STEVE WATSON & PARTNERS

BUILDING CODE CONSULTANTS
BUILDING SURVEYORS AND CERTIFIERS
SYDNEY • MELBOURNE • BRISBANE • CANBERRA

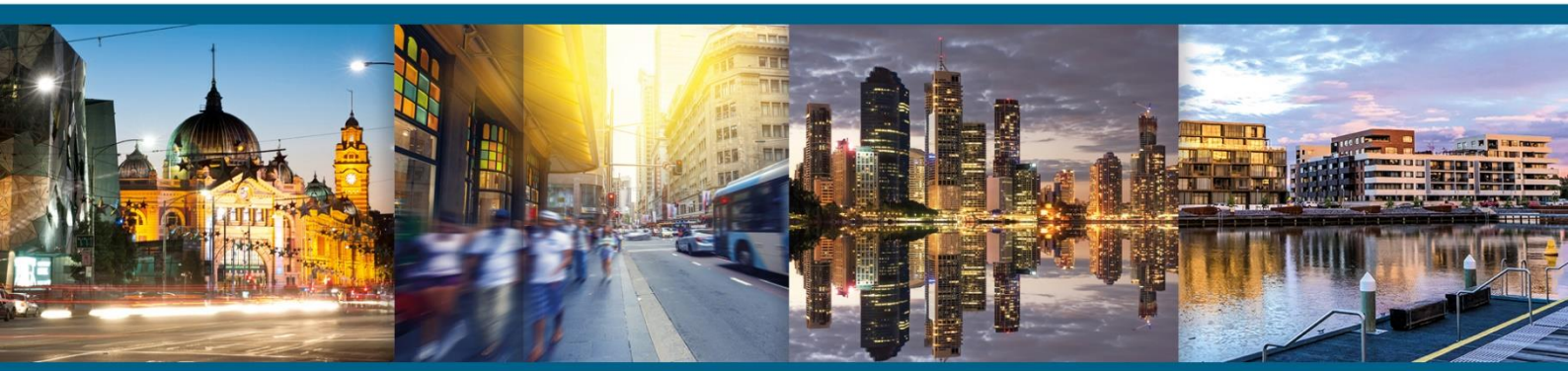
Mainsbridge School

Section 6.28 Compliance Certificate (Crown Certificate)

Report No: 2016/2297.06 R1.0

12 July 2019

Prepared for Hayball



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Section 6.28 Compliance Certificate (Crown Certificate)

Issued under the Environmental Planning and Assessment Act 1979 Section 6.28

Section 6.28 Compliance Certificate No. 16/2297.06/01

Steve Watson and Partners certify that the proposed development is Crown Development and that if carried out in accordance with the approved plans and specifications will comply with all development standards, Development Consent conditions and all requirements of the Regulation under the Environmental Planning and Assessment Act 1979.

Applicant	Name: **Hayball** Address: **26-32 Pirrama Road** Suburb: **Pyrmont** State: **NSW** Postcode: **2009**
Location of the Property	Address: **Mainsbridge School 95 Lawrence Hargrave Road,** Suburb: **Warwick Farm** State: **NSW** Postcode: **2170** Real Property Description: **Lot 22 DP 715287**

Proposed Development	Type: **Carrying out of work**
	Description:
	• **The construction of one and two-storey buildings comprising:**
	  ○ **new learning spaces,**
	  ○ **administration,**
	  ○ **library and shared halls, and**
	  ○ **canteen, amenities and storage facilities.**
	• **Landscaping, including opening space improvements, tree removal, covered outdoor learning areas (COLAs), new sports field, fencing and pathways.**
	Proposed Use: **School**
	Building Code of Australia Classification: **Class 9b**

Determination	**Approved** Date of Determination: **12 July 2019**

This Certificate has been prepared and issued in accordance with the Section 6.28 Compliance Report outlined in **Appendix A**.
The conditions of approval outlined in **Appendix A** must be complied with as part of the construction works and certified upon completion.

Guiseppe Graziano (BPB0144)
Steve Watson and Partners
Accreditation Body: **BPB** Accreditation no: **ABC 17** Date of Endorsement: **Friday 12 July 2019**

APPENDIX A – Section 6.28 Compliance Report

1. INTRODUCTION

This report presents an assessment of the proposed work as follows:

- The construction of one and two-storey buildings comprising:
  - new learning spaces,
  - administration,
  - library and shared halls, and
  - canteen, amenities and storage facilities.
- Landscaping, including opening space improvements, tree removal, covered outdoor learning areas (COLAs), new sports field, fencing and pathways.

at the Mainsbridge School relocating to Warwick Farm against the Deemed-to-Satisfy (DTS) requirements of the Building Code of Australia (BCA) 2016 (Amendment 1) and the Disability (Access to Premises – Buildings) Standards 2010.

The report has been prepared by Steve Watson and Partners for Hayball

2. STATUTORY FRAMEWORK

Development by the Crown

Development by the Crown is regulated by Part 4 Division 4.6 and Part 6 Division 6.8 of the EP&A Act. Section 6.28 of the Act requires that any demolition or building work cannot be commenced unless the works are certified as complying with the State's building laws at the date of calling for tenders. The above regulatory requirements generally still apply.

Furthermore, Part 13 Clause 227 of the Environmental Planning and Assessment Regulation 2000 clarifies that for the purposes of Section 6.28 of the Act, all the provisions of the Building Code of Australia are prescribed as the *"technical provisions of the State's building laws"*.

Disability (Access to Premises – Buildings) Standards 2010

The Disability (Access to Premises – Buildings) Standards came into force via BCA2011 throughout Australia on 01 May 2011, and with it introduced a higher standard of access to that required by previous versions of the BCA. In prescribed circumstances, the legislation requires upgrade of access and facilities for persons with disabilities when building work is proposed. In particular, unless works are undertaken by a lessee who does not lease the entire building, proposed building work anywhere in the building could trigger a need for enhanced access at the main building pedestrian entry and from that entry to all areas of the building that are subject to the building work.

3. LIMITATIONS

The following limitations apply to the assessment:

- The assessment does not consider the requirements for people with disabilities under the provisions of the Disabilities Discrimination Act 1992 (outside of the Premises Standard noted above).

- The assessment does not consider the requirements of legislation other than the nominated sections of the EP&A Act which might address building works such as OH&S, Construction Safety or the like.
- Generally the assessment does not incorporate the detailed requirements of the Australian Standards.
- This Section 6.28 Compliance Certificate incorporates a review of the proposed new works in order to comply with the requirements of BCA 2016 (Amendment 1). The Environmental Planning & Assessment Act and Regulation does not include provisions for upgrading existing crown buildings subject to new alteration works.
- The report does not consider or address the responsibilities of the building owner(s) in using discretion in upgrading the building to comply with current BCA requirements.
- Works outside of the scope nominated does not form part of this statutory approval.

4. DESCRIPTION OF THE WORK

The proposed works comprise of:

- The construction of one and two-storey buildings comprising:
    - new learning spaces,
    - administration,
    - library and shared halls, and
    - canteen, amenities and storage facilities.
- Landscaping, including opening space improvements, tree removal, covered outdoor learning areas (COLAs), new sports field, fencing and pathways.

5. BCA DETAILS & BUILDING CHARACTERISTICS

Building Characteristics	
Building Classification(s)	Class 9b
Number of Storeys	2
Rise in Storeys	2
Effective Height	less than 12

6. BCA ASSESSMENT

The following drawings have been assessed as part of this report.

Architectural Drawings

Drawing No.	Drawing Title	Issue	Date	Issued By
Site Drawing				
01.A00.00	Site Drawing - Cover Sheet	E	14/06/19	Hayball
01.A00.03	Keynote Index 1	D	14/06/19	Hayball
01.A00.04	Keynote Index 2	D	14/06/19	Hayball
01.A01.01	Keynote Index 2	F	14/06/19	Hayball
01.A01.02	Site Plan - Proposed	H	14/06/19	Hayball
01.A01.04	Site Plan - Remediation	F	14/06/19	Hayball
01.A01.05.01	Precinct Plan - Ground – North	C	28/06/19	Hayball
01.A01.06.01	Precinct Plan - Level 01 – North	C	28/06/19	Hayball
Building A & B				
AB.A03.01	Building A & B - GENERAL ARRANGEMENT PLAN -GROUND	H	14/06/19	Hayball
AB.A03.02	General Arrangement Plan –Level 1	I	27/06/19	Hayball
AB.A03.03	Roof Plan	F	14/06/19	Hayball
AB.A04.01	Reflected Ceiling Plan – Ground	G	14/06/19	Hayball
AB.A04.05	Reflected Ceiling Plan – Level 1	G	14/06/19	Hayball
AB.A05.01	Structural Set Out Plan – Ground	G	14/06/19	Hayball
AB.A05.02	Structural Set Out Plan – Level 1	G	14/06/19	Hayball
AB.A05.03	Wall Set Out Plan - Ground	E	14/06/19	Hayball
AB.A05.04	Wall Set Out Plan - Level 1	G	27/06/19	Hayball
AB.A06.01	Elevations	F	14/06/19	Hayball
AB.A06.03	Sections 1	D	14/06/19	Hayball
AB.A06.04	Sections 2	C	14/06/19	Hayball
AB.A08.01	Stair & Ramp Details 1	D	14/06/19	Hayball
AB.A08.02	Stair & Ramp Details 2	C	14/06/19	Hayball
AB.A11.01	Wet Areas 1	C	14/06/19	Hayball
AB.A11.02	Wet Areas 2	C	14/06/19	Hayball
Building C				
C.A03.01	Building C - General Arrangement Plan - Ground	F	14/06/19	Hayball
C.A03.03	Roof Plan	E	14/06/19	Hayball
C.A04.01	Reflected Ceiling Plan	F	14/06/19	Hayball
C.A05.01	Structural Set Out Plan	E	14/06/19	Hayball
C.A05.02	Wall Set Out Plan	E	14/06/19	Hayball
C.A06.01	Elevations	E	14/06/19	Hayball
C.A06.03	Sections 1	D	14/06/19	Hayball
C.A06.04	Sections 2	C	14/06/19	Hayball
C.A11.01	Wet Areas	C	14/06/19	Hayball
Building D				
D.A03.01	Building D - General Arrangement Plan – Block D - Ground	G	14/06/19	Hayball

D.A03.02	General Arrangement Plan - Block D - Level 1	G	14/06/19	Hayball
D.A03.03	Roof Plan	F	14/06/19	Hayball
D.A04.01	Reflected Ceiling Plan – Ground	F	14/06/19	Hayball
D.A04.04	Reflected Ceiling Plan – Level 1	F	14/06/19	Hayball
D.A05.01	Structural Set Out Plan – Ground	F	14/06/19	Hayball
D.A05.02	Structural Set Out Plan – Level 1	F	14/06/19	Hayball
D.A05.03	Wall Set Out Plan – Ground	E	14/06/19	Hayball
D.A05.04	Wall Set Out Plan – Level 1	E	14/06/19	Hayball
D.A06.01	Elevations	F	14/06/19	Hayball
D.A06.03	Sections 1	D	14/06/19	Hayball
D.A06.04	Sections 2	D	14/06/19	Hayball
D.A08.01	Stair & Ramp Details	D	14/06/19	Hayball
D.A11.01	Wet Areas	C	14/06/19	Hayball
Building E				
E.A03.01	Building E - GENERAL ARRANGEMENT PLAN	G	26/06/19	Hayball
E.A03.02	Roof Plan	F	26/06/19	Hayball
E.A04.01	Reflected Ceiling Plan	E	14/06/19	Hayball
E.A05.01	Structural Set Out Plan	D	23/05/19	Hayball
E.A05.02	Wall Set Out Plan	D	14/06/19	Hayball
E.A06.01	Elevations	E	26/06/19	Hayball
E.A06.03	Sections	D	14/06/19	Hayball
E.A11.01	Wet Areas	C	14/06/19	Hayball
Schedules				
S01.A07.18	Construction Details 8	A	14/06/19	Hayball
S01.A21.01	Wall Type Schedule	E	14/06/19	Hayball
S01.A22.01	Window Schedule	F	14/06/19	Hayball
S01.A22.02	Window Schedule 2	E	14/06/19	Hayball
S01.A22.03	Window Schedule 3	D	14/06/19	Hayball
S01.A22.04	Window Schedule 4	E	14/06/19	Hayball
S01.A23.01	Door Schedule	D	14/06/19	Hayball
S01.A23.02	Door Schedule 2	E	14/06/19	Hayball
S01.A23.03	Door Schedule 3	E	14/06/19	Hayball

Electrical Drawings

Drawing No.	Drawing title	Issue	Date	Issued By
WSP-MB-EL-000-000	Electrical Services Cover Sheet And Drawing List	C1	12/06/19	WSP
WSP-MB-EL-000-001	Legend And Notes	C1	12/06/19	WSP
WSP-MB-EL-000-002	Single Line Diagram	C1	12/06/19	WSP
WSP-MB-EL-000-003	Electrical Details Sheet 1	C1	12/06/19	WSP
WSP-MB-EL-000-004	Electrical Details Sheet 2	C1	12/06/19	WSP

WSP-MB-EL-L00-100	BLOCK A & B - Level Ground Lighting And Ceiling Fan Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-101	BLOCK A & B - Level 1 Lighting And Ceiling Fan Layout	C2	19/06/19	WSP
WSP-MB-EL-L00-102	Block C - Level Ground Lighting And Ceiling Fan Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-103	Block D - Level Ground Lighting And Ceiling Fan Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-104	Block D - Level 1 Lighting And Ceiling Fan Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-105	Block E - Level Ground Lighting And Ceiling Fan Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-106	Warwick Farm Toilet Block Lighting And Ceiling Fan Layout	C1	20/05/19	WSP
WSP-MB-EL-L00-200	Level Ground - Block A & B Power And Communications Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-201	Level 1 - Block A & B Power And Communications Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-201	Level 1 - Block A & B Power And Communications Layout	C2	19/06/19	WSP
WSP-MB-EL-L00-202	Ground - Block C Power And Communications Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-203	Ground Block D Power And Communications Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-204	Level 1 - Block D Power And Communications Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-205	Block E - Level Ground Power And Communications Layout	C1	09/05/19	WSP
WSP-MB-EL-L00-206	Warwick Farm Toilet Block Power And Communications Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-300	Ground - Block A & B Security Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-301	Level 1 - Block A & B Security Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-302	Ground - Block C Security Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-303	Ground - Block D Security Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-304	Level 1 - Block D Security Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-305	Ground - Block E Security Layout	C1	12/06/19	WSP
WSP-MB-EL-L00-306	Warwick Farm Toilet Block Security Layout	C1	20/05/19	WSP
WSP-MB-EL-S00-400	Site Plan Power And Communications Service	C1	12/06/19	WSP
WSP-MB-EL-S00-401	Site Plan Security Service	C1	12/06/19	WSP

WSP-MB-EL-S00-401	Site Plan Security Service	C2	19/06/19	WSP
WSP-MB-EL-S00-402	Site Plan Landscape Lighting	C1	12/06/19	WSP

Mechanical Drawings

Drawing No.	Drawing Title	Issue	Date	Issued By
WSP-MB-ME-000-000	Mechanical Services Cover Sheet And Drawing List	C1	12/06/19	WSP
WSP-MB-ME-000-001	Legends And Notes	C1	12/06/19	WSP
WSP-MB-ME-000-002	Equipment Schedules 1 of 3	C1	12/06/19	WSP
WSP-MB-ME-000-003	Equipment Schedules 2 of 3	C2	19/06/19	WSP
WSP-MB-ME-000-004	Equipment Schedules 3 of 3	C1	12/06/19	WSP
WSP-MB-ME-000-005	Typical Details	C1	12/06/19	WSP
WSP-MB-ME-000-100	Ground Floor - Block A & B Mechanical Layout	C2	19/06/19	WSP
WSP-MB-ME-000-101	Level 1 - Block A & B Mechanical Layout	C2	19/06/19	WSP
WSP-MB-ME-000-102	Roof - Block A & B Mechanical Layout	C2	19/06/19	WSP
WSP-MB-ME-000-200	Ground Floor - Block C Mechanical Layout	C1	12/06/19	WSP
WSP-MB-ME-000-201	Roof - Block C Mechanical Layout	C1	12/06/19	WSP
WSP-MB-ME-000-300	Ground Floor - Block D Mechanical Layout	C1	12/06/19	WSP
WSP-MB-ME-000-301	Level 1 - Block D Mechanical Layout	C1	12/06/19	WSP
WSP-MB-ME-000-302	Roof - Block D Mechanical Layout	C1	12/06/19	WSP
WSP-MB-ME-000-400	Roof - Block E Mechanical Airside Layout	C1	12/06/19	WSP
WSP-MB-ME-000-401	Roof - Block E Mechanical Layout	C1	12/06/19	WSP
WSP-MB-ME-000-402	Ground - Block E Mechanical Waterside Layout	C1	12/06/19	WSP
WSP-MB-ME-000-403	Block E Mechanical Waterside Schematic	C1	12/06/19	WSP
WSP-MB-ME-000-404	Block E Mechanical Airside Layout	C1	12/06/19	WSP
WSP-MB-ME-000-405	Block E Mechanical Pool Hall Equipment Schedules	C1	12/06/19	WSP

WSP-MB-ME-000-406	Block E Mechanical Typical Details	C1	12/06/19	WSP
WSP-MB-ME-000-500	Ground Floor & Roof - Toilet Block Mechanical Layout	C1	20/05/19	WSP

Dry Fire Drawings

Drawing No.	Drawing Title	Issue	Date	Issued By
WSP-MB-FR-000-000	Fire Protection Services Cover Sheet And Drawing List	C1	12/06/19	WSP
WSP-MB-FR-000-001	Legends And Notes	C1	12/06/19	WSP
WSP-MB-FR-000-400	Block E	C1	12/06/19	WSP
WSP-MB-FR-C00-001	Ground Floor - Block C Fire Protection Layout	C1	12/06/19	WSP
WSP-MB-FR-LA0-001	Ground Floor - Block A & B Fire Protection Layout	C1	11/06/19	WSP
WSP-MB-FR-LA1-001	Level 1 - Block A & B Fire Protection Layout	C2	19/06/19	WSP
WSP-MB-FR-LD0-001	Ground - Block D Fire Protection Layout	C1	12/06/19	WSP
WSP-MB-FR-LD1-001	Level 1 - Block D Fire Protection Layout	C1	12/06/19	WSP

Hydraulic Drawings

Drawing No.	Drawing Title	Issue	Date	Issued By
WSP-MB-HY-000-000	Hydraulic Services Cover Sheet And Drawing List	C1	12/06/19	WSP
WSP-MB-HY-000-001	Legends And Notes	C1	12/06/19	WSP
WSP-MB-HY-000-002	Typical Details 1	C1	12/06/19	WSP
WSP-MB-HY-000-003	Typical Details 2	C1	12/06/19	WSP
WSP-MB-HY-000-400	Warwick Farm Toilet Block Drainage Layout	C1	09/05/19	WSP
WSP-MB-HY-000-401	Warwick Farm Toilet Block Pressure Layout	C1	09/05/19	WSP
WSP-MB-HY-000-500	Block E Drainage Layout	C1	12/06/19	WSP
WSP-MB-HY-000-501	Block E Pressure Layout	C1	12/06/19	WSP
WSP-MB-HY-000-502	Block E Roof Layout	C1	12/06/19	WSP
WSP-MB-HY-LA0-100	Ground Floor - Block A & B Drainage Layout	C2	19/06/19	WSP
WSP-MB-HY-LA0-200	Ground Floor - Block A & B Water And Gas Layout	C3	01/07/19	WSP
WSP-MB-HY-LA1-100	Level 01 - Block A & B Drainage Layout	C2	19/06/19	WSP

WSP-MB-HY-LA1-200	Level 01 - Block A & B Water And Gas Layout	C3	01/07/19	WSP
WSP-MB-HY-LC0-100	Ground Floor - Block C Drainage Layout	C1	12/06/19	WSP
WSP-MB-HY-LC0-200	Ground Floor - Block C Water And Gas Layout	C1	12/06/19	WSP
WSP-MB-HY-LD0-101	Ground Floor - Block D Drainage Layout - Zone 1	C1	12/06/19	WSP
WSP-MB-HY-LD0-201	Ground Floor - Block D Water And Gas Layout - Zone 1	C1	12/06/19	WSP
WSP-MB-HY-LD1-101	Level 01 - Block D Drainage Layout - Zone 1	C1	12/06/19	WSP
WSP-MB-HY-LD1-201	Level 01 - Block D Water And Gas Layout - Zone 1	C1	19/06/19	WSP
WSP-MB-HY-RA0-000	Roof - Block A & B Hydraulic Layout	C2	12/06/19	WSP
WSP-MB-HY-RC0-000	Roof - Block C Hydraulic Layout	C1	12/06/19	WSP
WSP-MB-HY-RD0-001	Roof - Block D Hydraulic Layout – Zone 1	C1	12/06/19	WSP
WSP-MB-HY-S00-100	Site Layout - Drainage	C1	12/06/19	WSP
WSP-MB-HY-S00-200	Site Layout - Pressure	C1	13/05/19	WSP

Structural Drawings

Drawing No.	Drawing Title	Issue	Date	Issued By
S01000_01	Structural Drawings Title Sheet And Drawing Register	C	19/06/19	WSP
S01000_02	General Notes	D	19/06/19	WSP
S01000_11	Slab On Ground Details - Sheet 01	D	19/06/19	WSP
S01000_14	Suspended Slab Details - Sheet 01	C	19/06/19	WSP
S01000_15	Suspended Slab Details - Sheet 02	C	19/06/19	WSP
S01000_16	Suspended Slab Details - Sheet 03	C	19/06/19	WSP
S01000_17	Suspended Slab Details - Sheet 04	C	19/06/19	WSP
S01000_21	Steelwork Details - Sheet 01	D	19/06/19	WSP
S01000_22	Steelwork Details - Sheet 02	C	19/06/19	WSP
S01000_23	Steelwork Details - Sheet 03	C	19/06/19	WSP
S01000_26	Stair Details	D	19/06/19	WSP
S01000_31	Lift Details	C	19/06/19	WSP
S01000_36	Footing Details - Sheet 01	C	19/06/19	WSP
S01000_37	Footing Details - Sheet 02	D	19/06/19	WSP
S01000_41	Wall Details	D	19/06/19	WSP
S01000_51	Masonry Details - Sheet 01	C	19/06/19	WSP
S01000_52	Masonry Details - Sheet 02	C	19/06/19	WSP
S01100_01	Block A & B - Ground Floor General Arrangement Plan	C	19/06/19	WSP
S01120_01	Block A & B - Level 1 General Arrangement Plan	C	19/06/19	WSP
S01130_01	Block A & B - Roof Framing Plan	C	19/06/19	WSP

S01130_10	Block A & B - Roof Framing Sections - Sheet 01	C	19/06/19	WSP
S01130_11	Block A & B - Roof Framing Sections - Sheet 02	C	19/06/19	WSP
S01130_12	Block A & B - Roof Framing Sections - Sheet 03	C	19/06/19	WSP
S01210_01	Block C - Ground Floor General Arrangement Plan	C	19/06/19	WSP
S01220_01	Block C - Roof Framing General Arrangement Plan	C	19/06/19	WSP
S01220_10	Block C - Roof Framing Sections - Sheet 01	C	19/06/19	WSP
S01220_11	Block C - Roof Framing Sections - Sheet 02	C	19/06/19	WSP
S01310_01	Block D - Ground Floor General Arrangement Plan	C	19/06/19	WSP
S01320_01	Block D - Level 1 General Arrangement Plan	C	19/06/19	WSP
S01330_01	Block D - Roof Framing Plan	C	19/06/19	WSP
S01330_10	Block D - Roof Framing Sections - Sheet 01	C	19/06/19	WSP
S01330_11	Block D - Roof Framing Sections - Sheet 02	C	19/06/19	WSP
S01410_01	Block E - Ground Floor GA And Roof Framing Plans	E	19/06/19	WSP
S01410_05	Block E Ground Floor Sections	C	19/06/19	WSP
S01410_10	Block E Roof Framing Sections - Sheet 01	D	19/06/19	WSP
S01410_11	Block E Roof Framing Sections - Sheet 02	D	19/06/19	WSP

Civil Drawings

Drawing No.	Drawing Title	Issue	Date	Issued By
WSP-CV-0001	Civil Drawings – Cover Sheet, Notes Locality Plan and Drawings Register	C1	21/05/19	1
WSP-CV-0010	Overall Site Plan	C1	21/05/19	2
WSP-CV-0011	General Arrangement Plan – Sheet 1 of 2	C2	23/05/19	3
WSP-CV-0012	General Arrangement Plan – Sheet 2 of 2	C2	23/05/19	4
WSP-CV-0020	Stormwater Details	C1	21/05/19	5
WSP-CV-0021	OSD Tank Details	C1	21/05/19	6
WSP-CV-0040	Retaining Wall Details	C1	21/05/19	7
WSP-CV-0060	Sediment & Erosion Control Plan	C1	21/05/19	8
WSP-CV-0061	Sediment & Erosion Control Details	C1	21/05/19	9

Documentation relied upon to issue Section 6.28 Compliance Certificate No. 16/2297.06/01 for Mainsbridge School Relocation to Warwick Farm

Item No	Description	Date	Issued By
1.	Long Service Levy Receipt	30/05/19	Long Service Corporation
2.	Electrical Design Certificate (Project No. 2304785B)	28/06/19	WSP
3.	Mechanical Design Statement (Project No. 2304785B)	28/06/19	WSP
4.	Hydraulic Design Statement (Project No. 2304785B)	02/07/19	WSP
5.	Structural Design Statement (Ref No. 4785-STR)	21/06/19	WSP
6.	Floor Statement (Ref No. 230478T-CIV-WSP-CV-001 to 0071)	24/05/19	WSP
7.	Fire Protection Services Design Statement (Project No. 2304785B)	17/06/19	WSP
8.	Access Design Certificate	01/07/19	Morris Goding Access Consulting
9.	Access Review Detailed Design Statement, Rev 3	01/07/19	Morris Goding Access Consulting
10.	Design Statement – Spec C1.10 Fire Hazard Properties	01/07/19	Hayball
11.	Design Statement – Weatherproofing of Roofing and External Walls	17/06/19	Hayball
12.	Design Statement – External Wall System Disclosure Statement	17/06/19	Hayball
13.	Vertical Transportation Specification (Project No. 2304785B)	31/10/17	WSP
14.	Performance Based Solution Report – Screening to Sanitary Facilities (Ref No. 109675-PS-r1/an)	30/08/18	BCA Logic Report
15.	Section J Report: JV3 – Mainsbridge School Blocks A-D (Project No. PS 106870-181009-SJR-Mainsbridge) Rev 01	09/10/18	WSP
16.	Section J Report: JV3 – Mainsbridge School Block E (Project No. PS 107208-190107-SJR-Mainsbridge) Rev 01	07/01/19	WSP
17.	Performance Solution Report SY180238 R1.0	29/11/18	Defire
18.	Documentation required to satisfy relevant DA conditions as per attached DA checklist	-	-

7. ESSENTIAL FIRE SAFETY MEASURES

The following list of essential fire safety measures required to be incorporated into the building.

PROPOSED FIRE SAFETY SCHEDULE	
Measure	**Standard of Performance**
Access panels, doors and hoppers to fire resisting shafts	BCA2016 AMENDMENT 1 Clause C3.13 and tested prototypes (AS 1530.4 – 2014 and AS 4072.1-2005)
Automatic fail safe devices	Scheduled devices release upon trip of smoke detection and accordance with BCA2016 AMENDMENT 1 Clauses D2.19 and D2.21 and Fire Engineering Report Ref: SY180238 R1.0 by Defire dated 29 November 2018
Automatic fire detection and alarm system (smoke detection system and smoke detection system to automatically shut down air-handling system	BCA2016 AMENDMENT 1 Clause 4, 5, 6 of Specification E2.2a and AS 1670.1 – 2015 and AS/NZS 1668.1 – 2015.
Emergency lighting	BCA2016 AMENDMENT 1 Clause E4.2, E4.4 and AS 2293.1 – 2005
Exit signs	BCA2016 AMENDMENT 1 Clause E4.5, NSW E4.6, E4.8 and AS 2293.1 – 2005
Fire hydrants system	BCA2016 AMENDMENT 1 Clause E1.3 and AS 2419.1 – 2005
Fire seals protecting opening in fire resisting components of the building	BCA2016 AMENDMENT 1 Clause C3.15, Specification C3.15 and AS 1530.4 –2014 and AS 4072.1 – 2005 and installed in accordance with the tested prototype.
Hose reel system	BCA2016 AMENDMENT 1 Clause E1.4 and AS 2441 – 2005
Mechanical air handling system (automatic shutdown of air-handling system)	BCA2016 AMENDMENT Clause E2.2 and AS/NZ 1668.1-2015
Portable fire extinguishers	BCA2016 AMENDMENT 1 Clause E1.6 and AS 2444 – 2001
Warning and operational signs	BCA2016 AMENDMENT 1 Clauses D3.6, E3.3
Evacuation plans	Fire Engineering Report Ref: SY180238 R1.0 by Defire dated 29 November 2018
Performance Solutions • Door hardware	Fire Engineering Report Ref: SY180238 R1.0 by Defire dated 29 November 2018

8. CONDITIONS OF APPROVAL

1. All new construction works are to be undertaken and completed in accordance with the National Construction Code – Building Code of Australia (Volume 1) 2016 (Amendment 1).
2. All works are to undertaken in accordance with the advice and recommendations outlined in the Steve Watson and Partners BCA Assessment Report (2016/2297 Rev R1.2) dated 11/10/19.
3. Fire engineering requirements contained within the Fire Performance Solution Report (SY180238) Revision 1.0 prepared by Defire dated 29/11/2018 are required to be implemented into the building. Certification will be required prior to completion and occupation of the building.
4. All requirements relating to access for people with disabilities contained within the Access Review Detailed Design Statement Rev 3 dated 01/07/2019 prepared by Morris Goding Access Consulting are required to be implemented into the building. Certification will be required prior to completion and occupation of the building.
5. Essential fire safety measures are to be installed in accordance with the requirements listed in the attached fire safety schedule (above). Certification will be required prior to completion and occupation of the building (part).
6. Design certification for all services and structure has been provided by the Design Team and is relied upon as part of this approval. All engineers, consultants and sub-contractors will be required to certify each component of work against the BCA and approved documentation in this report.
7. Planning Approvals and Conditions of Consent are to be complied with and executed with the relevant authorities prior to the completion of building work. Note the satisfaction of specific conditions of the Development Consent **does not** form part of this approval.
8. This certificate does not alleviate and their parties of their obligations and responsibilities.

