BCA ASSESSMENT REPORT

Building 2B, Oakdale West Estate

SSD 7348 Mod3 & SSD 10397 Stage 2 DA

Prepared For:
Goodman Property Services (Aust) Pty Ltd

Revision 3

Date: 13.01.2020

Project No.: 190421

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REPORT STATUS				
DATE	**REVISION**	**STATUS**	**AUTHOR**	**REVIEWED**
12.11.2019	0	Preliminary Assessment – For Client & Consultant Review	DG	TH
28.11.2019	1	Preliminary Assessment – For DA Lodgement	DG	TH
11.12.2019	2	Updated Assessment – For DA Lodgement	DG	TH
13.01.2020	3	Updated Architectural Plans – For DA Lodgement	DG	TH

Prepared by:

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Blackett Maguire + Goldsmith

A. INTRODUCTION

A.1 BACKGROUND / PROPOSAL

Blackett Maguire + Goldsmith Pty Ltd (BM+G) have been commissioned by Goodman Property Services, to undertake a preliminary review of the proposed development, against the deemed-to-satisfy (DTS) provisions of the Building Code of Australia 2019 (BCA) pursuant to the provisions of clause 145 of the *Environmental Planning & Assessment Regulation 2000* and clause 18 of the *Building Professionals Regulation 2007*.

The proposed development involves the construction of Building 2B in the Oakdale West Estate, which consists of a 4-storey warehouse & distribution facility, with ancillary offices, internal automation and sortation equipment, and associated external hardstand and car parking.

Note: The following report includes an assessment of Building 2B only and does not comment on the Estate Masterplan Modification Plans, as the other buildings in the Estate (other than the previously assessed Precinct 1 buildings) will be subject to future Development Applications for the detailed design of each building and will be assessed accordingly at that time.

Source: SBA Architects Drawing No. DA-000 (D)

A.2 AIM

The aim of this report is to:

+ Undertake an assessment of the proposed warehouse facility against the Deemed-to-Satisfy (DtS) Provisions of the BCA 2019.
+ Identify any BCA compliance issues that require resolution/attention for the proposed development at the CC Application stage.

A.3 PROJECT TEAM

The following BM+G Team Members have contributed to this Report:

+ Dean Goldsmith (Director)
+ Tony Heaslip (Peer Review Building Surveyor)

A.4 DOCUMENTATION

The following documentation has been reviewed, referenced and/or relied upon in the preparation of this report:

+ BCA 2019

- Guide to the BCA 2019.
- Innova Services Fire Safety Strategy Rev.5
- Architectural plans prepared by SBA Architects Pty Ltd, as listed below:

Drawing No.	Rev.	Date	Drawing No.	Rev.	Date
DA000	D	10.01.2020	DA211	D	10.01.2020
DA001	D	10.01.2020	DA212	D	10.01.2020
DA002	D	10.01.2020	DA213	D	10.01.2020
DA100	C	10.01.2020	DA214	D	10.01.2020
DA101	G	10.01.2020	DA300	E	10.01.2020
DA102	D	10.01.2020	DA400	D	10.01.2020
DA200	D	10.01.2020	DA410	D	10.01.2020
DA201	D	10.01.2020	DA500	C	11.12.2019
DA202	D	10.01.2020	DA501	C	11.12.2019
DA203	D	10.01.2020	DA502	C	11.12.2019
DA204	D	10.01.2020	DA503	C	11.12.2019
DA210	D	10.01.2020	DA504	C	11.12.2019

A.5 Regulatory Framework

Pursuant to clause 145 of the Environmental Planning and Assessment (EPA) Regulation 2000 all new building work must comply with the current BCA however the existing features of an existing building need not comply with the BCA unless upgrade is required by other clauses of the legislation.

A.6 Limitations & Exclusions

The limitations and exclusions of this report are as follows:

- The following assessment is based upon a review of the architectural documentation.
- No assessment has been undertaken with respect to the Disability Discrimination Act (DDA) 1992. The building owner should be satisfied that their obligations under the DDA have been addressed. In this regard however, the provisions of the DDA Access to Premises – Buildings Standards have been considered as they are generally consistent with the accessibility provisions of the BCA.
- The Report does not address matters in relation to the following:
  i. Local Government Act and Regulations.
  ii. NSW Public Health Act 1991 and Regulations.
  iii. Occupational Health and Safety (OH&S) Act and Regulations.
  iv. Work Cover Authority requirements.
  v. Water, drainage, gas, telecommunications and electricity supply authority requirements.
  vi. DDA 1992.
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A.7 Terminology

Alternative/Performance Solution

A Building Solution which complies with the Performance Requirements other than by reason of satisfying the DtS Provisions.

Building Code of Australia (BCA)

Document published on behalf of the Australian Building Codes Board. The BCA is a uniform set of technical provisions for the design and construction of buildings and other structures throughout Australia and is adopted in New South Wales (NSW) under the provisions of the EPA Act and Regulation. Building regulatory legislation stipulates that compliance with the BCA Performance Requirements must be attained and hence this reveals BCA's performance based format.

Construction Certificate

Building Approval issued by the Certifying Authority pursuant to Part 4A of the EP&A Act 1979.

Construction Type

The construction type is a measure of a buildings ability to resist a fire. The minimum type of fire-resisting construction of a building must be that specified in Table C1.1 and Specification C1.1, except as allowed for—

(i) certain Class 2, 3 or 9c buildings in C1.5; and
(ii) a Class 4 part of a building located on the top storey in C1.3(b); and
(iii) open spectator stands and indoor sports stadiums in C1.7.

Note: Type A construction is the most fire-resistant and Type C the least fire-resistant of the types of construction.

Climatic Zone

Is an area defined in BCA Figure A1.1 and in Table A1.1 for specific locations, having energy efficiency provisions based on a range of similar climatic characteristics.

Deemed to Satisfy Provisions (DtS)

Provisions which are deemed to satisfy the Performance Requirements.

Effective Height

The vertical distance between the floor of the lowest storey included in the calculation of rise in storeys and the floor of the topmost storey (excluding the topmost storey if it contains only heating, ventilating, lift or other equipment, water tanks or similar service units)

Fire Resistance Level (FRL)

The grading periods in minutes for the following criteria-

(a) structural adequacy; and
(b) integrity; and
(c) insulation,

and expressed in that order.

Fire Source Feature (FSF)

The far boundary of a road which adjoins the allotment; or a side or rear boundary of the allotment; or an external wall of another building on the allotment which is not a Class 10 building.

National Construction Code Series (NCC)

The NCC was introduced 01 May 2011 by the Council of Australian Governments. The BCA Volume One (Class 2 to 9 Buildings) is now referenced as the National Construction Code Series Volume One — BCA.

Occupation Certificate

Building Occupation Approval issued by the Principal Certifying Authority pursuant to Part 4A of the EPA Act 1979.

Open Space

A space on the allotment, or a roof or other part of the building suitably protected from fire, open to the sky and connected directly with a public road.

Performance Requirements of the BCA

A Building Solution will comply with the BCA if it satisfies the Performance Requirements. A Performance requirement states the level of performance that a Building Solution must meet.

Compliance with the Performance Requirements can only be achieved by-

(a) complying with the DtS Provisions; or
(b) formulating an Alternative Solution which-
    (i) complies with the Performance Requirements; or
    (ii) is shown to be at least equivalent to the DtS Provisions; or
(c) a combination of (a) and (b).

Sole Occupancy Unit (SOU)

A room or other part of a building for occupation by one or joint owner, lessee, tenant, or other occupier to the exclusion of any other owner, lessee, tenant, or other occupier and includes a dwelling.

B. BUILDING CHARACTERISTICS

B.1 BUILDING CLASSIFICATION

The following table presents a summary of relevant building classification items of the proposed warehouse development:

BCA Class:	Class 5 (Office and Gatehouse) & Class 7b (Warehouse)
Rise in Storeys:	Five (5)
Effective Height:	Greater than 12m & Less than 25m – 16.72m
Type of Construction:	Type A Construction (Large Isolated Building)
Climate Zone:	Zone 6
Maximum Floor Area:	Large Isolated Building – >18,000m² (GFA = 206,968m²)
Maximum Volume:	Large Isolated Building - >108,000m³ (Note: Architect to confirm exact volume);

C. BCA ASSESSMENT

C.1 BCA DEEMED-TO-SATISFY COMPLIANCE ISSUES:

The following comments have been made in relation to the relevant BCA provisions relating to the compliance issues associated with the proposed warehouse building.

