

ANNEXURE F

BCA REPORT

Prepared by

McKENZIE GROUP CONSULTING



BUILDING CODE OF AUSTRALIA REPORT

**Proposed Commercial Building,
Olympic Park Site 13, Homebush Bay**

Dated: **10 March 2008**

Prepared for: **AV Jennings**

Prepared by: **McKenzie Group Consulting (NSW) Pty Ltd
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BCA ASSESSMENT REPORT
Proposed Commercial Office Development,
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Executive Summary

As Accredited Certifiers, we have reviewed architectural design documents prepared by Australand (refer appendix A) for compliance with the Building Code of Australia 2007.

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 during the design process for this building. The submission for Construction certificate will need to include verification from a suitably accredited fire engineer for the following items: -

1. Distance of travel to an exit on the Ground Floor Level in Building A currently exceed the prescriptive 30m to a single exit (38m). Therefore this item will be required to be assessed under the performance requirements of the BCA pursuant to DP4 of the BCA.

The documentation will need further detailing such as door hardware, specifications, service design, as outlined in Appendix D of this report.

The application for Construction Certificate shall be assessed under the relevant provisions of the Environmental Planning & Assessment Act 1979 (As Amended) and the Environmental Planning & Assessment Regulation 2000.

Assessed By,

Geoff Pearce
Building Regulations Consultant

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1.0 Introduction

The proposed building consists of a 5 level office development constructed above the carpark podium level. The building is provided with an internal scissor stair arrangement to the Southern side of the internal core, connecting into the existing core system of the carpark below, with egress discharging at Podium level, leading to road/open space.

The proposed building consists of 2 individual commercial towers, Building A and B. Building A, the larger of the two consists of 4 levels above the ground level podium, and Building B, 3 levels of office space.

2.0 Building Assessment Data

Summary of Construction Determination: -

Table A

Part of Project	Site 13
Classification	5
Number of Storeys Contained	6
Rise In Storeys	5
Type of Construction	A
Effective Height (m)	16.6m

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

Table B

Part of Project	BCA Classification	Approx. Floor Area (m ²)	Approximate Volume (m ³)	Assumed Population
Basement Level 1	7a	3,568m ²	TBA	-
Building A				
Ground Level	5/6	1,760m ²	TBA	176
Level 1 - 4	5	9,672m ²	TBA	241/Level
Building B				
Ground Level	5/6	924m ²	TBA	92
Level 1 - 3	5	3,618m ²	TBA	120/Level
Total		22,456m²	TBA	1595

Notes:

1. The above populations have been base 2 on the floor areas and calculations in accordance with Table D1.1.3 of the BCA, on a rate of 1 person per 10m².
2. The Carpark areas have been considered ancillary to the use for the purposes of population numbers.

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3.0 Fire Resistance

The buildings should be constructed generally in accordance with Table 3 of Specification C1.1 of the BCA 2007, where by generally an FRL of 120/120/120 will be required to be adopted to structural elements, as summarised in the below table: -

Part of Building	FRL: Loadbearing Elements	FRL: Non-loadbearing elements
External Walls (< 1.5 m from Boundary)	120/120/120	-/120/120
External Walls (1.5-3.0 m from Boundary)	120/90/90	-/90/90
External Walls (>3.0m from Boundary)	120/60/30	-/-/-
Floors	120/120/120	120/120/120
Fire Stairs/ Lift Shafts	120/120/120	-/120/120
Fire Walls	120/120/120	120/120/120
Roofs	120/60/30	120/60/30
Other	See Table 3, in Appendix D of this report	See Table 3, in Appendix D of this report

The building has been assessed on the basis that each level of the Site 13 building will be its own fire compartment, pursuant to the floor area and volumes required to be achieved in accordance with Clause C2.2 of the BCA.

The following items will be required also be required to be addressed as part of the structural design for subject building: -

- With regards to the interface between the existing podium slab and office building, please note that the slab is required to achieve a minimum FRL of 120/120/120, to separate the carpark and office portions.
- As the building is proposed to be non-sprinklered, spandrel separation between openings in the external façade of the building will be required to achieve compliance with Clause C2.6 of the BCA.
- The lift core will be required to be fire separated from the remainder of the commercial building by an FRL of 120/120/120, pursuant to Table 3 in appendix A of this report.
- Penetrations through fire rated floors required to be enclosed and achieve compliance with Specification C1.1 or Clause C3.15 of the BCA.
- Fire Isolated egress stairs are required to be fire separated from the remainder of the Building by an FRL achieving 120/120/120.

