



BUILDING CODE OF AUSTRALIA REPORT

Prince of Wales Comprehensive Cancer and Blood Disorder Centre

STAGE 1 - SCHEME DESIGN

Dated: 9 March 2012

Prepared for: Health Infrastructure NSW

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MANAGING COMPLIANCE

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Date	Rev No	No. of Pages	Issue or Description of Amendment	Prepared By	Reviewed By	Date Approved
16.08.11	A	6	Part 3B Report	Mike Gooley	Vanessa Hinge	16.08.11
9.03.12	B	11	Stage 1 – Scheme Design	Mike Gooley	Vanessa Hinge	9.03.12
26.03.12	C	11	Stage 1 - Final	Mike Gooley	Vanessa Hinge	26.03.12



Executive Summary

We have reviewed preliminary architectural design documents prepared by Rice Daubney (refer appendix A) for compliance with the Building Code of Australia 2012.

The purpose of this report is to provide preliminary advice and comment on Stage 1 (Radiation Oncology) situated at basement level 1 in relation to compliance with the BCA.

The assessment of the design documentation has revealed that the following areas are required to be assessed against the relevant performance requirements of the BCA. The submission for Crown Certification will need to include verification from a suitably accredited fire engineer: -

DTS Clause	Description of Non-Compliance	Performance Requirement
D1.4	Assessment of architectural drawings indicates the following extended travel distances: <ul style="list-style-type: none">• Travel distance from the bunkers to point of choice exceeds 20.0m (i.e. measured up to 22.0m);• Travel distance from the plant room, making allowance for plant room fitout exceeds 20.0m (i.e. measured approx. 30.0);• Travel distance to required exits exceeds 40.0m (i.e. measured 45.0m)	DP4 & EP2.2
E1.5	Stage 2 will require the building to be sprinkler protected throughout in accordance with E1.5 of the BCA. Sprinklers will not be installed within the bunkers and control area due to the sensitive nature of the medical equipment. Alternative solution will be developed as part of stage 1. The sprinkler infrastructure will be installed in all other areas as part of stage 1 to allow commissioning once stage 2 is complete.	EP1.4
E2.2	As part of stage 2 the building must be served by a zone smoke control system. The Radiation Oncology area within basement – level 1 is not proposed to be served by a zone smoke control system. Alternative solution will be developed as part of stage 1 to delete the future zone smoke control system from this area.	EP2.2

The fire engineered solution relating to performance requirements EP1.4 and EP2.2 will need to be approved after consultation with the NSW Fire Brigade as part of the Construction Certificate process.

The documentation will need further detailing such as architectural design specifications and services design.

This assessment is a preliminary review of the architectural drawings against the BCA, and is generic insofar as the design has progressed. Further assessment is required throughout the design process.

Assessed By
Mike Gooley
Director
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1.0 Introduction

The project involves the construction of a new 9 storey comprehensive Cancer and Blood Disorder Centre situated in the campus of Prince of Wales Hospital, Randwick.

This new building will be linked to the adjacent hospital building. The project will be separated into 2 distinct stages. These include:

- Stage 1 – construction of new bunkers whilst the existing facility will be operational during this phase;
- Stage 2 – demolition of existing facility and construction of a new 9 storey building.

1.1 Current Legislation

The applicable legislation governing the design of buildings is the Environmental Planning and Assessment Act 1979. This Act requires that all new building works must be designed to comply with the BCA.

The version of the BCA applicable to the development, is version that in place at the time of the application to the Certifying authority for the Construction Certificate/crown certificate.

1.2 Consent Authority May Require The Building To Be Upgraded

The local authority when assessing the development application may require that the existing building be brought into partial on full compliance with the current provisions at the BCA. The trigger for upgrade includes:

- Where the building works, together with any other works completed or authorised within the previous 3 years, represents more than half the total volume of the building; or
- Council are not satisfied the measures contained in the building are not adequate for the safety of present using the building or prevention of special to adjacent buildings.

