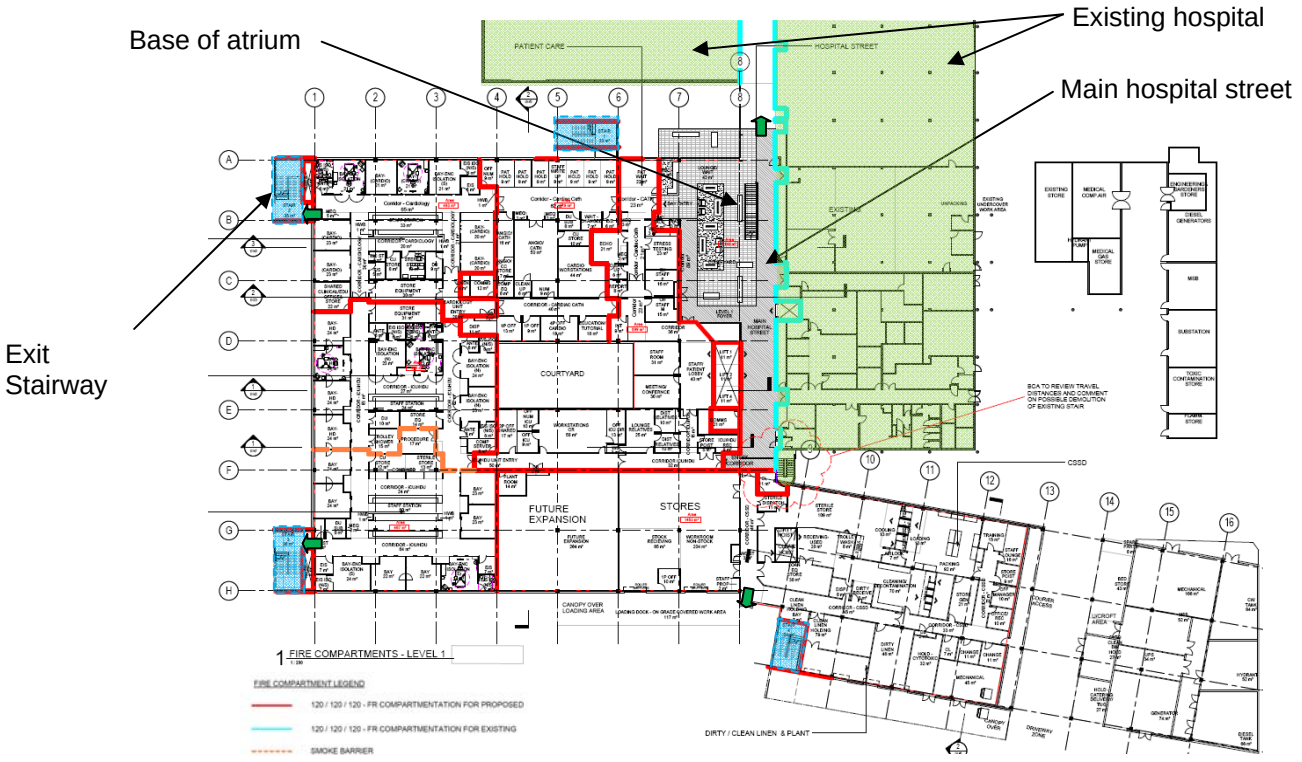


Figure 3 *Level 1 Floor Plan*

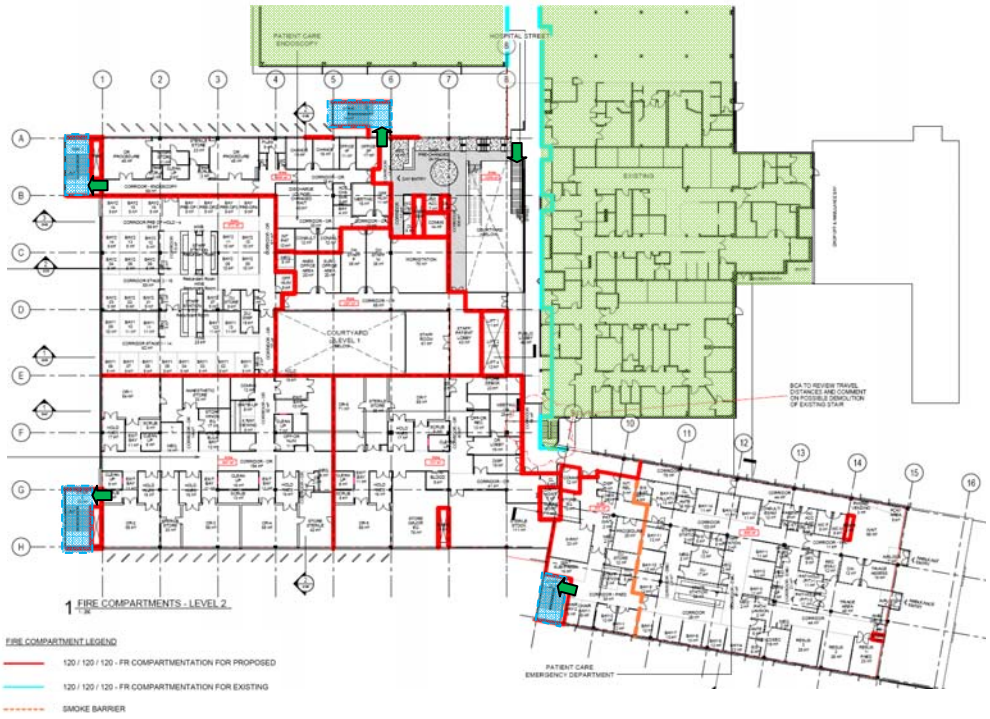


Figure 4 *Level 2 Floor Plan*

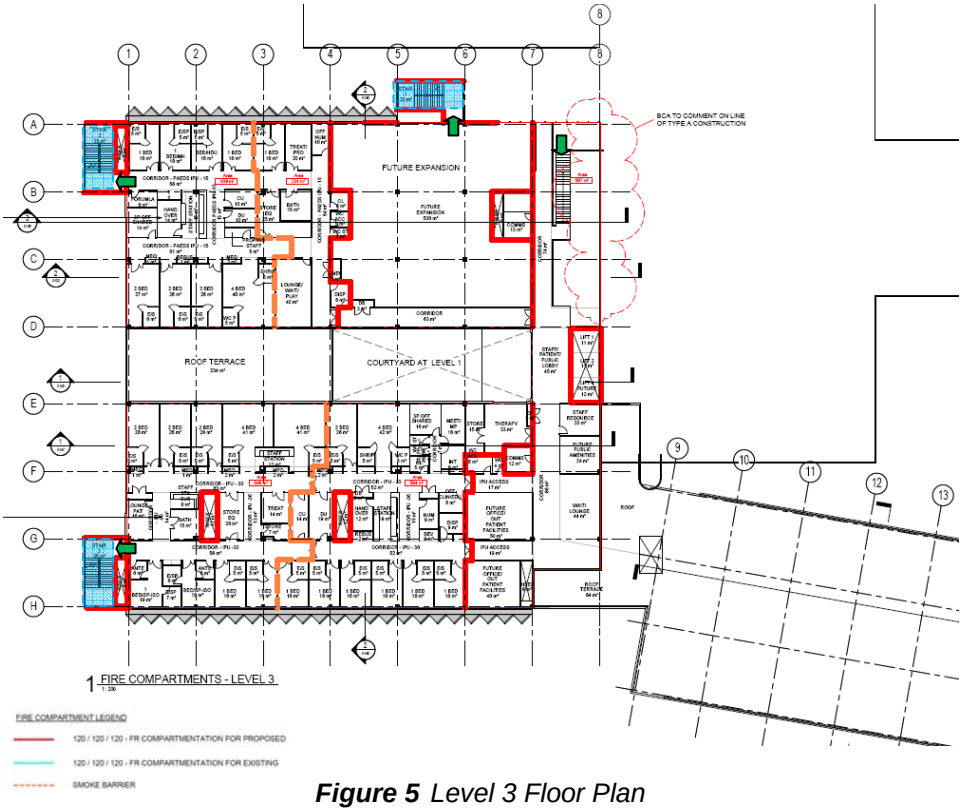


Figure 5 *Level 3 Floor Plan*

2.2 FIRE PROTECTION SYSTEMS

The new building will be provided with the following fire safety systems:

- Automatic fire sprinklers in accordance with AS 2118.1;
- Smoke detection system in accordance with AS 1670.1;
- Emergency Warning and Intercommunication System in accordance with AS 1670.4;
- Fire hydrants generally in accordance with AS 2419.1 and BCA Clause E1.3;
- Fire hose reels generally in accordance with AS 2441 and BCA Clause E1.4;
- Portable fire extinguishers in accordance with BCA Clause E1.6; and
- Emergency lighting and exit signage in accordance with BCA Part E4.

The systems will be linked to the existing systems in the hospital.

It is proposed that the main hospital street is to be retrofitted with sprinkler protection.

2.3 DESCRIPTION OF THE OCCUPANTS

The occupant characteristics in the new building are considered to be equivalent to those in other hospitals. They will cover a broad range of ages and come from a variety of socio-economic backgrounds. Due to the aging population in Australia, there is likely to be a significant number of elderly and otherwise mobility impaired occupants in the building in addition to the patients. The groups can be categorised into patients, nursing staff and others.

Patients in the proposed expansion are expected to be a combination of bed ridden patients and mobile patients. It is expected that patients undergoing treatment in operating theatres would not be moved unless it is safe to do so. Bed based patients rely on nursing staff to facilitate their evacuation. It will be assumed that two staff are required to move one bed.

It is expected that mobile patients will be able to evacuate without having to rely on nursing staff to facilitate their evacuation. It is expected that if these occupants are required to evacuate, they will be directed to their closest exit by staff and they will move to the exit without assistance.

Others would include non-nursing staff and visitors in the building who would be able to evacuate without requiring assistance.

2.4 BCA DTS VARIATIONS

Upon a preliminary review of the documentation, the following variations to the BCA Deemed-to-Satisfy Provisions have been identified by the Building Certifier, Davis Langdon and are required to be assessed as Alternative Solutions. As the design progresses a more detailed list of the DtS variations will be provided. This list forms the basis for the current fire engineering strategy. The table overleaf summarizes the relevant BCA Clause, variation and relevant performance requirement.

Table 2 *BCA DtS Variations*

Item	*BCA Clause*	*BCA DtS Variation*	*Relevant Performance Requirement*
1	C2.5	Fire compartmentation in the proposed expansion building will slightly exceed BCA DtS limits of 2,000m^2 for patient care areas and 1,000m^2 for ward areas. Smoke compartmentation in the proposed expansion building will slightly exceed BCA DtS limits of 500m^2 for ward areas and 1,000m^2 for treatment areas.	CP1, CP2
2	C2.7	Existing hospital building and the proposed expansion building will not be fully separated by a 120 minute fire wall.	CP2
3	D1.4	Travel distances in patient care areas will slightly exceed 12m to point of choice.	DP4, EP2.2
4	D1.5	Distance between alternative exits will exceed 45m in patient care areas.	DP4, EP2.2