9. CONCLUSION

The proposed Crown Development works involving The construction of one and two-storey buildings comprising: new learning spaces, administration, library and shared halls; and canteen, amenities and storage facilities. Landscaping, including opening space improvements, tree removal, covered outdoor learning areas (COLAs), new sports field, fencing and pathways. have been reviewed and are capable of complying technical provisions of the State's laws as specified under Section 6.28 of the Environmental Planning & Assessment Act 1979 and Clause 227 of the Environmental Planning & Assessment Regulation 2000.

The referenced documentation and conditions of approval must be complied during construction and certified upon completion of the construction works, prior to any occupation of the building (or part).

NSW GOVERNMENT | Long Service Corporation

30 May 2019

HUTCHINSON BUILDERS
23 DUNNING AVE
ROSEBERY NSW 2018

Levy Receipt

Receipt No.
00382572

Received from: (Name of person or organisation paying for levy)

HUTCHINSON BUILDERS

the amount of

$87,041.00

Payment details:

Direct Depos **$87,041.00**

being payment for Long Service Levy as detailed below

Levy Payment Form number	0357298
Council/Department/Authority	EDUCATION, NSW DEPT OF
D.A. Number	SSD 8792
Work address	95 LAWRENCE HARGRAVE RD WARWICK FARM NSW 2170
Estimated value of work	$24,869,100.00
Levy payable (No exemption)	**$87,041.00**
Total levy paid	**$87,041.00**
Credit Card Surcharge (non-refundable)	**$0.00**
Total Amount Paid	**$87,041.00**

Signed: (Signature of authorised person)

Date 30.5.19

395038

WSP
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2000 Australia
Tel: +61-2-9272-5101

www.wsp.com

Electrical Design Certificate

Project	Western Sydney Schools Mainsbridge SSP	**Date**	28/06/2018
Project No	2304785B	**No of pages**	2

The Electrical systems for the building works described below shall have its design finalised in accordance with:

- General — BCA 2016
- Energy Efficiency — BCA 2016 Section J6
- Interior Lighting (Safe Movement) — AS/NZS 1680.0 - 2009 & BCA 2016 – Clause F4.4
- Exit Signs — AS/NZS 2293.1 – 2005 & BCA 2016 – Clauses E4.5, E4.6 & E4.8
- Emergency Lighting — AS/NZS 2293.1 – 2005 & BCA 2016 – Clauses E4.2 & E4.4
- Outdoor Lighting — AS/NZS 1158.3.1– 2005 Pedestrian area Category P 11c and P12 lighting
  AS/NZS 4282 – 1997
- Fire Engineering Report — Performance solution report no. SY180238 Rev R1.0 prepared by Defire Exova, dated 29 November 2018
- Block B Special Programmes Kitchen — AS 4674 – 2004 Section 2.6

Building Description and Location

The project consists of the proposed development of the Mainsbridge SSP School located at 95 Lawrence Hargrave Rd, Warwick Farm NSW 2170.

The Electrical design will be in line with the reference documents below.

WSP Documents

	Electrical Specification
WSP-MB-EL-000-000	COVER SHEET AND DRAWING LIST
WSP-MB-EL-000-001	LEGEND AND NOTES
WSP-MB-EL-000-002	SINGLE LINE DIAGRAM
WSP-MB-EL-000-003	ELECTRICAL DETAILS SHEET 1
WSP-MB-EL-000-004	ELECTRICAL DETAILS SHEET 2
WSP-MB-EL-L00-100	BLOCK A + BLOCK B - LEVEL GROUND LIGHTING AND CEILING FAN LAYOUT
WSP-MB-EL-L00-101	BLOCK A + BLOCK B - LEVEL 1 LIGHTING AND CEILING FAN LAYOUT
WSP-MB-EL-L00-200	BLOCK A + BLOCK B - LEVEL GROUND POWER AND COMMUNICATIONS LAYOUT
WSP-MB-EL-L00-201	BLOCK A + BLOCK B - LEVEL 1 POWER AND COMMUNICATIONS LAYOUT
WSP-MB-EL-L00-300	BLOCK A + BLOCK B - LEVEL GROUND SECURITY LAYOUT

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WSP-MB-EL-L00-301	BLOCK A + BLOCK B - LEVEL 1 SECURITY LAYOUT
WSP-MB-EL-L00-102	BLOCK C - LEVEL GROUND LIGHTING AND CEILING FAN LAYOUT
WSP-MB-EL-L00-202	BLOCK C - LEVEL GROUND POWER AND COMMUNICATIONS LAYOUT
WSP-MB-EL-L00-302	BLOCK C - LEVEL GROUND SECURITY LAYOUT
WSP-MB-EL-L00-103	BLOCK D - LEVEL GROUND LIGHTING AND CEILING FAN LAYOUT
WSP-MB-EL-L00-104	BLOCK D - LEVEL 1 LIGHTING AND CEILING FAN LAYOUT
WSP-MB-EL-L00-203	BLOCK D - LEVEL GROUND POWER AND COMMUNICATIONS LAYOUT
WSP-MB-EL-L00-204	BLOCK D - LEVEL 1 POWER AND COMMUNICATIONS LAYOUT
WSP-MB-EL-L00-303	BLOCK D - LEVEL GROUND SECURITY LAYOUT
WSP-MB-EL-L00-304	BLOCK D - LEVEL 1 SECURITY LAYOUT
WSP-MB-EL-L00-105	BLOCK E - LEVEL GROUND LIGHTING AND CEILING FAN LAYOUT
WSP-MB-EL-L00-205	BLOCK E - LEVEL GROUND POWER AND COMMUNICATIONS LAYOUT
WSP-MB-EL-L00-305	BLOCK E - LEVEL GROUND SECURITY LAYOUT
WSP-MB-EL-L00-106	TOILET BLOCK - LIGHTING AND CEILING FAN LAYOUT
WSP-MB-EL-L00-206	TOILET BLOCK - POWER AND COMMUNICATIONS LAYOUT
WSP-MB-EL-L00-306	TOILET BLOCK - SECURITY LAYOUT
WSP-MB-EL-L00-400	SITE PLAN POWER AND COMMUNICATIONS SERVICE
WSP-MB-EL-L00-401	SITE PLAN SECURITY SERVICE
WSP-MB-EL-L00-402	SITE PLAN LANDSCAPE LIGHTING

Owner	**Builder**	**Contractor**
DOE	Hutchinson	TBA

Details of Person Signing

Position in Company	Electrical Engineer
Qualification and Experience	Master and Bachelor of Engineering (Electrical), Engineers Australia Membership 3 years' experience

Name: Kevin Chen **Date:** 28/06/2019 **Signature:**

This document shall in no way relieve the Builder and or Contractors of any legal responsibility or obligations with respect to the manufacture, installation, operation and respective certifications

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Mechanical Design Statement

Project	Western Sydney Schools Mainsbridge SSP	**Date**	28/06/2019
Project No	2304785B	**No of pages**	2

The Mechanical Ventilation and Air Conditioning systems for the building works described below shall have its design finalised in accordance with:

- General — BCA 2016 including Amendment 1
- Energy Efficiency — BCA 2016 Section J
- Mechanical Air Handling Systems — AS 1668.1 – 2015, AS 1668.2 - 2012 & BCA 2016 Clause E2.2
- Natural Ventilation — BCA 2016 Clause F4.6
- Mechanical Ventilation Systems — AS1668.2 – 2012 & BCA 2016 Clauses F4.5
- Refrigeration systems — AS/NZS 1677.1, AS/NZS 1677.2
- Smoke Hazard Management Systems — BCA 2016, NSW Appendix E2.2
- Block B Special Programmes Kitchen — AS 4674-2004 Section 2.5

Building Description and Location

The project consists of the proposed development of the Mainsbridge SSP School located at 95 Lawrence Hargrave Rd, Warwick Farm NSW 2170.

The Mechanical design will be in line with the reference documents below.

WSP Parsons Brinkerhoff Documents

	Mechanical Specification
WSP-MB-ME-000-000	**COVERSHEET AND DRAWING INDEX**
WSP-MB-ME-000-001	**LEGENDS AND NOTES**
WSP-MB-ME-000-002	**EQUIPMENT SCHEDULE 1 OF 3**
WSP-MB-ME-000-003	**EQUIPMENT SCHEDULE 2 OF 3**
WSP-MB-ME-000-004	**EQUIPMENT SCHEDULE 3 OF 3**
WSP-MB-ME-000-005	**TYPICAL DETAILS**
WSP-MB-ME-000-100	**GROUND – BLOCK A & B MECHANICAL LAYOUT**
WSP-MB-ME-000-101	**LEVEL 1 – BLOCK A & B MECHANICAL LAYOUT**
WSP-MB-ME-000-102	**ROOF – BLOCK A & B MECHANICAL LAYOUT**
WSP-MB-ME-000-200	**GROUND – BLOCK C MECHANICAL LAYOUT**

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WSP-MB-ME-000-201	**ROOF – BLOCK C MECHANICAL LAYOUT**
WSP-MB-ME-000-300	**GROUND – BLOCK D MECHANICAL LAYOUT**
WSP-MB-ME-000-301	**LEVEL 1 – BLOCK D MECHANICAL LAYOUT**
WSP-MB-ME-000-302	**ROOF – BLOCK D MECHANICAL LAYOUT**
WSP-MB-ME-000-400	**GROUND – BLOCK E AIRSIDE LAYOUT**
WSP-MB-ME-000-401	**ROOF – BLOCK E MECHANICAL LAYOUT**
WSP-MB-ME-000-402	**GROUND – BLOCK E WATERSIDE LAYOUT**
WSP-MB-ME-000-403	**BLOCK E MECHANICAL WATERSIDE SCHEMATIC**
WSP-MB-ME-000-404	**BLOCK E MECHANICAL WATERSIDE LAYOUT**
WSP-MB-ME-000-405	**BLOCK E MECHANICAL POOL HALL EQUIPMENT SCHEDULES**
WSP-MB-ME-000-406	**BLOCK E MECHANICAL TYPICAL DETAILS**
WSP-MB-ME-000-500	**GROUND AND ROOF – TOILET BLOCK MECHANICAL LAYOUT**

Owner	**Builder**	**Sub-Contractor**
DOE	Hutchinsons	TBA

Details of Person Signing

Position in Company	Mechanical Engineer
Qualification and Experience	Bachelor of Engineering (Building Services) & Dip. Eng (Building Services)

Name: Jesse Perkins **Date:** 28/06/2019 **Signature:**

This document shall in no way relieve the Builder and or Contractors of any legal responsibility or obligations with respect to the manufacture, installation, operation and respective certifications.

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Hydraulic Design Statement

Project	Western Sydney Schools Mainsbridge PS	**Date**	02/07/2019
Project No	2304785B	**No of pages**	2

The Hydraulic systems for the building works (the proposed new additions) described below have been designed in accordance with:

General	BCA 2016 Amendment 1
Water Supply	AS/NZS 3500.1 – 2003 Incl. • Section 8 – Water Storage Tanks • Section 9 – Non-Drinking Water Services • Section 14 – Installation of Water Supply System from Rainwater Tanks
Plumbing and Drainage	AS/NZS 3500.2 – 2003
Stormwater Drainage	AS/NZS 3500.3 – 2015 Incl. • Section 3 – Roof Drainage Systems - Design
Heated Water Services	AS 3500.4 – 2015 & BCA 2016
Gas Installations Part 1: General Installations	AS/NZS 5601 – 2004
All Local Authorities, incl. but not limited to	Sydney Water – incl. • Section 73 Notice of Requirements Jemena Local Council Requirements
Fire Hose Reel System Fire Hydrant System	AS2441-2005, BCA 2016 Part E1.4 AS2419.1-2005, BCA 2016 Part E1.3

Building Description and Location

The project consists of the proposed development of the Mainsbridge SSP School located at 95 Lawrence Hargrave Rd, Warwick Farm NSW 2170.

Hydraulic design will be in line with the reference documents below.

Limitations

This design certification does not cover existing site, buildings and any associated existing services.

WSP Documents

Document No.	Document Description
WSP-MB-HY-000-000	**COVER SHEET AND DRAWING LIST**
WSP-MB-HY-000-001	**LEGEND AND NOTES**
WSP-MB-HY-000-002	**DETAILS 1**

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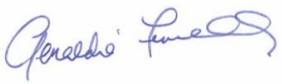
WSP-MBH-HY-000-003	**DETAILS 2**
WSP-MB-HY-S00-100	**SITE LAYOUT- DRAINAGE**
WSP-MB-HY-S00-200	**SITE LAYOUT- PRESSURE**
WSP-MB-HY-LA0-100	**BLOCK A + BLOCK B- GROUND FLOOR DRAINAGE**
WSP-MB-HY-LA0-200	**BLOCK A + BLOCK B- GROUND FLOOR WATER AND GAS**
WSP-MB-HY-LA1-100	**BLOCK A + BLOCK B- LEVEL 01 DRAINAGE**
WSP-MB-HY-LA1-200	**BLOCK A + BLOCK B- LEVEL 01 WATER AND GAS**
WSP-MB-HY-RA0-000	**BLOCK A + BLOCK B- ROOF LAYOUT**
WSP-MB-HY-LC0-100	**BLOCK C- DRAINAGE**
WSP-MB-HY-LC0-200	**BLOCK C- WATER AND GAS**
WSP-MB-HY-RC0-000	**BLOCK C- ROOF LAYOUT**
WSP-MB-HY-LD0-101	**BLOCK D- GROUND DRAINAGE ZONE 1**
WSP-MB-HY-LD0-201	**BLOCK D- GROUND WATER AND GAS ZONE 1**
WSP-MB-HY-LD1-101	**BLOCK D- LEVEL 01 DRAINAGE ZONE 1**
WSP-MB-HY-LD1-201	**BLOCK D- LEVEL 01 WATER AND GAS ZONE 1**
WSP-MB-HY-RD0-001	**BLOCK D- ROOF LAYOUT ZONE 1**
WSP-MB-HY-000-400	**WARWICK FARM TOILET BLOCK- DRAINAGE**
WSP-MB-HY-000-401	**WARWICK FARM TOILET BLOCK- PRESSURE LAYOUT**
WSP-MB-HY-000-500	**BLOCK E- DRAINAGE**
WSP-MB-HY-00-501	**BLOCK E- PRESSURE**
WSP-MB-HY-SPC	**Hydraulic Design Specification**

Owner	**Builder**	**Contractor**
DoE	HUTCHINSON BUILDERS	TBA

Details of Person Signing

Position in Company Hydraulic and Fire Protection Engineer

Qualification and Experience Bachelor of Engineering, Mechanical Engineering & 5+ years as a Hydraulic and Fire Protection Engineer

Name: Geraldine Fennelly **Date:** 02/07/2019 **Signature:** 

This document shall in no way relieve the Builder and or Contractors of any legal responsibility or obligations with respect to the manufacture, installation, operation and respective certifications.

Our ref: 4785-STR-Structural Design Certificate - Mainsbridge

Your ref: 4785-Structural Design Certificate - Mainsbridge

21 June 2019

Rob Chan
Hayball
Ground Floor 11-17 Buckingham Street
Surry Hills, NSW 2010

Western Sydney & Wollongong Schools – Mainsbridge

We, WSP Australia Pty Ltd certify its scope (see detailed breakdown in Appendix A) and further described in the following documents set out Appendix B complies with the structural provisions of the National Construction Code ("NCC") and the following relevant codes, being

ELEMENT	RELEVANT ITEMS
Structural Elements	B1.2 of NCC AS/NZS1170.0-2002 – General Principals AS/NZS1170.1-2002 – Permanent and Imposed AS/NZS1170.2-2011 – Wind Actions AS1170.4-2007 – Earthquake Actions
Concrete Construction	AS3600-2009 – Concrete Structures AS2870-2011 – Residential Slabs and Footings
Masonry Construction	AS3700-2011 – Masonry Structures
Steel Construction	AS4100-1998 – Steel Structures

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Sydney NSW 2001

Tel: +61 2 9272 5100 Fax: +61 2 9272 5101
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For WSP's scope of works, we have designed the concrete elements of the nominated structure to comply with the FRL requirements set out in the BCA report named below. The concrete & masonry elements have been designed in accordance with the methods and specifications of AS3600 & AS1170.

Firm:	Steve Watson and Partners Pty Ltd
Reference:	2016/2297
Date:	08/05/2019

In providing this certificate, we are not certifying the accuracy of the methods and means of construction which are the responsibility of the Contractor or compliance by the Contractor with laws, regulations, codes or applicable standards.

Signed on behalf of WSP Australia Pty Ltd

Lithesh Prasad
Senior Engineer
BSc(Eng) MIEAust CPEng NER

Enclosures
Attachment A – Scope covered by certificate
Attachment B – Drawing List

ATTACHMENT A
SCOPE COVERED BY CERTIFICATE

WSP were responsible for the design of the following structural elements:

- Concrete footings
- Concrete raft slabs on ground
- Concrete walls and columns
- Masonry walls (loadbearing)
- Suspended concrete slabs
- Steel roofs, columns and bracing

ATTACHMENT B
DRAWING LIST

S01000_01	TITLE SHEET AND DRAWING REGISTER
S01000_02	GENERAL NOTES
S01000_11	SLAB ON GROUND DETAILS SHEET 1
S01000_14	SUSPENDED SLAB DETAILS SHEET 1
S01000_15	SUSPENDED SLAB DETAILS SHEET 2
S01000_16	SUSPENDED SLAB DETAILS SHEET 3
S01000_17	SUSPENDED SLAB DETAILS SHEET 4
S01000_21	STEELWORK DETAILS SHEET 1
S01000_22	STEELWORK DETAILS SHEET 2
S01000_23	STEELWORK DETAILS SHEET 3
S01000_26	STAIR DETAILS
S01000_31	LIFT DETAILS
S01000_36	FOOTING DETAILS SHEET 1
S01000-37	FOOTING DETAILS SHEET 2
S01000_41	WALL DETAILS
S01000_51	MASONRY DETAILS SHEET 1
S01000-52	MASONRY DETAILS SHEET 2
S01100_01	BLOCK A & B GROUND FLOOR GENERAL ARRANGEMENT
S01120_01	BLOCK A & B LEVEL 1 GENERAL ARRANGEMENT
S01130_01	BLOCK A & B ROOF FRAMING PLAN
S03130_10	BLOCK A & B ROOF FRAMING SECTIONS SHEET 1
S01130_11	BLOCK A & B ROOF FRAMING SECTIONS SHEET 2
S01130_12	BLOCK A & B ROOF FRAMING SECTIONS SHEET 3
S01210_01	BLOCK C GROUND FLOOR GENERAL ARRANGEMENT
S01220_01	BLOCK C ROOF FRAMING PLAN
S01220_10	BLOCK C ROOF FRAMING SECTIONS SHEET 1
S01220_11	BLOCK C ROOF FRAMING SECTIONS SHEET 2
S01310_01	BLOCK D GROUND FLOOR GENERAL ARRANGEMENT
S01320_01	BLOCK D LEVEL 1 GENERAL ARRANGEMENT
S01330_01	BLOCK D ROOF FRAMING PLAN
S01330_10	BLOCK D ROOF FRAMING SECTIONS SHEET 1
S01330_11	BLOCK D ROOF FRAMING SECTIONS SHEET 2
S01410_01	BLOCK E GROUND FLOOR & ROOF PLANS
S01410_05	BLOCK E GROUND FLOOR SECTIONS
S01410_10	BLOCK E ROOF FRAMING SECTIONS SHEET 1
S01410_11	BLOCK E ROOF FRAMING SECTIONS SHEET 2
S01510_01	BLOCK WC4 GROUND FLOOR & ROOF PLANS
S01510_10	BLOCK WC4 SECTIONS SHEET 1

MEMO

TO:	Phil Ho – Hutchinson Builders
FROM:	Aleks Vasiloski
SUBJECT:	**Mainsbridge Public School – Flood Statement**
OUR REF:	2304785T-CIV-WSP-CV-0001 to 0071 (Mainsbridge PS)
DATE:	**24 May 2019**

To Phil,

This statement is to confirm that the floor levels of all habitable rooms satisfy B28 and B29 of the relevant consent and are no lower than the 1% Annual Exceedance Probability flood level plus 500mm of freeboard in accordance with the following:

- Liverpool City Council Section 149(2)&(5) Certificate No. 4152, dated 31 January 2017, and
- Liverpool City Council Annexure to Section 149(5) Issue No. 2027198, dated 1 February 2017.

and as per our drawing set for MAINSBRIDGE SSP:

- WSP-CV-0001
- WSP-CV-0010
- WSP-CV-0011
- WSP-CV-0012
- WSP-CV-0020
- WSP-CV-0021
- WSP-CV-0040
- WSP-CV-0060
- WSP-CV-0070
- WSP-CV-0071

Kind regards,

Aleks Vasiloski
Engineer
Associate

Level 12, 900 Ann Street
Fortitude Valley QLD 4006
GPO Box 2907
Brisbane QLD 4001

Tel: +61 7 3854 6200
Fax: +61 7 3854 6500
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FIRE PROTECTION SERVICES DESIGN STATEMENT

TO	Steve Watson & Partners		
ATTENTION	Michael Lokic	**DATE**	Monday, 17 June 2019
ADDRESS	Level 5, 432 Kent Street	**EMAIL**	mlokic@swpartners.com.au
	Sydney, NSW, 2000	**PROJECT NO**	2304785B
PROJECT	Western Sydney Schools Mainsbridge SSP 118 Flowerdale Rd, Liverpool NSW	**NO OF PAGES**	2
COPIES			

Pursuant to the provisions of **Clause A2.2 of the Building Code of Australia,** I hereby confirm that the above design is in accordance with normal engineering practice and meets the requirements of the Building Code of Australia, any relevant fire safety engineering report, the Environmental Planning and Assessment Regulation, relevant Australian Standards and relevant conditions of the Development Consent.

The Fire Protection systems for the building works described below have been designed in accordance with:

- General — BCA 2016 Amd 1
- Fire Detection, Warning, Control & Intercom Systems — AS 1670.1 – 2015, BCA Spec E2.2a
- Building Occupant Warning System — AS 1670.1 – 2015, BCA Spec E2.2a
- Portable Fire Extinguishers — AS 2444 – 2001, BCA Clause 1.6
- And as amended by — Fire Engineer Brief no. SY180238 Rev R1.0 prepared by Defire Exova, dated 29 November 2018

BUILDING DESCRIPTION AND LOCATION

The project consists of the proposed development of the Mainsbridge SSP School located at 95 Lawrence Hargrave Rd, Warwick Farm NSW 2170.

The work for the Fire Protection system will be in line with the reference document below.

Document No.	Document Description	Revision
WSP-MB-FR-000-000	Fire Protection Services - Cover Sheet and Drawing List	C1
WSP-MB-FR-000-001	Fire Protection Services - Legend and Notes	C1
WSP-MB-FR-LA0-001	Fire Protection Services – Ground Floor – Block A & Block B	C1
WSP-MB-FR-LA1-001	Fire Protection Services – Level 1 – Block A & Block B	C1
WSP-MB-FR-C00-001	Fire Protection Services – Ground Floor – Block C	C1
WSP-MB-FR-LD0-001	Fire Protection Services – Ground Floor – Block D	C1
WSP-MB-FR-LD1-001	Fire Protection Services – Level 1 – Block D	C1

Level 15, 28 Freshwater Place
Southbank VIC 3006

Tel: +61 3 9861 1111
Fax: +61 3 9861 1144
www.wsp.com

Document No.	Document Description	Revision
WSP-MB-FR-000-400	Fire Protection Services – Block E	C1

Details of Person Signing

Position in Company	Senior Fire Protection Engineer
Qualification and Experience	Post Grad Diploma in Fire Eng., BE (Civil) and 14+ years' experience
FPAS Accreditation Number	FSD36311 (Valid till 31.05.2020)
FPAS Accreditation	Fire Detection and Alarm Systems (NSW)
	Fire Hydrant and Hose Reel Systems (NSW)
	Fire Sprinkler Systems (NSW)

Name: Birju Gandhi **Date:** Monday, 17 June 2019 **Signature:**

This document shall in no way relieve the Builder and or Contractors of any legal responsibility or obligations with respect to the manufacture, installation, operation and respective certifications.

Morris Goding
Access Consulting

1 July 2019

Rob Chan
Architect
Hayball
11-17 Buckingham Street
Surry Hills NSW 2010

Dear Rob,

RE: Mainsbridge SSP – Access Design Certification

MGAC have reviewed the revised Detailed Design Documentation made available June 2019. The design is generally in accordance with normal disability access practice and meets the requirements of the Building Code of Australia, and relevant Australian Standards.

In particular the design is in accordance with the following:

BCA Part D3, E3, F2;	Building Code of Australia 2019
AS 1428.1 – 2009	General requirements for access
AS 2890.6 – 2009	Parking for people with disabilities

Disability Access to Premises Standards 2010 (including DDA Access Code)

I am an experienced, qualified and competent person in this area and as such can certify that the building systems and layout comply with the above, pursuant to recommendations which remain relevant in the following:
MGAC Access Review Report - dated 1 July 2019

Full Name:	David Goding
Company	Morris-Goding Accessibility Consulting
Qualifications:	Bachelor of Civil Engineering, ACAA
Address	Unit 6, Grd Floor, 56 Bowman Street Pyrmont NSW 2009
Phone No.	02 9692 9322 Fax. 02 9692 8433

Yours faithfully,

David Goding
Director
Morris Goding Access Consulting

Morris Goding
Access Consulting

Hayball

Mainsbridge SSP

Access Review
Detailed Design
FINAL v3

1 July 2019

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This report prepared by:

John Ward

Senior Access Consultant

Morris Goding Accessibility Consulting

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1. Introduction

1.1 Summary

Morris Goding Access Consulting (MGAC) has reviewed the Detailed Design Documentation for Mainsbridge SSP.

In general, the Detailed Design highlights a high degree of functional and technical compliance to the Access to Premises Standard, AS 1428 series and the Disability Discrimination Act (DDA), as the pathways, entrances, circulation spaces and sanitary facilities have all considered accessibility.

This report highlights key recommendations and/or items for clarification that have been identified to ensure functional compliance to the premises, with the consideration of Universal Design.

1.2 Documentation

This correspondence is specific to the following supplied documentation:

- Hayball Sharepoint Folder “190617_Mainsbridge CC Package” – made available 18 June 2019
- Hayball Email “RE: Mainsbridge SSP – Contractor Commencement” – received 26 June 2019 5:09pm

1.3 Legislation

The Access to Premises Standards as detailed within the National Construction Code 2016 and highlights the minimum level compliance requirements for Accessibility or Deemed to Satisfy Provisions. The Standard references the technical requirements of the built environment through the Australian Standard 1428 series. Achieving compliance to the Access to Premises Standard goes a significant way to achieving compliance with the requirements of the Disability Discrimination Act (DDA).

A registered Building Surveyor/PCA is required prior to issuing permits, to confirm compliance with the requirements. Where the Deemed to Satisfy provisions are unable to be met, the Registered Building Surveyor/PCA can seek a Performance Solution from a relevant expert to detail Performance Compliance Solutions. For existing buildings these are increasing important as the cost and structural constrains to modify an existing building could make the modification unviable.

The key elements of the Access to Premises Standard include:

- Part D3 – Access for People with a Disability.
- Part E3 – Passenger Lifts.
- Part F2 – Sanitary and Other Facilities.

1.4 Other Applicable Standards & Legislation

- Disability Discrimination Act (DDA) 1992.
- National Construction Code 2016.
- AS1428.1 – 2009, Part 1: General Requirements for Access – New Building Work.
- AS1428.2 – 1992, Part 2: Enhanced and Additional Requirements – Buildings and Facilities.
- AS1428.4.1 – 2009, Part 4.1: Means to Assist the Orientation of People with Vision Impairment – TGSI.
- Disability (Access to Premises – Buildings) Standards 2010 (DAPS 2010).
- AS1735.12 – 1999: Lift Facilities for People with Disabilities.
- Disability Standards for Education 2005
- Educational Facilities Standards and Guidelines

1.5 Consent Conditions

Access for People with Disabilities

B16. The works that are the subject of this application must be designed and constructed to provide access and facilities for people with a disability in accordance with the BCA. Prior to the commencement of construction, the Certifying Authority must ensure that evidence of compliance with this condition from an appropriately qualified person is provided and that the requirements are referenced on any certified plans.

