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# PROPOSED COSTCO WAREHOUSE

# AUBURN NSW

# CAPABILITY STATEMENT, BCA 2009

| | |
|---|---|
| Report prepared for: | Costco Wholesale<br>C/ - Group GSA<br>Level 7, 80 William Street<br>East Sydney NSW<br><br>Attention: Onofrio Marzulli |
| Report prepared by: | Philip Chun Building Code Consulting<br>Suite 404<br>44 Hampden Road<br>ARTARMON NSW 2064<br><br>Contact: Rob Marinelli / Mark Maxwell |
| Report Ref: | **09212_CapStatR3.1_20100212** |
| Job Number: | 09212 |
| Date. | 12th February 2010 |

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**DOCUMENT ACCEPTANCE**

| | Name | Signed | Date |
|---|---|---|---|
| Prepared by | Robert Marinelli |  | 29 January 2010 |
| Reviewed by | Robert Marinelli |  | 12 February 2010 |

**REVISION HISTORY**

| Revision No. | Prepared by | Description | Date |
|---|---|---|---|
| 09219R01_20090810 | Mark Maxwell | Capability Statement | 24th August 2009 |
| 09212_CapStatR02_20090831 | Robert Marinelli | Final Cap Stat | 31st August 2009 |
| 09212_CapStatR02.1_040909 | Mark Maxwell | Alternate Conclusion | 4th September 2009 |
| 09212_CapStatR02.2_02109 | Mark Maxwell | Updated Drawings No's | 2nd October 2009 |
| 09212_CapStatR02.3_20100129 | Robert Marinelli | Revised design | 29th January 2010 |
| 09212_CapStatR3.1_20100212 | Robert Marinelli | Updated drawings | 12th February 2010 |

# 1.0 Introduction and Documentation

## Introduction

This report contains a design philosophy review concerning the capability of the design to meet Building Code of Australia requirements. The review has found that the fundamental design is capable of meeting the requirements of BCA 2009 with the inclusion of fire engineering.

At the request of Group GSA acting for Costco Wholesale, this report contains details of compliance with respect to the Building Code of Australia 2009 for the proposed construction of a Costco warehouse and associated parking. The proposed building will include two levels of carparking (basement and ground), level one is class 6 retail sales / shop area, and level 2 is an office area over only a portion of the overall floor plate.

We have reviewed the submitted architectural documentation provided to date for compliance with the deemed-to-satisfy provisions of the Building Code of Australia. Where compliance with the deemed to satisfy provisions is not possible a schedule of alternate solutions has been provided as discussed and requested by the architects and designers.

We have made every attempt to cover the main issues under Parts C, D, E and F of the Building Code of Australia. Areas of the design are still being refined so that resolution will be possible prior to the issue of the Construction Certificate for the works.

Methodology is principally review of the available documentation for the building at this point in time prepared by Mulvanny G2 Architects, through Group GSA.

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## Documentation available and assessed

The Design Development scheme assessed comprises of the following design drawings as per the attached drawing schedule.

Architectural drawings prepared by Mulvanny G2 and Group GSA

| Drawing | Drawing Number | Revision | Date |
|---|---|---|---|
| Title Sheet and Location Plan | TS-0100-DA | D | 08/02/10 |
| Site Plan | SD-1100-DA | D | 08/02/10 |
| Basement Floor Plan Parking 2 | A1-2001-DA | D | 08/02/10 |
| Ground Floor Plan Parking 1 | A1-2002-DA | D | 08/02/10 |
| Level 1 Floor Plan Retail Floor | A1-2003-DA | D | 08/02/10 |
| Mezzanine Floor Plan Regional Office | A1-2004-DA | D | 08/02/10 |
| Roof Plan | A2-2005-DA | D | 08/02/10 |
| South and West Elevations | A3-3000-DA | D | 08/02/10 |
| North and East Elevations | A3-3001-DA | D | 08/02/10 |
| Sections | A4-3100-DA | D | 08/02/10 |

## 2.0 Use and Class of Buildings

The building design has been revised so that the lowest basement level will be exposed hence form a rise in storey. There will therefore be a rise in storey of the building of four requiring type A construction.

Class and use of the various levels of the building are as follows:-

| Location | Use | Classification | Rise in storeys | Type of construction |
|---|---|---|---|---|
| **Costco Warehouse** | | | | |
| Basement – P2 | Car park | 7a | 4 | Type A |
| Ground floor -P1 | Car park | 7a, 8 | 4 | Type A |
| Level 1 – F1 | Shop | 6 | 4 | Type A |
| Level 2 – F2 | Office<br>Mezzanine Plant | 5<br>6 - ancillary | 4 | Type A |

The building will be documented so that it will comply with the requirements of Type A construction. The required fire ratings are specified in the following report.