SECTION B- STRUCTURE

1. Part B1 – Structural Provisions

Structural engineering details prepared by an appropriately qualified structural engineer to be provided to demonstrate compliance with Part B1. This will include the following Australian Standards (where relevant):

- AS 1170.0 – 2002 General Principles
- AS 1170.1 – 2002, including certification for balustrades (dead and live loads)
- AS 1170.2 – 2011, Wind loads
- AS 1170.4 – 2007, Earthquake loads
- AS 3700 – 2018, Masonry code
- AS 3600 – 2018, Concrete code
- AS 4100 – 1998, Steel Structures and/or
- AS 4600 – 2005, Cold formed steel.
- AS 2159 – 2009, Piling Design &Installation
- AS 1720 – 2010, Design of Timber Structure
- AS/NZS 1664.1 & 2 – 1997, Aluminium Structures
- AS 2047 – 1999, Windows in buildings.
- AS 1288 – 2006, Glass in buildings.
- AS 3660.1 – 2000, Termite control (or confirmation no primary building elements are timber).

Comments: *Structural design and certification will be required at CC application stage.*

SECTION C – FIRE RESISTANCE

FIRE RESISTANCE AND STABILITY

2. Clause C1.1 – Type of Construction Required

The minimum type of fire-resisting construction of a building must be that specified in Table C1.1 and Specification C1.1 except as allowed for in this clause.

Comments: *Type A Construction applies to the main Warehouse Building and Office – see notes under Spec. C1.1, C1.9 & C1.14 below.*

Note: Type C Construction applies to Gatehouse, which does not require any FRL's per Table 5 of Spec. C1.1 below.

3. Clause C1.2 – Calculation of Rise in Storeys

The rise in storeys of a building is the sum of the greatest number of storeys at any part of the external walls of the building and any storeys within the roof space calculated in accordance with the requirements set out in this clause.

Comments: *Rise of Five (5) Storeys applies to the proposed warehouse building, due to the average internal height between a number of the Mezzanine platforms exceeding 6m [per C1.2(c)]. Note: The ancillary Gatehouse structure have a rise in storeys of one (1), hence the Type C Construction reference above.*

4. Clause C1.9 – Non-Combustible Building Elements

In a building of Type A or Type B Construction a number of building elements are required to be non-combustible including external walls & common walls (including elements incorporated in them including the façade coverings, framing and insulation), lift pit flooring and floor framing, services risers, load-bearing internal walls and fire walls.

Note: C1.9(e) provides a list of materials that may be deemed as non-combustible without the need for verification testing per AS 1530.1.

Comments: *The external walls (including all elements incorporated in the walls) of the building are required to be of non-combustible construction in accordance with C1.9 (a) & (b) – see further comments below under C1.14 also.*

5. Clause C1.10 – Fire Hazard Properties

The fire hazard properties of the proposed wall, floor & ceiling linings, materials (such as insulation & sarking) and other assemblies in a Class 2 to 9 building must comply with Specification C1.10 and the additional requirements of the NSW Provisions of Spec. C1.10.

Comments: *Design certification required at CC application stage.*

6. Clause C1.14 – Ancillary Elements

An ancillary combustible element must not be fixed, installed or attached to the internal or external parts of a non-combustible wall unless it is one of the concession items listed in items (b) – (m).

Comments: *The architectural elements in the main warehouse and office facades will require review to confirm that the proposed* internal & external attachments *to the external walls achieve compliance with the non-combustibility requirements of this clause – see comments under C1.9 also.*

COMPARTMENTATION AND SEPARATION

7. Clause C2.2 – General Floor Area and Volume Limitations

Sets out the parameters for the area and volume of Class 5, 6, 7, 8 & 9 buildings as required by sub-clauses (a), (b) & (c).

Note: Table C2.2 maximum size of Fire Compartments or Atriums.

Comments: *The proposed building is a Class 5 & 7b Large Isolated Buildings of Type A Construction as such the provisions for maximum fire compartment size under Table C2.2 do not apply. Refer to comments under C2.3 & C2.4 below in relation to the Large Isolated Building provisions applicable to the proposed development.*

8. Clause C2.3 – Large Isolated Buildings

A Large Isolated Building that contain Class 5, 6, 7, 8n or 9 parts, is required to be—

(i) protected throughout with a sprinkler system complying with Specification E1.5; and

(ii) provided with a perimeter vehicular access complying with C2.4(b).

Comments: *The proposed warehouse building is required to be sprinkler protected throughout and provided with perimeter vehicular access in accordance with Clause C2.4 (see notes below) pursuant to their Large Isolated Building designation under this clause.*

9. Clause C2.4 – Requirements for Open Spaces & Vehicular Access

An open space and vehicular access required by C2.3 must comply with the requirements of sub-clauses (a) & (b) of this Part as that they must be 6m wide within 18m of the building and of a suitable bearing capacity and unobstructed height to permit the operation and passage of F&RNSW vehicles.

Comments: *The proposed warehouse building complies with the provisions of C2.4 with the exception of the areas circled in blue on the mark-up below that are required to be addressed as a performance solution by the Fire Safety Engineer:*

- *Vehicular Access is greater than 18m from the external wall of the Building along the northern elevation and in the NW & SW corners of the site.*
- *Vehicular Access is discontinuous in the NW & SW corners of the building.*
- *Vehicular Access via the Staff Carpark on the Western side of the building is not likely to comply with the FRNSW Policy 4 vehicular access guidelines and the width of the entries to the carpark will be less than 6m.*

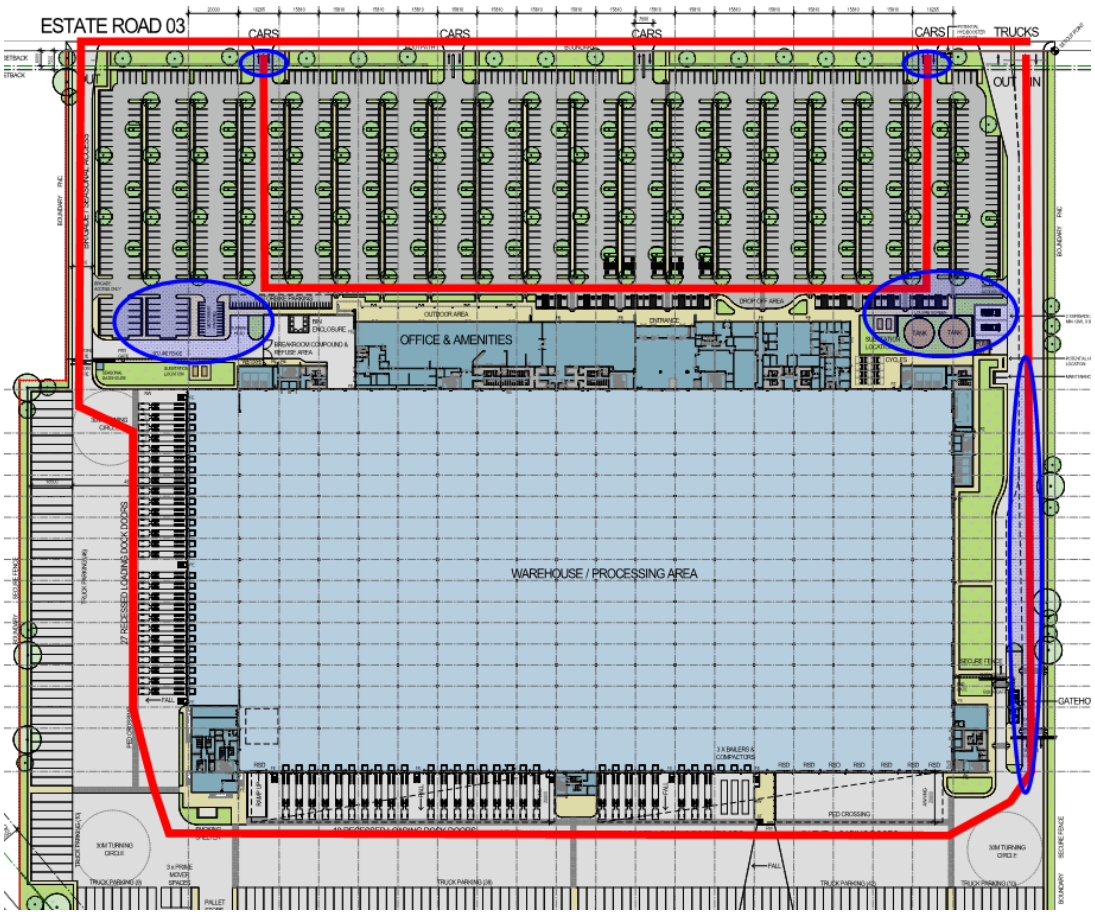


Figure 1 – Perimeter Vehicular Access per BCA C2.4.

10. Clause C2.6 - Vertical Separation of Openings in External Walls Limitations

If in a building of Type A construction, any part of a window or other opening in an external wall is above another opening in the storey next below and its vertical projection falls no further than 450 mm outside the lower opening (measured horizontally), the openings must be separated by and horizontal or vertical spandrel with an FRL of 60/60/60, and for the purposes of C2.6, window or other opening means that part of the external wall of a building that does not have an FRL of 60/60/60 or greater.