5	D1.8	External wall openings will exist within 3m of an external stairway.	DP5
6	C3.2	External wall openings will exist within 6m of another building.	CP2

3.0 FIRE ENGINEERING STRATEGY

Our proposed preliminary fire engineering strategy is presented below. This strategy is developed based on the preliminary BCA DtS variations advised by the Building Certifier and discussions with the design team.

3.1 PREVENTATIVE AND PROTECTIVE MEASURES

3.1.1 SUB-SYSTEM A - Fire Initiation and Development and Control

a) Fire Initiation Control

Fire initiation control is to be achieved through management of fire load and potential fire starts. These are to be achieved via the fire safety management of the building (see Appendix B – Minimising Fire Starts).

In general all corridors are to be kept clear of storage materials and all wall, floor and ceiling linings are to comply with the fire hazard properties specified in the BCA.

b) Fire Development Control

Fire hose reels and fire extinguishers are to be installed for use by occupants, predominately staff, for fighting fires in the building. This is to be supported by the fire safety management procedures and training (see Appendix B – Early Suppression).

A sprinkler system will be installed throughout the new building. Fast response sprinkler heads will be provided (maximum RTI of 50$m^{½}s^{½}$). It will act to control a fire in the building should the fire not be extinguished in an early stage and continues to develop.

It is proposed that the main hospital street is also sprinkler protected.

From a fire engineering viewpoint, the sprinkler system is a critical fire protection system. In order to maintain a high level of reliability, the following measures are proposed:

- A monitored valve and drain down facility is installed for each level of the new building and the main hospital street.
- A remote test valve is installed for each level of the new building and the main hospital street for annual testing.
- The sprinkler system is regularly maintained.

Management tasks with respect to sprinklers are outlined in Appendix B - Later Suppression.

3.1.2 SUB-SYSTEM B - Smoke Development and Spread and Control

The smoke detection system and sprinkler system will be key smoke management systems that act to control the growth and limit the amount of smoke production. The smoke detection system will detect smoke during the early stages of a fire to allow manual intervention whilst the sprinkler system will actively control or suppress a fire.

In the event that the abovementioned measures fail to limit the spread of smoke in the building, redundancy in the design exists by way of smoke compartmentation. Ward areas are required by the BCA to be compartmentalised into smoke compartments with a floor area not exceeding 500m^2. Treatment areas are to be compartmentalised into smoke compartments not exceeding 1000m^2.

The BCA requirements in regards to the smoke compartmentalization of hospital buildings will generally be complied with. In some cases, smoke compartments may slightly exceed the BCA permitted requirements and this is proposed to be permitted based on occupants being able to evacuate into the adjoining smoke compartment prior to the onset of untenable conditions. The assessment will be conducted in the fire engineering report and will be based on the provision of early warning via a smoke detection and alarm system and provision of a fire sprinkler system.