## 3.0 Construction and fire resistance ratings

The fundamental concept of fire rating for the building will be as per the following table:

| **Table 3 TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS Building element** | **Class of building — FRL: (in minutes)** | | | |
|---|---|---|---|---|
| | **Structural adequacy/Integrity/Insulation** | | | |
| | **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— | | | | |
| For loadbearing parts— | | | | |
| less than 1.5 m | 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 m or more | 90/ 60/ 30 | 120/ 60/ 30 | 180/120/ 90 | 240/180/ 90 |
| For non-loadbearing parts— | | | | |
| 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—** | | | | |
| Fire-resisting lift and stair shafts— | | | | |
| Loadbearing | 90/ 90/ 90 | 120/120/120 | 180/120/120 | 240/120/120 |
| Non-loadbearing | - / 90/ 90 | - /120/120 | - /120/120 | - /120/120 |
| Bounding public corridors, public lobbies and the like— | | | | |
| Loadbearing | 90/ 90/ 90 | 120/ - / - | 180/ - / - | 240/ - / - |
| Non-loadbearing | - / 60/ 60 | - / - / - | - / - / - | - / - / - |
| Between or bounding sole-occupancy units— | | | | |
| Loadbearing | 90/ 90/ 90 | 120/ - / - | 180/ - / - | 240/ - / - |
| Non-loadbearing | - / 60/ 60 | - / - / - | - / - / - | - / - / - |
| Ventilating, pipe, garbage, and like shafts not used for the discharge of hot products of combustion— | | | | |
| Loadbearing | 90/ 90/ 90 | 120/ 90/ 90 | 180/120/120 | 240/120/120 |
| Non-loadbearing | - / 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 |

It should be noted that the fire engineer may request additional fire rating to the building structure.

The proposed building will have a rise in storey of 4 and is therefore required to be of not less than Type A construction.

Internal columns to the underside of the building roof in type A construction will require a fire rating of at least 60/ - / - as per below.

*SPECIFICATION C1.1 FIRE-RESISTING CONSTRUCTION*
*3. TYPE A FIRE-RESISTING CONSTRUCTION*
***3.7 Internal columns and walls: Concession***
*For a building with an effective height of not more than 25 m and having a roof without an FRL in accordance with Clause 3.5, in the storey immediately below that roof, internal columns other than those referred to in Clause 3.1(f) and internal walls other than fire walls and shaft walls may have—*

*(a) in a Class 2 or 3 building: FRL 60/60/60; or*
***(b) in a Class 5, 6, 7, 8 or 9 building—***
***(i) with rise in storeys exceeding 3: FRL 60/60/60***
*(ii) with rise in storeys not exceeding 3: no FRL.*

Variation to this requirement will need justification through fire engineering.

External walls and columns that are loadbearing and within 18 metres of the side boundaries of the allotment do require a fire rating. This currently applies to the loading dock area.

The following services are to be separated from the remainder of the building via a 120/120/120 FRL:-

- Switchroom
- Lift motor rooms
- Boilers
- Essential services generator systems

Any electrical substation located on the ground floor level must be separated from any other part of the building by construction having an FRL of not less than -/180/180 and have self closing fire doors with a fire rating of -/180/30 (this will be an Energy Australia requirement rather than a BCA requirement).

**Fire compartment areas and volumes**

The maximum area and maximum volume of fire compartments allowed as specified in Part C2.2 of the BCA for Type A construction is 5,000 $m^2$ and 30,000$m^3$ respectively for class 6 & 7 buildings. The building is well over these requirements and therefore is required to comply with part C2.3 for large isolated buildings.
In accordance with C2.3, as the building is over 18,000² it is required to be fitted with a sprinkler system complying with Spec E1.5 and is to be provided with perimeter vehicular access complying with C2.4(b). As the Costco warehouse area has a floor to ceiling height of less than 12m it must have a smoke exhaust system in accordance with Spec E2.2b or smoke and heats vents in accordance with Spec E2.2c.