Comments: Although the building is of Type A Construction spandrel protection between the levels is NOT required as the building is proposed to be provided with a sprinkler system throughout in accordance with Spec. E1.5.

11. Clause C2.8 – Separation of Classifications in the Same Storey

If a building has parts of different classifications located alongside one another in the same storey, each element must have the required higher FRL for the classifications concerned.

Alternatively, the parts must be separated by a fire wall having the higher FRL for the classifications prescribed in Table 3 or 4 of BCA Specification C1.1 (for Type a or Type B Construction), or Table 5 for Type C Construction.

Comments: See comments under Spec. C1.1 in regards to the provision of a Performance Solution for a potential reduction in the Type A Construction FRL requirements applicable to both the warehouse and office components. It is noted that a fire wall per C2.8(b) between the Class 5 (Offices) and Class 7b (Warehouse) is not proposed or required as part of the proposed Performance Solution for rationalised FRL's.

12. Clause C2.10 - – Separation of Lift Shafts

Applies to all classes of buildings and specifies the protection requirements for openings for lift shafts and lift landing doors. The requirements are set out in sub-clauses (a), (b) (c) & (d) which relate to openings in Type A, B and C construction. Also note the Deemed to Satisfy Provisions of Clause C3.10.

Comments: The passenger and goods lifts in the building serving the upper levels are required to be fire isolated in a shaft that achieves an FRL of 240/120/120 (if loadbearing) or -/120/120 FRL (if non-loadbearing) as they connect more than 3-storeys in a sprinkler protected building. Details are to be included on the CC Application plans in this regard.

13. Clause C2.12 – Separation of Equipment

Equipment as listed below must be separated from the remainder of the building with construction complying with (d), if that equipment comprises –

(i) Lift motors and lift control panels; or
(ii) Emergency generators used to sustain emergency equipment operating in the emergency mode; or
(iii) Central smoke control plant; or
(iv) Boilers; or
(v) A battery or batteries installed in the building that have a voltage exceeding 12 volts and a storage capacity exceeding 200kWh.

Note: Separating construction must have –

(A) an FRL as required by Specification C1.1, but not less than 120/120/120/; and
(B) any doorway protected with a self-closing fire door having an FRL of not less than -/120/30.

Comments: Where appropriate, details demonstrating compliance are to be included in the CC Application plans for the warehouse building. Particular attention is drawn to the need for fire separation of smoke control plant / equipment and enclosures containing batteries that exceed the maximum capacity above.

14. Clause C2.13 – Electricity Supply System

(a) An electricity substation, main switchboard which sustains emergency equipment operating in the emergency mode, located within a building must –
(i) Be separated from any other part of the building by construction having an FRL of not less than 120/120/120; and
(ii) Having any doorway in that construction protected with a self-closing fire door having an FRL of not less then -/120/30
(i) Be separated from any other part of the building by construction having an FRL of not less than -/120/30.
(ii) Have any doorway in that construction protected with a self-closing fire door having an FRL of not less than -/120/30.

(b) Electrical conductors located within a building that supply

Note: Where emergency equipment is required in a building, all switchboards in the electrical installation, which sustain the electricity supply to the emergency equipment switchgear is separated from the non-emergency equipment switchgear by metal partitions designed to minimise the spread of fault from the non-emergency equipment switchgear.

Comments: Where appropriate, details demonstrating compliance are to be included in the CC Application plans for the warehouse building. The above requirements need to be taken into consideration as part of the design of the main switchroom serving the warehouse building in the SE corner of the ground floor level.

PROTECTION OF OPENINGS

15. Clause C3.8 – Openings in Fire-isolated Exits

Specifies that the doorways that open into fire-isolated exits must be protected by -/60/30 fire doors that are self-closing or automatic. This clause also details the deemed-to-satisfy methods of activation. This does not apply to doors opening to a road or open space. A window in the external walls of fire-isolated exits must be protected in accordance with C3.4 if it is within 6m of and exposed to a window or other opening in a wall of the same building other than in the same fire-isolated enclosure.

Comments: Details of the proposed -/60/30 FRL fire door locations are to be provided with the CC application plans in accordance with this requirement. It is noted the proposed window openings in the external walls of the fire stairs do not require protection per the above requirements.

16. Clause C3.9 – Service Penetrations in Fire-isolated Exits

Fire isolated exits must not be penetrated by any services other than electrical wiring as permitted by D2.7(e), ducting associated with a pressurisation system or water supply pipes for fire services.

Comments: Architect/Services Consultants to note and ensure compliance with regards to restriction of services penetrating the fire isolated stairs and passageway.

17. Clause C3.10 – Openings in Fire-isolated Lift Shafts

If lift shafts are required to be fire-isolated an entrance doorway must be protected by -/60- fire doors and the lift indicator panels must backed by construction having an FRL of not less than -/60/60 if it exceeds 35,000mm²

Comments: Details are to be included on the Architectural Plans and certification from the lift consultant to confirm compliance is to be provided for the construction certificate application.

18. Clause C3.12 – Openings in Floors & Ceilings for Services

This clause applies to the floors and ceilings in buildings of Types A, B & C Construction and sets out the methods required to limit the spread of fire though openings in these building elements, required to resist the spread of fire.

Comments: Certification will be required at OC application stage – see note below under C3.15 regarding the requirement for a Performance Solution for fire stopping in 240/240/240 FRL building elements.

19. Clause C3.13 – Openings in Shafts

This clause specifies that in buildings of Type A Construction, openings in shafts must be protected (generally with 1 hour fire rated shafts and doors).

Comments: Compliance is to be demonstrated with the construction certificate documentation.

20. Clause C3.15 – Openings for Services Installations

All opening for services installations in building elements required to be fire-resisting with respect to integrity and insulation must be protected in accordance with the provisions of Spec. C3.15.

Comments: Note – details of fire seals and fire stopping will be dependent upon the proposed Performance Solutions for FRL's referenced in Spec. C1.1 below and the location of the fire rated enclosures required per C2.12 & C2.13. It is noted however, that any services penetrations through elements with a 240/240/240 FRL may require a Performance Solution, given the lack of tested system for fire stopping that will achieve a 4hr insulation rating in accordance with this requirement. It is recommended that this be incorporated generically in any Fire Engineered Performance Solution to avoid non-compliance issues at OC stage.

SPECIFICATIONS

21. Specification C1.1 – Fire Resisting Construction

The new building works are required to comply with the requirements detailed under Table 5 of Specification C1.1 for Type C Construction. In this regard the proposed building elements are required to comply.

Comments: As the warehouse building is subject to compliance with the Type A Construction provisions of Table 3 of Spec. C1.1 (see Appendix 1), all building elements including the following are required to achieve the FRL's specified in Table 3 of Spec. C1.1 for a Class 7b building (generally 4 hours)

- *Load-bearing elements in the external walls, including the warehouse columns, structural steel elements in the external walls of the office, pedestrian bridge and access stair/lobby structure form the carpark. (240/-/- FRL)*
- *External Load-bearing Columns (240/-/- FRL)*
- *Internal Load-bearing elements, including Walls, Columns, Beams, etc. (240/-/- FRL)*
- *Fire Stairs - see further comments under D1.3 below (240/240/240 FRL)*
- *Floors, including Office Levels and Warehouse Mezzanines (240/240/240 FRL)*
- *Fire Walls (240/240/240 FRL)*

It is noted that a Performance Solution will be required to address the following requirements of Table 3 of Spec. C1.1 in relation to the office FRL's, the mezzanine structures and the Level 1-3 structure:

- *Rationalisation/Reduction of Office Structure FRL's on Ground Level*

- *Deletion of Fire Rating to secondary beam elements supporting the 4hr fire rated warehouse slabs forming Levels 1-3*
- *Deletion of 60/-/- FRL requirement for internal columns supporting roof on Level 3.*
- *Deletion or rationalisation of FRL's to Mezzanines between Ground Floor and Level 1.*

22. Specification C1.10 – Fire Hazard Properties.

This Specification sets out requirements in relation to the fire hazard properties of linings, materials and assemblies in Class 2 to 9 buildings as set out in the Tables.

Comments: *Refer to comments under Clause C1.10 above – certification will be required at both CC and OC Application stages.*

23. Specification C1.11 – Performance of External Walls in Fire

This specification contains measures to minimise in the event of fire the likelihood of external walls collapsing outwards as complete panels and the likelihood of panels separating from supporting members.

Comments: *Not applicable to the building as the rise in storeys is greater than two(2).*

SECTION D – ACCESS & EGRESS

PROVISION FOR ESCAPE

24. Clause D1.2 - – Number of Exits Required

This clause requires the provision of sufficient exits to enable safe egress in case of an emergency. D1.2 provides that all buildings must have at least one exit from each storey and sets out circumstances in which more than one exit may be required (particularly in relation to Class 9 buildings).