In order to further manage smoke spread in the building, additional measures will be provided. These are discussed below.

a) 3 storey atrium

An atrium space in the new building will include an open stair that interconnects all 3 levels. The atrium space will also be interconnected with the main street of the existing hospital. In the event of a fire in the atrium space, smoke may spread throughout the connected space. To mitigate the risk associated with smoke spread, the roof of the atrium space is proposed to be provided with natural vents which will aid in the venting of smoke in this area. Upon detection of a fire within the building, the natural vents are to automatically open and allow smoke to be vented out. The vents are to fail open upon power failure.

b) Operation of air handling systems

Upon detection of fire, mechanical systems serving the compartment of fire origin are to automatically shut down to prevent the spread of smoke via the mechanical ductwork. The exceptions to this are:

- Individual room units with a capacity not more than 1,000 L/s;
- Systems serving critical treatment areas and operating theatres;
- Miscellaneous exhaust air systems installed in accordance with Section 5 and 11 of AS/NZS 1668.1.

3.1.3 SUB-SYSTEM C - Fire Spread and Impact and Control

The building elements are generally to have a fire resistance level for fire separation as required by the BCA, unless otherwise state. This includes fire separation of the patient care areas, ward areas, stairways, lift shafts, services shaft, plants, etc.

a) Fire compartmentation of patient care areas

The maximum fire compartment size of ward areas and patient care areas will generally comply with the BCA requirements of 1,000m^2 and 2,000m^2 respectively. In some cases, fire compartment sizes may exceed the abovementioned limits and this is proposed to be permitted based on occupants being able to evacuate into the adjoining fire compartment prior to the onset of untenable conditions. The assessment will be conducted in the fire engineering report and will be based on the provision of early warning via a smoke detection and alarm system and provision of a fire sprinkler system.

b) Fire separation between different compartments

External wall openings are proposed to be located within 3m of external fire stairs these openings are proposed to be protected by independently fed internal wall wetting sprinklers (i.e. water supply for these sprinklers off the fire hydrant system). Windows openings must not be openable or if openable must be provided with motorised closers which automatically close the window upon general fire alarm. These windows are to be fail safe closed.

Unprotected openings in different fire compartments are proposed. Radiation calculations will be conducted to determine the levels of radiation received by the unprotected openings. If the levels of radiation are above 20kW/m^2 then these openings will require protection by independently fed internal wall wetting sprinklers. Window openings must not be openable or if openable must be provided with motorised closers which close the window upon general fire alarm. These windows are to be fail safe closed.

c) Fire compartmentation of patient care areas

The new building will be designed to prevent fire spread between the new and the existing hospital.

The existing hospital on site is not sprinkler protected whilst an automatic fire sprinkler system will be provided in the new building. Both buildings from a BCA perspective will be considered as separate buildings, hence are required to be separated via a fire rated wall which achieves an FRL of 120 minutes. A 120 minute fire rated wall will generally be provided to separate the existing hospital from the new building. The exception will be on the main hospital street which will not be provided with cross corridor fire rated doors.

As part of the proposed fire engineering strategy to address this variation to the BCA DtS requirements, sprinklers are proposed to be provided throughout the main hospital street and the atrium portions of the new building will be fire separated from the treatment/patient care areas. The figures below illustrate the proposed fire separation on Level 1. Appendix A provides drawings which illustrate the separation on all three levels. It should also be noted that the existing hospital is BCA Type B construction, whilst the proposed expansion inclusive of the atrium will be BCA Type A construction.