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2. Non-Compliance Analysis

This section of the report identifies non-compliances requiring attention by the design team and are to be read in conjunction with the MGAC issued drawing mark-ups that identify the locations and extent of the recommendations.

Where items are identified as being covered by a *Performance Solution*, these will be listed in Section 4 of this report. A listed Performance Solution is optional. It can be resolved by a redesign according to a recommendation and in doing so comply with Deemed to Satisfy Provisions.

For additional design guidance during future design development, the design checklist in Section 5 of this report should be consulted.

Element	Issues	Resolution	Status
Path of Travel	Glazing decals have not been shown to all locations where required.	Update window and door schedule for full coverage of glazing decals. **UPDATE** Amended. Complies.	**CLOSED**
Threshold Ramps	Detail shown is non-complaint in that the 280mm 1:8 ramp is too far from the door leaf (must start within 20mm to face of door).	Update details for compliance. The tiled threshold under the door must be laid at 1:8 with the concrete splay then completing the ramp extents. **UPDATE** Amended. Complies	**CLOSED**
Accessible WC	Hand drier / paper towel dispenser is remote to the basin in some cases.	Relocation so that the device can be reached from the seated position at the basin	**CLOSED**

		UPDATE Amended. Complies	
Accessible Shower	Clothes hanging devices have not been shown next to some shower seats, presumably as the wall space is taken up by a sliding door or window.	Resolve clothes hanging provision in the affected locations. **UPDATE** Not a strict compliance requirement.	**CLOSED**

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3. Recommendations / Assumptions

This section of the report identifies items with compliance implications where detail is currently lacking (NOTE: this is not to say that the particular issue is *non-complaint* however without information for review there is a risk of a future constructed non-compliance and possible abortive work on site to rectify). This section of the report also identifies opportunities for consideration for improved accessibility outcomes to mitigate DDA risk (non-mandatory). This section of the report may also contain MGAC assumptions and background history concerning key issues.

Element	Recommendations	Resolution	Status
Doors	Architect has advised that compliant doorway luminance contrast has been achieved with the current colour scheme.	As no LRV data has been provided the contrast must be verified during construction. Refer to Design Checklist.	**OPEN**
Path of Travel	Glazing decal selection not yet confirmed.	To be reviewed during construction, noting that with a variety of floor finishes there may be need for more than one type of decal. Refer to Design Checklist.	**OPEN**
Path of Travel	Slip resistance information for hard flooring is incomplete.	Slip resistance levels for some hard floor finishes have not been nominated. Where nominated confirmation is required that the result has been arrived at through application of relevant AS. Refer to Design Checklist. To be monitored during construction.	**OPEN**

Path of Travel	Drawings showing door detailing at threshold include a “T-guide”, which may introduce a trip hazard.	Review detailing of “T-guide” and ensure compliance with surface tolerance limits contained in AS1428.1. Refer to Design Checklist.	**OPEN**
Stairs	Nosing specification does not nominate colour or slip rating.	Provide the appropriate details during construction demonstrating compliance. Refer to Design Checklist.	**OPEN**
Stairs and Ramps	TGSI specification does not nominate colour or slip rating.	Provide the appropriate details during construction demonstrating compliance. Refer to Design Checklist.	**OPEN**
Stairs	At the East Stair the 90 degree handrail turn occurs over the landing at the base of the stair and leaves very little tread width, in the order of only 400mm. There is an obvious safety issue associated with this.	Review options to widen the stair tread in this location.	**OPEN**
Lifts	Shaft provision and indicative car size appears adequate.	Provide Shop Drawings of the car interior for access review during construction. Refer to Design Checklist. Provide manufacturers installation certificate referencing AS1735.12:1999 and BCA E3.6.	**OPEN**
Accessible WC	Generally more setout is required of fixtures to ensure a	Update the drawings with more complete	**OPEN**

	compliant result on site.	dimensions. Refer to Design Checklist.	
Ambulant WC	Generally more setout is required of fixtures to ensure a compliant result on site.	Update the drawings with more complete dimensions. Refer to Design Checklist.	**OPEN**
Accessible Shower	Generally more setout is required of fixtures to ensure a compliant result on site.	Update the drawings with more complete dimensions. Refer to Design Checklist.	**OPEN**
Hearing Augmentation	Scope of Hearing Augmentation not yet clear however is expected to match EFSG.	As EFSG requirements in this area are inferior to BCA there may be a compliance shortfall. Confirmation required.	**OPEN**
Signage	Detail not yet provided.	Provide Shop Drawings for access review during construction. Refer to Design Checklist.	**OPEN**
Accessible Car Parking	Generally compliant however detail is lacking.	Provide additional detail confirming compliance, such as levels, bollard, reference to AS2890.6:2009 etc. Refer to Design Checklist.	**OPEN**

Path of Travel	Bike path noted as optional. Edge detailing	If progressed it is recommended to provide further detail addressing such issues as landings, passing and turning, minimum 1500mm width and edge detailing. Refer to Design Checklist.	**OPEN**

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4. Performance Solutions

Non-Compliance	Justification	Key Recommendations to be implemented
No performance solutions yet identified		

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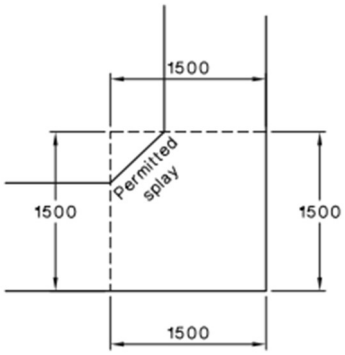
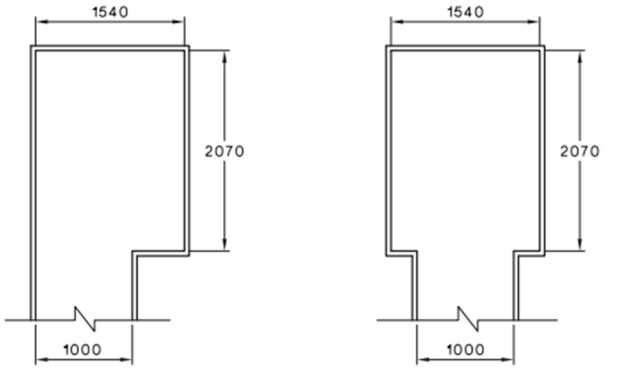
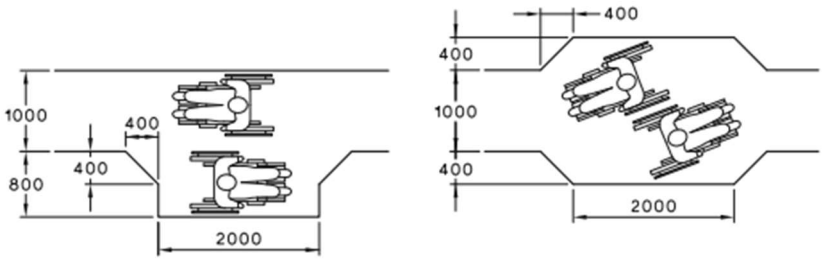
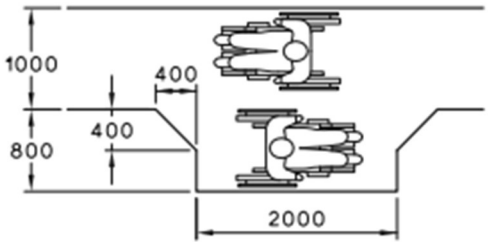
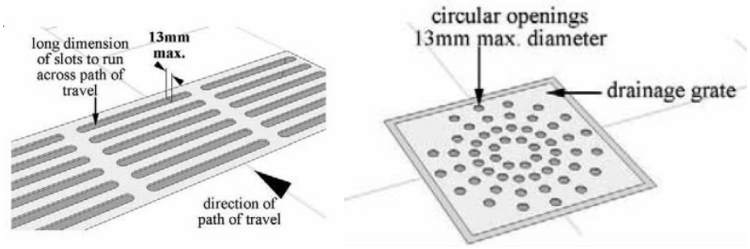
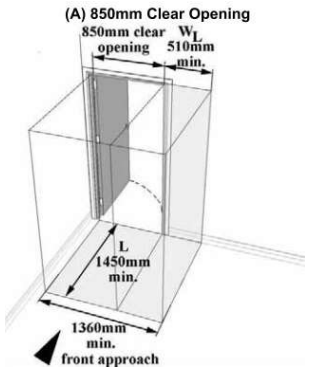
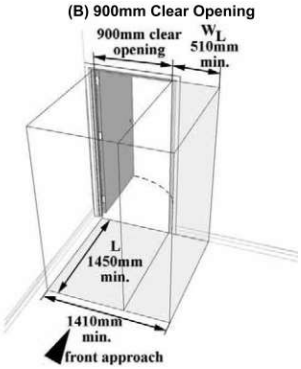
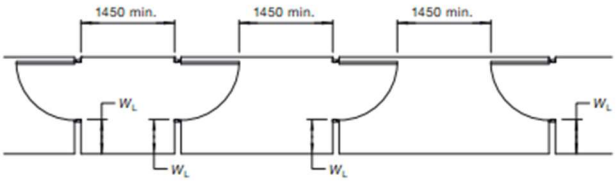
5. Design Checklist

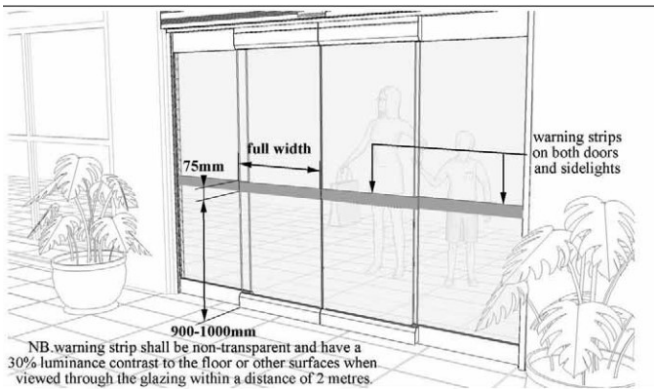
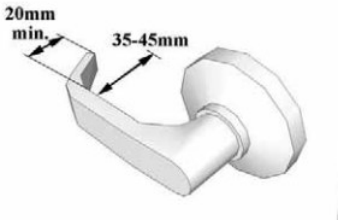
MANDATORY ISSUES (UNDER BCA 2016 & DDA PREMISES STANDARDS 2010)	
1. External Linkage	
1.1.	Provide an accessible path of travel compliant with AS1428.1 from all main pedestrian entry points at the site boundary to the principal pedestrian entrance/s of the building.
1.2.	For multiple building entries, ensure an accessible path of travel, compliant with AS1428.1 to and through 50% of entrances including the principal pedestrian entrance.
1.3.	Ensure any direct pedestrian linkages (i.e. not public footpath) from associated accessible buildings are compliant with AS1428.1.
1.4.	Provide an accessible path of travel, compliant with AS1428.1 from accessible car parking space/s on the site to the main entrance.
2. Ingress and Egress	
2.1.	Ensure a non-accessible entry is no more than 50 metres from an accessible entry (buildings >500m2).
2.2.	Provide level landing areas (1:40 max. gradient/crossfall) at doorway circulation areas and changes in direction to ensure safety when turning.
2.3.	Door operational forces to be lightweight (20N max.) suitable for people with disabilities. If this cannot be achieved an automatic or power operated main entry door to be provided, compliant with AS1428.1. Refer to Door section for door control details. It should be noted there are numerous variables that can affect door forces which need to be considered (e.g. door size, location, door seals, correct hanging, air pressure, door closer – CAM actuator).
3. Affected Part	
3.1.	Ensure that the 'affected part' of the building i.e. the principal pedestrian entrance to the existing building and the accessible path of travel (including lift facility) from this entrance to the new or modified work is compliant with AS1428.1:2009, BCA and DDA Access Code as required by the DDA Premises Standards (Part 1-6).
4. Paths of Travel	
4.1.	Provide 1000mm min. width paths of travel compliant with AS1428.1.

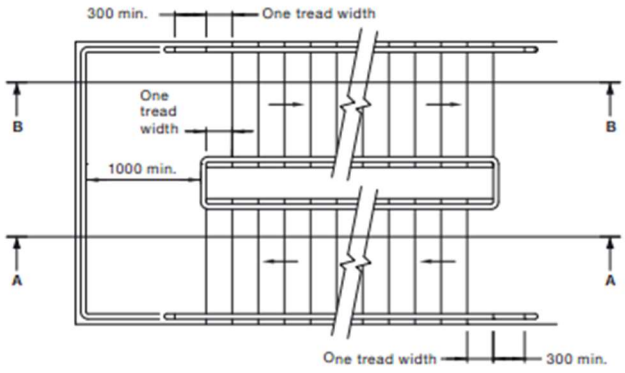
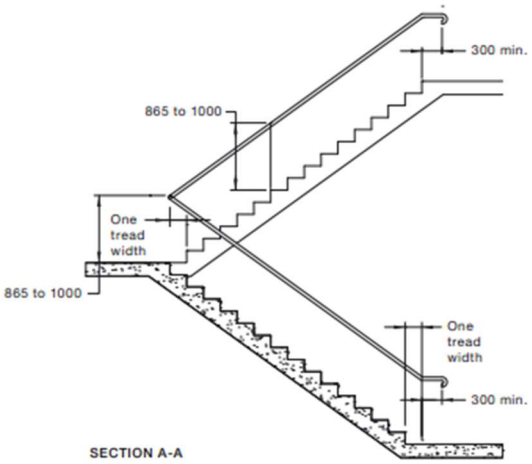
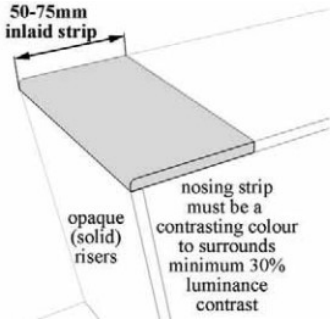
4.2.	Corridors less than 1500mm wide that turn between 60-90 degrees need increased (1500mm) width at turn with 45 degree splay on internal side, compliant with AS1428.1 fig. 4.  Turn 90° in path of travel Corridor less than 1500 mm wide requires widening at turn
4.3.	Turning spaces (1540mm W x 2070mm L) to be provided along pathways at 20m intervals and within 2m of corridor ends, to enable a wheelchair user to turn 180 degrees.  (a) Space required in corridor (b) Space required in corridor
4.4.	Provide at least one wheelchair passing bay (1800mm W x 2000 L) outside passenger lifts  DIMENSIONS IN MILLIMETRES FIGURE 3 EXAMPLES FOR PASSING SPACE FOR WHEELCHAIRS
4.5.	When a direct line of sight is not available additional wheelchair passing bays (1800mm W x

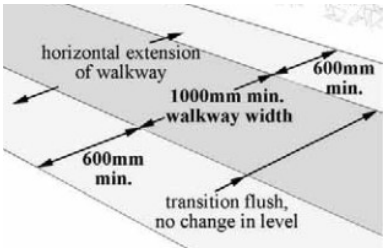
	2000 L) are to be provided at 20m max, intervals. 
4.6.	Ensure the slip resistance of flooring systems used within areas required to be accessible (including ramps, stairs and landings) are traversable by a wheelchair or walking frame, tested in accordance with wet pendulum test method of AS4586:2013/HB198. This is needed to satisfy AS1428.1 Clause 7.1. Test certificates required at OC Stage. **NB. All wet pendulum testing issued after 1 May 2014 must use 2013 test method. Test results issued prior to 1 May 2014 using 2004 method (HB197 Table 3) are still valid under BCA and for compliance purposes the slip ratings V, W, X (under 2004 method) can be considered equivalent to P5, P4, P3 (under 2013 method).*
4.7.	Ensure that any overhead hazards in areas with less than 2m min. vertical clearance (e.g. angled wall/columns or exposed underside of any stairs/escalators) will have access impeded by suitable physical barrier or have handrail and kerb rail or warning TGSI's installed, compliant with AS1428.4.1 fig. 2.6.
4.8.	Should carpet or similar soft flexible flooring surface be used, ensure pile height is no more than 11mm with 4mm max backing surface, compliant with DDA Premises Standard.
4.9.	Ensure drainage grates on accessible path of travel have openings no more than 13mm wide x 150mm long, with greater dimension transverse to main direction of travel to assist wheelchair users. 
5. Emergency Egress – Fire Isolated Stairs	
5.1.	Ensure that all ramps, stair treads/nosings and stair landings on required egress paths are slip resistant in accordance with BCA Table D2.14 (tested to AS4586:2013/HB198, Table 3A).
5.2.	All stair treads require contrasting step nosing strips by DDA Access Code 2010 clause D3.3 (a)(iii), compliant with AS1428.1 as follows:

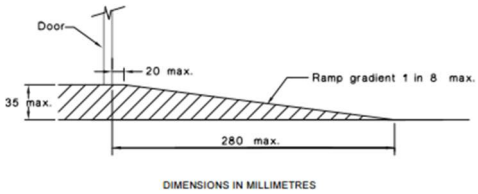
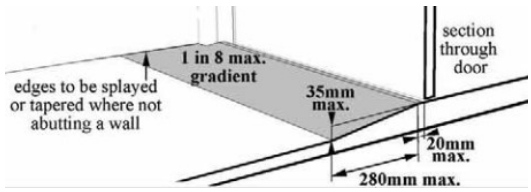
	Step nosing strips to be across full width of stair, between 50-75mm wide, in a continuous colour solid strip with 30% luminance contrast to background surface. Step nosing strips to be located on edge of tread (15mm max. setback if applied) and not to extend onto risers more than 10mm max. if exposed.
5.3.	Provide at least one accessible handrail as required under BCA part D2.17 within all fire-isolated stairs/ramps serving areas required to be accessible. The handrail profile, fixing and installation height is to be compliant with AS1428.1 clause 12.
5.4.	Clarification from BCA consultant/PCA is required to satisfy BCA Part D2.17 for the height of the top of the handrail to be at a consistent height (AS1428.1 clause12e), in particular throughout stair flights and if provided as inner handrail over landings Note: In our opinion, this could be achieved by including an off-set tread at base of each stair flight or by increasing stair landings by 300mm min. length (more than required egress path) to allow space for handrail to extend and continue at consistent height.
5.5.	All doors required to have “Exit” signs (under BCA clause 4.5) to also include accessible identification signs to identify each door for people with vision impairment. The signage to include appropriate raised tactile pictogram, raised text (in title case) and Braille. The sign is to state “Exit” and “Level” followed by either: The floor level number (where sign located), or; A floor level descriptor (where sign located), or; A combination of both of the above. The signage to be located on the wall, adjacent to latch side of door between 1200-1600mm height from FFL (with first line of braille to be located between 1250-1350mm from FFL).
5.6.	Provide 30% min. luminance contrast between egress doorways and adjacent surface/s. The contrasting area (e.g. wall, architrave etc.) must be 50mm min. width to effectively assist people with vision impairment.
5.7.	Where fire isolated stairs (base build only) are also used as communication stairs between levels ensure they are designed to comply with AS1428.1. Refer to general Stair section.
6. Doors	
6.1.	Doors (common use) require greater clear width to ensure 850mm min. (generally 920mm door leaf) to comply with AS1428.1.

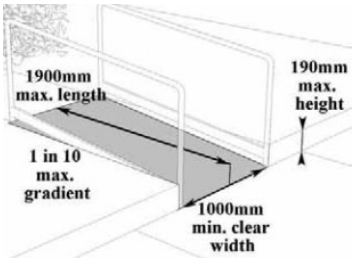
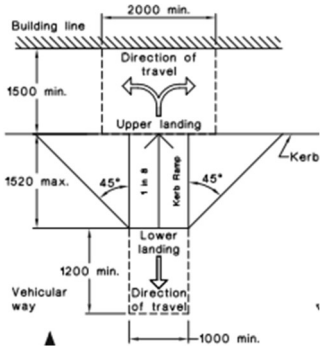
6.2.	Hinged doors (common use) require greater latch side clearance to ensure 510mm min. width on latch side (door opens away from user) to comply with AS1428.1. 
6.3.	Hinged doors (common use) require greater latch side clearance to ensure 530mm min. width on latch side (door opens toward user) to comply with AS1428.1. 
6.4.	Corridors require increased clear depth in front of doorways to ensure access for wheelchair users, compliant with AS1428.1.
6.5.	Provide 1450mm length between successive door swings in airlocks/vestibules on accessible path of travel. 
6.6.	Provide 30% min. luminance contrast between all doorways and adjacent surface/s. The contrasting area (e.g. wall, architrave etc.) must be 50mm min. width to effectively assist people with vision impairment. NB. Frameless glazed doorways will not meet this requirement.

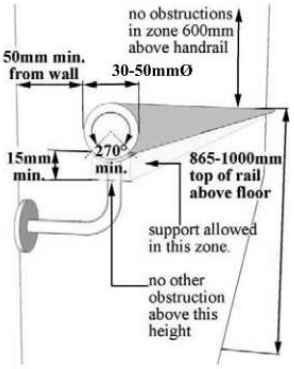
6.7.	Ensure all fully glazed doors and surrounding glazing (including glazed walls with no transom or similar), are clearly marked with 75mm min. wide, solid, non-transparent, contrasting line across their full width. The lower edge of line must be between 900-1000mm FFL and have 30% luminance contrast when viewed against floor or background surface within 2m of glazing. NB. Opaque strips to be used. 
6.8.	Provide lever action handles on hinged doors with returns or similar to assist people with dexterity impairment. The handle to be placed between 900-1100mm above FFL, compliant with AS1428.1. 
6.9.	Door operational forces to be lightweight (20N max.) suitable for people with disabilities, compliant with AS1428.1.
6.10.	The use of any intercom and/or door release to be placed between 900-1250mm FFL on the latch side of doorway and no less than 500mm from any internal corner or obstruction, compliant with AS1428.1.
6.11.	The control buttons for power operated doors to be raised, 25mm min. diameter, installed in accessible location i.e. between 1-2m from hinged door leaf in open position, between 900-1250mm height from FFL and at least 500mm from internal corner, compliant with AS1428.1.
7. Stairs	
7.1.	Ensure stairs located at site boundary are recessed (900mm min. from boundary) to allow required handrail extensions and TGSI's to not protrude into transverse path of travel, compliant with AS1428.1 fig. 26a.
7.2.	Ensure stairs adjacent to internal corridors are recessed (1 tread width plus handrail extension /turn down, approx. 650mm) to allow required handrail extensions to not protrude

	into transverse path of travel, compliant with AS1428.1 fig. 26b.
7.3.	Ensure all stairs have closed risers to assist people with ambulant and sensory disabilities, in accordance with AS1428.1.
7.4.	The stair design to provide an off-set tread at base of all stair flights to enable the continuous handrail provision at consistent height, compliant with AS1428.1 fig. 28a below:  
7.5.	Provide handrails on both sides of stairs compliant with AS1428.1 (see below).
7.6.	Provide warning tactile ground surface indicators (TGSI's) at top and bottom of all stairs in accordance with AS1428.4.1 (see below).
7.7.	Provide contrasting step nosing strips on all stair treads compliant with AS1428.1 as follows: Step nosing strips to be across full width of stair, between 50-75mm wide, in a continuous colour solid strip with 30% luminance contrast to background surface. Step nosing strips to be located on edge of tread (15mm max. setback if applied) and not extend onto risers more than 10mm. (if exposed). 
8. Walkways	
8.1.	Ensure 1:20 walkways have suitable landings at 15m max. intervals, compliant with AS1428.1 (see Landings section).

8.2.	Ensure walkway landings are 1200mm min. length, (no change in direction) or 1500mm x 1500mm min. length (internal splay permitted), for 90 degree turn, compliant with AS1428.1.
8.3.	Provide a suitable height wall (450mm min. height) or kerbing along open walkway sides, compliant with AS1428.1 fig. 19: Kerbing to be between 65-75mm height above FFL, or; At least 150mm height above FFL. NB. The top of kerbing must not be within 75-150mm range above FFL to minimise risk of wheelchair footplate entrapment. If kerbing extends within 75-150mm range between it must be continuous with no gap greater than 20mm.
8.4.	Without walls or kerbing, walkways (1:20 - 1:33 gradients) need to extend at least 600mm min. width at same grade in firm and level surface of different material compliant with AS1428.1. 
8.5.	Ensure curved walkways have 1500mm min. clear width with appropriate min. inside curve radius compliant with AS1428.1 fig. 20.
8.6.	Ensure the threshold of 1:20 walkway has smooth level transition between surfaces. Alternatively, provide wall or handrail and kerbing compliant with AS1428.1 to minimise potential trip hazards.
9. Ramps	
9.1.	Ensure connected ramps do not exceed 3.6m height, compliant with DDA Access Code. NB. This does not apply under BCA H2 public transport buildings.
9.2.	Ensure ramps that are adjacent to site boundary are recessed 900mm from boundary to ensure handrail extensions and TGSI's can be provided without protruding into the transverse pedestrian path of travel, compliant with AS1428.1.
9.3.	Ensure ramps that are adjacent to a corridor/walkway are recessed 400mm to ensure handrail extensions and TGSI's can be provided without protruding into the transverse pedestrian path of travel, compliant with AS1428.1.
9.4.	Ensure ramps have 1:14 gradient and appropriate level landings at top and bottom and at 9m. max intervals (see landings section).
9.5.	Ensure ramp landings are 1200mm min. length, (no change in direction) or 1500mm W x 1500mm min. L (internal splay permitted), for 90 degree turn, or 1540mm W x 2070mm L for 180 degree turn, compliant with AS1428.1. These min. landing dimensions are required

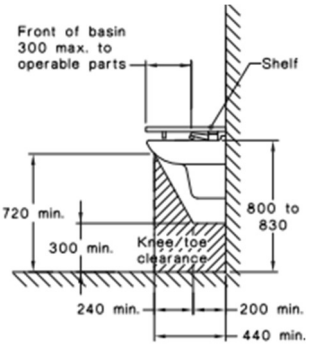
	clear of handrails and kerb rails.
9.6.	Ensure there are handrails on both sides of all ramps compliant with AS1428.1 (see below).
9.7.	Ensure curved ramps have 1500mm min. clear width with appropriate min. inside curve radius compliant with AS1428.1 fig. 20.
9.8.	Provide a suitable height wall (450mm min. height) or kerbing along open ramp sides, compliant with AS1428.1 fig 19: Kerbing to be between 65-75mm height above FFL, or; At least 150mm height above FFL. NB. The top of kerbing must not be within 75-150mm range above FFL to minimise risk of wheelchair footplate entrapment. If kerbing extends within 75-150mm range between it must be continuous with no gap greater than 20mm.
9.9.	The kerb to be suitably located in relation to handrail (and vertical supports if provided) i.e. Internal face of kerb in line with internal face of handrail or up to 100mm max. off-set inside the ramp, compliant with AS1428.1 fig. 19.
9.10.	Provide warning tactile ground surface indicators (TGSI's) at top and bottom of ramps in accordance with AS1428.4.1.
10. Doorway Threshold Ramps	
10.1.	Under BCA Part D2.15, an AS1428.1 threshold ramp is generally only permitted at external doorways i.e. connects to a road or open space clarification needs to be sought from PCA on this issue as there may be concessions for some building classifications e.g. 9a, 9c. 
10.2.	Ensure doorway threshold ramps have 1:8 gradient, 35mm max. height and 280mm max. length, compliant with AS1428.1 fig. 21. NB. Where ramp edges are not enclosed by walls/other side barrier, ensure ramp edges are splayed at 45 degrees. 
10.3.	There needs to be sufficient area available to satisfy AS1428.1 door circulation requirements in addition to threshold ramp dimensions e.g. an external door threshold ramp with side approach, requires 1240mm min. wide access way (no steeper than 1:40 gradient/crossfall)

	before base of the threshold ramp commences.
11. Step Ramps	
11.1.	Provide a step ramp leading to doorways as the height variation between internal and external RL's is greater than 35mm. NB. A level landing is also required to enable door circulation space, compliant with AS1428.1 fig. 31.
11.2.	Ensure step ramps have 1:10 gradient, 190mm max. height and 1900mm max. length. 
11.3.	Provide suitable barriers on step ramp sides (450mm min. height wall or balustrade and kerbing), or splayed edge if there is transverse pedestrian traffic.
11.4.	Ensure step ramps have appropriate level landings at top and bottom and at doorways, compliant with AS1428.1 (see Landings section).
11.5.	Ensure that consecutive step ramps (i.e. when landings between step ramps/ ramps overlap) are not used, compliant with DDA Access Code D3.11b.
12. Kerb Ramps	
12.1.	Ensure kerb ramps have 1:8 gradient, 190mm max. height, 1000mm min. width and 1520mm max. length, compliant with AS1428.1 fig. 23 and 24. NB. Under AS1428.4.1 kerb ramps with gradients less steep than 1:8.5 are not generally detectable by people with vision impairment. 
13. Handrails	

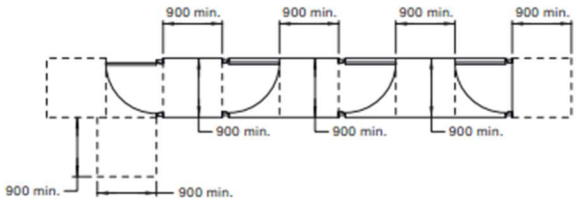
13.1.	Ensure circular/elliptical handrails have 30-50mm diameter, with 270 degree clear arc around top of handrail (extending for 600mm min. height) compliant with AS1428.1 fig. 29. 
13.2.	Ensure handrails are installed at a consistent height between 865-1000mm height above step nosing or FFL ramp surface, compliant with AS1428.1 Clause 12d. NB. The specified height should allow for construction tolerance as outside of this range will be non-compliant.
13.3.	Ensure handrails are installed no less than 50mm away from an adjacent side wall, compliant with AS1428.1 Clause 12h.
13.4.	Ensure the handrail at the top of the stair extends 300mm (horizontal) past the step tread then turns 180 degrees downwards or returns fully to post/wall, compliant with AS1428.1 Clause 11.2e, fig. 26.
13.5.	Ensure the handrail at the base of the stair extends one tread width (at same angle) plus 300mm (horizontal) from last riser, then turns 180 degrees downwards or returns fully to post/wall compliant with AS1428.1 Clause 11.2d, fig. 28b.
13.6.	Ensure that the handrail at the top or bottom of a ramp extends (on the horizontal) 300mm past ramp then turns 180 degrees downwards or returns fully to post /wall, compliant with AS1428.1 Clause 10.3h, fig. 14 and 15.
13.7.	For situations (e.g. class 9a and 9c buildings) where domed buttons are permitted by BCA Part 3.8a and 3.8c to be used instead of TGSI's at stairs/ramps, ensure handrails have suitable tactile warning i.e. domed button (4-5mm height and 10-12mm diameter) provided on top of handrail, 150±10mm from handrail end compliant with AS1428.4.1.
14. Tactile Ground Surface Indicators (TGSI's)	
14.1.	Ensure that TGSI's are slip-resistant and have the following minimum luminance contrast values against back ground surface, compliant with AS1428.4.1: Integrated TGSI's (i.e. tiles) require 30% min. luminance contrast. Discrete TGSI's (i.e. buttons) require 45% min. luminance contrast.