Note 1: Not less than 2 exits must be provided from each storey if the building has an effective height of more than 25m.

Note 2: Not less than 2 exits must be provided from any storey that involves a vertical rise within the building of more than 1.5m unless the floor area of the storey is not more than 50m^2 and the distance of travel from any point on the floor to a single exit is not more than 20m.

Comments: *Any proposed automated equipment zones on the Ground Level and Levels 1-3 that are enclosed or inaccessible and do not have clearly defined dedicated access to exits through the equipment will be required to be addressed as a Performance Solution by the Fire Safety Engineer.*

25. Clause D1.3 – When Fire Isolated Stairways & Ramps are Required

This clause specifies the requirements for when fire isolated stairs or ramps are required in buildings based upon the number of storeys that they interconnect and the classification of the building.

Comments: *The stairs serving Levels 1-3 in the warehouse portion of the building connect greater than 3 storeys in a sprinkler protected building and as such are required to be fire isolated. The proposed stairs are currently documented as being enclosed and as such details of the proposed FRL's are to be shown on the CC Application Plans to confirm compliance with D1.3 (and C3.8). In addition it is noted that the x3 egress stairs on the western side of the building, are designed with a glass façade (on the western elevation) that directly interfaces with the non-fire rated roof structure of the ground level office. The proposed fire rating of the stair shafts must extend beyond the office roof level to achieve compliance with Spec. C1.1 – compliance is readily achievable in this regard via the proposed concrete wall extension to each stair shaft above the office roof that is shown on the western elevation plan.*

26. Clause D1.4 – Exit Travel Distances

This clause specifies the permitted travel distances allowable from Class 2 to Class 9 buildings. Sub-clauses (a) to (f) specify the maximum distances to be taken into account for the various uses in each Class of building.

Comments: *The exit travel distances in each of the proposed main warehouse building are considered to be non-compliant with the requirements of Clause D1.4. The extent of non-compliances will require further assessment prior to confirm egress paths around the automation equipment however, a summary of the non-compliances is listed below:*

- *Central Parts of Ground Level Warehouse (Ground Level) - 125m to the nearest exit*
- *Ground Floor & Mezzanine Automated Equipment Zones – up to 40m to a point of choice to alternative exits*
- *Central Mezzanines (Between Ground & Level 1) – 45m to the nearest exit*

- *Central Parts of the Warehouse on Levels 1-3 = 100m to the nearest exit.*

The above non-compliance issues will be required to be addressed as Performance Solutions by the Fire Safety Engineer to demonstrate compliance with Performance Requirements DP4 & EP2.2 and design changes/additional egress paths maybe required as noted.

27. Clause D1.5 – Distances Between Alternative Exits

Exits required as alternative exits must be –

(a) not less than 9m apart; and
(b) not more than – 60m apart.
(c) Located so that the alternative paths of travel do not converge such that they become less than 6m apart.

Comments: *The distances between alternative exits in the warehouse building are considered to be non-compliant with the requirements of Clause D1.5. The extent of non-compliances are detailed below; however, they will be required to be addressed as Performance Solutions by the Fire Safety Engineer to demonstrate compliance with Performance Requirements DP4 & EP2.2.*

- *Central Parts of Ground Level Warehouse (Ground Level) - 250m between alternative exits.*
- *Central Parts of the Warehouse on Levels 1-3 = 180m between alternative exits.*

28. Clause D1.6 – Dimensions of Exits

This clause details the minimum dimensions such as height and width of paths of travel from Class 2 to 9 buildings. It also specifies the minimum dimensions of doorways from the various compartments and the width of exit doors from buildings depending on the uses and functions carried out within them.

Comments: *Population numbers for the proposed building have been provided by Goodman to facilitate an assessment of the provisions of D1.6 – see D1.13 below - and as a result it is considered that compliance with D1.6(c) & (d) is readily achievable.*

In addition to the above, it is to be noted that all exit paths are required to have a minimum clear height of 1m and 1980mm through doorway openings per D1.6(a).

A Performance Solution from the Fire Engineer will be required where the plant area egress stairs are proposed to have a minimum clear width of less than 1m (per AS 1657), to demonstrate compliance with DP4 and DP6.

29. Clause D1.7 – Travel by Fire Isolated Stairways and Ramps

A doorway from a room must not open directly into a stairway, passageway or ramp that is required to be fire-isolated unless it is from—

(i) a public corridor, public lobby or the like; or
(ii) a sole-occupancy unit occupying all of a storey; or
(iii) a sanitary compartment, airlock or the like.

Fire isolated exits are required to discharge to open space or a covered area complying with D1.7(b).

Where a path of travel from the point of discharge of a fire isolated exit necessitates passing within 6m of any part of an external wall of the same building, measured horizontally at right angles to the path of travel, that part of the wall must have –

- an FRL of not less than 60/60/60; and
- Any openings protected internally in accordance with BCA Clause C3.4; and
- For a distance of 3m above or below, as appropriate, the level of the path of travel, or for the height of the wall, whichever is the lesser.

Comments: *The discharge of the two-fire isolated exits serving the main office area on the western side of the building directly into the ground level lobby does not comply and as such a Performance Solution will be required to be provided by the Fire Engineer to demonstrate compliance with Performance Requirement DP5.*

In addition, the fire isolated passageway on Ground Level that provides direct egress from the fire stair on Grids 6-7/A to open space is not permitted to have the "DHW" room directly into the passageway and as such a minor redesign will be required in this area. It is also noted that the discharge path from this fire isolated passageway is likely to pass within 6m of the external walls of the building and as such protection may be required (per the details referenced above).

30. Clause D1.9 – Travel by Non-fire-isolated Stairways or Ramps

Sub-clauses (a) to (f) set out the prescribed travel distances to be provided in required exits of Class 2 to 9 buildings and Class 4 parts of buildings. The sub-clauses set out the maximum distances to be taken into account for the various uses in each Class of building.

Comments: As indicated under D1.3 the exit stairs serving the mezzanines in the warehouse area (are non-fire isolated and as such must comply with D1.9. The total egress distances from the mezzanines in the central parts of the building, via the stairs to open space will need to be addressed as a Performance Solution by the Fire Engineer as they will exceed 80m in total (up to 140m).

In addition, it is noted that the discharge distance from these stairs serving the Mezzanines exceeds 40m and as such this non-compliance will also require a Performance Solution from the Fire Engineer in addition, to the egress distance Non-compliances identified above.

31. Clause D1.10 – Discharge From Exits

Requires that an exit must not be blocked at the point of discharge. Barriers such as bollards must be installed to prevent vehicles from blocking the discharge from exits.

This clause also provides the methods of construction, location and separation, at exit discharge points for all building Classes.

Comments: All exit discharge points from the buildings are required to be protected in accordance with the requirements of this clause.

32. Clause D1.13 – Number of Persons Accommodated

Clause D1.13 and Table D1.13 are used to calculate the anticipated number of people in particular types of buildings so that minimum exit widths and the required number of sanitary and other facilities can be calculated. This clause and table are not to be used for non-BCA purposes.

Comments: In accordance with the comments under D1.6 above the population numbers for the proposed warehouse building have been confirmed by Goodman as 1500 total staff / persons (with a maximum on shift of 50% of the total being 750 persons).

CONSTRUCTION OF EXITS

33. Clause D2.2 – Fire Isolated Stairways and Ramps

A stairway or ramp (including any landings) that is required to be within a fire-resisting shaft must be constructed—
(a) of non-combustible materials; and
(b) so that if there is local failure it will not cause structural damage to, or impair the fire-resistance of, the shaft.

Comments: Architect & Structural Engineer to note. Details are to be provided with the Construction Certificate documentation.

34. Clause D2.3 – Non-fire-isolated Stairways & Ramps

This clause requires that required non-fire-isolated stairways and ramps must be either constructed in accordance with D2.2 or the alternative options set out in D2.3 (a) to (c).

Comments: The requirements of D2.3 apply to the proposed stairs serving the mezzanines - details are to be provided of the stair design at CC application stage.

35. Clause D2.8 – Enclosure of Space under Stairs and Ramps

The space below a required fire-isolated stairway or ramp in a fire-isolated shaft must not be enclosed to form a cupboard or other enclosed space. If the required stairway or ramp is non-fire-isolated, (including an external stairway) any cupboard underneath must have an FRL of 60/60/60, with a self-closing -60/30 door.

Comments: No enclosures are permitted under the Fire Isolated Exit Stairs serving the building.

36. Clause D2.13 – Goings & Risers

This clause sets out the detailed requirements for the construction and geometry of the goings and risers in required stairways. These details are set out in sub-clauses (a) to (c) and Table D2.13 Riser and Going Dimensions.

Comments: All stairs are to be designed with compliant dimensions per Table D2.13 below, have solid risers, and are to have contrasting nosings, slip resistant surfaces throughout in accordance with clause 11 of AS1428.1-2009. Refer to the slip resistance for stairs below under Clause D2.14.