2.0 Building Assessment Data

Summary of Construction Determination: -

	Stage 1 – Basement Level 1	Stage 2 (Whole Building)
Classification	9a - Hospital	9a - Hospital
Number of Storeys Contained	1	10
Rise In Storeys	Nil	9
Type of Construction	A	A
Effective Height (m)	Less than 25m	Greater than 25m

Summary of the floor areas and relevant populations where applicable: -

Part of Project	BCA Classification	Approx. Floor Area (m ²)	Assumed Population
Basement Level 1 – Radiation Oncology	9a	< 2,000	TBA
	Total	< 2,000 m²	

Based upon a review of the use and function of the Radiation Oncology Department (including bunkers) situated with basement level 1. There will be no patient-care areas (as defined in the BCA).

Notes:

1. The above populations have been base on the floor areas and calculations in accordance with Table D1.1.3 of the BCA.
2. The floor areas have been adjusted without ancillary areas such as sanitary facilities, corridors, shelving and or racking layouts in storage areas.



Health-care building means a building whose occupants or patients undergoing medical treatment generally need physical assistance to evacuate the building during an emergency and includes—

- (a) a public or private hospital; or
- (b) a nursing home or similar facility for sick or disabled persons needing full-time care; or
- (c) a clinic, day surgery or procedure unit where the effects of the predominant treatment administered involve patients becoming non-ambulatory and requiring supervised medical care on the premises for some time after the treatment.

Patient care area means a part of a health-care building normally used for the treatment, care, accommodation, recreation, dining and holding of patients including a ward area and treatment area.

Treatment area means an area within a patient care area such as an operating theatre and rooms used for recovery, minor procedures, resuscitation, intensive care and coronary care from which a patient may not be readily moved.

Ward area means that part of a patient care area for resident patients and may contain areas for accommodation, sleeping, associated living and nursing facilities.

3.0 Fire Resistance

The building must be designed in accordance with Table 3, specification C1.1 of the Building Code of Australia 2012.

3.1 Fire Compartmentation and separation

Stage 1:

The maximum size and volume of fire compartment for Class 9a (except for patient care areas) – must not exceed 5,000sqm and volume less than 30,000sqm. The size of the fire compartment for the Radiation Oncology has been assessed as less than 2,000sqm.

The building has been assessed on the basis of the following fire separation/ compartmentation within the development;

- Stage 1 works will be fire-separated by 2 hour construction;
- The proposed new building must be fire-separated from the existing building by construction that achieves an FRL of not less than 2 hours.
- The fire-isolated passageway must be enclosed with construction that achieves an FRL of not less than 2 hours.
- The plant room must be fire-separated from the remainder of the building by 2 hour construction.

Stage 2:

For the Class 9a buildings, in accordance with clause C2.5 Building Code of Australia, the following fire compartments will need to be constructed. Please provide confirmation:-

1. Patient care areas must be divided into fire compartments not exceeding 2000 m2.
2. Treatment areas must be divided into floor areas not more than 1000m2 by smoke-proof walls complying with Specification C2.5.
3. (c) Wardareas-
 - (i) where the floor area exceeds 1000 m2, must be divided into areas not more than 1000 m2 by walls with an FRL of not less than 60/60/60; and
 - (ii) where the floor area exceeds 500 m2, must be divided into areas not more than 500 m2 by smoke proof walls complying with Specification C2.5; and



- (iii) where division of ward areas by fire-resisting walls under (a) and (b) (i) is not required, any smoke proof walls required under (b)(ii) must have an FRL of not less than 60/60/60.

The following ancillary use areas located within a patient care area must be separated from the patient care area by walls with an FRL of not less than 60/60/60:

- a kitchen and related food preparation areas having a combined floor area of more than 30m².
- a laundry, where items of equipment are of the type that are potential fire sources
- a room containing a hyperbaric facility
- a room used predominantly for the storage of medical records having a floor area of more than 10m²

The location of smoke and fire compartmentation shall be reviewed during later stages to ensure the above noted parameters are satisfied.