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

- Lift motor rooms,
- Electricity supply,

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

The fire hazard properties of fixed surface linings to all walls, floors and mechanical ductwork will also need to be addressed within the detailed documentation phase pursuant to Specification C1.10 and/or Spec C1.10a of the BCA.

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4.0 Egress

Egress from the Site 13 building is provided by two sets of fire isolated scissor stairs, serving office levels 1 to 4. The subject stairs discharge outside into a covered area and inturn discharge onto road/ open space. In addition to the above the carparking levels is served by an additional fire isolated stairway to discharging to the adjoining pedestrian walkway.

The locations of the proposed exits indicated the following with regards to distance to and between alternate exits. Please note that these distances were assessed on an open floor plate with no consideration taken to potential fitout of these levels: -

- **Podium Level:** Please note on an open floor plate a maximum distance of travel to an exit was measured as 38m, within the largest commercial suite to a single exit. This item will be required to be addressed as part of the ongoing design development for the site, as the distance exceeds the prescriptive 30m to a single exit.

This item may be addressed via providing an additional exit within the largest Retail suite or via a performance based assessment by a suitably qualified fire engineer, in accordance with Performance item DP4 of the BCA.

- **Level 1 & 4:** A maximum distance of 36m was measured from the largest office module to the nearest entrance into the fire isolated exit.

Therefore, further to the above egress assessment, a performance based assessment will be required to be sought, addressing the extended distance of travel identified, pursuant to Performance Requirement DP4 of the BCA. As part of the fire engineering solution proposed for the retail suite and the ongoing design development of the site, consideration will be required to be taken regarding future fitout works of each level and impacts these works will have on distances to an exit.

Please note that as the discharge point of the fire isolated exits adjacent to the Café, is within a covered area, please note that the clear height throughout must be no less than 3.0m, and distance to open space from the discharge point, no less than 6.0m. Please note that if this cannot be achieved on site, a performance based assessment from a fire engineer will be required to be undertaken pursuant to Performance DP4 of the BCA,

Other detailing issues that will need to be addressed include:

- Door Hardware,
- Stair construction,
- Handrail construction,
- Swing of doors into fire isolated egress stairways,
- Balustrade construction, particularly if access is available to the open space located on Level 6.

4.1 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. Parts of the building required to be accessible shall comply with the requirements of AS1428.1-2001.

Parking shall be provided for people with disabilities in accordance with in accordance with Clause D3.5 of the BCA, by a ration of 1 accessible carpark per 100 caparking spaces. 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.

Tactile indicators will be required to be provided to the top and bottom of any public stairway or ramp in accordance with AS1428.4.

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5.0 Fire Services & Equipment

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

- 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.
- An automatic sprinkler system in accordance with the relevant provision of clause E1.5 of the BCA and AS 2118.1-1999, will be required to be provided to the Basement Carparking Area.

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

6.0 Ventilation and Smoke Hazard Management

Pursuant to the requirements Clause E2.2 of the BCA, the Smoke hazard management system for Building F will be required to consist of one of the following options, and shall be provided throughout the building: -

- In each *required fire-isolated stairway*, including any associated *fire-isolated passageway* or *fire-isolated ramp*, an *automatic* air pressurisation system for fire-isolated *exits* in accordance with AS/NZS 1668.1; or
- A zone smoke control system in accordance with AS/NZS 1668.1, if the building has more than one *fire compartment*; or
- An *automatic* smoke detection and alarm system complying with **Specification E2.2a**; or
- A sprinkler system complying with **Specification E1.5**

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.