Riser and Going Dimensions (mm)			
	Riser (R)	**Going (G)**	**Quantity (2R + G)**
Maximum	190	355	700
Minimum	115	250	550

Note: If AS1657 compliant stairs are proposed to the mezzanine levels (that do not comply with the above) and a Performance Solution from BCA Consultant may be required.

37. Clause D2.14 – Landings

The dimensions and gradients of landings in stairways are set out in this clause; the configuration will depend on the proposed use of a building. Sub-clause (b) details the layout for a Class 9a building to allow for the movement of a stretcher.

Comments: Architect to note.

Application	**Surface conditions**	
	Dry	**Wet**
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp steeper than 1:20 but not steeper than 1:14	P3 or R10	P4 or R11
Tread or landing surface	P3 or R10	P4 or R11

38. Clause D2.15 – Thresholds

The threshold of a doorway must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf unless –

(i) the doorway opens to a road or open space, external stair landing or external balcony; and

(ii) the door sill is not more than 190mm above the finished surface of the ground, balcony, or the like, to which the doorway opens.

Comments: Architect to note, details demonstrating compliance will be required to be included in the CC plans.

39. Clause D2.16 – Balustrades or Other Barriers

This clause details where balustrades are required to be provided and sets out in specific detail the construction requirements in sub-clauses (a) to (i) and Tables D2.16(a), D2.16(b) & D2.16(c).

Comments: Applies to all stairs serving as exits and the mezzanines or accessway where the drop to the level below exceeds 1m. Details demonstrating compliance are to be submitted with the CC Application drawings.

40. Clause D2.17 – Handrails

This Clause sets out the requirements regarding the location, spacing and extent of handrails required to be installed in buildings.

Comments: Architect to note, details demonstrating compliance will be required to be included in the CC plans. Handrails serving all stairs and ramps both internally and externally to the buildings are required to comply with the accessibility requirements of Clause D3.3 and AS 1428.1-2009.

41. Clause D2.19 – Doorways and Doors

This clause applies to all doorways and refers to the types of doors that cannot be used in buildings of prescribed uses, the use of power operated doors and the force required to operate sliding doors.

If the door is also power operated, it must be opened manually under a force of not more than 110N if there is a malfunction or failure to the power source; or upon the activation of a fire or smoke alarm anywhere in the fire compartment served by the door.

Comment: Architect to note – compliance readily achievable.

42. Clause D2.20 – Swinging Doors

A swinging door in a required exit or forming part of a required exit must be installed to the requirements of sub-clauses (a), (b) & (c). This clause only applies to swinging doors in doorways serving a required exit or forming part of a required exit. It does not apply to other doorways – see notes in the Guide to the BCA.

Comments: The proposed egress doors from the building and into the fire isolated exits are required to swing in the direction of egress in accordance with D2.20(a) – compliance is readily achievable.

43. Clause D2.21 – Operation of Latch

A door in a required exit or forming part of a required exit and in a path of travel to a required exit must be readily openable without a key from the side that faces a person seeking egress, by a single downward action or pushing action on a single device which is located between 900mm & 1.1m from the floor. This clause prohibits the use of devices such as deadlocks and knobs where knobs must be operated in a twisting motion in accordance with sub-clauses (a) & (b). D2.21 also sets out exceptions in relation to buildings where special security arrangements are required in relation to the uses carried out.

Comments: Architect to note, details demonstrating compliance will be required to be included in the CC plans.

ACCESS FOR PEOPLE WITH A DISABILITY

44. Clause D3.2 –Access to Buildings

This part requires accessways to be provided to accessible buildings from the main points of pedestrian entry at the allotment boundary and any accessible car parking space or accessible associated buildings connected by a pedestrian link.

Comments: Compliant Access is required to Main Office Entry on the Ground Level, from the street and on-site carparking, in accordance with AS 1428.1-2009. Refer to D3.3 and D3.4 below. Details and /or Access Consultant's Report demonstrating compliance are to be submitted at the CC Application stage.

45. Clause D3.3 – Parts of the Building to be Accessible

This part specifies the requirements for accessways within buildings and where the requirements of AS 1428.1-2009 are applicable.

Note: If compliant access is not proposed to be provided to the Warehouse areas in the building, comment will be required from an Access Consultant as to whether a concession under D3.4 or a performance solution can be considered.

Comments: As indicated above, the proposed building is required to be accessible throughout in accordance with AS1428.1-2009 (particular attention is drawn to access paths between the office areas/staff areas on Level 1 from the main passenger lift on the western side of the building). It is noted that compliance with the requirements of D3.3 and AS 1428.1-2009 is readily achievable; however, details and design certification will be required to be provided at CC Application stage.

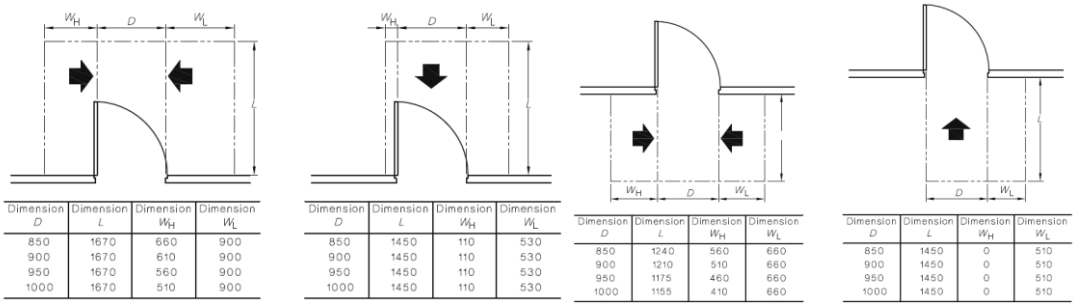
The following is a summary of some of the key matters which need to be considered from Clause D3.3 and AS 1428.1-2009:

+ *Access for persons with disabilities must be provided, at a minimum, to and within all areas normally used by the occupants, which is readily achievable given the proposed passenger lift on the western side of the building.*
+ *See comments under D3.4 below, however, as no lift access is provided to the warehouse mezzanine level it is assumed an exemption for compliant accessibility will be sought for this warehouse portion of the building (and potentially other parts of the building).*
+ *An accessway is required to be provided to the main office entry from Estate Road 03 which is currently shown indicatively on the Site Plan in the NW corner, however, the levels and grades of this pathway are to be fully detailed on the CC Application plans.*
+ *The minimum width of an accessible doorway must have a clear opening width of not less than 850mm in accordance with AS1428.1.*
+ *All doorways on a continuous path of travel shall have a minimum luminance contrast of 30% provided between: door leaf and door jamb; or door leaf and adjacent wall; or architrave and wall; or door leaf and architrave; or door jamb and adjacent wall. The minimum width of the area of luminance contrast shall be 50mm.*

+ *In accordance with Clause D3.3; the non-fire-isolated stairways must comply with Clause 11 of AS 1428.1-2009.*

+ *Clause D3.3(g) and (h) requires that the pile height or pile thickness shall not exceed 11mm and the carpet backing thickness shall not exceed 4mm. Moreover, the carpet pile height or pile thickness dimension shall not exceed 11mm, the carpet backing thickness dimension shall not exceed 4mm and their combined dimension shall not exceed 15mm.*

+ *Circulation space to the new doorways that are required to be accessible are to comply with Section 13 of AS1428.1-2009, as detailed below:*



Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1670	660	900
900	1670	610	900
950	1670	560	900
1000	1670	510	900

Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1450	110	530
900	1450	110	530
950	1450	110	530
1000	1450	110	530

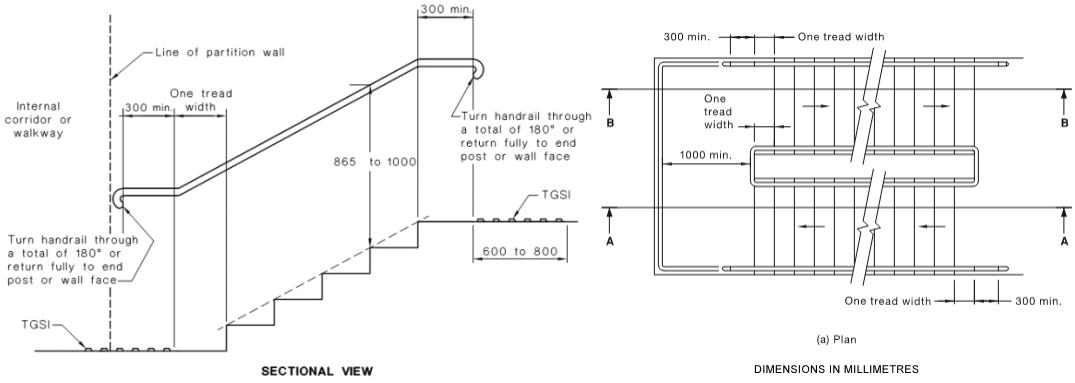
Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1240	560	660
900	1210	510	660
950	1175	460	660
1000	1155	410	660

Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1450	0	510
900	1450	0	510
950	1450	0	510
1000	1450	0	510

+ *Turning Spaces and Passing Spaces in all areas are required to be provided on each level of the building in accordance with Clauses 6.4 & 6.5 of AS 1428.1-2009.*

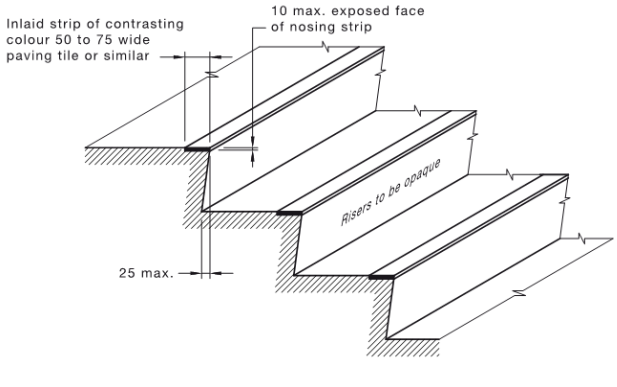
Stairways

+ *Every common area stairway must be constructed in accordance with Clause 11 of AS1428.1, except if they are within a fire isolated exit or serve the areas in the building that a D3.4 Exemption has been applied to. As such, the stairways must be designed to comply with the accessibility requirements of Clause 11 of AS1428.1-2009 and details will need to be confirmed on the plans for CC.*



+ *Stairs shall have opaque risers (i.e. Solid)*

+ *Stair nosing's shall comply with the following diagram, which achieve a colour contrast luminance of 30% to the background (tread):*



- *Stairways are to be served by Tactile Ground Surface Indicators in accordance with AS1428.4.1, except if they are within a fire isolated exit.*

Handrails

- *Handrails shall be installed along stairways as follows:*
  - *Shall be continuous through the flight and where practicable, around landings and have no obstruction on or above up to a height of 600mm,*
  - *Installed along both sides of the stairway (giving consideration also to 1m unobstructed width),*
  - *Shall have a compliant hand clearance in accordance with Figure 29 of AS 1428.1-2009.*

46. Clause D3.4 – Exemptions

This part provides exemptions to the Deemed-to-Satisfy provisions for access by people with a disability. This part provides details on buildings or parts of buildings not required to be accessible under the BCA where providing access would be inappropriate because of the nature of the area or the tasks undertaken.

Comments: *It is recommended that advice be obtained from an accredited Access Consultant at the CC Application stage, however, consideration to an exemption for the Ground Level Warehouse areas including Mezzanines, Levels 1-3 Warehouse and the external stairs serving the warehouse, along with the Gatehouse (on health & safety risk basis) may be appropriate on this project. Confirmation from Goodman will be required that includes a request for concession, where this would be applied and the reasons why it would be inappropriate for access for people with disabilities within the facility.*

47. Clause D3.5 – Accessible Carparking

This part provides details of the number of accessible carparking spaces required in a carpark depending on the classification of the building.

Comments: *In the case of Class 5 & 7b buildings 1 compliant accessible space is required for every 100 parking spaces or part thereof. In this regard we note that thirty-six (36) accessible parking spaces are proposed on the site which will achieve compliance with the requirements of D3.5:*

48. Clause D3.6 – Signage

This section provides requirements for signage in buildings required to be accessible By Part D3.

Comments: *Signage will be required to identify exits, accessible facilities, an ambulant accessible facility and the paths to accessible pedestrian entries (where required).*

49. Clause D3.8 – Tactile Indicators

This clause provides for the installation of tactile indicators in buildings required to be accessible and must be provided to warn people who are blind or have a vision impairment that they are approaching a stairway, escalator, passenger conveyor, ramp, overhead obstruction or an accessway meeting a vehicular way, except for areas exempted by D3.4.

Comments: *Compliant tactile indicators are required in all areas of the buildings to all ramps, stairs, paths approaching a driveway and any overhead obstructions less than 2m in height.*

50. Clause D3.11 – Ramps

Ramps may be used as part of an accessway where there is a change of level and must comply with the requirements set out in AS1428.1.

Comments: *Architect to note, details demonstrating compliance will be required to be included in the CC plans.*

SECTION E – SERVICES AND EQUIPMENT

FIRE FIGHTING EQUIPEMENT

51. Clause E1.3 - Fire hydrants

E1.3(a) – A fire hydrant system must be provided to serve a building having a total floor area greater than 500m² and where a fire brigade is available to attend a building fire.

E1.3(b) – Requires that the fire hydrant system must be installed in accordance with the provisions of AS2419.1 and also details where internal hydrants must be located.

Comments: *The proposed warehouse building is required to be served by a compliant hydrant system incorporating ring mains. Details demonstrating compliance with the provisions of E1.3 and AS 2419.1-2005 are required to be provided at CC Application stage. Note: The location of the hydrant booster on Estate Road 03 will be required to be within sight of the main entry of the building. Attention is also drawn to the FRNSW 50m/25m hydrant location requirements in Large Isolated Buildings, particularly in relation to the Warehouse Levels 1-3. It is considered highly likely that a Performance Solution for the design of the hydrant system of the building will be required from the Fire Engineer to address Performance Requirement EP1.3, for the hydrants under awnings, and locations/coverage of hydrants on Levels 1-3 and the lack of hydrant coverage to enclosed automated parts of the warehouse.*

52. Clause E1.4 – Fire hose reels

A fire hose reel system must be provided to serve a building where one or more internal fire hydrants are installed or in a building with a floor area greater than 500m².

This clause requires that the fire hose reel system must be installed in accordance with AS 2441 and sets out the detail for location and uses of fire hose reels.

Comments: *The main warehouse building is required to be served by a compliant fire hose reel system within the Class 7b areas only (excluding the Class 5 Office areas). Details demonstrating compliance are to be provided at the CC application stage.*

53. Clause E1.5 – Sprinklers

A sprinkler system must be installed in a building or part of a building when required by Table E1.5 and comply with Specification E1.5. Table E1.5 sets out which types of building occupancies and Classes which are required to have sprinkler systems installed in them.

Specification E1.5 sets out requirements for the design and installation of sprinkler systems.

Comments: *The proposed Large Isolated Building is required to be sprinkler protected throughout in order to address the requirements of Clause C2.3 and Table E1.5. Details demonstrating compliance are to be provided at the CC application stage. Note: If the sprinkler booster location does not comply with AS 2419.1-2005 (per the comments above re: the hydrant booster) a Performance Solution will be required from the Fire Engineer to address Performance Requirement EP1.4.*

54. Clause E1.6 – Portable fire extinguishers

Portable fire extinguishers must be provided as listed in Table E1.6 and must be selected, located and distributed in accordance with Sections 1, 2, 3 and 4 of AS 2444.

Comments: *Fire extinguishers will be required to be installed in the proposed building in accordance with Table E1.6 and AS 2444-2001.*

55. Clause E1.8 – Fire Control Centres

A fire control centre facility in accordance with Specification E1.8 must be provided for a building having an effective height of more than 25m and in a Class 6, 7, 8 or 9 building with a total floor area of more than 18,000m².

Specification E1.8 describes the construction and content of required fire control centres or rooms.

Comments: *The proposed warehouse building exceeds 18,000m² and as such is required to be provided with a Fire Control Centre that complies with Clauses 2-5 of BCA Spec. E1.8. Details demonstrating compliance are to be included on the CC Application plans.*

SMOKE HAZARD MANAGEMENT

56. Clause E2.2 – General Requirements

Class 2 to 9 buildings must comply with the provisions of this Clause to remove smoke during a fire, to control the operation of air handling systems and to prevent the spread of smoke between compartments.

Buildings must comply with the provisions of **Table E2.2a**, as applicable to Class 2 to 9 buildings. It deals with the design and construction of air handling systems that are part of a smoke hazard management system and air handling system that are not part of a smoke hazard management system.

The details relating to the installation and operation of the systems are set out in **Specifications E2.2a**, **E2.2b** and **E2.2c**.

Comments: *As the volume of the building is greater than 108,000m^3 a smoke exhaust system is required to be provided. In this regard, it is noted that a Performance Solution to the required smoke hazard management requirements may be under consideration by the Fire Engineer and will need to demonstrate compliance with Performance Requirement EP2.2.*

PART E3 LIFT INSTALLATIONS

57. Clause E3.2 – Stretcher Facilities in Lifts

Stretcher facilities, complying with this clause, must be provided in lifts in at least one emergency lift as required by E3.4 or in a storey above an effective height of 12m.

A stretcher facility must accommodate a raised stretcher with a patient lying on it horizontally by providing a clear space not less than 600mm wide x 2000mmm long x 1400mm high above the floor level.