3.2 Passive Fire Protection

Other passive fire protection issues that will need to be addressed in detailed documentation phase include:

- Lift motor rooms,
- Emergency power supply,
- Emergency generators,
- Electricity supply,
- Boilers or batteries,
- Hydrant Pump rooms,
- Sprinkler Pump Rooms,

To be separated from the remainder of the building by construction achieving a minimum fire resistance level of 120 minutes.

3.3 Fire Hazard Properties

The fire hazard properties of fixed surface linings and mechanical ductwork will also need to be addressed within the detailed documentation phase pursuant to specification C1.10 Building Code of Australia.

4.0 Egress

The egress provisions from the Radiation Oncology area within the basement level will be provided via 2 fire stairs that discharge outside the building and to a fire-isolated passageway that provides egress to open space adjacent to existing building 3.

Other detailing issues that will need to be addressed include:

- Door Hardware
- Exit door operation
- Stair construction
- Handrail and balustrade construction
- Details of Separation of rising & descending stairs
- Discharge from the Fire Isolated Exits
- Details of the egress provisions to the Road.

Stage 1:

In accordance with BCA Clause D1.4, the Radiation Oncology has been assessed as non-patient care areas. The following travel distances:-

Class 9a building – In non-patient care area in a 9a building –

- (i) *no point o the flor must be more than 20m from a point from which travel in different directions to 2 of the required exits is available; and*
- (ii) *the maximum distance to one of those exits must be not more than 40m from the starting point.*



Assessment of architectural drawings indicates the following extended travel distances:

- Travel distance from the bunkers to point of choice exceeds 20.0m (i.e. measured up to 22.0m);
- Travel distance from the plant room, making allowance for plant room fitout exceeds 20.0m (i.e. measured approx. 30.0);
- Travel distance to required exits exceeds 40.0m (i.e. measured 45.0m)

The basement level 1 will be served by 3 required exits. The distance between required exits will be less than 60.0m. Compliance will be achieved with C1.5 of the BCA.

The extended travel distances will be assessed as alternative solution by the fire engineer to achieve compliance with the performance requirements of the BCA.

5.3 Fire Isolated Exits

The proposal is for an underground tunnel to connect stage 1 (basement) to the existing Building 3. The tunnel will serve as a dedicated fire-isolated passageway for emergency egress and will be used by staff and patients to access the bunker treatment areas. The following design criteria will apply:

- The fire-isolated passageway must be fire-separated from the remainder of the building to achieve an FRL of not less than 2 hours;
- Entrance doors to achieve an FRL of at least 60 minutes;
- Entrance doors from Building 3 must achieve an FRL of at least 2 hours;
- Door can be held in the open position with automatic release to operate upon fire-trip;
- Fire egress discharge point along open passageway between existing retaining wall and building 3 which connects with the roadway;

5.0 Access for Persons with a Disability

Access for people with disabilities shall be provided to and within the building in accordance with the requirements of Clause D3.2, D3.3 and D3.4 of the BCA 2011. Parts of the building required to be accessible shall comply with the requirements of AS1428.1-2009.

The design would generally comply with the prescriptive provisions of the BCA with additional ongoing review being undertaken as to door widths, circulation, etc. Further details are to be provided or access to these areas is to be assessed by an access consultant.

Where the main public entrance is via a ramp, tactile indicators shall be provided in accordance with AS 1428.4 at the top and bottom. Parking shall be provided for people with disabilities in accordance with in accordance with Clause D3.5 of the BCA. Facilities services and features of the building accessible to people with disabilities shall be identified by signage complying with Clause D3.6 of the BCA.