Vehicular access required under C2.5:

- Must be capable of providing continuous access for emergency vehicles to enable travel in a forward direction from a public road around the entire building; and
- Must have a minimum unobstructed width of 6 m with no part of its furthest boundary more than 18m from the building and in no part of the 6 m width be built upon or used for any purpose other than vehicular or pedestrian movement; and
- Must provide reasonable pedestrian access from the vehicular access to the building; and
- Must have a load bearing capacity and unobstructed height to permit the operation and passage of *fire brigade* vehicles; and

- Must be wholly within the allotment except that a public road complying with the above may serve as the vehicular access or part thereof.

Currently the 6 metre fire access road is not wholly within the allowable 18 metres in some parts hence needs NSW fire brigade approval and an alternate solution.

**Protection of Openings**

Any openings within 3 meters of the side boundaries (excluding Street boundaries) are to be protected in accordance with C3.4 of the BCA 2009. As the building is more than 3m from any fire source feature there is no requirement for the protection of openings.

## 4.0 Access and Egress

**Principles**

The buildings' egress system has been assessed and designed to ensure compliance with the following principles:

- The maximum distance of travel to an exit in Class 5, 6, 7a & 8 building will be 40 metres, and to a point of choice will be 20 metres, the distance between alternate exits is not to exceed 60 metres
- The distance between alternate exits is to be not less than 9 metres.
- The construction and discharge of stairs, landings, thresholds, balustrades and handrails will need to meet the requirements of the BCA.
- All paths of travel are to be a minimum of 1000mm in clear width.
- Widths of exits and corridors must be sufficient to provide safe passage for occupant egress.

Based on the plans provided, the travel distances will not comply with Part D1.4 and D1.5 of the BCA. Distances will exceed 20m to a point of choice and distances will greatly exceed 40 metres and 60 metres as required above to all floors. Refer to previously provided mark-ups for specific areas of non-compliance.

An alternate solution is required to justify compliance with performance requirements.

**Aggregate exit widths:**

The retail floor area is over 13,000m$^2$. The population of the retail floor will be about 2,000 persons according to the D1.13 provisions of the Building Code of Australia. This can be reduced based on actual client estimates.

The provided aggregate exits will not comply for this population hence an alternate solution will be required. See fire engineering report by Defire.

**Separation of Rising and Descending Stair Flights**

There must be no direct connection between ground level and basement parking levels through the fire isolated stairs. Fire-isolation will be required to separate the two flights. This is to ensure that persons using the exit from the upper levels do not continue below the ground level.

**Considerations for access for the disabled**

(a) Access must be provided through the front entrance and from the accessible car spaces -
(b) Access for disabled persons is to meet the requirements of AS 1428.1-2001. There must be no steps or ramps steeper than 1:14 at the entrance. Any kerb ramps required to be accessible must comply with AS 1428.1.
(c) The circulation space at doorways must comply with AS 1428.1-2001.
(d) The door schedule will need to show the clear opening width is not less than 800mm. To achieve this, a minimum 870mm wide door leaf is required.
(e) The disabled accessible unisex sanitary facility must comply with AS 1428.1-2001.
(f) Braille and tactile signage should also be provided to al toilets.
(g) Car parking for disabled persons is required to the building at a ratio of 1 to 50.

Should any variations from the above arise it will require that justification be provided by an independent access consultant prior to the issue of a construction certificate. See Philip Chun Access report as part of this Part 3A submission.

## 5.0 Fire Systems

The following is a status of the services required and to be provided to the building.

**Fire services**

| | |
|---|---|
| Fire Hydrants | Fire hydrants are to be provided throughout to AS 2419 - 2005.<br><br>All internal pumprooms located within a building shall have a door opening to a road or open space, or a door opening to fire-isolated passage or stair which leads to a road or open space and except where the building has sprinklers in accordance with AS 2118.1, enclosing walls with an FRL not less than that prescribed by the Building Code of Australia for a fire wall applicable to the adjoining classification.<br><br>Hydrant booster location within 10 metres of a building is to be protected by a fire rated wall with a fire resistance rating of 90/90/90 extended 2 metres either side of booster and 3 metres above ground level.<br><br>The location of the boosters needs to be approved by the NSW Fire Brigade if they vary from the requirements of the Australian Standards.<br><br>Location of the fire hydrants to the building will need to be assessed but should be located within the fire isolated stairs of the building and additional as required to achieve compliance. |
| Fire Hose-Reels | Fire hose-reels should be arranged to provide for full coverage to the building in accordance with AS 2444.<br><br>Fire hose-reels are to be located within 4 metres of an exit or an internal fire hydrant. |
| Sprinklers | A sprinkler system complying with AS 2118.1 is to be provided.<br><br>Ensure the control valves do not control an area greater than that permitted for each applicable occupancy class.<br><br>Location of the sprinkler valve room needs to be directly to the street or open space. |

Variations from the above will require that justification be provided by a fire engineer and approval from the NSW Fire Brigade.