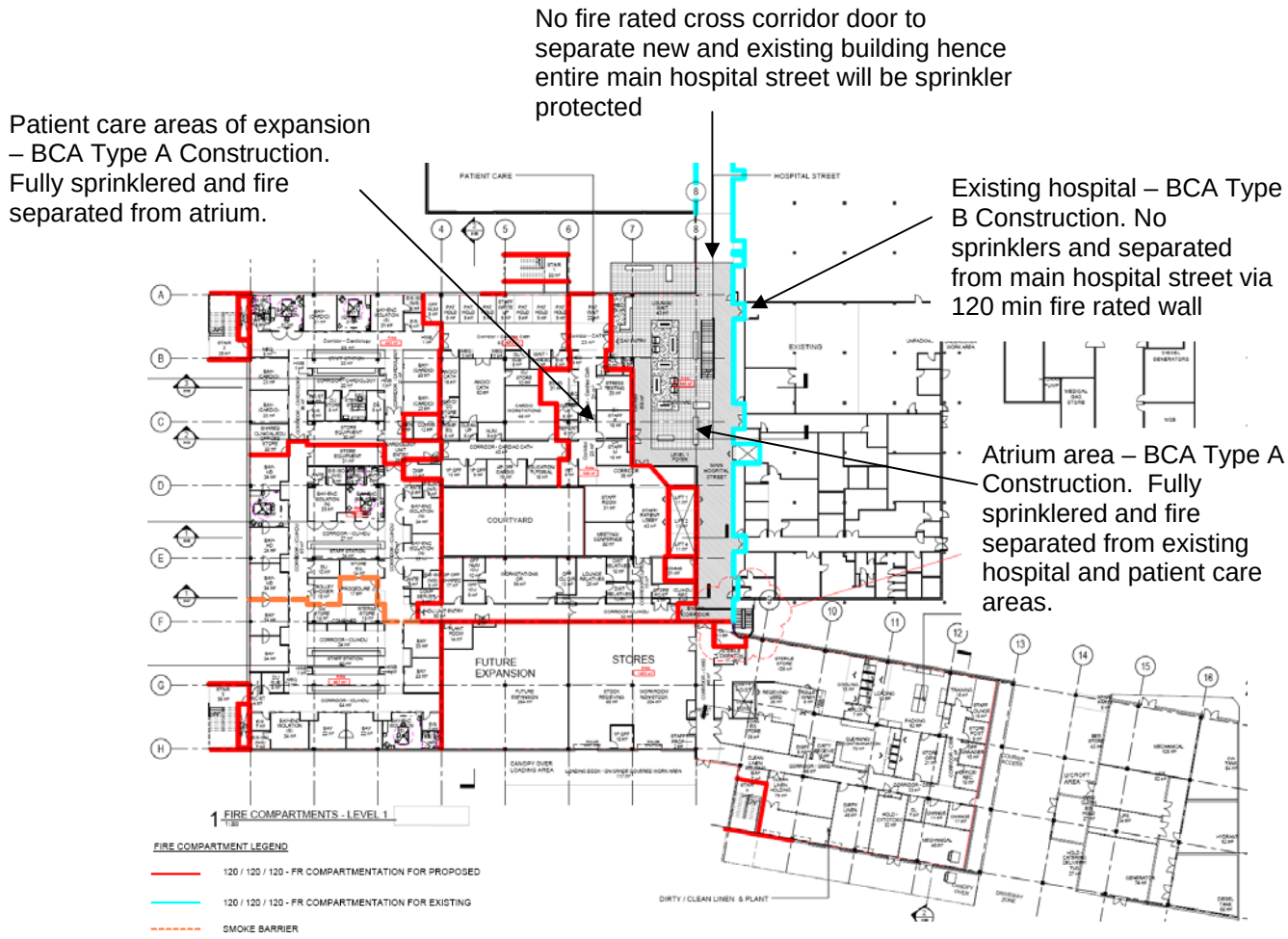


Figure 6 *Fire Separation on Level 1*

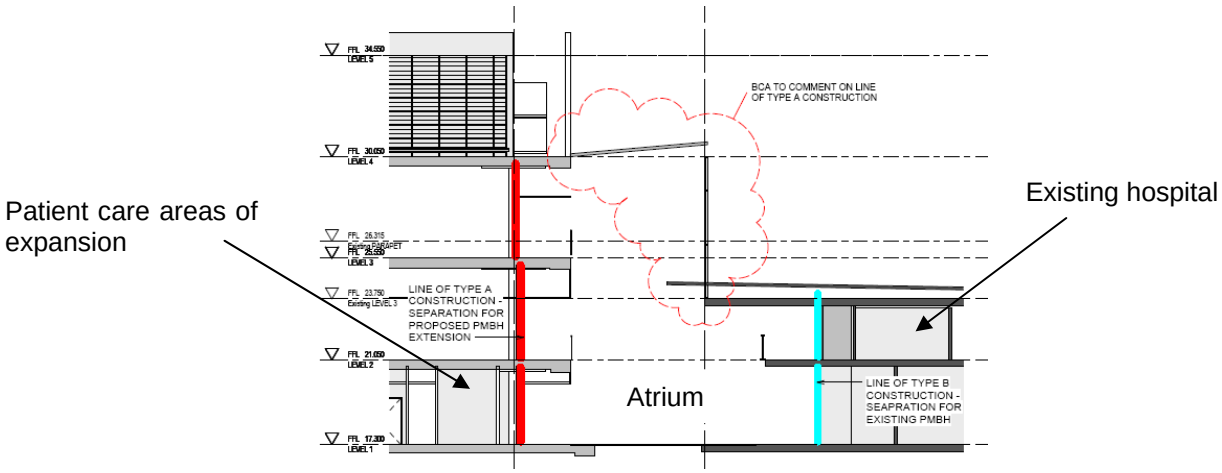


Figure 7 *Elevation showing Fire Separation*

3.1.4 SUB-SYSTEM D - Fire Detection, Warning and Suppression

As discussed earlier in Section 2.2, the building is protected by a smoke detection system and automatic fire sprinkler system. The activation of a smoke detector or sprinkler will activate the building occupant warning system. Warden intercom phones are also to be provided near exits within each evacuation zone. Manual call points are to be provided to comply with the BCA.

The Fire Indicator Panel (FIP) is to be analogue addressable and include automatic signalling equipment for automatic brigade call. The FIP is to be located at the main entrance for the hospital or a designated entrance as agreed with the fire brigade.

Floor by floor zoning is proposed for the sprinkler system. Each fire compartment of the building is to be a separate smoke detector and EWIS zone.

A matrix of the operations of the fire protection system is to be developed by the services engineer to clearly show the intended functions of the systems.

3.1.5 SUB-SYSTEM E - Occupant Evacuation and Control

The new building will be provided with 4 exit stairways for occupant evacuation. In the event of a fire, occupants will conduct vertical evacuation via these stairs which discharge directly outside the building.

As hospitals accommodate a large number of bed based patients, horizontal evacuation into neighbouring fire/ smoke compartments is often preferred, rather than vertical evacuation. This evacuation strategy will be adopted in the building.

The new building is compartmentalised into fire and smoke compartments hence occupants are able to evacuate away from the fire into neighbouring compartments to seek refuge, refer to drawings in Appendix A for preliminary compartmentation of the new building. The atrium space will be a separate fire compartment to the patient care areas so occupants in the atrium can evacuate into the patient care areas and vice versa.

To allow for the abovementioned evacuation strategy, the occupant warning system cascade sequence within the new building is to be designed as follows:

- Occupants in the fire compartment of fire origin will be provided with alert tones upon detection of a fire via the smoke detection system. If the fire alarm is not reset within 2 minutes the alert tone will cascade to the adjoining fire compartments whilst evacuation tones will annunciate throughout the fire compartment of fire origin. This cascade is to be implemented across the floor. The 2 minute alert period allows staff to conduct initial investigation first prior to evacuating occupants.
- Once the entire floor is in evacuation mode the alert tone will cascade to the floor above and the floor below the floor of fire origin.
- If a sprinkler activates or upon activation of a manual call point, alert tones shall annunciate across the entire floor of fire origin. If the fire alarm is not reset within 2 minutes the alert tone will cascade to the floor above and below the floor of fire origin whilst evacuation tones will annunciate throughout the floor of fire origin.

An evacuation strategy is to be further developed by the hospital as part of the emergency control organisation.

In terms of the building design, given the new building is fully sprinkler protected and compartmentalised, fire growth and spread in the building will be limited. The intent of the design is to limit fire to ideally the object of fire origin or in the event sprinklers fail, fire compartment of fire origin. This strategy will generally increase the available time for building occupants to move to a place of safety. Travel distances to points of choice to exits and distance between alternate exits will slightly exceed those permitted by the BCA. These variations to the BCA DtS provisions are proposed to be permitted based on the following:

- Sprinkler system provided throughout the new building;
- Smoke detection system provided throughout the new building;
- Smoke and fire compartmentation generally provided as per BCA requirement; and
- Occupants are provided with alternate exits into adjoining fire and smoke compartments.

3.1.6 SUB-SYSTEM F - Fire Services Intervention

The responding fire brigade for a call out at Port Macquarie Base Hospital will be Port Macquarie fire station located 4.8km away (refer to Figure 8).