General

Access to be provided to and within the building pursuant to AS1428.1-2009 as follows:

- Via the principle public entry and at least 50% of all other entrances
- From designated car parking spaces for the use of occupants with a disability.
- From another accessible building connected by a pedestrian link.
- All areas used by the public.

Note that entrances that are not accessible are to be located within 50m of an entrance that is accessible.

A hearing augmentation-listening system shall be installed throughout the building in accordance with the requirements of Clause D3.7 of the BCA.



5.0 Services and Equipment

The following fire services will need to be provided to the **building**:

Stage 1:

- Fire hydrants in accordance with clause E1.3 of the BCA and AS 2419.1-2005,
- Fire hose reels in accordance with clause E1.4 of the BCA and AS 2441-2005,
- Portable Fire Extinguishers in accordance with clause E1.6 of the BCA and AS 2444-2001,
- Emergency lighting, exit signage and directional exit signage is required throughout the building in accordance with Part E of the BCA and AS/NZS 2293.1,
- Automatic smoke detection and alarm system in accordance with clause E2.2 of the BCA and AS 1670-2004,
- Emergency warning and intercommunication system in accordance with E4.9 and AS 1670.4 and 4428.4

A fire control centre is not required for stage 1, however facility for the co-ordination of fire brigade operations shall be provided within the building.

5.1 Fire Hydrants

A system of Fire Hydrants is required to be provided to BCA Clause E1.3 and AS 2419.1-2005. We will reply upon design certificate from a Hydraulic Consultant.

A booster assembly as part of the fire hydrant requirements. The booster if is required to be located attached to the building at the main entry. If remote from the building at the main vehicle entry or with sight of the main entry of the building within 20m of a hardstand area.

The location of a temporary booster assembly for stage 1 works will be discussed and agreed with Fire and Rescue NSW at the time of the FEB meeting.

6.2 Fire Hose Reels

A Fire Hose Reel System is required to BCA Clause E1.4 and AS2441.

To be located within 4m of exits and provide coverage within the building based on a 36m hose length.

Please note that fire hose reel coverage cannot pass through fire or smoke doors.

6.3 Automatic Sprinkler Protection

An Automatic Fire Suppression System is required required to Specification E1.5 and AS2118 as part of stage 2 works.

Location of fire pumps, tanks, FIP, control valves and booster will be assessed as part of stage 2.

A fire safety engineering assessment in consultation with the NSW Fire Brigade will be developed for the following:

- Stage 2 will require the building to be sprinkler protected throughout in accordance with E1.5 of the BCA. Sprinklers will not be installed within the bunkers and control area due to the sensitive nature of the medical equipment. Alternative solution will be developed as part of stage 1. The sprinkler infrastructure will be installed in all other areas as part of stage 1 to allow commissioning once stage 2 is complete.

Stage 2:

- Automatic Sprinkler system throughout the building;
- Fire Control Centre in accordance with E1.8 required to serve a building with effective height > 25m;
- Emergency lift provision in accordance with clauses E3.2-3.4 of the BCA and AS-1735.2,



6.0 Ventilation and Smoke Hazard Management

Smoke hazard management shall be assessed as either compliant with the requirements of Clause E2.2a of the BCA or part of any Fire engineering report to ensure that the requirements of EP2.2 of the BCA have been verified. The report shall be referred to the NSW Fire Brigades for comments as part of the design certification process.

As part of stage 2 the building must be served by a zone smoke control system. The Radiation Oncology area within basement – level 1 is not proposed to be served by a zone smoke control system. Alternative solution will be developed as part of stage 1 to delete the future zone smoke control system from this area.

Throughout the development the provision of natural or mechanical ventilation is required to all habitable rooms in accordance with F4.5 Building Code of Australia and AS 1668 and AS/NZS 3666.1

9.0 Sanitary Facilities

The sanitary & other facilities within stage 1 would generally consist of: -

- Male and female sanitary facility;
- Unisex disabled sanitary facility.