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7.0 Lift Services

The passenger lifts proposed to be provided to Building F will be required to achieve the following: -

- Fitted with warning signs, fire service controls in accordance with AS 1735.2,
- Stretcher facilities are to be provided within the lifts with minimum dimensions of 600mm wide, 2000mm long and 1400mm high, as the Building has an effective height of more than 12m.
- Fire Service Control room is required to achieve compliance with AS1735.1 or .2.
- The lifts are required to cater for persons with disabilities and be provided with the following: -
 - A handrail in accordance with AS 1735.12
 - Minimum internal floor dimensions as specified in AS 1735.12,
 - Fitted with a series of door opening sensory devices which will detect a 75mm diameter or across the door opening between 50mm and 1550mm above floor level,
 - Have a set of buttons for operating the lift located at heights above level complying with AS 1735.12.

8.0 Sanitary Facilities

The sanitary & other facilities within the development would generally consist of the following. Please note that population numbers for the below calculations are based on numbers identified within Table B of Section 2.0 of this report: -

Building	Occupant Number		WC	Urinal	Basin
Commercial	Male	797	40	16	27
	Female	797	53	N/A	27
	Unisex Wheel Chair Accessible		1	N/A	1
Total Required			94	16	55
Retail	Male	66	2	2	2
	Female	66	2	N/A	2
	Unisex Wheel Chair Accessible		1	N/A	1
Total Required			5	2	5
Total Provided			105	TBA	TBA

Therefore the above table details a slight shortfall in sanitary facility numbers for the proposed male population for the development. However these numbers can be refined over the design period as the estimated population numbers for the subject building are detailed more accurately.

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 AS1428.1-2001.

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 AS1428.1-2001.

Where detailed fitout is pending analysis will be undertaken once tenants and indicative layouts/tenant numbers are known. No allowance has been made for corridors etc that would be provided.

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9.0 Energy Efficiency

The proposed development shall be provided insulation Building sealing and services in accordance with NSW Part J of the BCA 2007. Therefore the following sections of Part J will be required to be assessed and incorporated within the design: -

The building is required to comply with the energy provisions of the BCA 07.

Options available are:

- Comply with either JV2 or JV3
- Or
- Comply with the deemed to satisfy provisions in relation to:
 - Building Fabric
 - External Glazing
 - Building dealing
 - Air movement
 - Air conditioning and ventilation systems
 - Artificial light and power
 - Hot water supply

Certification from an appropriately qualified engineer should be provided for either option with a report / computations outlining how compliance is achieved. The building has been provided with a report on the equivalent provisions in the UK as outlined in the Building Regulations 2000 Approved Document L2A. These elements shall need to be reviewed against the relevant requirements below by the various design disciplines to ensure the BCA requirements are satisfied.

Deemed to Satisfy Measures

The following deemed to satisfy energy measures would be applicable to the project.

Roof and Ceiling Construction:

Roofs and or ceilings are to be constructed to provide an R rating of 3.2.

External Walls:

External walls are to be constructed to provide an R rating of 1.8.

Floors:

Floors are to achieve an R rating of 1.0.

Glazing:

This section relates to the conductance and solar heat gain of the windows, taking into consideration of the type of window frame, orientation and whether there are overhangs / shadings.

A glazing calculator will be required to be undertaken and results provided for assessment.

Building Sealing:

A seal to restrict air infiltration must be fitted to each edge of the external doors and openable windows. The seals may be foam or compressible strip, fibrous seal or the like. The main entry doors must have either an airlock, or self closing doors, or a revolving door.

Miscellaneous exhaust fans must be fitted with a sealing device such as a self closing damper.

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An evaporative cooler must be fitted with a self closing damper.

Air conditioning & Ventilation systems:

An air conditioning unit must be capable of being inactivated when the building is not in use, and where the system has motorized outside air and return dampers, close the dampers when the air conditioning unit or system is inactivated.

Where it is proposed to zone areas, thermostats for each area are to be provided.

When the air flow rate is greater than 1000 L/s the total motor shaft power of the fans in the system should not exceed 15 W/m².

Time Switch:

Power supply to an air conditioning system, or ventilation system or heating system by a timer.

Heating and chilling systems:

Systems that provide heating and chilling for air conditioning must have piping insulated.

An air cooled condenser fan motor, other than one that is part of a package system must not use more than 15W of motor shaft power for each kW of heat rejected.