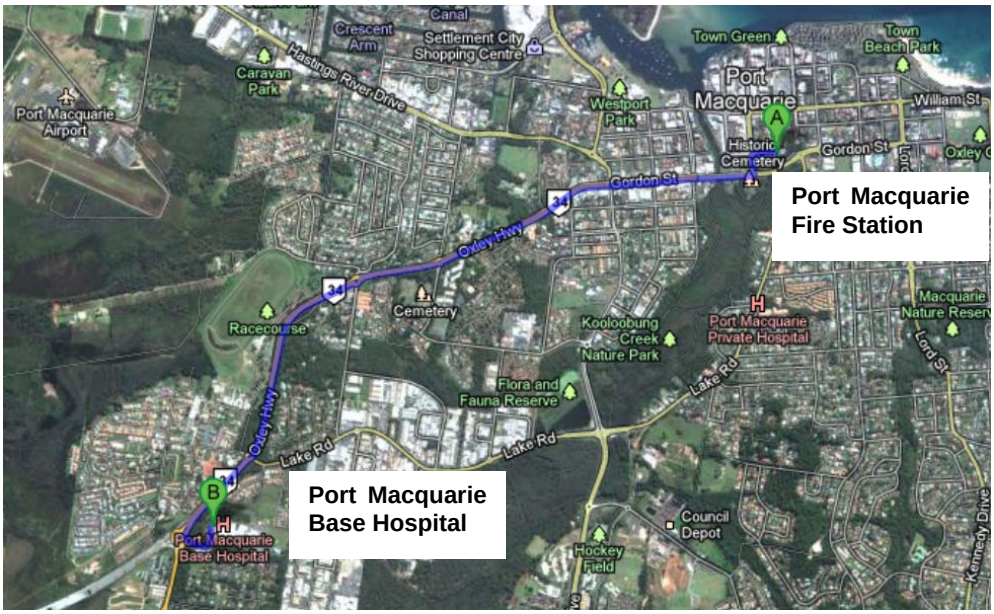


Figure 8 *Fire Brigade Travel to Port Macquarie Base Hospital*

Port Macquarie fire station is a fully manned fire station consisting of permanent/ full time fire fighters and retained/ volunteer fire fighters. Upon arrival fire fighters are expected to interrogate the site FIP and conduct any initial set up necessary i.e. source water and set up booster assembly.

Given that the proposed expansion will be protected by sprinklers, fire brigade personnel are expected to be able to enter the building and fight the fire from within the building. Fire hydrants will be provided within the building for use by the fire brigade.

3.1.7 Construction and Commissioning

The building structure is to be designed and constructed to comply with BCA Section B and the Australian Standards for the relevant building materials, including AS 3600 and AS 4100 for concrete and steel structures, respectively.

The building, services and fire protection systems are to be constructed and approved by the Authorities Having Jurisdiction, as required by the NSW Environmental Planning and Assessment Regulations and other relevant regulations.

3.1.8 Management, Use and Maintenance

A sound fire safety management system is to be implemented to lower the fire risks. This includes appropriate house-keeping, staff training and maintenance of equipment (see Appendix B).

The fire safety management plans and procedures are to be developed by the hospital once the expansion building is occupied.

Fire safety management plans are to take into account the building design, fire engineering, occupational health and safety considerations. These plans and procedures are to be regularly reviewed and modified to suit any changes to the building or operation of the building.

The fire safety systems are to be regularly maintained to AS 1851 (see Appendix B).

4.0 REFERENCES

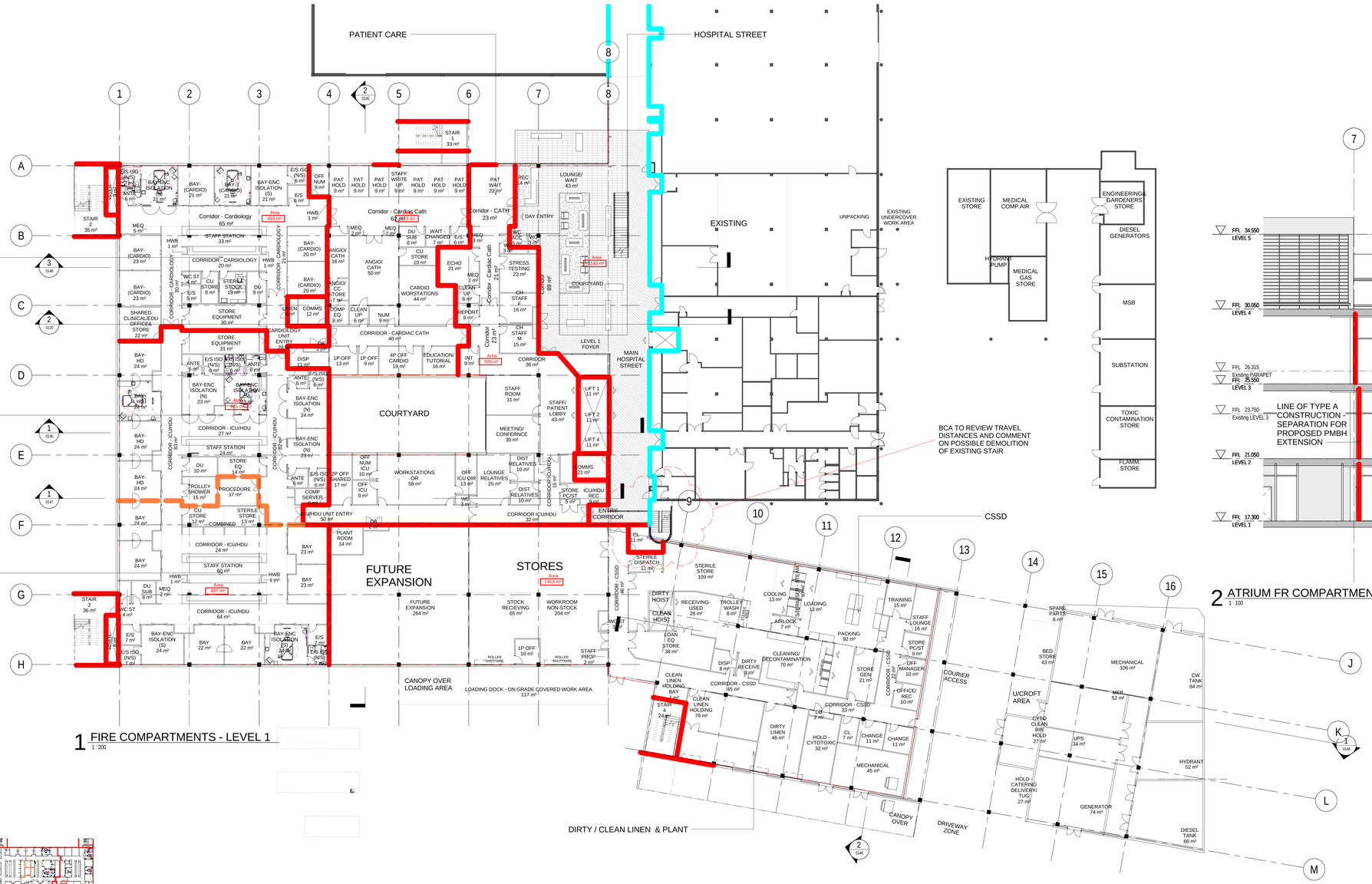
[1] "National Construction Code Building Code of Australia", Volume 1 – Class 2 to 9, Australian Building Codes Board, 2011.