	Composite TGSI's with 2 materials/colours requires 60% min. luminance contrast.
14.2.	Ensure that warning TGSI's extend across the full width of the path of travel and commence 300mm from the edge of stairs, ramps etc. compliant with AS1428.4.1.
14.3.	Ensure that warning TGSI's have between 600-800mm depth at open areas, or at landings (>3m length) and/or when handrail is discontinuous, compliant with AS1428.4.1.
14.4.	Ensure that warning TGSI's have between 300-400mm depth at enclosed landings (<3m) or when external handrail is discontinuous, compliant with AS1428.4.1.
15. Passenger Lifts	
15.1.	Passenger lifts travelling more than 12m require 1400mm W x 1600mm L min. dimensions (subject to DDA Access Code Section 4.4 concession for existing buildings).
15.2.	Passenger lifts travelling less than 12m (except stair platform lifts) require 1100mm W x 1400mm L min. dimensions.
15.3.	Stairway platform lifts (previous AS1735.7) require 810mm W x 1200mm L min. dimensions, compliant with BCA Part E3.6. NB. They cannot be used where another type of lift can be used or in high traffic public areas.
15.4.	Low-rise platform lifts (previous AS1735.14), require 1100mm W x 1400mm L min. dimensions compliant with BCA Part E3.6 and must not travel more than 1000mm height variation.
15.5.	Low rise, low speed constant pressure lifts, unenclosed type (previous AS1735.15), require 1100mm W x 1400mm L min. dimensions compliant with BCA Part E3.6 and must not travel more than 2m. They cannot be used high traffic public areas.
15.6.	Low rise, low speed constant pressure lifts, enclosed type (previous AS1735.15), require 1100mm x 1400mm min. dimensions compliant with BCA Part E3.6 and must not travel more than 4m. They cannot be used high traffic public areas.
15.7.	Any low rise lifts (previous part AS1735.14 or 15) that require constant pressure to be applied to the lift control buttons to either call and/or operate the lift (i.e. Press and Hold) are to include signage to explain operations of use.
15.8.	Small size low-speed automatic lifts (previous AS1735.16), require 1100mm W x 1400mm L min. dimensions and must not travel more than 12m.
15.9.	Ensure all passenger lifts (except stair platform lifts) have 900mm min. clear door opening, compliant with AS1735.12.
15.10.	Ensure all Low-rise platform and Low rise, low speed constant pressure lifts with manual door opening (previous AS1735.14, 15 and 16) have suitable door circulation areas

	compliant with AS1428.1.
15.11.	Ensure the centre line of standard lift call buttons in all lift lobbies are located at height of 900-1200mm and at least 500mm distance from an internal corner to be accessible to people using wheelchairs, compliant with AS1735.12.
15.12.	Ensure all passenger lifts (except stair platform and low rise platform lifts) include an internal lift control panel with centre line of control buttons located at a height no less than 700mm and no greater than 1250mm above FFL. The components of the floor level buttons shall possess Braille, raised tactile symbols and numbers, visual and auditory indicators, compliant with AS1735.12. Note: horizontal lift control panels are preferred over vertical panels for ease of reach as they generally can be positioned with control buttons within 900-1100mm FFL which is the preferred range for most wheelchair users (advisory/DDA).
15.13.	Ensure all passenger lifts (except stair platform and low rise platform lifts) include 2 x lift control panels when the width/length dimension is less than 1400mm.
15.14.	Ensure all passenger lifts (except stair platform and low rise platform lifts) include an internal handrail installed at a height 850-950mm. The handrail ends shall be no more than 500mm away from any operating device or button, compliant with AS1735.12.
15.15.	Ensure all passenger lifts (except stair platform lifts) include emergency hands free communication, including a button to alert call centre of a problem and a signal light to confirm that call has been received.
15.16.	Ensure all lifts serving more than 2 levels provides automatic audible information within the lift car to identify each level the lift stops.
15.17.	Ensure all lifts serving more than 2 levels provides appropriate visual and audible arrival signals of the lift car in all lift lobbies.
15.18.	Ensure all lifts serving more than 2 levels provides appropriate audible range and frequency, (between 20-80dbA at maximum frequency of 1500 Hz), compliant with DDA Access Code Table E3.6b.
15.19.	The lighting in all enclosed lift cars must be at least 100 lux, compliant with AS1735.12.
15.20.	All visible information to provide 30% min. luminance contrast to background surface.
16. Accessible Toilets	
16.1.	Provide 1 unisex accessible toilet at each bank of male/female toilets on each storey compliant with BCA Table F2.4a. NB. Where more than 1 toilet bank on each storey provide at 50% of banks.

16.2.	Ensure a balance of left and right handed WC pans within the building.
16.3.	Ensure accessible toilet is compliant with AS1428.1. This requires 2300mm x 1900mm clear area around pan with basin to sit outside the area (max. encroachment of 100mm at basin front).
16.4.	Ensure the centreline of the accessible toilet pan to be between 450-460mm from side wall.
16.5.	Ensure all accessible toilets have 800mm±10mm clearance between front of WC pan to rear wall.
16.6.	Ensure the height to top of pan seat to be between 460-480mm above FFL.
16.7.	Ensure the pan seat to have 30% luminance contrast against background tiled floor surface.
16.8.	Provide grabrails on wall of toilet at a height of between 800-810mm (to top of grabrail) from FFL. NB. If concealed cistern used, WC grab-rails are to be continuous across side and rear walls. If exposed cistern used, rear grabrail to commence 50mm max. from cistern edge.
16.9.	Provide angled toilet backrest (350-400mm W x 150-200mm H) installed between 120-150mm height from top of pan seat and 50mm max. distance from seat bolt hole. NB. No toilet lid to be provided as this impedes use of back rest.
16.10.	Ensure the centreline of the basin to be at least 425mm from side wall.
16.11.	The height of the basin to be between 800-830mm from FFL with lever action taps and insulation of water pipes.
16.12.	Provide basin with a 430-440mm min. depth projection and suitable wheelchair knee/toe height clearance, compliant with AS1428.1 fig. 44 below: 
16.13.	The front of basin to be 300mm max. distance to the operable part of taps.
16.14.	Provide separate fixed shelf (120-150mm W x 300-400mm L) next to wash basin, installed at 900–1100mm above FFL.

16.15.	Toilet roll holder to be installed on adjacent wall to toilet at 600mm centre-line height from FFL within 300mm max. length from front of pan and no closer than 50mm to grabrail. The toilet roll holder type to have an exposed toilet roll for ease of use.
16.16.	Provision of soap dispenser, hand drier or paper towel dispenser at a dispensing height, between 900-1100mm. Ensure these fixtures are within arm's reach when directly in front of the wash basin.
16.17.	Provide mirror, with base installed at 900mm max. above FFL.
16.18.	1 x clothes hanging device to be installed between 1200-1350mm from FFL and at least 500mm from an internal corner.
16.19.	Door operation force to be lightweight (20N max.) suitable for people with disabilities.
16.20.	Door to include an in-use indicator and a bolt/catch that can be opened from outside in an emergency. If snib turn is used the handle to be 45mm min from centre.
16.21.	The baby change table cannot impede into required circulation space (when folded up). The top of table to be installed at 820mm height with 720mm min. under bench clearance above FFL, compliant with AS1428.1.
16.22.	Light switches to be installed between 900-1100mm above FFL and 500mm min. from internal corner.
16.23.	GPO's to be installed between 600-1100mm above FFL and 500mm min. from internal corner
16.24.	Rocker action/toggle type switches at least 30mm x 30mm dimensions are required to assist people with dexterity impairment.
17. Accessible Showers	
17.1.	Ensure all accessible showers have shower rail/curtain installed.
17.2.	Ensure the height of the top of shower seat to be between 470-480mm FFL.
17.3.	Provide a horizontal grab rail (660mm min), to be placed beneath the vertical shower support rail, between 390-400mm from side wall, installed between 800-810mm height from FFL.
17.4.	Provide vertical shower support rail to start between 1000-1100mm from FFL. The top of the shower support rail to finish between 1880-1900mm FFL. The rail to be placed between 580-600mm from the side wall.
17.5.	Ensure the shower taps and soap holders to be placed between 900-1100mm from FFL. Ensure the taps/soap holders are 50mm min. width from the shower support rail and no further away than 800mm from side wall.

17.6.	Ensure the height of the hose wall outlet to be 700mm height above FFL, compliant with AS1428.1 fig. 48 to ensure suitable hose length when showering. To also include suitable back-flow prevention device.
17.7.	The 2 x clothes hanging devices required outside the shower recess to be between 400-600mm length from the seat, installed between 1200-1350mm from FFL.
18. Ambulant Cubicles	
18.1.	Provide an ambulant cubicle for people with disabilities in male/female toilet banks, (adjacent to an accessible toilet facility) to satisfy the DDA Access Code.
18.2.	Provide minimum 900mm x 900mm circulation area between successive door swings in airlocks/vestibules on path of travel leading to ambulant toilets compliant with AS1428.1 fig. 34. 
18.3.	Provide minimum 900mm x 900mm circulation area outside the ambulant cubicles compliant with AS1428.1 fig. 53b.
18.4.	The cubicle to be between 900-920mm clear width with WC pan centred (i.e. 450-460mm set out).
18.5.	Ambulant cubicles to have 900mm x 900mm clear area in front of (standard projection from wall) WC pan and clear of door swing.
18.6.	Ensure ambulant cubicles have 700mm clear width cubicle door with 900mm x 900mm clear area outside the door.
18.7.	Ensure the height to top of pan seat to be between 460-480mm above FFL.
18.8.	Ambulant cubicle door needs in-use indicator and bolt/catch that is able to be opened from outside (in emergency). If snib catch used, the handle to be 45mm min. length from centre.
18.9.	Grabrails provided on both sides of cubicle at 800-810mm height (to top of grabrail) from FFL.
18.10.	Toilet roll holder to be placed at 700mm max. height from FFL and 300mm max. distance from front of pan on adjacent wall, no closer than 50mm to grabrails. The toilet roll holder type to have exposed toilet roll for ease of use.
18.11.	Clothes hook to be installed between 1350-1500mm from FFL on the back of door.

19. Hearing Augmentation	
19.1.	Provide hearing augmentation in the following areas if an inbuilt amplification system is installed (except one used for emergency warning systems only): Rooms in Class 9 buildings; Auditoriums, conference and meeting rooms, judicatory, and; Service counters screened to the public (e.g. reception, ticket/teller booths).
19.2.	Hearing loops are required to at least 80% of floor area with inbuilt amplification system. These areas are required to be signed.
19.3.	For Class 9b buildings, any screen or scoreboard that can display public announcements, to be capable of supplementing the public address system (excluding emergency warning only).
20. Signage	
20.1.	All male, female and accessible toilet identification signs to include appropriate raised tactile pictogram, raised text (in title case) and Braille. The signage to be located on the wall, adjacent to latch side of door between 1200-1600mm height from FFL (with single lines of tactile text located between 1250-1350mm above FFL).
20.2.	Entry doors to airlocks to sanitary facilities also require raised tactile pictogram, raised text (in title case) and Braille to identify each sanitary facility within.
20.3.	Accessible toilet sign to include international symbol of access (wheelchair logo) in white on blue background, compliant with AS1428.1. Sign to also include 'LH' or 'RH' to indicate a left-hand or right-hand transfer onto toilet pan. Min. font size to be 20mm san serif, compliant with AS1428.1.
20.4.	All male and female ambulant cubicle signs to include appropriate raised tactile pictogram, raised text (in title case) and Braille. The signage to be located on the ambulant cubicle door between 1200-1600mm height from FFL (with single lines of tactile text located between 1250-1350mm above FFL).
20.5.	Provide directional signage, e.g. at any toilet banks (without accessible toilet) to show path of travel to nearest accessible toilet and/or at the non-accessible entry to show path of travel to the accessible entrance. The directional signage for these items to include: appropriate raised directional arrow, raised tactile pictogram, raised text (in title case) and Braille and international symbol of access, compliant with AS1428.1. The signage to be located on the wall, adjacent to latch side of door between 1200-1600mm height from FFL (with single lines of tactile text located between 1250-1350mm above FFL).

	If the sign can be temporarily obscured consideration for additional overhead directional signage located above 2m height (advisory).
20.6.	Ensure that all signage is designed to be detectable, with raised symbols, providing 30% luminance contrast with sign background that in turn contrasts with background wall surface.
20.7.	Areas with hearing augmentation require identification signs that include international symbol of hearing (ear logo) in white on blue background, compliant with AS1428.1 and appropriate raised tactile pictogram, raised text (in title case) and Braille. These are required: At doorway entrances to room (latch side of door between 1200-1600mm height from FFL) or if an open area suitably located to designate the area and; Within the room/area to identify the hearing augmentation system, the area covered and how to use and/or gain assistance.

ADVISORY ISSUES
The following recommendations do not have impact on the building sign off under the DDA Access Code for Buildings or the BCA. These are advisory recommendations in line with the intent and objectives of the DDA to ensure equitable and dignified access for people with disabilities.
Paths of Travel
Provide 30% min. luminance contrast between key surfaces to assist people with vision impairment in orientation/way-finding and improve safety e.g. between wall and floor finishes, between ramps/stairs and adjacent flooring, between handrails and walls, between door hardware and doors etc.
Furniture/Work Stations
Locate reception desks/service counters with clear direct line of sight to key access pathways e.g. main entry, accessible turnstiles, lift lobby.
Provide reception desks/service counters with a section lowered to a height no greater than 870mm FFL. Ensure the counter has appropriate foot (290mm) knee (650) clearance. The counter shall be at least 800mm in width.
Ensure office furniture is moveable/portable to allow for any future work place adjustments. The furniture will therefore be better able to create the required/appropriate circulation spaces for a person with a disability.
Ensure all work stations can be technically height adjusted within range of 700-850mm. If not all are adjustable, consideration for a proportion of workstations to be provided as adjustable with same dimension and finish as others to assist in reconfiguration for future work-place adjustment.
Provide 30% min. luminance contrast between horizontal and vertical work surfaces to assist people with vision impairment.
Provide a range of seating types within waiting areas including some chairs with back and armrests to assist people with ambulant disabilities and the elderly.
Kitchen/Utility Areas
Provide 1550mm min. width between utility and kitchen benches
Kitchen benches along walls are preferred to island benches for people with vision impairment for improved safety due to less exposed edges
If applicable, ensure the operative part of any hot/chilled water unit is no greater than 1100mm above the FFL. The unit to be no 300mm max. distance from the front edge of kitchen bench.
Consideration to be given to provide clearance underneath kitchen bench areas for a person using a wheelchair. This ‘area’ could contain benches that could be easily removed when the need becomes apparent (advisory).

Lighting
Ensure the min. illumination levels are compliant with AS1428.2, in particular: Passageways and Pathways 150 lux Accessible Toilets 200 lux Reception Counters 250 lux General Displays/Signage 200-300 lux
Provide even lighting levels on installed signage to minimise glare and improve legibility.
Hearing Augmentation
Absorbent materials/finishes can assist in reducing reverberation to improve general acoustics and use of hearing augmentation systems e.g. using acoustic tiles, furniture, carpet, curtains, bulletin/felt boards etc to minimise hard surfaces that reflect sound.
Provide appropriate, even lighting with minimal glare, particularly at reception/information counters to assist people with hearing impairment lip-read/communicate with staff e.g. suitable luminaire direction and/or use of diffuser, screening to windows/glazing (tinting, blinds, louvres).
Provide hearing loops at all service counters (with or without screening), lift points, communication points, (e.g. intercoms to buildings) and warning systems, compliant with AS1428.5 (advisory) to enable all people making enquiries to clearly hear staff.
When multiple counters in one location provide the same service, ensure 20% min. of each class of counter provides a hearing loop system.
When hearing loops are provided within a room provide relevant signage (to identify type of system, how to use or where to seek assistance or receivers), compliant with AS1428.5. This signage to be located in the first third of the room, when facing speaker.
All public payphones to have an adjustable volume control to increase level of sound at least 20dB above normal sound.
Accessible public payphones to have TTY capabilities and be signed with international symbol for deafness, compliant with AS1428.1 and .5.
Consideration to provide computer-aided real time captioning (CART) systems, and/or access to captioning on television sets/video display as required in addition to hearing loops systems at public meeting areas to enable deaf participants to effectively communicate.
Emergency Egress
Ensure all 850mm clear widths (920mm door leaf) to all fire stair and egress doors.
Where possible provide level or ramped exits from the building, compliant with AS1428.1.
Provide fire refuge areas within fire-isolated stairs (e.g. 1 x wheelchair footprint requires at least

800mm W x 1300mm L area) outside the path of travel and clear of fire hydrants. Inclusion of an accessible intercom, located with operative components between 900-1250mm above FFL and 500mm from any internal corner is recommended for communication purposes.
Provide door circulation on the external corridor side of fire-egress doors (and where achievable also on the internal side), compliant with AS1428.1.
Should the provision of any emergency systems be installed within the building, the systems should include audible and visual warnings indicators to assist people with sensory disabilities e.g. strobe lights (incorporating 2 colours, preferably blue/orange or similar), visual messages on a computer system, people with hearing augmentation being provided with a vibrating pager.
Consideration for accessible identification signage within fire-isolated stairs/ramps to assist people to orient themselves when egressing or seeking assistance e.g. the sign to state “You are on Level” followed by the relevant floor number with raised tactile text and Braille.
Consideration to provide fire-isolated passenger lift for egress purposes in line with BCA performance requirements. NB. For this situation lift lobby areas would also require a suitable level of fire and smoke protection to ensure safe waiting area for lifts to arrive.
The client shall make preparation of an emergency management plan which would include the use of a fire warden, to identify strategies to facilitate emergency egress for people with disabilities.

1 July 2019

Mr. Michael Lokic
Steve Watson & Partners
Level 17, 456 Kent Street
Sydney NSW 2000

DESIGN STATEMENT – SPECIFICATION C1.10 FIRE HAZARD PROPERTIES
PROJECT: Mainsbridge SSP, 95 Lawrence Hargrave Road, Warwick Farm

Dear Michael,

Specification C1.10 sets out the requirements of Fire Hazard Properties of linings, materials and assemblies For Class 2 to 9 buildings.
In our professional opinion, the floor, wall and ceiling linings as design & documented in the following drawings & schedules is capable of meeting the requirements Specification C1.10, BCA/NCC 2016 Amendment 1:

GENERAL			
2141.01	A00.00	COVER SHEET	E
2141.01	A00.03	KEYNOTE INDEX 1	D
2141.01	A00.04	KEYNOTE INDEX 2	D
2141.01	A01.01	SITE PLAN – EXISTING	F
2141.01	A01.02	SITE PLAN - PROPOSED	H
2141.01	A01.05.01	PRECINCT PLAN – GROUND – NORTH	C
2141.01	A01.06.01	PRECINCT PLAN – LEVEL 1 - NORTH	C
ADMIN & HALL BUILDING A / B			
2141.01.AB	A03.01	GENERAL ARRANGEMENT PLAN - GROUND	H
2141.01.AB	A03.02	GENERAL ARRANGEMENT PLAN - LEVEL 1	I
2141.01.AB	A03.03	ROOF PLAN	F
2141.01.AB	A06.01	ELEVATIONS	F
2141.01.AB	A06.03	SECTIONS 1	D
2141.01.AB	A06.04	SECTIONS 2	C
LEARNING BUILDING C			
2141.01.C	A03.01	GENERAL ARRANGEMENT PLAN - GROUND	F
2141.01.C	A03.03	ROOF PLAN	E
2141.01.C	A06.01	ELEVATIONS	E
2141.01.C	A06.03	SECTIONS 1	D
2141.01.C	A06.04	SECTIONS 2	C
LEARNING BUILDING D			
2141.01.D	A03.01	GENERAL ARRANGEMENT PLAN - GROUND	G
2141.01.D	A03.02	GENERAL ARRANGEMENT PLAN - LEVEL 1	G
2141.01.D	A03.03	ROOF PLAN	F
2141.01.D	A06.01	ELEVATIONS	F
2141.01.D	A06.03	SECTIONS 1	D
2141.01.D	A06.04	SECTIONS 2	D
POOL BUILDING E			
2141.01.E	A03.01	GENERAL ARRANGEMENT PLAN	G
2141.01.E	A03.02	ROOF PLAN	F
2141.01.E	A06.01	ELEVATIONS	E
2141.01.E	A06.03	SECTIONS	D
SCHEDULES			
2141.01.S01	A21.01	WALL TYPE SCHEDULE	E

I am an appropriately qualified and competent person practicing in the relevant area of work. I have recognised relevant experience in the area of work to which this statement relates. Hayball holds appropriate current professional indemnity insurance as required by the consultancy agreement.

Yours sincerely,

Rob Chan
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NSW Nominated Architects:
Tom Jordan 7521, Richard Leonard 7522,
David Tordoff 8028

17 June 2019

Mr. Michael Lokic
Steve Watson & Partners
Level 17, 456 Kent Street
Sydney NSW 2000

DESIGN CERTIFICATE – WEATHERPROOFING OF ROOFING AND EXTERNAL WALLS

PROJECT: Mainsbridge SSP, 95 Lawrence Hargrave Road, Warwick Farm

Dear Michael,

In our professional opinion, the design as documented in the below schedule of documents is capable of meeting Building Code of Australia 2016 Amendment 1 and can comply with Performance Requirement FP1.4 as summarised below:

a. We have assessed the building height, wind region, eave width and overall roof and external wall envelope complexity associated with the new external walls and roofing design

b. We have assessed the design and specification of the external wall and roofing systems and have been guided by:
   i) Manufacturers specifications and design requirements for each of the specified materials proposed
   ii) Relevant Australian standards
   iii) Code Mark and other test certificates as appropriate
   iv) Good construction practice
   v) Flashing and sealing associated with roofing, windows, doors and other openings, where detailed,
   vi) Flashing and sealing associated with material interfaces, where detailed,
   vii) Any specified in-situ tests and approval protocols for prototype wall or roofing systems.

c. The roof and external wall system, including openings around windows and doors, have been designed and/or specified appropriately to prevent the penetration of water that could cause;
   i) unhealthy or dangerous conditions or loss of amenity for occupants and
   ii) undue dampness or deterioration of building elements.

d. The proposed design is in accordance with Section A0 of Volume 1 of the Building Code of Australia 2016 Amendment 1 and determined to comply with Performance Requirement FP1.4 as summarized in the table below.

e. The proposed design as currently documented by Hayball, and detailed in the below schedule of documents, is the design this Certificate pertains to and no other. Certification of the proposed design that has been altered in any way by a party other than Hayball, whether deliberate or otherwise, is not given expressly or implied.

Means of complying with the BCA	**Relevant performance requirement**	**Assessment methods used**
Performance Solution complying with the relevant Performance Requirements as required by Clause A0.3 of the BCA	FP1.4	Supporting Evidence, Verification Methods, and/or Expert Judgment approriate in accordance with BCA clause A0.5

APPENDIX – PLANS, SPECIFICATIONS AND TEST/CODEMARK CERTIFICATES REFERENCED OR RELIED UPON

Certificates, test reports and specifications
List all Code Mark Certificates, test reports and specifications relied upon.

See attached enclosed manufacturer performance certificates.

Plans
Complete section below OR append list of documents:

Document No		Title	Revision
GENERAL			
2141.01	A00.00	COVER SHEET	E
2141.01	A00.03	KEYNOTE INDEX 1	D
2141.01	A00.04	KEYNOTE INDEX 2	D
2141.01	A01.01	SITE PLAN – EXISTING	F
2141.01	A01.02	SITE PLAN - PROPOSED	H
ADMIN & HALL BUILDING A / B			
2141.01.AB	A03.01	GENERAL ARRANGEMENT PLAN - GROUND	H
2141.01.AB	A03.02	GENERAL ARRANGEMENT PLAN - LEVEL 1	H
2141.01.AB	A03.03	ROOF PLAN	F
2141.01.AB	A06.01	ELEVATIONS	F
2141.01.AB	A06.03	SECTIONS 1	D
2141.01.AB	A06.04	SECTIONS 2	C
LEARNING BUILDING C			
2141.01.C	A03.01	GENERAL ARRANGEMENT PLAN - GROUND	F
2141.01.C	A03.03	ROOF PLAN	E
2141.01.C	A06.01	ELEVATIONS	E
2141.01.C	A06.03	SECTIONS 1	D
2141.01.C	A06.04	SECTIONS 2	C
LEARNING BUILDING D			
2141.01.D	A03.01	GENERAL ARRANGEMENT PLAN - GROUND	G
2141.01.D	A03.02	GENERAL ARRANGEMENT PLAN - LEVEL 1	G
2141.01.D	A03.03	ROOF PLAN	F
2141.01.D	A06.01	ELEVATIONS	F
2141.01.D	A06.03	SECTIONS 1	D
2141.01.D	A06.04	SECTIONS 2	D
POOL BUILDING E			
2141.01.E	A03.01	GENERAL ARRANGEMENT PLAN	E
2141.01.E	A03.02	ROOF PLAN	E
2141.01.E	A06.01	ELEVATIONS	D
2141.01.E	A06.03	SECTIONS	D
SCHEDULES			
2141.01.S01	A21.01	WALL TYPE SCHEDULE	E

I am an appropriately qualified and competent person practicing in the relevant area of work. I have recognised relevant experience in the area of work to which this statement relates. Hayball holds appropriate current professional indemnity insurance as required by the consultancy agreement.

Yours sincerely,

Rob Chan
Architect
Registered Architect No. 10371
Hayball

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4/135 Sturt Street
Southbank VIC 3006 Australia
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ABN 84 006 394 261
NSW Nominated Architects:
Tom Jordan 7521, Richard Leonard 7522,
David Tordoff 8028

17 June 2019

Mr. Michael Lokic
Steve Watson & Partners
Level 17, 456 Kent Street
Sydney NSW 2000

DESIGN STATEMENT-

EXTERNAL WALL SYSTEM DISCLOSURE STATEMENT (DESIGN)

EXTERNAL WALL COMPONENTS (TYPE B CONSTRUCTION)

PROJECT: Mainsbridge SSP, 95 Lawrence Hargrave Road, Warwick Farm

Dear Michael,

In our professional opinion, the design as documented in the schedule below are capable of meeting the above requirements of BCA referred to: BCA 2016 Amendment 1.

- I confirm that the table provided overleaf identifies all the proposed external wall elements designed for the subject development.
- I have undertaken reasonable investigations to ascertain the compliance of these systems and components with the non-combustibility requirements of Clause C1.9 of the BCA, such as reviewing product technical information, fire test reports, code mark certificates and fire-engineer's reports.
- I am satisfied that, based on my research that the wall systems and components comply with the non-combustibility requirements of Clause C1.9 of the BCA.
- Supporting documents that can be used to demonstrate compliance for each wall type with the relevant sections of the BCA have been provided.
- The information contained in this statement is true and accurate to the best of my knowledge.

I am an appropriately qualified and competent person practicing in the relevant area of work. I have recognised relevant experience in the area of work to which this statement relates. Hayball holds appropriate current professional indemnity insurance as required by the consultancy agreement.

Yours sincerely,

Rob Chan
Architect
Registered Architect No. 10371
Hayball

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ABN 84 006 394 261
NSW Nominated Architects:
Tom Jordan 7521, Richard Leonard 7522,
David Tordof

EXTERNAL WALL SYSTEM DISCLOSURE (DESIGN)

EXTERNAL & COMMON WALL COMPONENTS (TYPE B CONSTRUCTION)

Mainsbridge SSP, 95 Lawrence Hargrave Road, Warwick Farm

EXTERNAL WALL ELEMENTS TABLE The table below must be completed for all wall types.