The fan of a closed circuit cooler must not use more than:

- Propeller or axial – 500W of motor shaft power for each l/s of cooled fluid,
- Centrifugal – 670W of motor shaft power for each l/s of cooled fluid.

The fan of an evaporative condenser must not use more than:

- Propeller or axial – 18W of motor shaft power for each l/s of heat rejected,
- Centrifugal – 22W of motor shaft power for each l/s of heat rejected.

Interior Artificial Lighting:

The maximum design illumination load is not to exceed 10W/m².

Artificial lighting must be controlled by a time switch or occupant sensor.

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Appendix A- Design Documentation

The following documentation was used in the assessment and preparation of this report: -

DRAWING NO.	Title	Issue	Date	Drawn By
AR-EA-2.01	Basement Plan - Level 1	-	15.02.08	Bates Smart
AR-EA-2.02	Basement Plan - Level 2	-	15.02.08	Bates Smart
AR-EA-2.03	Floor Plan – Ground	-	15.02.08	Bates Smart
AR-EA-2.04	Floor Plan – Level 1 - 3	-	15.02.08	Bates Smart
AR-EA-2.05	Floor Plan – Level 4	-	15.02.08	Bates Smart
AR-EA-2.06	Floor Plan – Level 5	-	15.02.08	Bates Smart
AR-EA-2.07	Roof Plan	-	15.02.08	Bates Smart
AR-EA-5.01	East Elevation	-	15.02.08	Bates Smart
AR-EA-5.02	North Elevation	-	15.02.08	Bates Smart
AR-EA-5.03	West Elevation	-	15.02.08	Bates Smart
AR-EA-5.04	South Elevation	-	15.02.08	Bates Smart
AR-EA-5.05	West Elevation	-	15.02.08	Bates Smart
AR-EA-5.07	Street Context Elevations	-	15.02.08	Bates Smart
AR-EA-6.01	Sections A-A	-	15.02.08	Bates Smart
AR-EA-6.02	Sections B-B	-	15.02.08	Bates Smart

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Appendix B- Draft Fire Safety Schedule

	Items to be inspected or tested as nominated by the relevant authority	Deemed to satisfy installation standard/code/conditions of approval
1.	Automatic Fail Safe Devices	BCA Clause D2.19 & D2.21
2.	Automatic Fire Detection and Alarm System	BCA Spec. E2.2a & AS 1670 – 2004
3.	Automatic Fire Suppression System	BCA Spec. E1.5 & AS 2118.1 – 1999
4.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 1998
5.	Emergency Evacuation Plan	AS 3745 – 2002
6.	Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 and AS/NZS 2293.1 – 1998
7.	Fire Doors	BCA Clause C3.2, C3.4, C3.5, C3.6, C3.7 & C3.8 and AS 1905.1 – 1997
8.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 1988
9.	Fire Hydrant System	Clause E1.3 & AS 2419.1 – 1994
10.	Fire Seals	BCA Clause C3.15 & AS 1530.4 – 1997
11.	Lightweight Construction	BCA Clause C1.8 & AS 1530.3 – 1999
12.	Mechanical Air Handling System	BCA Clause E2.2, AS/NZS 1668.1 – 1998 & AS 1668.2 – 1991
13.	Paths of Travel	EP&A Reg 2000 Clause 186 and to be verified by fire engineer.
14.	Smoke Hazard Management System	BCA Part E2 & AS/NZS 1668.1 – 1998
15.	Warning and Operational Signs	Section 183 of the EP & A Regulations 2000, AS 1905.1 – 1997, BCA Clause C3.6, D2.23 and E3.3.