APPENDIX A DRAWINGS

FOR CONTINUATION OF HOSPITAL STREET FR COMPARTMENTATION SEE PLAN 3 BELOW

FIRE COMPARTMENT LEGEND

- 120 / 120 / 120 - FR COMPARTMENTATION FOR PROPOSED
- 120 / 120 / 120 - FR COMPARTMENTATION FOR EXISTING
- SMOKE BARRIER



1 FIRE COMPARTMENTS - LEVEL 1
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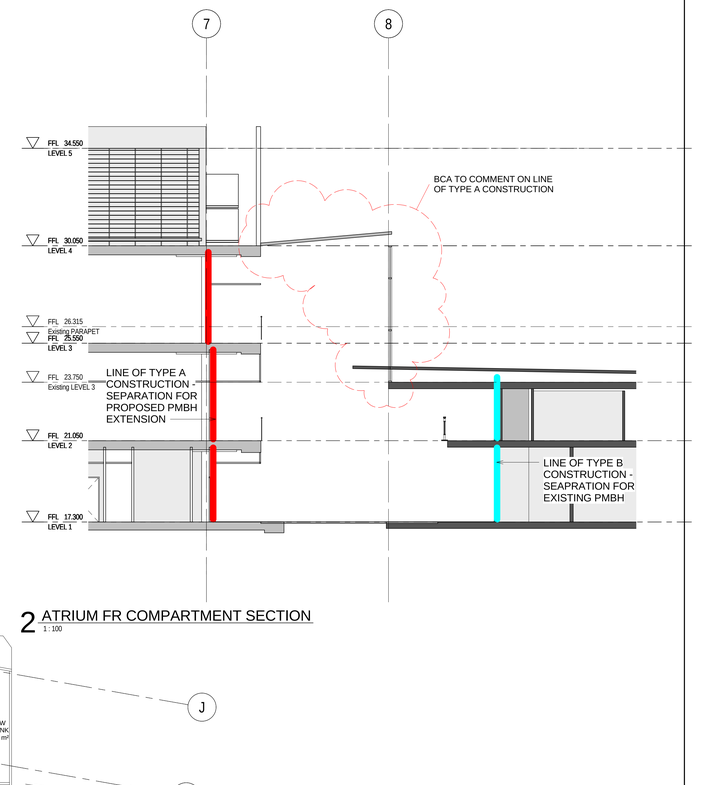
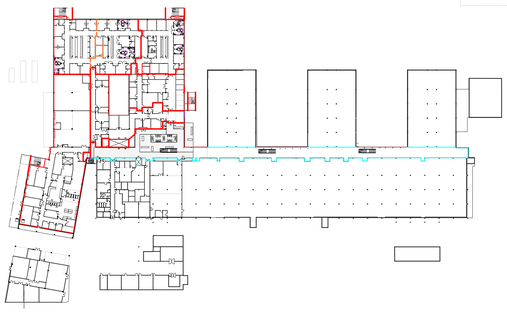


2 ATRIUM FR COMPARTMENT SECTION
1 : 100



3 OVERALL HOSPITAL FR COMPARTMENT PLAN - LEVEL 2
1 : 1000

FOR INFORMATION

KEY PLAN

NORTH

NOTES
1. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS GOVERN.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS SHALL BE VERIFIED ON SITE BEFORE PROCEEDING WITH THE WORK. HASSELL SHALL BE NOTIFIED IN WRITING OF ANY DISCREPANCIES.
4. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS, REPORTS AND DRAWINGS.

Rev	Description	Date
01	Updated in line with Fire Engineer meeting	30.11.2011

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DRAWING TITLE
FIRE COMPARTMENTS - LEVEL 1

STATUS	JOB NO.
SCHEMATIC DESIGN	003145

SCALE AT A0	DRAWN	CO-ORDINATED	CHECKED	APPROVED
As indicated	MD		GS	GS

DISC	DWG NO.	LEVEL	REGION	STAGE	ISSUE
	0120	L1	OP	SD	01

Original Sheet Size A0 -1188 x 841mm

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FOR CONTINUATION OF HOSPITAL STREET FR COMPARTMENTATION SEE PLAN 3 BELOW

FIRE COMPARTMENT LEGEND

- 120 / 120 / 120 - FR COMPARTMENTATION FOR PROPOSED
- 120 / 120 / 120 - FR COMPARTMENTATION FOR EXISTING
- SMOKE BARRIER

PATIENT CARE ENDOSCOPY

HOSPITAL STREET

PATIENT CARE STAGE 1 / 2 RECOVERY

PATIENT CARE THEATRES

EXISTING

COURTYARD BELOW

COURTYARD LEVEL 1 BELOW

DROP OFF & AMBULANCE BAY

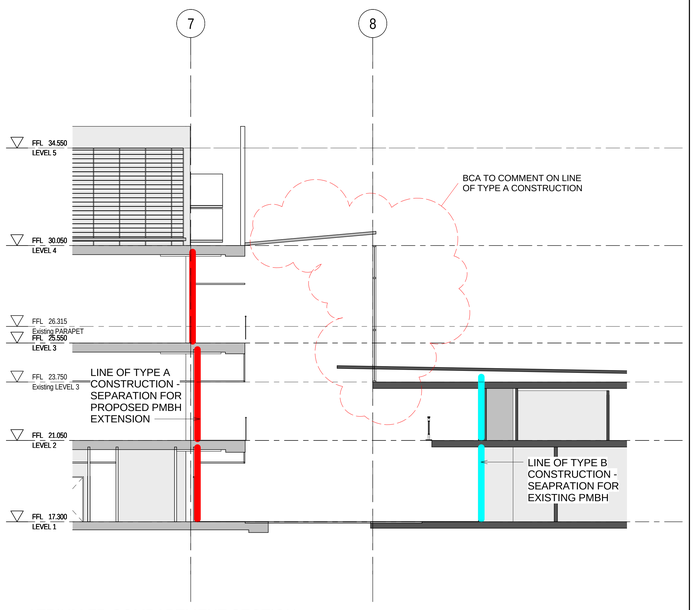
EGRESS PATH

ENTRY

BCA TO REVIEW TRAVEL DISTANCES AND COMMENT ON POSSIBLE DEMOLITION OF EXISTING STAIR

PATIENT CARE EMERGENCY DEPARTMENT

1 FIRE COMPARTMENTS - LEVEL 2
1 : 200



2 ATRIUM FR COMPARTMENT SECTION
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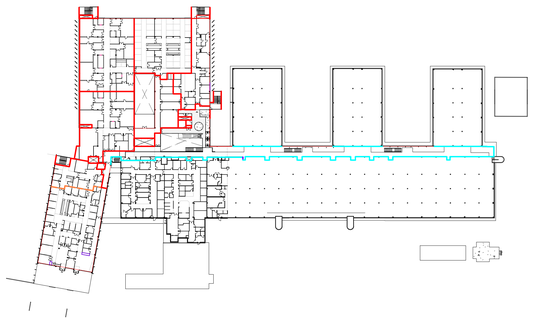

3 OVERALL HOSPITAL FR COMPARTMENT PLAN
1 : 1000

FOR INFORMATION

KEY PLAN

NORTH

NOTES

1. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS GOVERN.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS SHALL BE VERIFIED ON SITE BEFORE PROCEEDING WITH THE WORK. HASSELL SHALL BE NOTIFIED IN WRITING OF ANY DISCREPANCIES.
4. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS, REPORTS AND DRAWINGS.