LINING / CLADDING MATERIAL *(Note. Nominate every type of external cladding and/or wall material)*

External/Cladding Material (Eg Fibre cement, Aluminium composite panel, masonry etc)	**Elevation(s)**	**Structural frame material**	**Manufacturer** (Eg, Alucobond, Vitracore etc)	**Product Name** (Eg, Alucobond Plus, Vitracore G3 etc)	**Test certificate, Codemark certificate or Fire Engineering Report** (List all documents evidencing compliance)
Face Brick	N,E,S,W	N/A	PGH	Mowbray Blue	N/A
Off Form Concrete (unpainted)	N,S,E	Reinforced concrete	N/A	N/A	N/A
9mm Compressed Fibre Cement Sheet	N,E,S,W	Steel top hats on Steel Stud frame	CSR Cemintel	ExpressWall BareStone	Refer to Cemintel Compliance certificate enclosed
Metal Wall Cladding	E, S, W	Steel Columns and Girts & Framing	BlueScope	Mini-Orb	N/A

INSULATION *(list all types incorporated in the external wall systems)*

Material Rockwool etc	**Elevation**	**Manufacturer** (Eg, CSR etc)	**Product Name**	**Test certificate reference**
Glasswool	N,E,S,W	Bradford	Gold 75mm wall batts Gold 90mm wall batts	See FCO-9694 enclosed See NR 18006 enclosed

SARKING *(list all types incorporated in the external wall systems)*

Manufacturer (Eg, CSR etc)	**Elevation**	**Product Name**	**Test certificate reference**
Bradford	N,E,S,W	Thermoseal Firespec	See FCO-3235D enclosed

HAYBALL

MAINSBRIDGE PUBLIC SCHOOL

VERTICAL TRANSPORTATION SPECIFICATION

OCTOBERR 2017

CONFIDENTIAL

MAINSBRIDGE PUBLIC SCHOOL

VERTICAL TRANSPORTATION SPECIFICATION

HAYBALL

TYPE OF DOCUMENT (VERSION)
CONFIDENTIAL

PROJECT NO 2304785B
DATE: OCTOBERR 2017

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HAYBALL
CONFIDENTIAL
PROJECT NO 2304785B OUR REF: 170928_VERTICAL TRANSPORTATION SPECIFICATION_MAINSBRIDGE SSP PS.DOCX
OCTOBERR 2017

REV	DATE	DETAILS
1	24/08/31/10/2017	Concept Tender

	NAME	DATE	SIGNATURE
Prepared by:	Matt Revitt	31/10/2017	MBR
Reviewed by:	Robert Holman	31/10/2017	RWH
Approved by:	Keelan Cuthill	31/10/2017	KC

TABLE OF CONTENTS

1 PROJECT INFORMATION

1.1 GENERAL

The contractor for each trade will be engaged under a Design and Construct (D&C) role. The design is currently at approved concept design stage and the schematic design stage, development and design documentation has yet to be undertaken and is to be completed by the contractor as part of this contract. The scope of works outlined in this document as well as those indicated on the layout drawings shall be allowed for in the contractor's tender submission. Any items not allowed for by the contractor shall clearly be excluded.

The design herein captures the scope and intent of the client's building services brief at the time of issuance. The final design will need to be completed by the Contractor. The contractor shall make all due allowances to complete the design and undertake the works based on the concept documentation provided as well as relevant Education Facilities Standards and Guidelines (EFSG) and Statuary Codes and Regulations. The contractor shall therefore accept that the final design and design philosophy established to date may change. The contractor is to allow for potential changes in the design to meet the client's brief.

Construction staging and temporary works requirements for demolition, minor reticulation works and ancillary items have not been designed or documented and it is the contractors responsibility to design the works commensurate with the permanent works.

This D&C performance specification is to be read in conjunction with other tender documents.

This Specification is a performance specification and for the purpose of this Performance Specification, Works shall mean all works or work as described in this Specification and/or associated documentation.

1.2 PROJECT TEAM

The Project Team includes the following team members:

PRINCIPAL/CLIENT -DEPARTMENT OF EDUCATION (DOE)

PROJECT MANAGER - GHD

ARCHITECT - HAYBALL

CONSULTANT ENGINEER – MEP SERVICES - WSP

STRUCTURAL ENGINEER – WSP

CIVIL ENGINEER - WSP

1.2.1 THE PROJECT DESCRIPTION

LOCATION

The new and/ or updated development will be located within the Western Sydney region.

UTILITIES

The following utilities are relevant for this project;

1. Water
2. Gas
3. Sewer
4. Storm water
5. Telecommunications
6. Electricity

2 GENERAL REQUIREMENTS

2.1 GENERAL

2.1.1 DEFINITIONS

Unless the context otherwise requires, the following definitions apply:

1 Supply: 'Supply', 'furnish' and similar expressions mean 'supply only'.

2 Provide: 'Provide' and similar expressions mean 'supply, deliver and install' and include all testing, commissioning, tuning, interfaces etc.

3 Proprietary: 'Proprietary' means identifiable by naming manufacturer, supplier, installer, trade name, brand name, and catalogue or reference number.

4 Samples: Includes samples and prototypes.

5 Zinc-coated steel: Includes zinc-coated steel, zinc/iron alloy-coated steel and aluminium/zinc-coated steel.

2.1.2 SPECIFICATION OBJECTIVES

The intent of this Specification is to:

1 Provide a basis for competitive tendering for suitably qualified tenderers.

2 Allow competent Contractors to price the works.

3 Provide a clear statement of technical and performance requirements against which compliance can be assessed.

4 Provide documentation required by Authorities to demonstrate design compliance with statutory requirements for the purpose of building permit application.

5 Provide documentation detailing the scope and quality of the project for the purpose of Client's confirmation of compliance to the Client's project brief.

6 Define the requirements of the Contractor with respect to Quality Assurance.

7 Define the scope of services including project management, installation engineering, testing commissioning, maintenance and documentation to be provided.

8 Specify the technical requirements of the Installation.

9 The Specification relies upon the Contractor having the necessary specialist services resources to complete the detailed design, testing and commissioning of the installation in accordance with the design intent and the requirements of the specification.

2.1.3 DESIGN INTENT

1 Intent: The Contract documents are intended to call for complete, operational systems. Provide all items (major and minor), equipment, accessories and incidental work required for the completion of the installation and to ensure full integration.

2 Diagrammatic layouts: Layouts of service lines, plant and equipment shown on the drawings are diagrammatic only, except where figured dimensions are provided or calculable. Before commencing work, inspect the site, obtain all necessary measurements and information.

2.1.4 DISCREPANCIES IN DOCUMENTS

Give immediate notice in case of any ambiguity, discrepancy or inconsistency in the Contract document. Should conflict arise between the requirements of specification, drawings, mandatory requirements, standards including Australian Standards, then the higher standard or most stringent requirements shall prevail and shall be deemed to have been included in the Contract. The Contract's order of documents precedence is not intended and shall not be applicable in this case

2.1.5 REFERENCED DOCUMENTS/STANDARDS

Use referenced documents/standards which are editions, with amendments, current 3 months before the closing date for tenders, except where other editions or amendments are required by Statutory Authorities.

2.2 QUALITY ASSURANCE

1 Provide a Quality Assurance plan in order to propose, establish, maintain, monitor and document a quality assurance system covering all aspects of the design, purchase, fabrication, installation and completion of the works. The plan shall be in accordance with ISO 9001./.2 (as appropriate).

2 Designate a Project Quality Inspector to discharge the quality plan, which must include the following minimum:

3 Inspect the installation works regularly and provide installation defects reports on regular basis in order to systematically reduce the incidences of installation defects. Submit copy of such defects lists to the Consultant upon request. This task can be delegated to qualified site foreman if applicable.

4 Check and sign off all shop drawings (including all third party shop drawings) for conformance to requirements prior to submission. All such documents shall list all non-conformances with the Specification and Drawings

5 Check and sign off equipment compliance schedule against the particular Specification requirements and equipment schedules prior to submission. All such documents shall list all non-conformances with the Specification and Drawings

6 Check and sign off all samples for conformance to requirements prior to submission. All such documents shall list all non-conformances with the Specification and Drawings.

7 Check all tests required for proper manufacturing of the equipment.

8 Check and sign off all manufactured items for compliance prior to dispatch to site.

9 Check and sign off installation of all items under this Specification. Provide signed off installation ITPs for every elements of installation (minimum floor by floor and/or for every individual area up to 1000sqm whichever is smaller)

10 Check all materials, welding, joining, terminations, fixing and finishes.

11 Check and sign off all associated ITPs for all on-site tests required to commission the works.

12 Check and sign off operating and maintenance manuals to ensure they contain adequate information to permit systems to be operated by the Client at the end of defects liability period. (Including adequate training and tuition of the nominated Client's representative).

13 Check and sign off all associated integrated ITPs for all integrated on-site tests required to commission the works and to be carried out by various systems.

14 All trades works including sub trades works shall form part of overall QA and required to have their ITPs, Shop drawings, technical submissions signed off also by the Project Quality Inspector. This sign off represent all required checking that these works are consistent and compliant with the rest of the works.

15 Submit the following documentation:

- a Quality System third party certification, if any, to the Standards specified by the Joint Accreditation System of Australia and New Zealand.
- b Quality manual detailing, corporate Q.A. policy statement, system element description, register of procedures and project specific ITPs.

16 Notice:

- a Inspect witness points: If notice for inspection is to be given in respect of parts of the works, advise if and when those parts are to be concealed. Inspect and provide signed off installation ITPs indicating appropriate methods of installation been carried out.
- b Inspection hold points: If notice of inspection is to be given in respect of parts of the works, do not conceal those parts without approval.
- c Minimum notice for inspections to be made: 4 hours for inspections full time on-site, otherwise 2 working days for on-site inspections, and 5 working days for local pre-delivery inspections.
- d Concealed services: Give notice so that inspection may be made of services to be concealed. Irrespective of Consultant Engineer inspection, inspect the works, sign off relevant ITPs and highlight any noncompliance and/or defects.

17 Witness tests: Give sufficient notice so that designated tests may be witnessed.

- a Minimum notice for tests to be witnessed is 5 working days for site tests; and 10 working days for local pre-delivery tests.
- b Test hold points: Do not carry out designated tests without approval.

18 Testing Authorities:

a General: Except for Site Tests, have type tests carried out by authorities accredited by NATA to test in the relevant field, or an approved organisation outside Australia recognised by NATA through a mutual recognition agreement. Co-operate as required with testing authorities.

b Site tests: Use instruments calibrated by authorities accredited by NATA.

19 Reports:

a General: Submit copies of test reports, including certificates for type tests, showing the observations and results of tests and compliance or non-compliance with requirements.

b Submit Installation Defects Reports carried out on regular basis to the Consultant Engineer upon request.

20 Concealment:

a If tests are to be carried out on parts of the work, do not conceal those parts and do not commence further work on those parts until the tests have been satisfactorily completed and compliance verified.

2.3 ELECTROMAGNETIC COMPATIBILITY

1 Comply with Australian Communications Authority requirements for electrical and electronics products to limit electromagnetic interference (EMI).

2 Emissions:

a Passive products with C-tick or Regulatory Compliance Mark (RCM) to AS/NZS 4417.3, marking of electrical products to indicate compliance with regulations – Specific requirements for electromagnetic compatibility regulatory applications.

3 Immunity:

a Electrical and electronic apparatus: To AS/NZS 4252.1, Electromagnetic compatibility – Generic immunity standard – Residential, commercial and light industry (EN 50082-1), or

b EN 5008-2, Electromagnetic compatibility – Generic immunity standard – Industrial environment.

4 Harmonics and Voltage Surges:

a Levels of emissions to be acceptable to the electricity distribution code. Keep the THDI current to 5% maximum for all individual components/equipment and at least to that level at the first supplying control panel for all components/equipment connected to the switchboard. Provide active harmonic filters within the component, or respective control panel. Do not rely on the external harmonic filters to be installed on the Main Switchboard(s).

2.4 BUILDING PENETRATIONS

FIRE RESISTING BUILDING ELEMENTS

1 Seal penetrations to comply with NCC using a system to AS 4072.1, Components for the protection of openings in fire-resistant separating elements – Services penetrations and control joints.

2 Comply with Section 3 of AS/NZS 1668:1, Fire and Smoke control in Multi Compartment Buildings.

3 AS4072.1 inter-alia Appendix B and AS1851 inter-alia Clause 17.2.3.1 shall be complied with in as-built documentation to identify all fire and smoke containment compartment walls and barriers. To satisfy specific identification requirements to AS4072.1 Appendix B4 and AS1851 Clause 17.2.4, permanently fixed labelling, tagging and signage of all passive fire and smoke containment systems must be provided for on-site identification. Fire stopping barriers and penetrations shall comply in particular with reference to a service label affixed adjacent to each fire stop barrier and service penetration (or close proximity group) as detailed on page 25 of AS4072.1 and page 165 of AS1851. This as-built provision amongst other as-built documentation and manuals is essential as part of handing over process of the project.

NON-FIRE RESISTING BUILDING ELEMENTS

1 Seal penetrations around conduits and sleeves. Seal around cables within sleeves. If the building element is weatherproof, acoustic rated or subject to pressure, maintain the rating. Acoustically seal penetrations through plantroom walls and floors.

CHASES

1 Cut, drill and chase as necessary, where possible avoiding finished work. Where chasing of finished work is essential, make good all damage to the original standards of the finishes.

LIMITATIONS

1 General: Do not penetrate, or chase the following without approval:

2 Structural building elements including external walls, core walls, fire walls, floor slabs, beams or columns.

3 Acoustic barriers.

4 Other building services.

5 Membrane elements including damp-proof courses, waterproofing membranes and roof coverings.

6 Membranes: If approval is given to penetrate membranes, provide a waterproof seal between the membrane and the penetrating compound.

2.5 REQUIRED SUBMISSIONS

1 Provide in good time to allow review without impediment to the programme, including possible amendment and resubmission:-

- a Copies of correspondence and notes of meetings with Authorities.
- b Documents showing approval of the Authorities whose requirements may apply to the work.
- c Certified schedule of compliance for all plant and equipment, prior to placing orders.
- d Factory test results where applicable.
- e All product data, performance test and commissioning results required by this Specification.

f Shop drawings for fabrication and installation of all equipment and items supplied.

g Manufacturer's product data for equipment, materials, components and systems including:

i Technical specifications and drawings.

ii Size, arrangement, operating and maintenance clearances.

iii Operating weight.

iv Type test reports.

v Performance and rating curves or tables marked with each selection showing for both duty point and for part load conditions the capacity; the energy consumption and power factor; and the sound power level.

vi Motor power requirements (both full load and starting).

vii Control details.

viii Recommendations for installation and maintenance.

ix Evidence of compliance with specified product certification schemes.

h Inspection, test and commissioning plans for every section of the works. Detail:

i The procedure of how to complete the task.

ii The skill or competency of the person undertaking the works.

iii The review or testing procedure to assure satisfactory completion of the task.

iv The person within the Works Package's organisation authorised to sign-off the task as accepted.

i Client handover/training proposals.

j Record and installation drawings: Record all changes to equipment and services layouts, wiring and any other items during the construction period, which may have been incorporated into these works.

k Operating and Maintenance manuals.

l Maintenance/service records during the defects liability period.

2 Give notice before commencing work affected by the submissions, unless the submissions have been reviewed with no exception taken.

3 Do not commence production of equipment, materials, components of equipment, components or systems until submission has been reviewed with no exception taken.

4 Maintain and submit monthly a schedule of shop drawings and submissions to identify all proposed drawings and submissions designated in the following categories:

a Accepted.

b Submitted, awaiting acceptance (with submission date and revision number).

c Not yet submitted.

5 Submit electronically (PDF or alternative agreed format).

6 Identify the project, Works Package, supplier/manufacturer, applicable product name, product number, included product options, and relevant specification references.

7 Where selected equipment or systems do not fully comply with this Specification and associated documents, submit details of proposed deviations for acceptance. Where such deviations require any changes to the structure, building works or services, these shall be provided without variation to the Contract. Apart from deviations listed, it will be taken that the materials and equipment proposed meets with all other specified requirements. Review of equipment and materials is undertaken on this basis, and that non-complying equipment/materials may be rejected at any time – even if already installed.

8 Submit amended documents as appropriate, highlighting changes since the previous submission.

2.5.1 SAMPLES

TIMING

1 Co-ordinate submissions of samples as listed in the Schedules. Do not cause delays by making late submissions or submitting inadequate samples.

QUANTITY

1 Submit a sample of each designated item and 2 copies of supporting documentation. Include ancillary items such as fasteners and mounting brackets. Amend and resubmit samples which are not accepted.

IDENTIFICATION

1 Identify the project, Contractor, their agents or supplier, manufacturer, applicable product, model number and options, as appropriate and include pertinent Specification references.

2 Include service connection requirements and product certification.

3 Identify non-compliances with project requirements, and characteristics that may be detrimental to successful performance of the completed work.

SAMPLE ACCEPTANCE AND RETENTION

1 Do not commence work affected by samples until the samples have been accepted. Submit further samples as necessary.

2 Keep approved samples in good condition on site, until Practical Completion.

3 Incorporate in the works samples, which have been approved for incorporation. Do not incorporate other samples.

4 Installed items will match accepted samples throughout the works.

2.6 MATERIALS, EQUIPMENT AND COMPONENTS

2.6.1 GENERAL

1 Provide new materials, equipment and components shall be new, of good quality and fit for purpose, selected for a reasonable service life. Do not provide without approval products that are obsolete, discontinued or about to be discontinued.

2 Identification of a proprietary item does not necessarily imply exclusive preference for the item so identified, but indicates a deemed to comply item.

3 Manufacturers: Provide equipment and associated accessories which are the products of established manufacturers regularly engaged in the manufacture of such equipment, who issue comprehensive rating data and certified test data on their products.

4 Consistency: For the whole quantity of each material or product use the same manufacturer or source and provide consistent type, size, quality and appearance.

5 Safety: Provide all necessary safety devices for the protection of personnel against injury and the protection of plant and equipment against damage including relief valves, belt guards, safety railing, effective earthing of electrical components, electrical interlocks, warning lights, and signs, alarms and local lighting. Provide permanent lifting eyes for equipment exceeding 40kg.

6 General: Select, if no selection is given, and transport, deliver, store, handle, protect, finish, adjust, prepare for use, and use manufactured items in accordance with the current written recommendations and instructions of the manufacturer or supplier.

7 Instructions: Submit the recommendations and instructions, and advise of conflicts with other requirements.

8 Project modifications: Advise of activities that supplement, or are contrary to, manufacturers or suppliers' written recommendations and instructions.

9 Product certification: If products must comply with product certification schemes, use them in accordance with the certification requirements.

10 Provide permanently fixed plates indicating manufacturer, model, serial number, capacity and electrical data for all equipment. Lettering height: 5mm maximum, 1.5mm minimum.

11 Provide materials or products are supplied by the manufacturer in closed or sealed containers

2.6.2 FINISHES AND VISUAL ELEMENTS

1 Surfaces shall be flat and free of noticeable distortion, warping and twisting.

2 Edges and corners accessible to users dressed to avoid cutting if touched.

3 Pressings shall be accurate in dimension and profile to ensure consistent mating and clearance gaps and pressing shape.

4 Mating surfaces between adjacent pressings - flush and accurate to produce smooth distortion free joint.

5 Provide protection against damage until Practical Completion.

6 Surface shall be clean, undamaged and free of stains

2.6.3 MANUFACTURERS' OR SUPPLIERS' RECOMMENDATIONS

1 General: Select, if no selection is given, and transport, deliver, store, handle, protect, finish, adjust, prepare for use, and use manufactured items in accordance with the current written recommendations and instructions of the manufacturer or supplier.

2 Instructions: Submit the recommendations and instructions, and advise of conflicts with other requirements.

3 Project modifications: Advise of activities that supplement, or are contrary to, manufacturers or suppliers' written recommendations and instructions.

4 Product certification: If products must comply with product certification schemes, use them in accordance with the certification requirements.

2.6.4 CLEANING AND PROTECTION OF FINISHED WORK

During handling and installation of work at the site, clean and protect work in progress and adjoining work. Apply suitable protective covering on newly installed work where required to ensure freedom from damage or deterioration at a time of Completion; otherwise, clean and perform maintenance on newly installed work as frequently as necessary throughout remainder of construction period. Adjust and lubricate operable components to ensure operation without damaging effects.

2.6.5 PROHIBITED MATERIALS

1 Do not use any of the following materials:

- a Lead where the metal or its corrosion products may be directly ingested, inhaled or absorbed, or any lead-based paints or primers.
- b Chromate paint pigment or chromate water treatment.
- c Urea formaldehyde foam or materials which may release formaldehyde in quantities which may be hazardous or irritant.
- d Synthetic mineral fibres except in accordance with Worksafe Australia National Standard and National Code of Practice.
- e Materials in which chlorofluorocarbons, hydrochlorofluorocarbons or hexa-fluoroacetones have been used as a blowing agent.
- f Chlorofluorocarbons.
- g Polychlorinated biphenyls.
- h Other substances generally known to be deleterious to health or safety or which would adversely affect the works.

i Any that would be contrary to achievement of a required project Green Star or other sustainability rating.

2.7 INSTALLATION

2.7.1 GENERAL

1 General: Carry out the work in a proper and workmanlike manner.

2 Arrangement: Install equipment and services parallel or perpendicular to building elements. Organise reticulated services neatly. Provide for movement in both structure and service. Under suspended ground floors, keep services at least 150mm clear above ground surface, additional to insulation.

3 Movement and expansion: Provide expansion facilities in ductwork, piping, cables, cable trays and supports to accommodate thermal expansion and movement at structural expansion joints.

4 Protection: Protect equipment from weather and the ingress of dirt, moisture, vandalism and tampering.

5 Access: Provide access to all components requiring entry, inspection or maintenance.

6 If interruptions to supply of any service are required co-ordinate the shutdowns to the satisfaction of the Superintendent, advise the occupants, minimise inconvenience, and advise when supply is reinstated. Arrange shutdowns out of hours.

2.7.2 SERVICES/UTILITIES CONNECTIONS

1 If the utility provider elects to perform or supply part of the works, make the necessary arrangements. Install equipment supplied, but not installed, by the utility provider.

2 Connect to utility provider services or service points. Excavate to locate and expose connection points. On completion reinstate the surfaces and facilities which have been disturbed. Pay connection charges.

2.7.3 SYSTEM INTEGRATION

1 Interconnect system elements so that the installations perform their designated functions.

2.7.4 SETTING OUT OPENINGS AND MAKING GOOD

1 The Specification Drawings are diagrammatic only and unless otherwise stated shall not be used for determining the precise positions of equipment outlets and like features. The exact location of these shall be determined on site and/or from shop drawings.

2 All chases, ducts, recesses and penetrations in structural elements not shown on the building and structural drawings shall be subject to approval.

3 Provide the precise location of all openings, fixings and similar items of work required for these works.

4 Determine requirements at such times as not to cause delay to the work.

5 Check all items to ensure correct positioning.

6 Wrongly located or omitted openings, fixings and similar items of work resulting from incorrect or lack of inter trade coordination shall be remedied and paid for under these works.

2.7.5 WORKS PROGRAMME AND TIME CHART

1 Sufficient information of construction phase activities shall be provided to enable preparation of a detailed construction programme incorporating activities of every trades.

2 The programme of work shall be arranged in consultation with all Trades and the installation shall be completed according to the agreed programme.

3 The Works programme shall clearly show the start and completion dates with the typical activities listed below. The list is indicative.

4 Submission of shop drawings and major technical submissions.

5 Shop fabrication

6 Ordering of plant and materials.

7 Delivery of plant and materials.

8 Erection, testing and painting/identification of pipework/cable trays/ conduits/ducts in false ceilings.

9 Erection of pipe risers and installation of electrical wiring in vertical building risers before building riser walls are completed and closed.

10 Permanent power connection.

11 Commencement of fitting offs and final terminations.

12 Authorities acceptance tests.

13 Commencement of testing.

14 Commencement and Completion of plant commissioning.

2.7.6 METALWORK

1 General: Use metalwork capable of transmitting the loads imposed, and sufficient to ensure the rigidity of the assembly without causing deflection or distortion of finished surfaces. Construct to prevent rattle and nuisance.

2 Metal separation: Prevent contact between electrolytically dissimilar metals, by using concealed insertion layers.

3 Edges and surfaces: Keep clean, neat and free from burrs and indentations. Remove sharp edges.

2.7.7 FIXING

1 Fix all plant to structure in approved manner, either directly or via secondary structure as required. Submit details of types of fixings, locations and loads for approval.

2 Fix only light weight items to non-structural building elements.

3 Do not pierce waterproof roofs, floors or walls with fixings.

4 Fasteners to comply with appropriate Australian / New Zealand Standards.

5 Use proprietary corrosion resistant fasteners capable of transmitting the loads imposed, and sufficient to ensure the rigidity of the assembly. Use metal expansion bolts for concrete and masonry. Do not use explosive charge fixings without approval.

6 Corrosion protection: Use corrosion resistant, chemically and electrolytically compatible fasteners. Provide insulating spacers where necessary.

2.8 CO-ORDINATION

Comprehensive co-ordination of all services and associated building work form part of the Works. These responsibilities shall include:

1 Co-ordination of the works as required.

2 Management of the advance procurement of equipment to meet programme.

3 Co-ordination of in-ground and in-ceiling services routes, including trenching, trays and pipework.

4 Management of the preparation and approval of fully co-ordinated drawings including penetration drawings.

5 Management of services testing and commissioning

6 Ensuring provision of all test results and required certifications to obtain Certificate of Occupancy from the Building Surveyor.

During the construction period the works require that a competent supervisor is provided on site responsible for the comprehensive co-ordination of all engineering services, including civil, structural, electrical, mechanical, hydraulics, fire and lift services.

Responsibility for the proper direction, supervision, control and co-ordination of the work forms part of the works and shall assist all other trades in every way possible in meeting this responsibility.

All services shall be thoroughly co-ordinated prior to installation. Should work proceed without co-ordination being undertaken and authorisation by those with such responsibility and should other trades subsequently not be able to effectively proceed with their respective installation, the work initially undertaken shall be removed and reinstalled at the expense of the Contractor.

Any claims for additional costs or delays due to the lack of effective co-ordination by the various trades will be rejected.

Arrange and co-ordinate all interconnection testing with other services systems, e.g. fire mode tests, power failure testing, etc.

2.8.1 CO-ORDINATION OF INSTALLATION WITH CEILING TILES AND FINISHES

Co-ordination shall be carried out to ensure that all building and services elements such as air ducts, outlets and light fittings, sprinklers, speakers and other ceiling elements are installed in a co-ordinated manner , such that all services can be connected and maintained as indicated on the Architectural Reflected Ceiling Plans.

2.9 SAFETY IN DESIGN

Safety in Design risk management shall form an integral part of these works and shall conform to the requirements of the Workplace Health and Safety (WHS) Act 2011 & WHS Regulations 2011.

The Safety in Design process shall conform to the State-relevant Compliance and Guidance documentation.

General principles of risk management to be followed shall be as AS/NZS ISO 31000 (2009) Risk Management – Principles and Guidelines.

The National Standard for Construction Work (NOHSC:1016) shall be used to align design risk management practice with construction risk management practice.

The Safety in Design Risk Assessment shall include but not be limited to:

1. Understand the range of work activities associated with the intended use of the building / structure as a work place.
2. Identify hazards, assess risks (quantify and rank), identify control measures, implement control measures, review and prepare risk register prior to construction of work. Monitor and review throughout construction and operation. The process includes review and acknowledgement of residual risks identified and communicated by the designer as defined by the WHS Act and Regulations.
3. Elimination or where this is not reasonable practicable, minimisation of any risk to health and safety of any person. The process includes, recommendation of design alternatives that will eliminate / reduce risks, recommendation of control measures for residual risks; organising participate and facilitating Safety in Design workshops as required.
4. Report in writing, on health and safety aspects and risks of the design identified. Implementation of control measures which shall be monitored and reviewed throughout construction and operation.
5. Provide at the conclusion of the project all residual risk information, in the form of a Safety in Design File and the related instruction and training as required to ensure an understanding of the safety aspects of the installation.

Where local regulatory practice differs from the above the more onerous shall be used as the basis for compliance.

3 PROJECT REQUIREMENTS AND DESCRIPTION OF WORKS

3.1 GENERAL

Unless varied by Specification Addenda, the requirements set out below in this section are mandatory and no deviation is permitted.

List and allow in your tender form all of the items called in and listed in this section. No deviation from requirements of this section is permitted unless approved by Superintendent in writings during the tender process.

3.2 ROLES & RESPONSIBILITIES

3.2.1 OBLIGATIONS OF THE CONTRACTOR

1 In writing this Technical Specification the Client expects and relies upon the Contractor to provide its own personnel and its trades possessing specialist trade expertise necessary to complete the works in accordance with this Technical Specification which form part of the overall Contract documentation.

2 In addition, the Contractor has the following obligations:

3 To raise in good time, issues requiring design input or clarification from the Consultant Engineer, particularly in respect to:

- a interpretation of the Specification or drawings;
- b problems in complying with the Specification together with suggested alternative/substitutions;
- c matters in the Contractor's opinion, are omissions not discovered during the tender process, together with suggested alternatives/substitutions

4 To allow the design verification costs of the Consultant Engineer when suggesting alternatives and departures from this Technical Specification and accompanying Drawings.