Comments: The lift within the building serves storeys above an effective height of 12m and as such is required to accommodate a stretcher in accordance with the requirements of the clause above. Design certification required at CC Application stage.

58. Clause E3.3 – Warning Against use of Lifts in Fire

Warning signs required be provided must be displayed where they can be readily seen and must comply with the details and dimensions of **Figure 3.3**.

Comments: Applies to the proposed lift in the building - Lift Contractor to note.

59. Clause E3.5 – Landings

E3.5(a) The provisions of clause 12.2 – "Access" of AS 1735.2 do not apply.

E3.5(b) The provisions of Clause A3.2 – "Access to landings" of Appendix A of AS 1735.1 do not apply.

E3.5(c) Access and egress to and from lift well landings must comply with the Deemed-to-Satisfy Provisions of Part D.

Comments: Design certification from the lift supplier shall be provided with the documentation submitted with the Construction Certificate application.

60. Clause E3.6 – Passenger Lifts

In an accessible building, every passenger lift must be one of the types identified in **Table E3.6a,** have accessible features in accordance with **Table E3.6b** and not rely on a constant pressure device for its operation if the lift car is fully enclosed.

Comments: Design certification from the lift supplier shall be provided with the documentation submitted with the Construction Certificate application.

61. Clause E3.7 – Fire Service Controls

In passenger lifts designed in accordance with AS 1735 Parts 1 and 2, all lift cars serving any storey above an effective height of 12m must be provided with fire service controls.

Comments: As the lift in the building serves storeys with an effective height greater than 12m, it is required to be provided with fire service controls in accordance with this clause. Design certification from the lift supplier shall be provided with the documentation submitted with the Construction Certificate application.

62. Clause E3.9 – Fire Service Recall Operations Switch

Each group of lifts must be provided with one fire service control switch (required by Clause E3.7 above) that activates the fire service recall operation. This clause details the switch, the labelling, the key and operation procedures for a fire service recall operation.

Comments: Design certification from the lift supplier shall be provided with the documentation submitted with the Construction Certificate application.

63. Clause E3.10 – Lift Car Fire Service Drive Control Switch

The lift car fire service drive control switch required by E3.7 must be activated from within the lift car. This clause details the switch, the initiation, the labelling and operation for the fire service drive control switch.

Comments: Design certification from the lift supplier shall be provided with the documentation submitted with the Construction Certificate application.

EMERGENCY LIGHTING, EXIT SIGNS AND WARNING SYSTEMS

64. Clause E4.2 – Emergency Lighting Requirements

This clause details when emergency lighting must be installed in Class 2 to 9 buildings. The requirements for buildings and parts of buildings are detailed in sub-clauses (a) to (i) and each sub-clause must be considered as more than one may apply to any single building

Comments: *Emergency Lighting is required throughout the building in accordance with E4.2, E4.4 and AS/NZS 2293.1-2005.*

65. Clause E4.4 – Design & Operation of Emergency Lighting

Every required emergency lighting system must comply with AS2293.1.

Comments: *Electrical Consultant to note. It is noted that compliant emergency lighting is unlikely to be provided in the automated portions of the warehouse and as such the lack of emergency lighting to these areas are to be addressed as a Performance Solution by the Fire Engineer to demonstrate compliance with Performance Requirement EP4.1.*

66. Clause E4.5 – Exit Signs

An exit sign must be clearly visible to persons approaching the exit and must be installed on, above or adjacent to each door providing egress from a building. Sub-clauses (a) to (d) set out the situations where exit signs are required to be installed.

Comments: *Electrical Consultant to note, details demonstrating compliance will be required to be included in the CC plans.*

67. Clause E4.6 – Direction Signs

If an exit is not readily apparent to persons occupying or visiting the building then exit signs must be installed in appropriate positions in corridors, hallways, lobbies, and the like, indicating the direction to a required exit.

Comments: *Electrical Consultant to note, details demonstrating compliance will be required to be included in the CC plans.*

68. Clause E4.8 – Design & Operation of Exit Signs

Every required exit sign must comply with AS/NZS 2293.1 and be clearly visible at all times when the building is occupied by any person having the legal right of entry into the building.

Comments: *Electrical Consultant to note, details demonstrating compliance will be required to be included in the CC plans. It is noted that compliant exit signs are unlikely to be provided in the automated portions of the warehouse and as such the lack of exit signs to these areas are to be addressed as a Performance Solution by the Fire Engineer to demonstrate compliance with Performance Requirement EP4.2.*

SECTION F – HEALTH & AMENITY

DAMP AND WEATHERPROOFING.

69. Performance Requirement FP1.4

A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause

a) Unhealthy or dangerous conditions, or loss of amenity for occupants; and
b) Undue dampness or deterioration of building elements.

Note 1: There are no Deemed-to-Satisfy provisions for this Performance Requirement in respect to External Walls. Note 2: Refer to Clause F1.5 for roof coverings.

Comments: Design statement and a documented Performance Solution is to be provided with the Construction Certificate application, either by using:

- *The Verification Methods in Clause FV1; or*
- *Other verification methods deemed acceptable by the Certifier; or*
- *Evidence to support that the use of the material or product, form of construction or design meets the Performance Requirements or the DTS provisions, such as a Certificate of Conformity (eg. CodeMark); or*
- *By way of Expert Judgement.*

70. Clause F1.1 – Stormwater drainage

Stormwater drainage must comply with AS/NZ 3500.3-2018.

Comments: *Details of stormwater disposal, from a suitably qualified consultant are required to be submitted with documentation for the CC.*

71. Clause F1.5 – Roof Coverings

This clause details the materials and appropriate standards, with which roofs must be covered with. The roofing requirements are set out in sub-clauses (a), (b) (c), (d), (e) & (f) which set out the types of materials that may be used and the adopted Australian Standards that apply to their quality and installation.

Comments: *Note – design certification required at CC Application stage.*

SANITARY AND OTHER FACILITIES

72. Clause F2.3 – Facilities in Class 3 to 9 Buildings

This clause provides the requirements for sanitary facilities to be installed in Class 3, 5, 6, 7, 8 and 9 buildings in accordance with **Table F2.3**. The requirements and variations are set out in sub-clauses (a)-(h).

Comments: *As indicated in D1.13 above the proposed population numbers have been provided by Goodman for the main building to assess if the proposed toilet facilities within the buildings are adequate to achieve compliance with Table F2.3. Based on these population numbers, the proposed sanitary facilities numbers are considered compliant with Table F2.3.*

73. Clause F2.4 – Accessible Sanitary Facilities

Accessible unisex sanitary compartments must be provided, in accordance with **Table F2.4(a)** and unisex showers must be provided in accordance with **Table F2.4(b)**, in buildings or parts that are required to be accessible. The details for the provision of disable facilities and the standard, AS 1428.1, are set out in sub-clauses (a) to (i).

Comments: *The proposed accessible toilet facilities and ambulant sanitary facilities on each level of the building are considered to achieve compliance with the provisions of Table F2.4 (particularly in relation to the minimum 50% of toilet banks requirement per storey). Details demonstrating that the design of each facility complies with AS 1428.1 are to be provided at the CC application stage, however, compliance is readily achievable.*

LIGHT AND VENTILATION

74. Clause F4.4 – Artificial Lighting

Artificial lighting is required where it is necessary to minimise the hazard to occupants during an emergency evacuation. Sub-clauses (a), (b) & (c) sets out the places where artificial lighting is always required in all classes of buildings and the standard to which it must be installed.

Comments: *Design certification to be submitted at CC Application Stage for the building.*

75. Clause F4.5 – Ventilation of Rooms

A habitable room, office, shop, factory, workroom, sanitary compartment, bathroom, shower room, laundry and any other room occupied by a person for any purpose must have natural ventilation complying with F4.6 **or** a mechanical or air-conditioning system complying with AS1668.2 and AS/NZS 3666.1.

Note: NSW F4.5(b) a mechanical ventilation or air-conditioning system complying with AS 1668.2 – the reference to AS/NZS 2666.1 is deleted from the BCA in NSW as the need to comply with this standard is regulated under the relevant section of the Public Health Act 1991.

Comments: *Design certification to be submitted at CC Stage for the building.*

SECTION J – ENERGY EFFICIENCY

76. Part J1 – Building Fabric

The provision of insulation of the building envelope will be required in the proposed Building, in accordance with **Clauses J1.0 to J1.**6, and the **Tables therein**, including Thermal Construction General, Roof and Ceiling Construction, Rooflights, Walls, and Floors. Design details and/or certification of design will be required to be provided in this regard.

Comments: This section applies to any air-conditioned spaces proposed within the warehouse building. Design details and/or certification of building envelope design will be required to be submitted with the application for a Construction Certificate.