Please note the Unisex facilities provided for people with disabilities may be counted once for each sex. These facilities are to be provided in accordance with AS1428.1-2009.

10.0 Energy Efficiency

The proposed development shall comply with Part J of the BCA. To achieve compliance, there are two options available:

1. The building can comply with the deemed-to-satisfy provisions of the BCA, relating to the following areas:
 - Building Fabric
 - Glazing
 - Building Sealing
 - Air Conditioning & Ventilation Systems
 - Artificial Lighting & Power
 - Hot Water Supply
2. The building can be verified against a reference building as per Verification Method JV3. This requires that the proposed building and its services be shown to have an annual energy consumption of equal or less than the reference building which has been modelled as per the requirements of Part J of the BCA.

Certification from an appropriately qualified engineer should be provided for either option with a report / computations outlining how compliance is achieved.

Access for maintenance is to be provided to the building in accordance with the requirements of BCA Part J8.

The proposed site will be located in a climate zone 5.



Appendix A - Design Documentation

The following architectural drawings by Rice Daubney, dated 16 March 2012 was used in the assessment and preparation of this report: -

Drawing No.	Title
SD 0000	Cover Sheet
SD 1001	Location Plan & Existing Site Plan
SD 1002	Staging Diagram
SD 1003	Stage 1 – Level 2 – Proposed Site Plan
SD 1004	Stage 1 – Level 1 – Proposed Plan
SD 1005	Stage 2 - - Level 2 – Preliminary Site Plan
SD 1006	Stage 2 – Level 1 - Preliminary Plan
SD 1101	Stage 1 – GA Plan Level 1 Bunker Area 1
SD 1102	Stage 1 – GA Plan Level 1 Bunker Area 2
SD 1601	Stage 1 – Section 01
SD 1602	Stage 1 Section 02
SD 1603	Stage 1 Section 03
SD 2001	Stage 1 – Building 3/2 Level 1 Proposed Plan
SD 8001	Stage 1 – 3D Visualisation
SD 9001	Stage 1- Bunker Room Layout
SD 9002	Stage 1 – Bay Beverage
SD 9003	Stage 1 Dirty Utility Sub – Temporary
SD 9004	Stage 1 – Change Cubicle – Accessible
SD 9005	Stage 1 – Clean Utility Sub – Temporary
SD 9006	Stage 1 – Consultant/Treatment
SD 9007	Stage 1 – Office Single Person (9m2)
SD 9008	Stage 1 Patient Bay Holding – Temporary
SD 9009	Stage 1 – Property Bay (lockers)
SD 9010	Stage 1 – Toilet Accessible
SD 9011	Stage 1 – Toilet Staff



Stage 1:

Appendix B - Draft Fire Safety Schedule

Essential Fire Safety Measures		Standard of Performance
1.	Access Panels, Doors and Hoppers	BCA Clause C3.13
2.	Automatic Fail Safe Devices	BCA Clause D2.19 & D2.21
3.	Automatic Fire Detection and Alarm System	BCA Spec. E2.2a & AS 1670 – 2004
4.	Automatic Fire Suppression System	Subject to Alternative Solution Assessment
5.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2005
6.	EWIS	BCA Clause E4.9 & AS 1670.4 - 2004
7.	Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 and AS/NZS 2293.1 – 2005
8.	Fire Doors	BCA Clause C3.2, C3.4, C3.5, C3.6, C3.7 & C3.8 and AS 1905.1 – 2005
9.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005
10.	Fire Hydrant System	Clause E1.3 & AS 2419.1 – 2005
11.	Fire Seals	BCA Clause C3.15 & AS 1530.4 – 1997
12.	Lightweight Construction	BCA Clause C1.8 & AS 1530.3 – 1999
13.	Mechanical Air Handling System (zone smoke control system)	Subject to Alternative Solution Assessment
14.	Paths of Travel	EP&A Reg 2000 Clause 186
15.	Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001