5 .To certify compliance with Authority requirements.

6 To pay all fees applicable to the works.

7 To obtain all Authority permits and certificates to allow the progress of the work.

8 To provide manufacturer's and construction drawings of sufficient detail to allow proper fabrication, co-ordination and installation and a scale not less than 1:50; incorporating all post-tender changes to architectural and structural drawings.

9 To provide samples and prototypes where specified.

10 To provide manufacturer's factory test records (type tests and witnessed tests) and site installation inspection and sign-off certifying that the completed installation comply with the manufacturer's installation guidelines and requirements

11 To provide the completed Services installation that is fully and correctly commissioned and fine-tuned and, that is functional and operable efficiently in compliance with all requirements of this Technical Specification.

12 To provide copies of all monthly/ quarterly maintenance and servicing reports required to the Consultant Engineer.

13 To certify compliance with Contract documents, including all variation instructions, at Practical Completion

3.2.2 CONTRACTOR'S DESIGN RESPONSIBILITIES

1 Specifically for specialist services trades, the Contractor shall be responsible for the detailed design activities listed below, as these activities are considered to be normally undertaken through the custom and practice of the industry.

2 The Contractor shall be responsible for ensuring that the detailed design undertaken is fully co-ordinated and compatible with the remainder of the project design.

3 Check space requirements of equipment and services which are indicated diagrammatically in the Contract documents. Select equipment with dimensions to suit the available space.

4 Lay out equipment and services to be accessible for operation, maintenance and replacement and so as not to interfere with access to other installations. Make offsets as necessary.

5 Set out access ways 2.1m high and 1.0m wide (minimum) to all major plant clear of all obstructions, unless otherwise approved.

6 Co-ordinate the layout of plant and services with the building layout and structure, and with other plant and services.

7 Neatly group services, with separate layers for crossing services.

8 Interface details with other trades.

9 Size and location of penetrations in walls and floors.

10 Physical co-ordination of installation with other trades.

11 Provision of electrical loads to electrical trade and compare with design loads cable sizes and circuit protection devices, seeking design direction where discrepancies occur.

12 Co-ordination of the construction of the installation.

13 Details of electrical wiring and control diagrams of all equipment supplied showing all interconnections between equipment to enable the necessary wiring to be undertaken.

14 Thermal expansion accommodation and anchorage, including provision of bellows or bends, taking into account final installation details and consistent with specified requirements.

15 Mounting, support and fixing details, and fasteners, including any secondary structure which may be required.

16 Cable installation details and derating factors.

17 Settings for protection equipment, time delays, time switches etc.

18 Capacity, location, design and sizing of cable support, trunking and conduit systems.

19 Acoustic design or modification of actual selected equipment that may require change, to meet with the noise levels specified. Such change to approval of the Consultant Engineer. Specified levels to be achieved with all plant operating.

20 Selection of all anti-vibration mountings to suit the particular application of the mounts

3.3 DESCRIPTION OF WORKS

Whether or not particular works are described in the Technical Specification all items and materials needed for the complete works are required and shall be installed unless clearly excluded.

The project includes the detailed design, supply, delivery, installation, commissioning, tuning, testing, placing into service, maintenance, warranty and defects liability of materials, labour and plant of the services systems in accordance with this Technical Specification. All components and systems shall be complete in every respect and tested and commissioned unless otherwise noted specifically.

3.3.1 GENERAL

1 Allow to decommission, make safe and remove any existing redundant services to be deleted within the area of works.

2 Site visit and familiarisation with the site conditions and scope of work required under this contract and making required allowances to complete the works.

3 All necessary negotiations including formal submissions as required with all Authorities/utilities having jurisdiction including obtaining of design approval and final certification of the installed systems by an independent certifier approved by the Authority. Payment of all fees associated with the authorities/utilities connections and permits for the installation

4 Provision of detailed safety in design analysis and ensure the installation is in compliance with the Site's safety in design proposal including all regulatory requirements.

5 Engagement and Coordination with the Green Star / Sustainability Consultant and the Independent Commissioning Agent, including timely preparation of documents as required by them

6 Allow for all requirements in relation to alternatives proposed for the project. Allow for Consultant Engineer review cost based on agreed market hourly rates. These sums are to be paid irrespective of the alternatives being selected or not.

7 Collaboration and working with Mechanical Trade who is responsible for the management and coordination of overall services shop drawing process including providing timely input into the process to allow fully coordinated shop drawing production for all services Active engagement and provision of nominated staff for input into the multidisciplinary coordination workshops in relation to shop drawing

production as well as onsite installation methodology and integrated commissioning of multi-disciplinary interfaces

8 Coordinate with the Electrical trade and advise final equipment selections and their power requirements prior to their ordering and installation of submains to respective switchboard to ensure correct submain cable selections- Submains cabling from the MSB is provided to the primary Lift switchboards. Provide all lugs, cable glands and gland plates for the Electrical trades so they can terminate the cabling and do the final connection to your respective switchboard. Any submains/subcircuit to secondary switchboards/control panels shall be included in the respective services (Vertical Transportation) Works Packages

9 Provision of QA plan including inspection, testing, commissioning ITPs for all systems installed

10 Preparation of "For Construction" and "Shop Drawings" coordinated with other services prior to commencement of works including services layouts at the same scale as the design drawings.

11 Provision of all samples and technical submissions. The technical data shall consist of the completed Technical Data form. The samples required, for each substantially different design, are:

- a internal lift car finishes including:
  - i wall and ceiling finishes
  - ii car lighting
  - iii car operating panels and indicators
  - iv buttons.
- b landing controls including:
  - i landing call button station including button
  - ii hall lanterns.

12 Identification and coordination of penetrations, provision of fire/smoke sleeves and sealing of all wall, floor, ceiling penetrations to the required fire/smoke/acoustic rating.

13 Provision of necessary requirements for adequate Noise and vibration controls as detailed further in this specification including vibration isolation for all rotating equipment.

14 Provision of seismic restraints, including design.

15 Provision of all painting and finishes including identification and labelling schedules,

16 Provision of As-Built drawings and O&M Manuals in compliance with a uniform overall Site Services Documentation System.Provision of all training for staff in the operation and preventative maintenance of the systems .Training of the nominated building facility management staff to the level of understanding of day by day operation of the services systems

17 Twelve (12) months statutory testing, servicing, maintenance, defect liability and warranty of all services systems/equipment installed under this contract from the date of Practical Completion

18 Fine tuning commissioning of all systems during the defects liability period as per Green Star/NABERS requirements. The tuning shall involve inspection, check and all adjustments of all systems and controls every three (3) months after the date of Practical Completion. Detailed final recommissioning of all systems shall be carried out at the end of the defect liability period.

3.3.2 INTER SERVICES WORKS

1 Provision of wire mesh screens to meet the requirements of AS1735.2 (clause 5.3) on the inside face of the lift well to suit ventilation opening at the top of lift well. MRL Lifts only

2 Provision of lighting and power outlets within the lift wells

3 Provision of Telephone cabling from lift car to connection box(es) (supplied part of Electrical Works Package)

4 Hands free operation, self-latching auto dial telephone in each Car Operating Panel (COP) operated by button press, able to operate independently of any proprietary lift monitoring system

5 Provision of lift telephone cabling from Junction Box at the lift overrun to each lift car

6 Provision of Access Control and CCTV cabling from lift cars to connection box(es) supplied

7 Installation only of access control card reader in lift COP's, and landing stations where required

3.3.3 OVERALL SYSTEMS

1 Provision of a complete Lift services system inclusive of all equipment, controls, certifications, finishes, landing stations, landing indicators, car operating panels/ displays/buttons, interfaces as further detailed herein and/or shown on the drawings

3.3.4 SCHEDULES LIFTS

DESIGNATION		LIFT
No. of units in Group		One
Lift Numbering		Lift No. 1
General	**Load (kg)**	2000
	Load Rating	Pass / Goods A
	Passengers (No.)	26
	Speed (m/s)	1.0
	Machine type	G'Less
	Control System	Conventional
	Drive System	VVVF
	Front opg's	G, 1
	Rear opg's	Nil
	No. Stops	2
	Access Control	Yes (Low Level)

DESIGNATION		LIFT
	Stretcher Carrying Capacity	Not Required
	Emergency Lift Requirement	No
Car sizes	**Inside Car Width**	2,350
	Inside Car Depth	1,700
	Inside height to false ceiling	2,300
	Roof pocket	Nil
Doors	**Type**	2-PC
	Clear width	1,200
	Clear height	2,100
	No. entrances per lift car	One
Liftwell	**Clear Width**	3,100
	Clear Depth	2,100
	Pit depth	1,400
	Travel	
	Headroom	4,000
	Pit to solid earth	Yes
Machinery Space	**Separate from liftwell or MRL**	MRL
Special Operations	— Exclusive Service — Lift Recall Facility — Backup battery — Regenerative drive (Optional)	

3.3.5 LANDING STATIONS / INPUT PANELS

APPLICATION	LIFTS WITH CONVENTIONAL CONTROL
Quantity	Single Lifts: One riser
Design	Landing button station shall be of the Standard VT sub-contractor flush mount design, incorporating buttons as detailed in this specification.

3.3.6 LANDING INDICATORS

APPLICATION	LIFTS WITH CONVENTIONAL CONTROL
Design	Hall lantern shall be of the flush mount design. Standard VT Works Package design with jewel of lantern projecting a minimum 20mm from face plate
Display	N/A.

3.3.7 CAR OPERATING PANEL

APPLICATION	LIFTS WITH CONVENTIONAL CONTROL
No. panels per car	Two (2) one Main and one Auxiliary
Design	Standard VT Works Package Design to meet the requirements of AS1735.12 and incorporate buttons as detailed in this specification.
Fan operation	Via push button with adjustable timer

3.3.8 LIFT CAR DISPLAYS

APPLICATION	LIFTS WITH CONVENTIONAL CONTROL
Type	Standard LCD digital position and direction car information display.
Number and Location	One on each COP, located between 1,800 and 2,100 above the car floor level.
Level allocated display	Nil

3.3.9 BUTTONS

APPLICATION	ALL LIFTS, BUTTON STATIONS AND COP'S
Type	Dewhurst US95-15 Braille Dual Illuminating type or approved equivalent
Colours	Buttons shall be backlit in white and when pressed illuminate blue or other approved colour combinations. The emergency communication button shall illuminate yellow when activated as per the requirements of EN81.

3.3.10 FIXINGS

APPLICATION	ALL FIXINGS
Type	Secret fixings or screw fixings – Delco tamper proof or approved equivalent

APPLICATION	ALL FIXINGS
Finish	Any visible fixings that cannot be secret shall be the same finish as the faceplate

3.3.11 KEY SWITCHES

APPLICATION	ALL KEY SWITCHES
Type	BiLock or approved equivalent
On Landing Stations	Provide the following Key-Switches: — Fire service at level G landing station. — Lift on/off keyswitch at level G
On Main COP	Provide the following Key-Switches: — Lights (3 position – off, on, and emergency light test). — Exclusive service (3 position – off, on, and park).

3.3.12 DOORS

APPLICATION	DOORS
Type	Horizontal sliding
Door Sills	Anodised aluminium
Entrance monitoring	Panachrome 3D or approved equivalent.

3.3.13 LANDING ENTRANCES

APPLICATION	LANDING ENTRANCES
Frame Finish	No. 4 Linished Stainless Steel
Frame Type	Full depth including projection beyond wall finish.

3.3.14 PROTECTIVE BLANKETS

APPLICATION	PROTECTIVE BLANKETS
Type	Padded fire resistant
Quantity	One set for lift 1

3.3.15 CAR GUIDE SHOES

APPLICATION	CAR GUIDE SHOES
Type	Roller guides or silent running sliding shoes.

3.3.16 TRAVELING CABLES

APPLICATION	
Allowance	In addition to those required for normal lift function allow: 1 6 x shielded twisted pair cables, 1 x Cat 6 cable plus one co-axial cable shall be provided for the following: a Emergency Phone b Access Control c CCTV d EWIS/PA
Spare	Allow 10% spare single core, twisted pairs and double insulated power cables.

3.3.17 LIFT CAR INTERIORS & APPOINTMENTS

LIFT CAR FINISHES

A weight allowance of 600kg is to be allowed for lift car finishes (including floor finish).

ENTRANCE WALL	From manufacturers, standard range of finishes.
WALLS SIDE	From manufacturers, standard range of finishes.
WALLS REAR	Above handrail to be mirror finish and below to be from manufacturers premium range of finishes.
WALLS FRONT RETURN	From manufacturers, standard range of finishes.
SKIRTINGS	From manufacturers, standard range of finishes.
HANDRAILS	In accordance with AS1735.12.
FLOOR	To be supplied by others, allow for 20mm tiles.
CEILING/FALSE CEILING	From manufacturers premium range of finishes.
LIGHTING	High efficiency LED lamps. Lights shall be automatically controlled as detailed in the controls section of this specification.
PASSIVE CAR WALL VENTILATION	As required by AS1735

APPOINTMENTS

	APPLICATION
Landing Station faceplates	No. 4 Linished Stainless Steel
Landing Indicator faceplate	No. 4 Linished Stainless Steel
Landing Indicator jewel	White polycarbonate
Car Operating Panel(s)	No. 4 Linished Stainless Steel
Car Doors	No. 4 Linished Stainless Steel
Landing Doors	No. 4 Linished Stainless Steel
Door Jambs	No. 4 Linished Stainless Steel

3.4 SHOP DRAWING AND CONSTRUCTION DRAWING REQUIREMENTS

1 Prepare and submit dimensioned drawings showing details of the fabrication, layout and installation of all plant and equipment, including relationship to building structure and other services.

2 Prepare and submit drawings of penetrations and “built-in” components in the same form and manner as described for the processing of shop drawings. All penetration measures shall relate to grid lines, co-ordinates or relative levels.

3 Submit co-ordinated penetration drawings in sufficient time for review. Any failure to submit requirements within sufficient time for revision of structural drawings, resulting in re-working of the structure or re-ordering of structural components shall be solely at the expense of the Contractor and shall not constitute any claim for variation or delay.

4 Provide drawings generally in accordance with the design drawings supplied with this specification.

5 Sheet sizes: Standard metric series, all sheets the same size. Plantroom layout plans 1:50 scale, with sections and details at 1:20 scale. All services Floor plans at 1:100 scale, with detailed sections.

6 Drawings:

7 Access to and removal of all plant including locations and sizes of access doors to be installed in finished building surfaces.

8 Schematic and layout drawings of piping, ducting, tray and conduits, electrical and controls.

9 Switchboard and control panel layouts and schematics with terminal numbering.

10 Locations of all control sensors, valves and actuators.

11 Detail of all interfaces with other services and utilities.

12 Services co-ordination drawings for spatial co-ordination with building structure and other services with details for restricted locations.

13 Control logic diagrams with settings.

14 Foundations, plinths, chases, ducts, pits and penetrations through structure.

15 Layout and details of services cast in concrete.(for co-ordination and review by structural engineer /architect)

16 Structural support details and methods of fixing to structure.

17 Construction loadings (for structural engineer review).

18 Lifting point loads.(for structural engineer review)

19 Maintain current sets of drawings on site and progressively record variations which lead to creation of as-built drawings.

20 A manufacturing drawing will not be satisfactory as a Shop Drawing if it does not clearly indicate the finished appearance and dimensions and interrelationships of the Equipment depicted even though it may be suitable for manufacturing purposes in which case a separate Shop Drawing shall be submitted

21 Please note when shop drawings review comments states “satisfactory subject to comments”, resubmit the revised drawings with comments incorporated within a period of no longer than 2 weeks. However this should not stop the installation works.

A1 Lift shop drawings

22 The following lift Shop Drawings shall be provided as a minimum:

- a Lift layouts.
- b Lift car interiors.
- c Lift landing entrances.
- d Lift car and landing faceplate appointments.
- e Lift notices, labels and signs.
- f Any other item of equipment visible to a normal user of the finally installed equipment.

23 These Shop Drawings shall show the following information:

- a Lift layouts:
  - i The layout shall show the following minimum information to demonstrate that the Works will meet the specified requirements and to ensure that the end user is provided with sufficient detail for future technical reference in the form of “as installed” data and that the design team members have the information needed to design their elements associated with the lift; some information may be provided in an alternative format to the Layout if done so in an acceptable manner.
  - ii Such information as may be required by the architect and structural engineer to ensure that the lift enclosure and structural supports will be dimensionally and structurally adequate for the proposed lift, Including where applicable building grid references and relationships thereto and North orientation and enclosure details and penetration details and monorail and lifting eye and beam and hatch and plinth and vision window details and the like and loads imposed on the building including appropriate impact allowances and earthquake loadings and

indication of which loads may act simultaneously and in which direction. Elevations on the entrance enclosure wall shall be viewed from the lobby and not from the liftwell.

iii Such information as may be required by the Consultant Engineer to ensure that the HVAC requirements of the lift are provided; such information as may be required by the Consultant Engineer to ensure that the power supply requirements of the lift are provided; such information as may be required by the Consultant Engineer to ensure that the fire prevention and detection requirements of the lift are provided; such information as may be required by the Consultant Engineer to ensure that the hydraulics requirements of the lift are provided; such information as may be required by the Consultant Engineer to ensure that where applicable the access control and communication and surveillance requirements of the lift are provided.

iv Code classification such as Passenger or Class of Goods.

v Major equipment details Including where applicable rated load and speed and acceleration, machine type, motor size and rating, control system type and model, safety gear type, Power Door Operator type and model, guide rail sizes, rail loading data for "C" class Goods lift, hydraulic ram size, etc.

vi Liftwell plan including clearances and dimensional relationships between adjacent elements and showing finished dimensions of lift car and entrance and liftwell enclosure and major steel work and general landing entrance frame profiles and pit door location.

vii Where a separate machine room then the machine room plan showing all lift equipment Including machine and controller and governor and circuit breaker and location and size of major associated plant such as machine room air conditioning equipment.

viii Vertical section through the liftwell and machine room if separate showing major vertical dimensions and relationships Including where applicable entrance height, inside car height, car false ceiling height, pit depth, false floor height, pit door height, levels served, level designations, Reduced Levels of finished floor levels of floors served, vertical dimensions between all levels served, total travel between terminal floors served, liftwell headroom between top level served and underside of structure over liftwell, and height of machine room structure and monorails and lifting eyes therein, and height of major associated plant such as machine room air conditioning equipment.

ix An elevation on each different entrance wall viewed from the lobby showing finished landing entrances and landing appointments and their relationships to finished floor levels and to each other.

b Lift car interiors:

i The drawing shall show the visible finishes and dimensions of all visible elements of the car and car doors Including the floor, walls, skirtings, handrail, false ceiling and ceiling.

ii Finish specifications that completely describe the material.

iii Car faceplate appointments as dimensioned shapes with their relationship to the car floor and walls and description as to their function e.g. main car operating panel, auxiliary operating panel, etc.

iv Fittings and descriptions such as light fittings and lamp specifications, and surveillance camera if any.

v Ventilation details including natural and mechanical.

vi How mechanical ventilation avoids directly drawing air from adjacent natural ventilation slots at top of car walls.

vii Complying regarding fire hazard properties.

viii Construction behind Visible panels on those walls not containing entrance and handrails allowing removal of panels and handrails from within lift for repair and replacement.

ix Constructed so as to allow Complying continued use of lift until panels and handrails replaced (excepting only handrail requirements for disabled use which may apply).

c Lift landing entrances:

i The drawing shall show an elevation from the landing and a section through the architrave and a sectional plan through the entrance.

ii The profile in plan and elevation of the architraves shall be shown and dimensioned including jamb depth, projection beyond finished wall, face width, return beyond finished wall, method of fixing and relationship of head to jambs where visible.

iii Radii and projections shall be dimensioned.

iv Construction whether welded or bolted shall be specified.

v Landing doors shall be shown.

vi Material and finish shall be specified.

vii The elevation shall show the adjacent landing faceplate appointments as shapes with a description as to their function e.g. call button faceplate, hall lantern faceplate, etc, and shall dimension the relationship of the faceplates to the floor and adjacent landing entrance.

d Lift car and landing faceplate appointments:

i The drawings shall show in large scale the faceplates and all appointments and fixings including third party access control fixtures.

ii Material and finish shall be specified.

iii Surface engraving method and infill shall be detailed.

iv Method of fixing and hinging shall be detailed.

v Projecting elements shall be dimensionally defined.

vi Font style shall have been previously ascertained from the architect.

e Lift notices and labels and signs:

i The drawing shall show in large scale all visible labels and signs.

ii Material and finish shall be specified.

iii Method of fixing shall be detailed.

iv Surface engraving method and infill shall be detailed.

v Font style shall have been previously ascertained from the architect.

f Other lift items of visible equipment.

24 The drawings shall show all other items of equipment visible to the user that are not specified above, and items that the building manager or designate may use such as monitors and displays and controls.

3.5 SITE PROVISIONS & BUILDING WORKS IN CONNECTION

1 This clause is provided to highlight the project requirements in relation to the Site provisions as well as Building Works In Connection BWIC and to ensure that they have been allowed for part of the Contractor Tender submission. Contractor is responsible for demarcation of tasks and responsibilities between various trades in relation to these items to suit his/her delivery methodology.

2 Site Provision include but not limited to;

3 Hoisting and Lowering:

4 Scaffolding:

5 Temporary Services – Water, Electricity:

6 Site facilities including Sheds.

7 Power & Fuel for Testing and Commissioning

3.5.1 BUILDING WORKS IN CONNECTION

1 Allow for the following ; Demolition:

a Services decommissioning, disconnection from supply, capping and sealing.

b Services demolition and removal.

c Ground Works: Services trenches; excavation and backfilling.

i Concrete:

A Chasing, coring, cutting and making good.

B Placing, casting in and protection of pipe sleeves and conduits.

C Bases and plinths for equipment (excluding galvanised steel edge surround to be provided as part of the Mechanical Services Works Package).

D Piers and beams under cooling towers, fluid coolers and adiabatic coolers.

E Water-proof curbs round floor penetration in plant rooms.

ii Masonry:

A Chasing, coring, cutting and making good.

B Plant enclosures, masonry air ducts and service risers.

iii Structural Steel:

A Lifting beams.

B Platforms and walkways for maintenance to equipment.

iv Roofing:

A Openings and under flashings including over flashings

B Services works.

C Roof access walkways.

v External Walls

A Metal louvre grilles complete with bird mesh for air intakes and exhausts.

vi Internal walls

A Setout of cutouts including cutout and trimming of openings

vii Doors:

A Cut-outs in doors and trimming of openings

B Undercutting of doors for ventilation purposes.

C Access doors and hatches for maintenance of Services equipment.

viii Ceilings:

A Removal and replacement of ceiling tiles.

B Co-ordination of penetrations.

C Ceiling access panels to equipment, valves, dampers and duct access panels above solid ceilings.

D Sealed air Plenums for smoke exhaust systems.

ix Dry wall/ Plenum Construction

A Sealed air plenums for supply and exhaust systems where show on the drawings, including fire rating and thermal insulation where required.

B Co-ordination of penetrations.

C Vapour barriers within walls where required.

3.6 SERVICES INTERFACE WORKS

Contractor is responsible to carry out the works outlined under all contract documents including this Specification to achieve a fully operational installation including all required interfaces between various systems. Whilst the responsibilities for interface works and division of works is solely with Contractor the following information is provided for guidance only. Contractor has full control to alter and modify the trade allocation/demarcation of interface works to suit the Contractor's overall programme and delivery methodology in order to achieve a fully integrated, interfaced and operational whole services installations, systems and sub-systems.

Table below indicate key areas where different work packages will interface with each other. Column 1 indicate the disciplines/work packages identified and column 2 & 3 outline the key interface works between these two work packages.

	DISCIPLINE 1	DISCIPLINE 2
VT 1 / Mech 2	— Confirmation of all heat loads that will arise in lift machine areas for determination of ventilation louvre sizing. — Supply and installation of wire mesh screens to meet the requirements of AS1735.2 (clause 5.3) on the inside face of the lift well to suit ventilation opening at the top of lift well. MRL Lifts only.	— Provision of vermin proof and weather proof ventilation grille and fire damper on the outside of the lift well to suit the ventilation opening at the top of lift well. MRL lifts only
VT 1 / Elec 2	— Coordinate the final location of Lift control panels switchboards for submains reticulation. Termination of submains cables for non MRL lifts. Final connection of submains for MRL lifts part of VT Works Package. — Telephone cabling from lift car to connection box(es) supplied. — Install and connect CCTV cameras in lift car — Access Control and CCTV cabling from lift cars to connection box(es) supplied — Hands free operation, self-latching auto dial telephone in each Car Operating Panel (COP) operated by button press, able to operate independently of any proprietary lift monitoring system. — Provision of lift telephone cabling from Junction Box at the lift overrun to each lift car — .Provision for access control card reader in lift COP's, and landing stations where required.	— Coordinate the final location of Lift control panels switchboards for submain reticulation. Final connection of submains for MRL lifts part of VT Works Package — Provision of communication connection box(es) at the lift overrun, for the telephone system and connection thereto, and cabling from connection box(es) to the Building Distributor. — Supply of CCTV camera and any enclosure and mounting bracket — Co-ordinate the wiring / cabling system requirement for access control and CCTV — Supply, install and commission access control card reader. — Provision of HLI from security system to lift management system computer, or lift controller to access control and alarm monitoring.
Fire 1 / VT 2	— Provision of fire detection system in lift wells above the controller. Supply and install cabling at the lift overrun for the OWS and connection there to. — Provision of OWS speakers for installation by VT	— OWS cabling from lift cars to connection box(es). — Install and connect OWS speakers in lift car.

3.7 USE OF LIFT FOR CONSTRUCTION

1 For the purposes of this clause "Construction Use" shall mean the carrying of people or materials in or on a lift other than for the purposes of installing and testing and commissioning by the VT Works Package and "legal" use shall mean the satisfaction with the condition of the lift by the Authority having jurisdiction over the acceptable use of a lift for the use to which it is put.

2 Should a lift be used for Construction Use prior to Practical Completion of that part of the Works the following shall apply;

a The Consultant shall have no responsibility in regard to any aspect of such use.

b The lift shall be used safely and legally including separation and guarding from any adjacent lift and supervision of its use and adequate maintenance and emergency communication and the rescue of trapped passengers.

c The lift shall be adequately protected against damage, wear and tear for the use to which it is put.

d The lift and its environment shall be restored to the same condition and cleanliness as applied before such use commenced.

4 DESIGN AND PERFORMANCE CRITERIA

4.1 GENERAL

1 The following standards are applicable throughout the project.

2 National Construction Code (2016) (Referred throughout this specification as NCC) including all relevant Australian Standards called in the NCC

3 Relevant Occupation/Workplace Health and Safety legislation

4 The Environmental Protection Authority

5 Workcover

6 Any other Authority having jurisdiction over all or part of the installation to ensure that the equipment and installation, when manufactured and installed, will comply with the rules and regulations.

The following standards are applicable throughout the project as a minimum. Where items of equipment are required the relevant Australian Standard to the equipment will apply. If clarification required Contractor shall seek clarification at the time of tender.

Where Australian Standards and Codes do not exist, the appropriate British Standard or Code shall apply.

Details of documents applicable to this:

4.2 AUSTRALIAN/NEW ZEALAND STANDARDS & CODE (VERTICAL TRANSPORTATION SERVICES)

STANDARD / CODE	*TITLE*
AS 1428.1	Design for access and mobility – General requirements for access – New building work
AS 1428.2	Design for access and mobility – Enhanced and additional requirements – Buildings and facilities
AS 1428.3	Design for access and mobility – Requirements for children and adolescents with physical disabilities
AS 1735.1	Lifts, escalators and moving walks - General requirements
AS 1735.4	Lifts, escalators and moving walks – Service lifts – Power-operated
AS 1735.5	Lifts, escalators and moving walks - Escalators and moving walks
AS 1735.7	Lifts, escalators and moving walks – Stairway lifts
AS 1735.8	Lifts, escalators and moving walks – Included lifts

STANDARD / CODE	TITLE
AS 1735.9	Lifts, escalators and moving walks – Special purpose industrial lifts
AS 1735.11	Lifts, escalators and moving walks – Fire-rated landing doors
AS 1735.12	Lifts, escalators and moving walks - Facilities for persons with disabilities
AS 1735.14	Lifts, escalators and moving walks – Low-rise platforms for passengers
AS 1735.15	Lifts, escalators and moving walks – Low rise passenger lifts – Non-automatically controlled
AS 1735.16	Lifts, escalators and moving walks – Lifts for persons with limited mobility – Restricted use – Automatically controlled
AS 1735.17	Lifts, escalators and moving walks – Lifts for people with limited mobility – Restricted use – Water-drive
AS 1735.18	Lifts, escalators and moving walks – Passenger lifts for private residence – Automatically controlled
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
CIBSE	Commissioning Codes
EN81	Safety rules for the construction and installation of lifts
ISO 14798	Lifts (elevators), escalators and moving walks — Risk assessment and reduction methodology
ISO 22559	Safety requirements for lifts (elevators)
NCC	Section E

4.3 SEISMIC RESTRAINTS

4.3.1 DESIGN STANDARD

1 NCC - Building Code of Australia.

2 AS1170.4 - Structural design actions - Earthquake actions in Australia

4.3.2 DESIGN PARAMETERS

The following design parameters shall be used to design the Engineering Services equipment and fastenings as per AS1170.4:

Importance Level	TBA
Site Sub-Soil Class	TBA

Design and install the scope of works to withstand the earthquake forces determined from the above design criteria in accordance with the requirements of the BCA and AS1170.4.