Rev	Description	Date
01	Updated in line with Fire Engineer meeting	30.11.2011

Rev	Description	Date

Rev	Description	Date

CONSULTANT
aurecon
PROJECT MANAGEMENT
AURECON CONSULTANTS PTY LTD
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ENSTRUCT CONSULTANTS PTY LTD
LEVEL 4, 2 GLEN ST
MILSONS POINT NSW 2061
Ac OR
HYDRAULIC & FIRE SERVICES
ACOR CONSULTANTS PTY LTD
LEVEL 1, 24 FALCON STREET
CROWS NEST NSW 2065

CONSULTANT
MECHANICAL SERVICES
UMOW LAI
LEVEL 7, 657 PACIFIC HIGHWAY
St LEONARDS NSW 2065
ELECTRICAL SERVICES
WOOD & GRIEVE ENGINEERS
LEVEL 3, 454-456 PACIFIC HIGHWAY
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PROJECT

PORT MACQUARIE HOSPITAL EXPANSION
Wrights Rd, Port Macquarie NSW 2444, Australia

DRAWING TITLE

FIRE COMPARTMENTS - LEVEL 2

STATUS	JOB NO.
SCHEMATIC DESIGN	003145

SCALE AT A0	DRAWN	CO-ORDINATED	CHECKED	APPROVED
As indicated	MD		GS	GS

DRAWING NO.	LEVEL	REGION	STAGE	ISSUE
0121	L2	OP	SD	01

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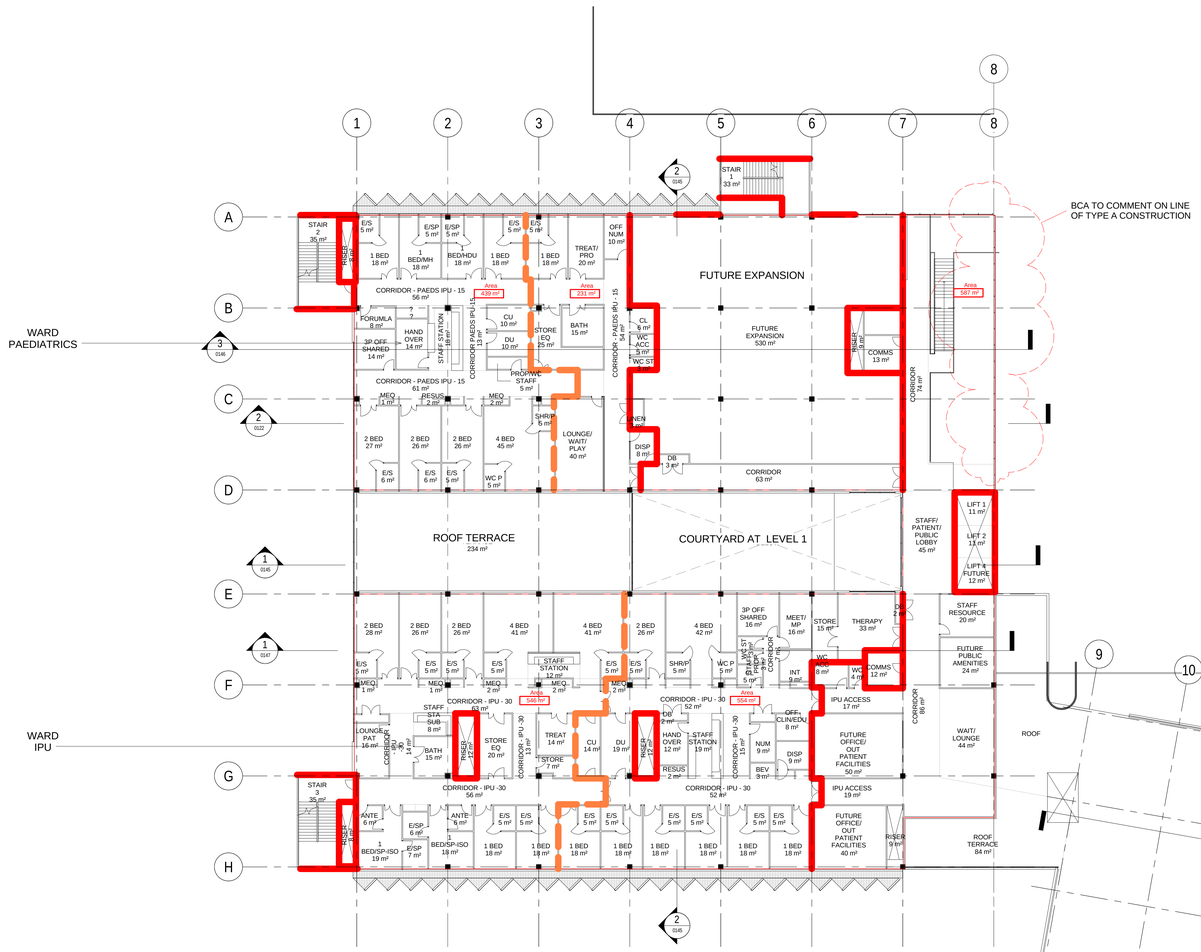
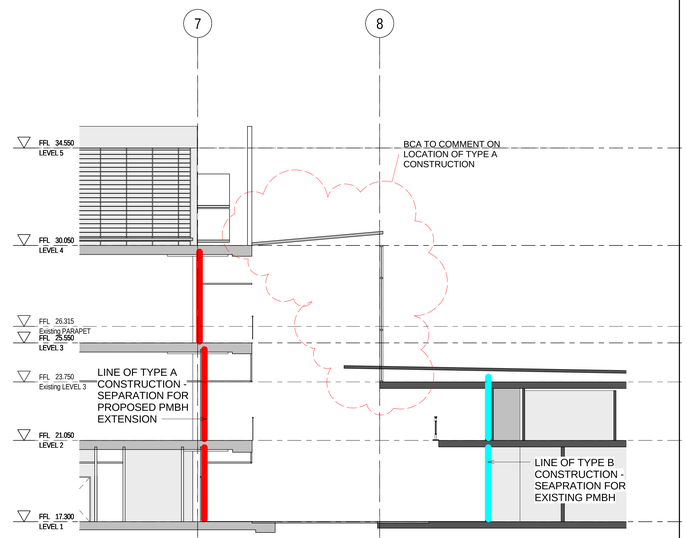


FIRE COMPARTMENT LEGEND

- 120 / 120 / 120 - FR COMPARTMENTATION FOR PROPOSED
- 120 / 120 / 120 - FR COMPARTMENTATION FOR EXISTING
- SMOKE BARRIER



2 ATRIUM FR COMPARTMENT SECTION
1 : 100

FOR INFORMATION

KEY PLAN

NORTH

NOTES

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Rev	Description	Date
01	Updated inline with fire engineer meeting	30.11.2011

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HASSELL

PROJECT

PORT MACQUARIE HOSPITAL EXPANSION
Wrights Rd, Port Macquarie NSW 2444, Australia

DRAWING TITLE

FIRE COMPARTMENTS - LEVEL 3

STATUS	JOB NO.
SCHEMATIC DESIGN	003145

SCALE AT A0	DRAWN	CO-ORDINATED	CHECKED	APPROVED
As indicated	MD		GS	GS

LOC	WBS NO.	LEVEL	REGION	STAGE	ISSUE
	0122	L3	OP	SD	01

Original Sheet Size A0 -1188 x 841mm

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APPENDIX B MANAGEMENT TASKS

Sound management of fire safety is essential. This can be facilitated by a fire-safety management plan which should have the following objectives:

- minimise the number of fire starts
- extinguish any fire before it becomes threatening
- enable occupants to escape the effects of a fire

Responsibilities of Building Owners and Occupiers

The building owners and occupiers have the responsibility of ensuring the safety of all building occupants, including any members of the public entering the premises. That this is the case is reinforced by various legal requirements.