77. Part J2 – Glazing

Glazing within the external building envelope will be required to be assessed/designed to achieve compliance with **Clauses J2.0 to J2.5**, including the **Tables therein**, having regard to the maximum aggregate air-conditioning energy attributable to each façade of the proposed building. A calculation demonstrating that the proposed design of the building complies with the requirements of **Part J2** is required to be provided in this regard.

*Comments: This section applies to any air-conditioned spaces proposed within the warehouse building. A calculation demonstrating that the proposed design of the glazing in each building complies with the requirements of **Part J2** is required to be submitted with the application for a Construction Certificate.*

78. Part J3 – Building Sealing

The proposed building envelope will be required to be sealed to prevent air infiltration in accordance with the requirements of **Clauses J3.0 to J3.6**. Details or certification that the proposed building design complies with the requirements of **Part J3** is required to be provided.

*Comments: This section applies to any air-conditioned spaces proposed within the main warehouse building. Details or certification that the proposed design complies with the requirements of **Part J3** will need to be submitted with the application for a Construction Certificate.*

79. Part J5 – Air-Conditioning & Ventilation Systems

Details and/or design certification which confirm that any proposed air-conditioning system or unit within the proposed building achieves compliance with the relevant requirements of **Part J5** will be required to be provided from the mechanical engineer.

Comments: Details or certification demonstrating compliance will need to be submitted with the application for a Construction Certificate for the building.

80. Part J6 – Artificial Light & Power

Details and/or design certification which confirm that all artificial lighting, power control, and boiling/chilled water units within the proposed building achieves compliance with the relevant requirements of **Part J6** will be required to be provided from the electrical engineer.

Comments: Details or certification demonstrating compliance will need to be submitted with the application for a Construction Certificate for the building.

81. Part J7 – Hot Water Supply, & Swimming Pool & Spa Pool Plant

Details and/or design certification which confirm that any proposed hot water supply system within the proposed building achieves compliance with the relevant requirements of **Part J7** (Section 8 of AS 3500.4) will be required to be provided from the hydraulic engineer.

Comments: Details or certification demonstrating compliance will need to be submitted with the application for a Construction Certificate for the building.

82. Part J8 – Facilities for Energy Monitoring

Provision for monitoring of energy consumption must be provided to a building where the floor area exceeds 500m², and must be capable of recording the consumption of gas and electricity. In addition, where the floor area of the building exceeds 2,500m² the energy monitoring facilities must be capable of individually recording air-conditioning, lighting, appliance power, central hot water supply, lifts/escalators, and other ancillary plant.

Comments: Details or certification demonstrating compliance will need to be submitted with the application for a Construction Certificate.

D. SUMMARY OF KEY COMPLIANCE ISSUES

The following comprises a summary of the key compliance issues identified under the assessment contained above this report. These matters are to be addressed prior to issue of the Construction Certificate.

D.1 MATTERS REQUIRING FURTHER RESOLUTION/PLAN AMENDMENTS

	BCA Clause/s	Description
1.	C1.9 & C1.14	Details of the non-combustible external walls to the Office, and Warehouse are required to be provided for assessment.
2.	D1.2/D1.4	Details of the resolution of any "dead-end" egress distances on Ground Level and egress from enclosed areas in the equipment zones on Ground & Levels 1-3 are required to be provided for further assessment.
3.	D1.3	Details of the fire rated construction to the proposed fire stairs serving all levels of the building are to be provided for review along with details of the FRL of the wall interface between the glazed western façade of the x3 main stairs and the office roof below.
4.	Part D2	Details of all proposed stairways and balustrades to the mezzanine structures within the warehouse are to be provided for review to determine if they are compliant with the dimensional requirements of Part D2 or if a Performance Solution is required.
5.	Part D3 & AS 1428.1-2009	Access to the building is required from the following: + All main entry points on the allotment boundary; and + Any accessible car parking within the site. The reference plans indicate that compliance with the above is readily achievable in this instance, however further details are required with respect to levels from the site entry to the main entry of the building. Note: Confirmation of a D3.4 concession for the warehouse is required to be provided by the Operator of the facility to confirm all areas that maybe exempted from compliance with AS 1428.1-2009,
6.	Section J	A separate report will be required from an Energy Efficiency consultant to outline the applicable requirements for the building.

D.2 MATTERS REQUIRING FIRE SAFETY ENGINEERED ALTERNATIVE SOLUTIONS

	BCA Clause/s	Description
1.	Spec. C1.1	Proposed reduction of Type A Construction required FRL's to a number of building elements, in both the warehouse and office components of the building.
2.	C2.3/C2.4	The following compliance issues have been identified with respect to the proposed perimeter vehicular access serving the Site: + The vehicular access is greater than 18m from the building. + Vehicular Access is discontinuous in the NW & SW corners of the building. + Vehicular Access via the Staff Carpark on the Western side of the building is not likely to comply with the FRNSW Policy 4 vehicular access guidelines and the width of the entries to the carpark will be less than 6m.
3.	C3.15	Fire Stopping of services penetrations in 240/240/240 FRL building elements.
4.	D1.2	Dedicated egress paths from enclosed automated equipment zones.
5.	D1.4 /D1.5	The current plans indicate that exit travel distances, and distances between alternative exits within the warehouse on ground floor and Levels 1-3 will not comply with D1.4 & D1.5 – respectively – see further details below.
6.	D1.6	Egress Stairs are less than 1m wide and designed per AS 1657 to some areas in the equipment zones.

BCA Clause/s		Description
7.	D1.7	The discharge of the fire isolated exits (x2) in the ground level lobby on the western side of ground floor level, in lieu of discharging to open space is non-compliant with D1.7 requirements.
8.	D1.9	Stairs from the mezzanine levels do not comply with the cumulative egress distances via the non-fire isolated exit stairs, nor do the distances from the discharge location of these exit stairs comply
9.	E1.3 (inter alia AS 2419.1-2005)	To allow external fire hydrants to be located beneath the awnings and proposed coverage and/or lack of coverage to the automated areas of the warehouse and Levels 1-3 are likely to be non-compliant.
10.	E1.4	Limited Fire Hose Reel coverage to the automated portions of the warehouse and to the central parts of Levels 1-3.
11.	E1.5	The sprinkler booster location is not fully compliant with AS 2419.1-2005/AS 2118.1-2017.
12.	E2.2	It is noted that a rationalised automatic smoke exhaust system throughout the building may be considered.
13.	Part E4	Limitations to emergency lighting and exit signs in the automated portions of the warehouse.

E. CONCLUSION

This report contains an assessment of the referenced architectural documentation for the proposed warehouse/industrial development at Building 2B of the Oakdale West Estate, Horsley Park against the Deemed-to-Satisfy Provisions of the BCA 2019. Arising from the review, it is considered that the proposed development can readily achieve compliance with the relevant provisions of the BCA.

The following essential fire safety measures will be required for the building;

Essential Fire and Other Safety Measures	Standard of Performance
Alarm Signaling Equipment	AS1670.3 – 2018
Automatic Fail-Safe Devices	BCA Clause D2.21
Automatic Fire Detection & Alarm System	BCA Spec. E2.2a & AS/NZS 1668.1 – 2015 and *Fire Engineered Alternative Solution
Automatic Fire Suppression Systems	BCA Spec. E1.5 & AS 2118.1-2017 and *Fire Engineered Performance Solution
Building Occupant Warning System activated by the Sprinkler System	BCA Spec E1.5 Clause 8 and/ or AS 1670.1 – 2018
Emergency Lighting	BCA Clause E4.4 & AS 2293.1 - 2018
Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 and AS 2293.1 – 2018 and *Fire Engineered Performance Solution
Fire Control Centre	BCA Spec E1.8
Fire Doors	BCA Spec. C3.4 & AS 1905.1-2015
Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005
Fire Hydrant Systems	BCA Clause E1.3 & AS 2419.1 – 2005 and *Fire Engineered Performance Solution
Fire Seals	BCA C3.15 & AS 1530.4-2014 / AS 4072.1-2005
Mechanical Air Handling Systems	BCA Clause E2.2, AS/NZS 1668.1 - 2015 & AS 1668.2 – 2012
Paths of Travel	EP & A Regulation Clause 186 and *Fire Engineered Performance Solution

Essential Fire and Other Safety Measures	Standard of Performance
Perimeter Vehicular Access	BCA Clause C2.4 and*Fire Engineered Alternative Solution
Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
Required Exit Doors (power operated)	BCA Clause D2.19(d)
Smoke Hazard Management Systems (Smoke Exhaust System)	BCA Part E2 & AS/NZS 1668.1 - 2015 *Fire Engineered Alternative Solution
Warning & Operational signs	Section 183 of the EP & A Regulations 2000, AS 1905.1 - 2015, BCA Clause D2.23, E3.3

Note the above fire safety schedule is indicative only and could be subject to change as result of design changes.

APPENDIX 1 – SPEC. C1.1 FRL REQUIREMENTS

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