4.4 DESIGN AND PERFORMANCE CRITERIA (VT SERVICES)

4.4.1 REQUIREMENTS FOR ACCESS BY THE DISABLED

Lift designated as passenger lifts shall comply with AS1735 Part 12

1 Where there is a difference between a minimum requirement of AS1735 Part 12 and a requirement of the Specification that also complies with AS1735 Part 12 the requirement of the Specification shall be complied with.

2 Where there are options within AS1735 Part 12 they shall be selected as follows:

4.2	4.2.B – BEAMS.
4.3	4.3.a – at least 3 seconds of advance warning of arrival at the floor.
8.5	8.5.b.(i) – non-oral sounds.
8.6	8.6.1 – locate on the same wall as the Car Operating Panel
10.3	10.3.(b) – internally illuminating control buttons.

4.4.2 ELECTRICAL INFORMATION

1 Power Factor Correction shall not be less than 0.95.

2 The following table of electrical information is to be considered when selecting the equipment for this project.

UNIT >>>>>>		*LIFT 1*
Prospective fault level at point of connection of lift sub-main to the lift distribution board.	kA	6
Size of LMR A/C circuit breaker to be provided	Amp	40
Proposed size of sub-mains	No Cables x No Cores x Size (actives & Neutrals)	4 x 1 x 10sqmm
No. of Elec feeds per nominated lift or group	No.	1
Run on essential power	Yes / No	No

4.4.3 NOISE AND VIBRATION REQUIREMENTS

1 Measures necessary to maintain noise and vibration requirements shall be implemented Including use where appropriate of isolating pads or mountings, loaded to manufacturer's recommendations, Including hoisting machine, controller, penetrations between machine space and liftwell if appropriate, switchgear, sheave, guide shoes, door mechanism, rope hitch and chain.

2 Prior to Practical Completion and as part of the normal testing and commissioning procedures the lift machinery noise shall be subjected to acoustic measurements in order to determine their compliance with the Specification. Sound level measurements shall be made outside normal working hours.

3 Sound levels shall be measured in "A" weighted decibels or dB(A).

4 The Equipment or Equipment machinery noise shall be described by the maximum sound level occurring during the measurement period or L_{max} value. The sound level measured shall be representative of the overall sound pressure level for the frequency range bounded by and including the 31.5 Hertz and 8k Hertz octave bands.

5 Where the sound level varies considerably with time, as is the case with lift pass-by noise and other single event levels, the L_{max} sound level shall be measured on 5 to 10 occasions and arithmetically averaged.

6 In occupied areas such as lift lobbies and inside lift cars, measurements shall be made at positions where people would normally be located, approximately 1.0 to 1.5 metres from any wall or flat surface.

REQUIRED NOISE AND VIBRATION MEASURES – LIFTS

1 The following table describes some required measures and the maximum allowable sound level at various locations within the building under different operating conditions, subject to a tolerance of 2dB(A).

APPLICATION	L_{MAX} DB(A)
Inside lift car measured at least 1 metre away from any flat surface with ventilation switched on while the ambient noise level in lift lobby is at least 5dB(A) below the event limit.	
Lift levelling into floor with doors opening and with doors closing	58
Lift accelerating and decelerating	55
Lift running at contract speed	55
Inside lift foyer, lift passing floor while the ambient noise level in lift lobby is at least 5dB(A) below the event limit	55
Inside machinery space with machine running while lift performs journey of at least one floor run	82
Inside liftwell while lift performs journey in each direction between bottom and top terminal floors	70
Vibration emanating from Equipment shall not be apparent in occupied areas of the building other than plant rooms.	

GUIDE RAIL SUPPORTS

To minimise structure borne noise from the lift equipment, guide rail brackets and trimmer beams shall be positioned vertically as follows:

1 Coincident with floor slabs at each level.

2 Midway between floor slabs.

5 PAINTING, PROTECTION AND IDENTIFICATION

5.1 GENERAL REQUIREMENTS

1 Select painting and finishes in accordance with the area environmental conditions.

2 Review the risk assessment and statutory and authority requirements completed as part of the system testing, commissioning and handover requirements and provide labelling and signage as determined.

3 Where exposed to view paint exposed equipment, cable trays, ductwork and pipework

4 Where ductwork, pipework, cable trays exposed to view is not specified to be painted, all factory and installation markings shall be removed.

5 All black steel surfaces and surfaces subject to corrosion shall be primed with at least two coats of primer and protected.

6 Protect all items of work during dispatch and whilst on site during progress of installation.

7 Fabricated pipe and steelwork shall be delivered to site prime coated

8 Concealed pipe work to be prime coated

9 If exposed to view, paint new services and equipment including in plant rooms, except chromium, anodised aluminium, GRP, UPVC, stainless steel, non-metallic flexible materials and normally lubricated machined surfaces. Repaint proprietary items only if damaged.

10 Do not combine paints from different manufacturers in a paint system.

11 Remove or protect fixtures, equipment, surfaces and labels before starting to paint, and re-instate after completion of painting.

12 All internal surfaces of air outlets and openings exposed to view shall be painted matt black

13 Repair factory finishes if damaged with identical finishes.

14 Finish visible joints made by welding, brazing or soldering using methods appropriate to the class of work (including grinding or buffing) before further treatment such as filling, painting, galvanising or electroplating.

15 If galvanised surfaces have been cut or welded after galvanising, prime the affected area using zinc rich organic binder AS/NZS 2312.

16 Before applying coatings to metalwork, complete cutting, drilling and other fabrication, remove all grease, oil and other contaminants and prepare surfaces to AS 1627.0

17 Use relevant Australian Standards for the following finishes; Galvanising, Electroplating, Anodising, Thermoset powder coating, Two-pack liquid coating, Air-drying enamel, Stoving enamel

5.2 SUBMISSIONS

1 Provide the following submissions or samples:

- a Proposed Labelling Systems.
- b Schedule of statutory, maintenance and operating signage.
- c Valve Identification

5.3 CORROSION PROTECTION

5.3.1 GENERAL

1 Apply corrosion protection measures to all metallic surfaces.

2 Select an appropriate protective coating system to suit atmospheric corrosivity category as defined in referenced Standards/Codes.

3 Fastenings are to be protected to have a corrosion resistance equivalent to the parts fastened.

4 All welding is to be completed before any corrosion protection treatment is applied.

ATMOSPHERIC CORROSIVITY CATEGORY	TYPICAL EXTERIOR ENVIRONMENTS	TYPICAL INTERIOR ENVIRONMENT
C1: Very Low	Few alpine regions	Heated or air conditioned buildings, such as most of commercial buildings. Unheated or non-air conditioned buildings in semi-sheltered locations remote from marine or industrial influence
C2: Low	Dry, rural areas as well as other regions remote from the coast or sources of pollution. Typical areas occur in arid and rural inland regions, most inland cities and suburbs of cities on sheltered bays.	Unheated or non-air conditioned buildings, where some condensation may occur, such as warehouses and sports halls, can be in this category. Proximity to the coast is an important factor.
C3: Medium	Coastal areas with low salinity	Food processing plants, laundries, breweries, printing works, dairies
C4:High	Sea-shore (calm)	Swimming pools, dye works, paper manufacturers, foundries, smelters and chemical processing plants, livestock buildings
C5-I: Very High (Industrial)	Sea-shore /offshore	-
C5-M: Very High (Marine)	Shoreline (severe surf)	Adjacent to acidic processes
T: Inland Tropical	Non-coastal tropics	-

5.3.2 PROTECTION FOR STEEL SURFACES

1 Apply corrosion protection to meet the performance criteria scheduled in the table below.

2 Standards of surface preparation procedures and of corrosion treatments are to meet the specified criteria and the referenced Standards/Codes for the relevant application.

3 Surface preparation procedures and coating systems for corrosion protection are to meet all relevant requirements of the referenced Standards/Codes.

ATMOSPHERIC CORROSIVITY CATEGORY	SURFACE PREPARATION	COATING SYSTEM
C1: Very Low	Class Sa 2½ Blast Cleaning 'Very thorough' (commonly called 'near white') blast cleaning which removes millscale, rust and foreign particles to the extent that only traces remain.	1st Coat – zinc phosphate alkyd primer, 75 micron thick 2nd Coat – full gloss alkyd finish, 50 micron thick 3rd Coat – full gloss alkyd finish, 50 micron thick **Or** Factory applied zinc primer and thermoset powder coated finish
C2: Low	Class Sa 2½ Blast Cleaning	1st Coat – zinc phosphate alkyd primer, 75 micron thick 2nd Coat – full gloss alkyd finish, 50 micron thick 3rd Coat – full gloss alkyd finish, 50 micron thick **Or** Factory applied zinc primer and thermoset powder coated finish
C3: Medium	Class Sa 2½ Blast Cleaning	1st Coat – Organic zinc primer, 75 micron thick 2nd Coat – polyurethane, 100 micron thick Or Factory applied zinc primer and thermoset powder coated finish
C4: High	Class Sa 2½ Blast Cleaning	1st Coat – Organic zinc primer, 75 micron thick 2nd Coat – polyurethane, 100 micron thick **Or** Factory applied zinc primer and thermoset powder coated finish
C5-I Very High Industrial	Manufacturer's recommendation	To approval
C5-M Very High Marine	Class Sa 2½ Blast Cleaning	1st Coat – Organic zinc primer, 75 micron thick 2nd Coat – polyurethane, 100 micron thick Or Factory applied zinc primer and thermoset powder coated finish
T Inland Tropical	Class Sa 2½ Blast Cleaning	One coat inorganic zinc coating, 75 micron thick **Or** zinc or aluminium thermal spray metallic coating.

5.3.3 PROTECTION FOR NON FERROUS METALLIC SURFACES

1 Standards of surface preparation procedures and of corrosion treatments are to meet the specified criteria and the referenced Standards/Codes for the relevant application.

2 Surface preparation procedures and coating systems for corrosion protection are to meet all relevant requirements of the referenced Standards/Codes.

5.4 PAINTING

5.4.1 LOW VOC

The following additional requirements are to be met if required by the Green Star Schedule in Schedules.

1 All painted surfaces to use low-VOC paints.

2 VOCs are to be in accordance with The Australian Environmental Labelling Association, Inc. Standard No: AELA 23-2005 'Australian Voluntary Environmental Labelling Standard Architectural and Protective Coatings'. Conformance with VOC levels listed in this standard (refer to table below) shall be demonstrated by providing test reports from laboratories accredited to carry out the relevant tests and/or calculations and appropriate documentation of production methods and quality controls.

PRODUCT TYPE	MAXIMUM VOC CONTENT (G/LITRE)
Latex Primer for galvanised iron and zincalume	60
Exterior latex undercoat	55
Interior latex undercoat	65
Interior gloss	75
Interior semi-gloss	16
Exterior gloss	75

3 VOC limits on architectural coatings covered. Allowable levels include water content in the formulation.

4 For solvent-based coatings the paint shall not contain VOCs in excess of 200g/litre. For recycled paints the VOC level (averaged across batches) in the paint must not exceed 100g/litre.

5 The VOC content of the paint shall either be calculated from the VOC data for each of the raw materials or, experimentally by ASTM D3960, as qualified the Australian Environmental Labelling Association, Inc. Standard No: AELA 23-2005 'Australian Voluntary Environmental Labelling Standard Architectural and Protective Coatings'.

6 Where the raw material is a mixture of compounds, some of which contain VOCs, the VOC content of the mixture may in turn be calculated from the VOC content of the individual components. Where this is not known, it must be determined by the methodology detailed in AELA 23-2005.

5.4.2 PREPARATION OF SURFACES

1 Preparation: all surfaces shall be prepared by thorough cleaning of all dirt, grease, scale, welding flux and corrosion in accordance with AS/NZS 2312.

2 For galvanised surfaces that have been subsequently cut or welded, prime the affected area with organic zinc rich coating for protection of steel to AS/NZS2312, two pack or accepted alternative.

3 Prime/undercoat all surfaces. Galvanised and non-ferrous surfaces must be etch primed.

5.4.3 APPLICATION

1 First coat: apply the first coat immediately after the substrate preparation and before contamination of the substrate can occur.

2 Apply all paint systems in strict accordance with manufacturer's recommendations.

3 Finish: each coat of paint or finish shall be uniform in colour, gloss, thickness and texture and free of runs, sags or blisters.

5.4.4 FINISHING

1 Concrete Bases: 2 coats synthetic emulsion paint

2 Equipment Panels/Switchboards: 2 final coats full gloss enamel

3 Equipment: Factory spray application

4 Shaft Wall: 2 coats white emulsion paint

5 Counterweight: 2 coats yellow emulsion paint

6 Other surfaces: 2 final coats full gloss enamel

5.5 COLOURS

Paint colours nominated are to be in accordance with AS 2700 and AS 1345.

5.6 IDENTIFICATION AND LABELLING

5.6.1 GENERAL

1 Mark all systems and equipment including wiring, piping, control panels, switchboards, ductwork, equipment cabinets, conduits, controls, gauges, valves and fittings to that they are readily identifiable.

2 Equipment requiring special maintenance procedures or presenting occupational health and safety hazards: provide permanent labels complying with statutory requirements.

3 Locate labels so that they are easily seen and either attached to, below or next to item referred.

4 Labelling to match installation documentation schedules.

5 For systems containing hazardous materials provide labelling in accordance with AS 1318.

6 Where a pipe or duct passes through a wall, slab or partition provide labelling each side.

7 Equipment and Service labels shall be in accordance with the Legend of Symbols nomenclature for the respective service. Provide appropriate Emergency and Operating Instructions to every equipment and system.

8 Provide text and simple diagrams where practicable. Locate at a fixed point and point of operation.

9 Affix hazardous equipment with warning signs.

10 Labels shall be permanent.

11 Type: select from the following:

- a Engraved and black filled lettering on stainless steel or brass plate, minimum 1mm thick mechanically fixed.
- b Stencil with black or white lettering contrasting with background.
- c Engraved two-colour laminated plastic mechanically fixed.
- d Adhesive labelling.
- e Painted.

12 Adhesive labels and laminated plastic labels shall not be used where exposed to the environment.

13 Painted labels shall be in the same finish paint type as the installation.

5.6.2 LABELLING REQUIREMENTS

Items	Requirements
Pipework (mech)	Labelling and lettering to AS 1345 and AS1318
Pipework(Fire)	Labelling and lettering to AS 1345 and AS 1318
Pipework(Hyd)	Labelling and lettering to AS 1345 and AS1318
Conduits	Labelling and lettering to AS 1345
Exposed Conduits	Labelling and lettering to AS 1345
Valves	Labels shall be colour coded laminated labels indicating service, function and normal position, and attached to hand wheels or spindles using a vandal resistant permanent chain/ring
Switchboards(general)	— Main switches: 10mm. — Outgoing electrical functional units: 8mm. — Automatic controls electrical equipment and instruments: 5mm. — Rear covers of switchboards: 5mm. — Components inside electrical enclosures and control panels: 3.5mm — Locate labels so that they are easily seen from normal access adjacent to the item being marked. Do not install labels on components normally removed or replaced.
All equipment such as chillers, pumps, fans, air handling units, generators	— Label in accordance with the specification abbreviations, symbols and acronyms scheduled or otherwise approved.

Items	Requirements
including controls, gauges and fittings to that they are readily identifiable	— Locate labels so that they are easily seen from normal access adjacent to the item being marked. Do not install labels on components normally removed or replaced. — Major equipment nameplates: 40mm. — Minor equipment nameplates: 20mm. — Danger, warning and caution notices: 10mm for heading, 5mm for test. — Warning notices: 7mm. — Minor lettering: 3mm. — Lettering Style: Helvetica Medium. — Fixing: Use mechanical fixings. Do not penetrate isolation vapour barriers. — Equipment requiring special maintenance procedures or presenting occupational health and safety hazards: provide permanent labels complying with statutory requirements. — Equipment requiring consumables including replacement belts, oils, filters and strainers: provide labels indicating consumable component details and quantities and corrective maintenance trigger point such as filter pressure drop.
Fire services In ceiling identifications	— Provide identification to ceiling tile or access panel for servicing to test drain valves, flow switches, concealed detectors or similar. — Use colour markers of ‘black’ for general servicing and ‘red’ for Code required identification e.g. concealed detectors. — Use self-adhesive ‘dot’ type markers on ceiling suspension or plastic headed pins for insertion in ceiling material.

6 INSPECTION, TESTING, COMMISSIONING, HANDOVER & DEFECTS LIABILITY PERIOD

6.1 GENERAL

1 This section sets out the engineering and quality assurance requirements for the completion of the installation, inspection regime, testing, commissioning, handover and defects liability period.

6.1.1 DESIGN

Complete the detail engineering of the testing commissioning and handover of the works to the specified requirements.

Comply with applicable authority design guidelines and codes of practice and requirements.

As a guide, commissioning guidelines as detailed by CIBSE Commissioning Codes shall be used as a minimum to undertake the commissioning of services listed in this section.

6.1.2 STANDARDS & GUIDELINES

Refer to Design and Performance Criteria Section

6.1.3 HAZARD AND RISK ASSESSMENT

1 Notwithstanding compliance with Codes and Standards applicable to the Works Package, the Contractor is deemed to have conducted a Hazard and Risk Assessment having regard to the general experience and practices within the industry and the specified nature of the project and users thereof AND to have allowed for the selection and design and commissioning and adjustment of the Equipment that will produce acceptably low risk levels for the installation and maintenance personnel and users and owner of the Equipment.

2 An acceptably low risk level is one that in practice results in there being no serious harm being experienced during the proper use of the Equipment by an installation or maintenance personnel or user with regard to any reasonably foreseeable hazard.

3 Proper use shall exclude use that does not comply with notices that provide instructions or warnings.

4 Up to the granting of Final Completion of the Works, monitor possible hazards as may be deemed to come to his attention through actual or public domain forecast changes to Codes and Standards applicable to the Works or to changes advised to him about the nature of the project and users thereof AND shall advise such new hazards AND shall submit the Hazard and Risk Assessment in their regard

and recommended measures to produce acceptably low risk levels AND shall seek instruction as to the implementation of such measures.

5 Provide a copy of Hazard and Risk Assessments carried out in compliance with this Specification.

6 Include a copy of Hazard and Risk Assessments carried out in compliance with this Specification in the Installation Manual.

Hazard and Risk Assessment shall be conducted employing internationally accepted methods.

6.1.4 DOCUMENTS REQUIRED FOR OCCUPANCY AND COMPLETION

Prior to occupancy and completion of the vertical transportation services the following items (documents and certificates) shall be provided by the VT Works Package as follows: items in the column "Certificate of Occupancy" are only required to the extent required by the relevant State and Commonwealth laws.

ITEM DESCRIPTION	CERTIFICATE OF OCCUPANCY	CONTRACTUAL COMPLETION	NOTES
Certification that the lift installation meets the requirements of the BCA Including clauses C1.10, C3.10, Section E3, and any fire engineering requirements for the project	Req'd	Req'd	Include test certificates for wall and floor coverings in lift cars where applicable
Certification that any lift installation landing entrances have been provided and installed in accordance with AS1735 parts 1, 2, 3, 10, 11 and 12.	Req'd	Req'd	
Plant design notification and registration documents as required by the Occupational Health and Safety Act and Plant Safety Regulations	Req'd	Req'd	
Hazard and Risk documents as required by the Occupational Health and Safety Act and Plant Safety Regulations	Req'd	Req'd	
Copies of all inspection, commissioning and test documents setting out details of all tests conducted and the results and data resulting there from.	Req'd	Req'd	Including specified performance tests.
Certificate of Electrical Safety and compliance with AS3000	Req'd	Req'd	
Certification that the installation complies with all legislative requirements and relevant published Standards Including AS1735		Req'd	
Certification that the installation complies with the contract documents Including this Specification		Req'd	
Completed and Approved Installation manual as specified Including as-built drawings in the manual and electrical circuit drawings on site		Req'd	

6.1.5 PRACTICAL COMPLETION REQUIREMENTS

1 Notwithstanding any other provisions of the Contract with regard to the granting of Practical Completion, the following requirements, listed in order of importance / priority, shall be completed and completion submissions made prior the date of Practical Completion:

2 Minimum submissions required for application for Occupancy Permit:

3 Submission of signed off testing and commissioning schedules to confirm that Testing and Commissioning has been finalised and that all plants and systems operate in a safe, stable and automatic manner under all conditions of full and partial load - full commissioning data.

4 Submission of Authority approvals including Statutory Authority approvals and Certification of Compliance with the NCC

5 Submission of Certification that works comply with the Contract Documents

6 Operating Instruction and Maintenance manual sections covering all Safety Services as required by regulations

7 Other submissions:

8 Submission of correctly and completely executed ITPs including test results completed in accordance with the Contractor Quality Plan and the satisfaction of the Consultant Engineer

9 Adequate training and instruction of the Principal's representatives in safe operation of the plant

10 Official Equipment manufacturer's acceptance certification for the installation

11 Completed Operating and Maintenance manuals and 'as built' drawings

12 The Defects Liability period may be extended in the event:

- a Specific systems fail to achieve the desired outcomes after two attempts are made to rectify the drawback. These specific systems include those that are fire and life safety or business / mission critical to the Principal.
- b If there have been more than three (3) attempts to rectify the defect, in which instance a further 12 months of monitoring will be required after the defect is rectified to monitor that the desired outcomes are achieved without further shortfalls.

6.2 PRACTICAL COMPLETION REQUIREMENTS

1 Notwithstanding any other provisions of the Contract with regard to the granting of Practical Completion, the following requirements, listed in order of importance / priority, shall be completed and completion submissions made prior the date of Practical Completion.

2 Minimum submissions required for application for Occupancy Permit

3 Submission of signed off testing and commissioning schedules to confirm that Testing and Commissioning has been finalised and that all plants and systems operate in a safe, stable and automatic manner under all conditions of full and partial load - full commissioning data.

4 Submission of Authority approvals including Statutory Authority approvals and Certification of Compliance with the NCC

5 Submission of Certification that works comply with the Contract Documents

6 Operating Instruction and Maintenance manual sections covering all Safety Services as required by regulations

7 Other submissions:

8 Submission of correctly and completely executed ITPs including test results completed in accordance with the Contractor Quality Plan and the satisfaction of the Consultant Engineer

9 Adequate training and instruction of the Principal's representatives in safe operation of the plant

10 Official Equipment manufacturer's acceptance certification for the installation

11 Completed Operating and Maintenance manuals and 'as built' drawings

12 The Defects Liability period may be extended in the event:

a Specific systems fail to achieve the desired outcomes after two attempts are made to rectify the drawback. These specific systems include those that are fire and life safety or business / mission critical to the Principal.

b If there have been more than three (3) attempts to rectify the defect, in which instance a further 12 months of monitoring will be required after the defect is rectified to monitor that the desired outcomes are achieved without further shortfalls.

6.3 MANAGEMENT OF INSPECTION, TESTING, COMMISSIONING, HANDOVER AND DEFECTS LIABILITY PERIOD COMMITMENTS

6.3.1 GENERAL

1 Manage the whole process so as to

2 Ensure complete execution of Project Specific Quality Plan and specifically Installation and Commissioning ITPs are completed progressively from commencement of the project.

3 Test and verify the operation of individual items of plant and equipment, sub-systems, systems and the overall installation including the interfaces with other building services systems forming part of the project.

4 Create and record accurately and verify all "As Built "drawings progressively prior to services being concealed by construction of ceilings, wall cavities and shafts.

5 Ensure completed Operating and Maintenance manuals inclusive of comprehensive system descriptions, operating modes and associated control functionality, tailored and project specific manufacturer's literature.

6 Responsive defects rectification process during the construction phase as well as post Practical Completion during Defects liability Period.

7 Ensure Responsive approach towards maintenance and operational fine tuning during the Defects Liability Period

6.3.2 SEQUENCE OF ACTIVITIES

Generally follow the sequence of activities listed below. Modify to suit specific requirements of the project however no reduction of scope is allowed.

1 Submission of Project specific Project Quality Plan including generic and project Specific ITPs within the first quarter of the project programme after site possession.

2 Ongoing inspection of installation works by relevant Quality Manager and/or his nominated staff for meeting project quality requirements including preparing Inspection reports (listing all observed installation defects) not longer than fortnightly and also checking that all Installation ITPs are signed off.

3 Initiate Safety In Design process and documentation where applicable

4 Evidence of adequate commissioning programme allowance in construction programme.

5 Production and submission of commissioning Inspection and Test Plan (ITP) 12 weeks after site possession

6 Amendment to ITP as necessary and re-submission at least 1-2 weeks after the original submission.

7 Submission of controls manufacturer's functional descriptions elaborating on the methodology proposed to implement the requirements of the control strategies The manufacturer's controls functional descriptions shall be prepared and submitted at least 12 weeks prior to start of installation and commissioning of controls systems.

8 Nomination of those to be involved in commissioning including individuals with responsibility for management, engineering and field testing and commissioning.

9 Liaison with and briefing of Authorities to ensure that the connection to their assets and commissioning procedures and resultant data provided for their approval is consistent with their requirements and records.

10 Preparation of periodic (minimum monthly) progress reports on testing and commissioning.

11 Early and active engagement of Independent Commissioning Agent ICA where applicable.

12 Early (within the first quarter of the project construction programme) submissions of Operating and Maintenance Manual (for Safety Services and, for preliminary draft of the overall manual). Confirmation of acceptance of proposed Electronic Operating and Maintenance Manual software/platform.

13 Submission of detailed commissioning procedures for review by the Consultant Engineer. Refer to schedule below;

Expected Project Duration (up to PC)	*Submission Requirement*	*Re-Submission Requirement.*
8 weeks	Prior to Week 1 or Prior to commitment of work whichever the sooner.	Within 3 days.
12 weeks	Prior to Week 1 or Prior to commitment of work whichever the sooner.	Within 5 days
16 weeks	Prior to Week 2 or Prior to commitment of work whichever the sooner.	Within 5 days
20 weeks	Etc.	Within 5 days
24 weeks		Within 10 days.
9 months		Within 10 days.
12 months +		Within 10 days.

14 Rectification of all defects likely to interfere with testing and commissioning.

15 Commencement of "As Built" drawing production

16 Carryout preliminary commissioning including pre-commissioning procedures until achievement of correct operation and performance. Providing statement that the pre-commissioning activities for each system are completed.

17 Testing and commissioning of major plant and equipment, complete systems, interfaces between systems and finally all systems which interact together under normal or emergency conditions.

18 Integrated testing and commissioning of multi systems (including multi-disciplinary systems) and their associated interfaces

19 Inclusion of all completed Commissioning ITPs in the Operating and Maintenance Manual.

20 Rectification of any further defects and deficiencies found during testing and commissioning.

21 Provide notification of completion of remedial work in sufficient time to permit re-inspection as necessary before the intended date for re-testing.

22 Repetition of sequence of activities as necessary until works comply with acceptance criteria as set out in the ITPs.

23 Final handover of Final Operating and Maintenance Manuals

24 Certification that works comply with the Contract Documents and with the NCC and Statutory Authorities and are ready for granting of Practical Completion.

6.3.3 SUBMISSIONS

Required submissions include but not limited to the following;

1 Installation and commissioning Inspection and Test Plans ITPs. 4 Copies of ITPs to be supplied, 3 bound into Installation Manuals and 1 bound separately

2 Evidence of periodic (weekly) Quality Inspection/defects reports

3 Testing and commissioning procedures including integrated commissioning procedures.

4 Evidence of Safety In Design process during the construction phase is completed where applicable

5 Evidence of currency of calibration of equipment to be used in commissioning procedures.

6 Records of all pre-commissioning checks and final commissioning data. All records/data to be certified as being conducted in accordance with agreed and approved procedures.

7 Manufacturers' certificates for all proprietary items, to confirm that the installation complies with their installation and maintenance requirements prior to start-up of equipment. Certificates shall also be provided at commencement of equipment installation to confirm their requirements with respect to installation are being provided for.

8 Manufacturers' test certificates of all capacity/performance verification checks carried out at factory prior to dispatch to site.

9 Accurate and verified (by QA manager)"As Built" drawings

10 Complete Operating and Maintenance Manuals (Electronic system/package and, unless instructed otherwise, hard copies)

11 Warranties

12 Maintenance Plan and Schedules following acceptance of technical submission and installation minimum 4-8 weeks prior to Practical Completion with priority with respect to timely completion given to plan and schedules covering Safety Services. .

6.3.4 INSPECTION AND TEST PLANS

1 Inspection and test plans are to be prepared specifically for the project but may be based on or customised from generic ITPs. . All commissioning result forms shall be completed, including the following:

Tested By: ..... Please print	Witnessed By: .....
Signed:	Signed: .....
Date:	Date: .....

Test Device used: .....

Serial Number: .....

Date of Calibration: .....

Method of Testing: .....

2 List acceptance criteria for each element and sub-element of the installation in ITPs. Acceptance criteria to include:

a Specification details in regard to materials, construction methods, physical requirements, performance and operational requirements.

b Schedule of Technical Data in respect of make, model and performance details of equipment.

c Shop drawings.

d Control logic and diagrams.

e Authority inspection and testing requirements.

f References to specific clauses of this Specification for acceptance criteria

6.3.5 COMMISSIONING INSTRUMENTATION

1 All instrumentation used in the commissioning of the installation shall be managed in accordance with the requirements of AS 3912 or NEBB.