**Fire Control Centre**

A Fire Control Centre in a specialised area at ground floor level is to be provided in accordance with Specification E1.8.

Any variations from Specification E1.8 are to be approved by the NSW Fire Brigade.

**Smoke hazard management**

The building will need to be provided with a smoke exhaust system according to Table E2.2b and to comply with AS 1668 parts 1 and 2.

Variations from the above will require that justification be provided by a fire engineer

### Lift systems

All lift cars must be provided with fire service controls in accordance with AS 1735.2. All lifts must be accessible for people with disabilities and provided with at least the following:

- Fitted with car control buttons and handrails complying with AS 1735.12.
- Internal floor dimensions not less than 1400mm x 1100mm.
- Clear opening of the doorway to be not less than 900mm.
- Fitted with door opening sensory devices.

### Emergency Lighting, Exit Signs and Warning Systems

| | |
|---|---|
| Exit and emergency lighting | A system of emergency lights and exit signage will be installed in the building to AS2293. |
| Building Occupant Warning System | A building occupant warning system in accordance with Clause 6 of Spec E2.2a |

## 6.0 Health and amenity issues

The following criteria detail the required sanitary facilities to be provided.

**Sanitary facilities**

Sanitary facilities must be provided for retail staff and possibly patrons for the building. This needs to be clarified once the population has been confirmed for both staff and patrons.

**Light and ventilation**

| | |
|---|---|
| Retail/ Warehouse / Office buildings | Natural ventilation in accordance with F4.6 or mechanical ventilation to AS 1668.2 is to be provided to the building. |
| Carparks | Every storey of the carpark must have a system of ventilation complying with AS 1668.2 or an adequate system of permanent natural ventilation. The building is proposed to be provided with a complying ventilation system to AS1668.1 and 2. |

**Room Sizes**

The ceiling minimum height of 2.4m is required to areas except corridors, sanitary facilities and storage areas. Compliance is readily achievable. Plant rooms need to be checked and the correct heights allowed in the design.

## 7.0 Energy Efficiency

**Part J compliance**

The building will be in Climate Zone 6 and must be built in accordance with the requirements of Part J of the BCA in terms of Energy Efficiency. An Energy consultant should be consulted and a report provided demonstrating the requirements and methods of compliance for the building. The most important part of the architect to consider is glazing and the thermal insulation requirements for the building fabric due to the building size.

## 8.0 Access for maintenance

The following criteria must be observed in the special design of the plant areas apart from the issues that may be raised by the Energy consultants.

NSW SECTION J ENERGY EFFICIENCY

NSW J8.2 Access for maintenance
Access for maintenance must be provided to—
(a) all services and their components, including—
- (i) time switches and motion detectors; and
- (ii) room temperature thermostats; and
- (iii) plant thermostats such as on boilers or refrigeration units; and
- (iv) outside air dampers; and
- (v) reflectors, lenses and diffusers of light fittings; and
- (vi) heat transfer equipment; and

(b) adjustable or motorised shading devices.

## 9.0 Alternate solutions / fire engineering

The building design will require some alternate solutions. The non-compliant BCA issues that require alternate solution to satisfy performance requirements include but may not be limited to the following;

- Reduction of the fire rating of internal columns beneath the roof to nil from 60/ - / - .
- 20m to a single exit or point of choice
- 40m to an alternate exit / single exit.
- 60m between alternate exits as measured back through the point of choice.
- Aggregate exit width less than deemed to satisfy BCA
- Smoke exhaust quantities and operation
- Perimeter access greater than 18m for the building

The engineered solution should be in accordance with performance requirement of the Building Code of Australia and have been verified by Defire in their preliminary report.

## 10.0 Approvals from the New South Wales Fire Brigade

The following issues may need approval from the New South Wales Fire Brigade and in some cases concurrence will be sought through an application for departures from the deemed to satisfy provisions:-

- Location of fire control centre.
- Fire Engineered alternate solutions as prepared by others as noted above. This may vary once a further assessment of the drawings is completed, but should not affect the Part 3A submission at this stage.

## 11.0 Conclusion

We have assessed the architectural building design to date and have reviewed the scheme with respect to the Building Code of Australia. Overall the development has the potential to comply with the requirements of the BCA, however alternate solutions, as specified above are required to be sought. The finer details with respect to BCA 2009 compliance can be finalised prior to the issue of a Construction Certificate.