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Appendix C- Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2004:

Table 3				
TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS				
Building element	Class of building - FRL: (in minutes) <i>Structural adequacy/Integrity/Insulation</i>			
	2, 3 or 4 part	5, 7a or 9	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any fire-source feature to which it is exposed is -				
<i>For loadbearing parts-</i>				
less than 1.5m	90/ 90/ 90	120/120/120	180/180/180	240/240/240
1.5 to less than 3 m	90/ 60/ 60	120/ 90/ 90	180/180/120	240/240/180
3 or more	90/ 60/ 30	120/ 60/ 30	180/120/ 90	240/180/ 90
<i>For non-loadbearing parts-</i>				
less than 1.5 m	- / 90/ 90	- /120/120	- /180/180	- /240/240
1.5 to less than 3 m	- / 60/ 60	- / 90/ 90	- /180/120	- /240/180
3 m or more	- / - / -	- / - / -	- / - / -	- / - / -
EXTERNAL COLUMN not incorporated in an external wall, where the distance from any fire-source feature to which it is exposed is -				
less than 3 m	90/ - / -	120/ - / -	180/ - / -	240/ - / -
3 m or more	- / - / -	- / - / -	- / - / -	- / - / -
COMMON WALLS and FIRE WALLS-	90/ 90/ 90	120/120/120	180/180/180	240/240/240
INTERNAL WALLS-				
<i>Fire-resisting lift and stair shafts-</i>				
<i>Loadbearing</i>	90/ 90/ 90	120/120/120	180/120/120	240/120/120
<i>Non-loadbearing</i>	- / 90/ 90	- /120/120	- /120/120	- /120/120
<i>Bounding public corridors, public lobbies and the like-</i>				
<i>Loadbearing</i>	90/ 90/ 90	120/ - / -	180/ - / -	240/ - / -
<i>Non-loadbearing</i>	- / 60/ 60	- / - / -	- / - / -	- / - / -
<i>Between or bounding sole-occupancy units-</i>				
<i>Loadbearing</i>	90/ 90/ 90	120/ - / -	180/ - / -	240/ - / -
<i>Non-loadbearing</i>	- / 60/ 60	- / - / -	- / - / -	- / - / -
<i>Ventilating, pipe, garbage, and like shafts not used for the discharge of hot products of combustion-</i>				
<i>Loadbearing</i>	90/ 90/ 90	120/ 90/ 90	180/120/120	240/120/120
<i>Non-loadbearing</i>	- / 90/ 90	- / 90/ 90	- /120/120	- /120/120
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES and COLUMNS-				
	90/ - / -	120/ - / -	180/ - / -	240/ - / -
FLOORS	90/ 90/ 90	120/120/120	180/180/180	240/240/240
ROOFS	90/ 60/ 30	120/ 60/ 30	180/ 60/ 30	240/ 90/ 60

Table 3.9	
REQUIREMENTS FOR CARPARKS	
Building element	FRL (not less than) <i>Structural adequacy/ Integrity/Insulation</i> ESA/M (not greater than)
Wall	
(a) <i>external wall</i>	
(i) less than 3 m from a <i>fire-source feature</i> to which it is exposed: <i>Loadbearing</i> <i>Non-loadbearing</i>	60/60/60 -/60/60
(ii) 3 m or more from a <i>fire-source feature</i> to which it is exposed	- / - / -
(b) <i>internal wall</i>	
(i) <i>loadbearing</i> , other than one supporting only the roof (not used for carparking)	60/ - / -
(ii) supporting only the roof (not used for carparking)	- / - / -
(iii) <i>non-loadbearing</i>	- / - / -
(c) <i>fire wall</i>	
(i) from the direction used as a <i>carpark</i>	60/60/60
(ii) from the direction not used as a <i>carpark</i>	as required by Table 3
Column	
(a) supporting only the roof (not used for carparking) and 3 m or more from a <i>fire-source feature</i> to which it is exposed	- / - / -
(b) steel column, other than one covered by (a) and one that does not support a part of a building that is not used as a <i>carpark</i>	60/ - / - or 26 m ² /tonne
(c) any other column not covered by (a) or (b)	60/ - / -
Beam	
(a) steel floor beam in continuous contact with a concrete floor slab	60/ - / - or 30 m ² /tonne
(b) any other beam	60/ - / -
Fire-resisting lift and stair shaft (within the <i>carpark</i> only)	60/60/60
Floor slab and vehicle ramp	60/60/60
Roof (not used for carparking)	- / - / -
Notes: 1. ESA/M means the ratio of exposed surface area to mass per unit length. 2. Refer to Specification E 1.5 for special requirements for a sprinkler system in a <i>carpark</i> complying with Table 3.9 and located within a multi-classified building.	