In order to safeguard the occupants from fire injuries, a sound fire-safety management plan must be developed and implemented. The Building Management or its designate within the building should be given the responsibility to develop and implement a plan.

Fire-Safety Management Plan

Having established the objectives of the fire-safety management plan it is necessary to develop the plan. This plan should be developed by reference to HB 143 and AS/NZS 4360 since managing fire safety is really managing the risks associated with potential fires.

The plan shall be documented and communicated to staff/occupants. The successful implementation of the fire-safety management plan requires ongoing communication, consultation and review especially with those who will be involved in implementing the plan.

Evacuation Plan

Evacuation of parts of the building may be required. To be successful, this must be conducted in an orderly and timely manner and in such a way to reinforce the exits likely to be chosen by the occupants. An evacuation plan is therefore essential and the principles given in AS 3745 should be consulted when developing the plan

MINIMISING FIRE STARTS

Development and communication of rules regarding storage of combustibles

(a) rules need to be developed and documented with respect to:
- no storage within egress paths
- no storage close to switchboards and other electrical/mechanical equipment
- penalties for non-compliance

(b) rules need to be well communicated with photographs showing acceptable and unacceptable situations.

Routine maintenance of equipment

Maintenance of electrical and mechanical equipment aimed at reducing likelihood of overheating or electrical faults and consequent fires. Maintenance actions shall be documented and filed for easy recall.

Establish and communicate "hot work" procedures

These procedures must be documented and communicated. All workers undertaking cutting, welding, or other hot work must:
- remove or cover combustibles below or adjacent to the hot working area
- carry a functional portable extinguisher
- be trained in the use of extinguishers
- "sign on" before work is started and "sign off" after completion
- understand penalties for non compliance

Ongoing upgrade of electrical lighting and wiring

Older higher voltage lighting and older wiring may represent significant sources for fire initiation. Modifications shall be documented and filed for easy recall.

Routine inspections of storage of combustibles in relation to potential heat sources such as switchboards and mechanical equipment

Storage of goods in close proximity to electrical and mechanical equipment can lead to overheating and fire initiation. These audits shall be documented and filed for easy recall.

Audits of "hot spots" in switchboards and equipment

Can be accomplished using thermal imaging cameras. These audits shall be documented and filed for easy recall.

Rectification of hot spots

Incorporated as part of maintenance program. Rectification actions shall be documented.

Policing of penalties for non-compliance with procedures

This is where the contractor or tenant is warned or penalized for violations. Constant education showing the ease with which a fire can start, and the potential consequences, is required as part of staff and contractor training. A record shall be kept of non-compliances.

EARLY DETECTION

Establish and communicate who should be notified in the event of a member of staff observing a fire start or smoke

This will most likely be building management/security staff. Need to also establish how such notification is to be made.

Establish and communicate who should investigate a potential incident should a smoke or other detector be activated

Maintenance of automatic fire detection and alarm equipment

This is concerned with the operability of FIP's and associated automatic detection systems such as smoke detectors.

Relevant standard: AS 1851-2005

General staff training

Similarly a wide range of staff should be trained to recognize a fire start and respond in accordance with established procedures.

EARLY SUPPRESSION

Establish and communicate whose responsibility it is to fight a fire with an extinguisher

The rule should generally be that the closest trained staff member to the detected fire should seek to extinguish the fire with an extinguisher.

Establish and communicate when it is appropriate for security/building management staff to use a hose reel

It is not expected that general nursing staff will use a hose reel.

Maintenance of portable extinguishers

Relevant standard: AS 1851 - 2005

Maintenance of hose reels

Relevant standard: AS 1851- 2005

Training of general staff in the use of portable extinguishers

Required

Training of security staff in the use of hose reels and extinguishers

Required

LATER SUPPRESSION

Establish and communicate whose responsibility it is to communicate and interact with the fire brigade before and after it arrives

The initial contact will probably be made by security/building management at the time that a fire is reported. Security/building management likely to be responsible throughout.

Assist fire brigade to fire source

The purpose of this is to ensure that the brigade gets to the fire as quickly as possible.

Maintenance of sprinkler pumps and other parts of sprinkler systems

Relevant standard(s): AS 1851-2005, AS 1951.14.

Maintenance of hydrant system

Relevant standard(s): AS 1851-2005

Establish and communicate policy with respect to storage of combustibles in relation to sprinkler heads

The aim is to:

- limit the shielding due to stored combustibles and non-combustibles in order to maximize sprinkler effectiveness
- explain the consequences of not complying
- establish and communicate penalties for non-compliance

Auditing of combustibles and non-combustibles in relation to sprinkler heads

Aim is to provide a mechanism to measure and reinforce compliance with above policy so as to ensure that sprinklers are not overrun due to late activation or to water not being able to get to fire.

Establish and communicate policy with respect to sprinkler isolation

The aim is to:

- minimise the time that sprinklers are isolated – encourage construction procedures that only require short term isolation
- ensure that isolation procedures do not introduce permanent blockages into pipework
- ensure that sprinkler system is reinstated each day or at the completion of work whichever is the lesser period of time
- ensure that sprinkler modifications are adequately recorded such that there is no confusion about which sprinkler belongs to which zone
- enforce penalties for non-compliance

Policing of penalties for non-compliance with procedures

This is where the contractor or tenant is warned or penalized for violations. Constant education showing the importance of sprinklers and the effects of high levels of shielding is required as part of staff and contractor training.

EFFECTIVE EVACUATION

Development and communication of evacuation plan

Relevant standard: AS 3745

Maintenance of doors to stairs enclosures

Relevant standard: AS 1851-2005

Maintenance of smoke control systems

This is concerned with ensuring the correct operation, in the event of a fire, of:

- fans
- dampers
- ensure that egress paths are kept tenable

Relevant standard(s): AS 1851-2005

Auditing of combustibles in exit paths

This is concerned with ensuring that:

- no combustibles in exits, corridors or stairs
- exit paths are free of obstacles

Policing of rule for no combustibles in exits

- no storage within exits, corridors or stairs

Practice and training in relation to evacuation plan

It is important that staff have an awareness of their responsibilities and that this is reinforced by training and practice.