2 Reference instruments are to be NATA certified.

3 All commissioning results to include instrument calibration documentation.

6.3.6 COMMISSIONING PERSONNEL

1 Provide only qualified registered / licensed personnel specific to the trades as required by local regulations, and where regulatory requirements do not apply, personnel certified by appropriate industry bodies.

2 Submit a schedule of key commissioning personnel together with their qualifications prior to undertaking commissioning activities on site.

6.4 TESTING & COMMISSIONING

6.4.1 PRE-ENERGISATION TESTS

Prior to energisation of any system with electrical connections, conduct the following tests:

1 Tightness of screwed and bolted connections.

2 Physical integrity.

3 Correct phasing. Check phase rotation is consistent throughout the project and is the same as the supply.

4 Motor rotation.

5 Insulation resistance tests.

6 Test operation of all trips, interlocks, motor driven devices, contactors and control circuits and devices by instigating or simulating inputs.

6.4.2 TESTS

Carry out inspection and test requirements including:

1 Specified consecutive hoist and door motor starts with lift fully loaded cycling between adjacent floors with door dwell set to zero seconds.

2 Speed test.

3 Static balance test.

4 Levelling and re-levelling tests.

5 Overload test.

6 Control system performance tests.

7 Performance Guarantee tests.

8 VT Works Package standard field test data.

9 Ride quality tests.

10 Acoustics and vibration tests.

11 Inspections to ascertain compliance with the Specification as may be amended throughout the contract.

12 Tests as detailed in Annex D of EN81-1

Documentation of inspections and tests conducted

ARCHITECT'S INSPECTIONS

1 Inspection of Equipment and finishes for correctness, appearance and quality of finishes. Documentation of inspections and tests conducted.

6.4.3 COMMISSIONING

Operate the installation to prove the performance, capacities and ability to provide the required service.

Undertake commissioning in 4 stages:

1 Individual component functionality testing including verification of defects free installation

2 Major items of plant and equipment and components.

3 Systems and sub-systems.

4 Inter-system operation and interfaces.

Commissioning to include:

5 Performance of individual plant items and components.

6 Operating sequences, interlocks and safeties.

7 Final controls calibration.

8 System operation under all operating modes and under all conditions of load.

9 Inter-system operation and correct interfacing connections under all operating conditions and under simulated fire conditions.

10 Noise and vibration tests.

11 Thermoscan survey of switchboards.

12 Rectification and correction of any defects and deficiencies.

13 Continue commissioning until achievement of correct performance and operation.

14 Electrical testing and verification to AS/NZS 3000.

15 Cleaning of plant room, switchboards and all equipment and devices.

6.5 FINAL CONTRACT AND HANDOVER DOCUMENTATION

6.5.1 GENERAL REQUIREMENTS

1 Documentation is required in electronic and hard copy format. Electronic documentation shall be supplied on the latest Microsoft and AutoCAD Software versions at the time of Practical Completion.

2 Scope of the documentation and format requirements comprise:

DOCUMENT	FORMAT	SETS
Operating and Maintenance Manuals, including Final commissioning data	Electronic installed on BMS File Server	1
	Electronic Storage Device – Microsoft Office Latest Version	3
	Hardcopy	3
As Built Drawings	Electronic Storage Device – AutoCAD	3
	Hardcopy – Full Size with hanging strips	1
	A3 Size	2
Control Software	Electronic Storage Device	1
OH&S Safety Signage	Permanent	1

6.5.2 AS BUILT DRAWINGS

1 All As Built/As Installed documents submitted shall have a stamp with similar words to the following and be signed prior to submission for review.

AS INSTALLED DRAWING
We certify that this drawing is an accurate record of the work installed by our company under the terms of our contract.

Contractor's Name .....
Contractor's Address .....
.....
Signed ..... Date .....
Printed .....

2 Progressively record changes to form a record of work as installed.

3 Prepare and submit for approval as-built drawings covering all aspects of the work.

4 Show dimensions, types and locations of equipment, cables, piping, ductwork pits and markers in relation to permanent site features and other underground services.

5 Show the 'as-installed' locations of building elements, plant and equipment with particular emphasis on items requiring maintenance or clearing.

6 Show off-the-grid dimensions where applicable. Include relationship to building structure street features and other services and changes made during commissioning.

7 Show inverts of drainage and relative locations of gully and boundary traps

8 Provide As Built documentation as per Schedule of Required As Builts :

6.5.3 OPERATING AND MAINTENANCE MANUALS

1 Provide comprehensive Operating and Maintenance documentation to cover all installations in order to provide a detailed understanding of the plant and its operation, an aid for training of operators, a reference for fault diagnosis and a framework for preventative and breakdown maintenance.

2 Submit manuals in two stages. Stage 1 include all of the sections (generally sections 1-5) of manuals excluding final testing and commissioning records and As Built drawings. This manual shall be submitted well in advance of the Practical Completion and should be signed off by the Consultant Engineer at least 4-6 weeks before programme Practical Completion Date.

3 First draft manuals Stage 1: Submit a first draft manual 8-10 weeks before the date for practical completion for review.

4 Second drafts Stage 1: Following receipt of comment on the first draft and not later than 2 weeks after submit a completed second draft for review. Incorporate comments.

5 Third Draft Stage 1 &2: Include all remaining sections and submit 2-3 weeks before Practical Completion. Incorporate all changes and resubmit until all comments are addressed to the satisfaction of the Consultant Engineer.

6 Final copies Stage 1&2: Submit 3 sets of final volumes within 2 weeks after practical completion. Incorporate feedback from review and from training of Principal's staff, including preparation and insertion of additional data. Include a section containing commissioning test reports.

7 Revisions: Prior to final completion, submit 3 sections sets of loose leaf amendments for insertion in the manuals, incorporating feedback from the maintenance period.

8 Warning and Cautions: Include to emphasise conditions hazardous to personnel or equipment, giving instructions to avoid the hazard. Format to be:

9 **WARNING:** An examining or testing procedure or practice which must be observed or risk loss of life or injury to personnel.

10 **CAUTION:** An examining or testing procedure or practice which must be followed or risk damage to equipment.

11 The manual shall be neatly prepared and bound in one, or a series of, vinyl hard-back folder with lettering on the front and the spine including the following information:

OPERATION AND MAINTENANCE MANUAL	VOLUME NUMBER
MAINSBRIDGE SSP PUBLIC SCHOOL	DATE OF ISSUE
VERTICAL TRANSPORTATION SERVICES	CONTRACTOR
CONSULTANT ENGINEERS – WSP	SUB CONTRACTOR

12 Pagination: Number pages consecutively. Double sided on A4 size (minimum 50%) recycled white (minimum CIE whiteness of 140) paper, with reinforced binder perforations.

13 Ring size: 50mm maximum, with compressor bars.

14 Dividers: Durable divider for each separate element, with typed description of system and major equipment components. Clearly print short titles under laminated plastic tabs.

15 Drawings: Fold illustrative drawings to A4 size and accommodate them in plastic pockets in the binder. Title block to be visible without removal of drawing

16 All aspects of the style and quality of the manual, including folders and contents shall be submitted for approval prior to completion.

17 After the draft copy has been approved, supply 3 copies of the manuals for issue to the Principal and the Consultant Engineer.

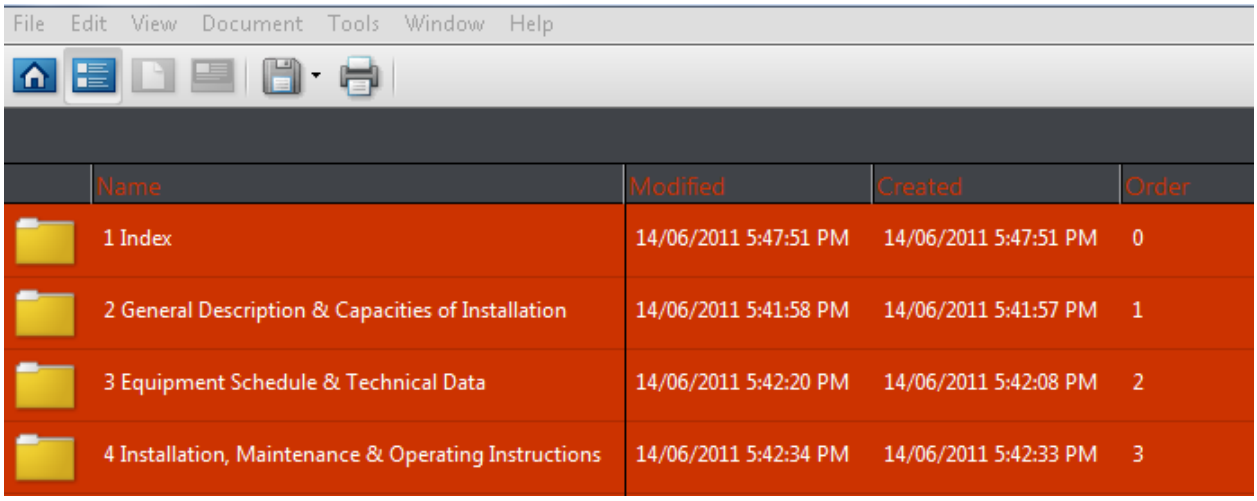
18 Allow for loading the manual onto the Building BMS systems (where available) and arrange to provide the manual including commissioning results.

ELECTRONIC/DIGITAL FORMAT

1 Documents shall be stored in DVD Disc or Potable USB Flash Drive Storage Drive. Provide labelling to the storage media.

2 Electronic Storage device shall not be “copy protected”.

3 Manual shall be contained within **a single searchable PDF** accessible via Adobe or similar PDF reader. PDF shall be indexed, divided in to folders and titled. Each folder shall contain relevant electronic/digital format documentation in line with the contents specified below. Refer below of a screen print of Adobe Reader for a typical arrangement.



"Screen Shot" for Reference

4 Avoid submitting manually scanned Manufacturers' data, where possible include only searchable PDF documentation.

5 Include only relevant diagrams, equipment data in clear concise English. Avoid jargon and esoteric pseudonyms.

6 Provide each document included in the PDF with the following naming convention:

7 Section "X" – "Document Description".pdf

8 Provide clear scanned copies of Statutory Certificates of Compliance

   a Accessible Dwg format CAD drawings of the as-built documentation shall be contained within the PDF.

INSTALLATION MANUAL FORMAT

1 Section 1 – Index

   a Index all sub-divisions of each section including lists of drawings, equipment, etc. for quick reference.

   b Include index in every volume of the manuals.

2 Section 2 - General Description and Capacities of Installations:

   a Divide into sub-sections for general items and for each individual system as appropriate and include full details

   b Include a directory: Names, addresses and telephone, email and facsimile numbers of Principal, Consultant Engineer, Sub-Consultants, Contractor and names of responsible parties.

   c Include a scope of works: Statement of scope of services and interfacing with other Contracts.

   d Include an installation description: General description of installation.

e Systems description: Technical description of the systems installed, written to ensure that the Principal's staff fully understand the scope and facilities provided. Identify function, normal operating characteristics and limiting conditions. Include schematic diagrams.

f System performance: Technical description of the modes of operation of the systems installed.

3 Section 3 – Equipment:

a Sub-divide as for Section 2 and list all major items of equipment installed complete with manufacturer's name, agent's name, contact details, model and/or type No., serial No., size, design ratings and including all relevant data necessary for re-ordering or replacing the equipment or components of same. As far as practicable, all equipment should be broken down to individually identifiable items.

b Provide manufacturers' technical literature for equipment installed, assembled specifically for the project, excluding irrelevant matter. Mark each product data sheet to clearly identify specific products and component parts used in the installation and data applicable to the installation. Do not include advertising literature. Cross out any section of literature which is not applicable to the project.

c Include descriptions of operating systems, and major hardware such as safety gear, motor, controller, PDO, light guardian, direct drive, ropes, remote monitoring system), hydraulic equipment, etc.

d Include a detailed description of special operating modes as may be specified, examples being priority service, fire recall, standby power operation, Utility lift modes, and the access control interfaces complete with detailed schematics.

4 Section 4 – Installation, Maintenance and Operating Instructions:

a Sub-divide as for Section 2 and include manufacturer's installation, maintenance and operating instructions for each item of equipment.

b Emergency maintenance procedures, including telephone numbers for emergency services and after hour's contact for suppliers and Contractors and procedures for fault finding.

c Manufacturer's technical literature as appropriate. Register with manufacturer as necessary. Retain copies delivered with equipment.

d Detailed recommendations for preventative maintenance frequency and procedures which should be adopted by the Principal to ensure the most efficient operation of the systems installed. Include inspection, testing and maintenance programme in tabular form showing frequency and level of routine checks for each item.

e Safe trouble shooting, disassembly, repair and reassembly, cleaning, alignment and adjustment, balancing and checking procedures. Provide logical step-by-step sequence of instructions for each procedure. Include calibration and recommissioning of controls.

f Schedule of spares recommended to be held on site, being those items subject to wear or deterioration and which may involve the Principal in extended deliveries when replacements are required. Include complete nomenclature and model numbers, and local sources of supply. Include sectionalised diagrams of machines identifying component parts.

g Schedule of normal consumable items, local sources of supply and expected replacement intervals up to a running time of 40,000 hours. Include lubricant and lubrication schedules for equipment where applicable.

h Add to the manufacturer's technical literature, for assembly, operating, maintenance and disassembly, safety information for all plant, systems or structures installed within the project or for existing plant, systems or structures where assembly, operating, maintenance and disassembly are altered or amended by the installation of plant, systems or structures within the project.

i The added safety information shall be included at relevant sections of the manufacturer's literature and not as a separate part and shall be made clear and obvious to the user of the manual.

5 Section 5 – Plant Operating Instructions:

a Sub-divide as for Section 2 and provide a complete description and correct sequence of all actions necessary to start-up, operate and shut-down all plant including procedures for seasonal changeovers where applicable. These instructions shall include full information on such items as normal and abnormal gauge readings, instrument settings and control points, differentials, time delays, oil levels, water temperatures, and all similar relevant variable and adjustable items, to permit checking and adjustments where practicable and identification of hazardous conditions or malfunction of plant. In addition the instructions shall include information on the immediate action to be taken in the event of hazardous conditions arising.

b Add to the manufacturer's technical literature, for assembly, operating, maintenance and disassembly, safety information for all plant, systems or structures installed within the project or for existing plant, systems or structures where assembly, operating, maintenance and disassembly are altered or amended by the installation of plant, systems or structures within the project.

c The added safety information shall be included at relevant sections of the manufacturer's literature and not as a separate part and shall be made clear and obvious to the user of the manual.

6 Section 6 – Performance Test Results:

a This section shall be sub-divided as for Section 2 and shall include all performance test results as outlined in previous Clauses.

7 Section 7 – Certificates & Warranties

a Statutory Certificates of Compliance for:

b Electrical work.

c Copies of manufacturers' warranties.

d Certificates from authorities and utilities.

e Production certification.

f Copies of test certificates for the installation and equipment used in the installation.

g Product type test certificates.

h Electrical certificates of compliance.

i Inspector's compliance certificate.

j Plant design notification and registration documents as required by the Occupational Health and Safety Act and Plant Safety Regulations.

k A statement of the Codes and Standards with which the installation complies.

l Hazard and risk assessment report.

m Acoustic and vibration report.

8 Section 8 – Drawings

a Drawings and technical data: As necessary for the efficient operation and maintenance of the installation.

6.5.4 WARRANTIES

1 Warranty periods are deemed to end at expiry of defects liability period unless specified otherwise.

2 Name the Principal as warrantee. Register with manufacturers as necessary. Retain copies delivered with components and equipment.

3 Commence warranty periods at practical completion or at acceptance of installation, if acceptance is not concurrent with Practical Completion.

4 If installation is not being manufactured and product warranty is conditional on the manufacturer's approval of the Contractor, submit the manufacturer's written approval of the installing firm.

6.5.5 REQUIRED OPERATING INSTRUCTIONS

1 Provide operating instructions and schematic diagrams mounted alongside equipment to meet statutory requirements, e.g. Fire Brigade. Diagrams to be colour-coded, colour-fast, laminated and mounted.

6.5.6 TRAINING OF PRINCIPAL'S NOMINATED PERSONNEL

1 The service of a fully knowledgeable Commissioning Engineer shall be required for a period of 2 full working weeks to instruct the Owner's nominated representatives in all details of the plant operation.

2 Conduct training at agreed time, at system or equipment location.

3 Immediately after Practical Completion, explain and demonstrate to the building users or nominated representative, the purpose, function and maintenance of the installations.

4 Use qualified personnel who are knowledgeable about the installations.

5 Prior to Practical Completion, explain and demonstrate to the Principal's nominated personnel the purpose, function, operating and maintenance of the installations.

6 Use items and procedures listed in the Operation and Maintenance manuals as the basis for detailed instruction of Principal's nominated personnel.

7 Conduct training at agreed time, at each system of equipment location.

8 Upon completion, submit certificates of training, signed by trainer and trainees.

9 Provide qualified manufacturer's training representatives who are knowledgeable about the installations

10 The services of the Contractor's Commissioning Engineer and BMS controls commissioning engineer shall be required for a period of 8 weeks after Practical Completion to assist the operator in the operation of the Facility. **(include for Mechanical Services / BMS)**

11 During the warranty period, provide technical assistance and advice to the Principal's nominated personnel regarding the operation and maintenance of the plant.

12 For equipment requiring seasonal operation, demonstrate during the appropriate season and within 6 months of Practical Completion.

13 Include copy of training material within the O&M Manual

6.5.7 SPARE PARTS SCHEDULE

At least 8 weeks before the date for Practical Completion, submit a schedule of spare parts necessary for maintenance of the installation. State against each item the recommended quantity, and the manufacturer's current price, including for

1 Packaging and delivery to site;

2 Checking receipt, marking and numbering in accordance with the spare parts schedule;

3 Referencing equipment schedules in the operation and maintenance manual; and

4 Painting, greasing and packing to prevent deterioration during storage.

6.6 POST PRACTICAL COMPLETION AND DEFECTS LIABILITY PERIOD

6.6.1 WARRANTY & DEFECTS LIABILITY

Warrant the whole of the Contract Works, for the Defects Liability Period (DLP), against defective workmanship and materials and against non-compliance of equipment and/or complete system with specified performance and operation.

The Defects Liability Period shall continue for a period of 12 months after the date of issue of Practical Completion and during this period, the Contractor shall be responsible for making good on a timely manner, defects arising from the defective design materials, premature component failures, or workmanship or from any act of the Contractor that may develop in the work.

Perform maintenance during the warranty period to maintain warranty conditions. Maintenance shall comply with the current regulatory requirements.

In the event of inclusion of equipment normally covered by a lesser time warranty, or whose warranty would otherwise normally expire during the warranty period, allow for and include the costs of extending such warranty to that covering up to the end of the Defect Liability Period.

Where warranted work or equipment has failed, the warranty shall recommence on the date of acceptance of the rectified work for an additional period of time, extended by the period during which the Principal was without the use of the work or equipment. For rectified work involving new replaced equipment, the warranty for the new component shall be from date of replacement for the 12 months or longer as required by this specification

6.6.2 GENERAL DLP MAINTENANCE SCOPE

Maintenance services shall include:

1. Preparation of a maintenance management plan which includes a detailed maintenance programme, equipment schedules, statutory and preventative maintenance schedules, OH&S risk assessment, inspection and testing schedules, breakdown rectification management and reporting systems. Submit maintenance plan and schedules prior to Practical Completion
2. Preventative and corrective maintenance and testing services to assure specified system reliability and availability.
3. Statutory maintenance and testing required by the Building Regulations and other authorities.
4. Breakdown and system fault responses. Attend site, ascertain cause of alarm and rectify where possible make system alterations at own cost to prevent future system faults. Pay any Authority charges resulting from callout on system faults.
5. Statutory regular system fire and life safety system control and performance verification test to be carried out after hours.
6. Comply with Building and Occupational Health and Safety Regulations Comply with manufacturer's recommended maintenance programme and schedules.
7. Monthly maintenance and servicing in accordance with maintenance schedules recommended by equipment manufacturers.
8. Rectification of defects at Contractors cost. Replacement of consumables at Contractors cost during the maintenance period.
    a. Submission of monthly reports to Principal and Consultant Engineer on maintenance activities performed.
    b. Provision and filling out log book which must be kept on site, detailing all visits.
    c. Service personnel to be available for call out on a 24 hour per day, 7 day per week basis. Response time for emergency and corrective maintenance must not exceed 2 hours.
    d. Operation and verification in conjunction with other services trades, of all fire and life safety systems.

6.6.3 FINAL COMPLETION

Final Completion will not be granted until maintenance records are complete and signed off and until all defects have been rectified and inspected.

The Maintenance and Defects Liability Period may be extended unless maintenance and servicing visits have been made and reported as specified.

6.6.4 SUBMISSIONS

1 Provide;

2 Maintenance management plan.

3 Monthly Maintenance reports.

4 Completed maintenance records

Mandatory maintenance records to include monthly maintenance and service reports, including water treatment reports, reports on all defects and their rectification, certification of the correct operation of essential services, a maintenance log book and any other records which must be kept in order to comply with legislative or OH&S requirements.

Monthly Maintenance and Service Reports to include:

1 Check list of all items serviced and inspected.

2 Description of maintenance performed.

3 Notes on supplementary maintenance required.

4 Comprehensive water treatment report.

Maintenance Log Book to include:

1 Schedule of all equipment.

2 Schedule of all control sensors and control set point values.

3 Register of maintenance visits and cross reference to service reports.

4 Register of work performed under headings of preventive maintenance, corrective and emergency maintenance and defects rectification.

The Maintenance Log Book is to be kept in a locked cabinet provided for the purpose in an agreed location on site.

At the conclusion of each maintenance visit the log book is to be duly completed and signed off by an authorised representative of the Principal /Building Owner and service records are to be forwarded to the Principal /Building Owner or his representative within 3 days of each visit.

6.6.5 DLP PREVENTATIVE MAINTENANCE AND TESTING

GENERAL

As a minimum, carry out all maintenance and servicing recommended by the manufacturer of each piece of equipment at the recommended intervals.

SCOPE

Defects Liability Maintenance is included in the Works.

GENERAL REQUIREMENT

Carry out Defects Liability Maintenance to the end of the Defects Liability Period using adequate number of competent maintenance personnel, providing sufficient spare parts as required to maintain the Works with minimum down time servicing and maintaining the Works.

PARTICULAR REQUIREMENTS

Carrying out comprehensive maintenance adequately and periodically in accordance with following requirements.

1 Maintenance of the Works in condition which is safe, complying, reliable and in good state of cleanliness and repair;

2 Regularly servicing the Equipment with visits at least twice monthly;

3 Provision of a 24-hour call-out service with call-outs attended within guaranteed maximum response time, and without charge;

4 Restricting the average number of call-outs for each Unit, excluding nuisance calls, to nine per year;

5 Maintenance of performance requirements established for the Works;

6 Completion within one month of date of Practical Completion of defects and work outstanding at date of Practical Completion;

7 Conducting tests of the installation in accordance with the requirements of the manufacturer's requirements; the relevant design standard, and include the following:

   a Annual governor, safety gear and buffer tests;

   b Monthly phone system and alarm device test;

   c Quarterly emergency light test;

   d Annual ride quality and lift tune measurement, and report to the building owner.

8 Removal of minor rubbish from the pit during regular service visits;

9 Replacement of lamps and tubes installed in the Equipment during regular service visits;

10 Keeping records relating to service visits, call outs, faults rectified and repairs carried out;

11 Provision of a statement detailing such information when instructed;

12 Completion of an on-site log book recording attendances and nature of the work carried out;

13 Maintenance and update of essential data Including wiring diagrams, drawings and software listings necessary to maintain the Works;

14 Immediate replacement of Equipment which fails as result of incorrect servicing, faulty workmanship, materials or design;

15 Replacement of failed Equipment manufactured overseas using air-freight if not in stock;

16 Replacement of faulty Equipment outside normal working hours of premises if so instructed.

7 TECHNICAL REQUIREMENTS – LIFTS

7.1 CONTROL SYSTEM

7.1.1 GENERAL CONTROL SYSTEMS FEATURES

1 All lifts within a particular rise shall operate normally as an interconnected group where any lift may respond to a landing call.

2 As a minimum, all lifts shall have at least the following features:

- a Exclusive service.
- b Fireman's service.
- c Load-weighing control.
- d Door nudging system.
- e Anti-nuisance feature.
- f Automated switching of light fittings in lift cars.

7.1.2 GENERAL/CONVENTIONAL CONTROL SYSTEMS

1 The lift control systems shall be high speed micro-processor and software based and incorporate the latest proven demand based traffic management algorithms to optimise system response times and operating/energy efficiencies.

2 Provide high speed microprocessor based control systems compatible with the types of equipment specified and commensurate with the efficient operation of the building.

3 The control system shall be able to utilise neural network topology to dynamically adapt to passenger traffic demand.

4 The control system shall incorporate facilities to manage long wait calls, respond to dynamically changing car loading, and respond to learned traffic patterns.

5 The system shall be capable of continued operation in the event of any single lift controller failing or being removed from service for maintenance, and shall incorporate redundancy strategies to accommodate this requirement.

6 The system shall have inbuilt facilities to allow for future changes to the number of floors served and for special control facilities such as executive recall to be provided. These inbuilt facilities shall allow for implementation without major changes to hardware within the controllers. All aforementioned features shall be provided in any type of lift control system including Destination Control.

7 The power control system shall be the solid state type that controls and varies the voltage supply to the lift motor to provide stepless acceleration, smooth deceleration and a soft final stop.

8 The system shall control acceleration, deceleration and full speed running to preset patterns. The lifts shall restart automatically on resumption of power supply after a power failure. A master controller shall start the lifts in a sequential order.

7.1.3 SPEED CONTROL SYSTEM

1 Closed loop control equipment operating on distance measuring principle.

2 Smooth step-less acceleration and deceleration, compensated to minimise fluctuations in acceleration and deceleration and full speed rate which may be influenced by variations such as load, temperature and humidity.

3 Final stop by electrical control of motor.

4 Brake application after lift stopped and at floor level.

5 Final stop with levelling accuracy of ±6 mm under all load conditions.

6 The speed control system and motor drive shall incorporate a 'full scale' lift position detection or measurement system that enables the lift to be consistently stopped at floor level within the accuracy nominated using closed loop control principals. The system shall re-level to floor level to compensate for rope stretch as the load changes when passengers/load are added or removed from the lift at floor level. Movement of the lift at floor level with the doors open shall be provided and shall be carried out in a smooth stepless manner that is virtually imperceptible to lift users.

7.1.4 DRIVE SYSTEM EFFICIENCY (ESD)

1 The lift drives shall be based on variable frequency AC permanent magnet motors.

2 Drives shall have a regenerative capability that recovers excess energy in an overhauling condition to be returned to the electrical mains rather than dumped as heat.

7.1.5 ACCESS CONTROL

1 All the control systems shall interface with the access control system as may be specified elsewhere.

2 The lift control system shall interface with a security management system. When a signal is received from the system that the security is on, car calls to all or any floors selected by the security system may not be registered.

3 Car calls to the secured floors may be registered by insertion/wiping of a coded card key which will permit certain call/s to be registered.

4 Interfacing shall be provided between the lift control system and the security control system.

5 The interface level shall be as per that specified elsewhere.

6 Supply feedback signals to the security controller indicating which floor button has been selected by the card user.

7 When in the secured mode, the group control system shall not permit dispatching of lifts to a parking floor if that floor is on security.

8 Allow for all wiring between the interface panel connected to by the Security Services Contractor and lift controllers and from lift controllers to each card reader.

9 Allow space in all car operating panels for installation of card readers. Card readers shall be housed behind a Perspex window. Install card readers supplied by Security Subcontractor.

7.1.6 FLOOR LEVELLING

1 Floor levelling shall be obtained in a stepless manner direct to the floor to within +/- 6mm under all load conditions.

2 The levelling equipment shall be silent in operation and of a type which does not use mechanically operated switches in the well.

3 A low speed re-levelling feature shall be provided to maintain correct level if for any reason level within guaranteed tolerances is not achieved in the initial approach to floor or while loading or unloading at floor level.

7.1.7 EXCLUSIVE/INDEPENDENT SERVICE

1 Operation of the independent service switch will cause the lift to be removed from normal service and respond to car calls only. If it is a single lift then all landing call buttons will become inoperative and any registered hall calls will be cancelled. Hall lanterns shall not operate while the lift is on independent service.

2 The use of the independent service switch provided in one car operating panel shall:

- a remove the lift from automatic or group control whereby it does not respond to or cancel registered landing calls
- b park the lift with doors open
- c open panel to show hidden car call buttons
- d allow car button registration to be made in the normal manner and with respect to further travel of the lift, shall set the direction of travel
- e constant pressure on the door close button shall cause the doors to close and the lift to respond to a registered car call, all car calls shall be cancelled upon opening or reopening of the doors
- f cause the door passenger protection device to become inoperative
- g not cancel car button security where provided.

7.1.8 FIRE SERVICE

1 Fireman's Service shall be in accordance with BCA requirements and AS1735 Part 1 / Part 2.

7.1.9 LOAD WEIGHING

1 A load weighing feature of the strain gauge, load cell or other appropriate type, shall be provided to achieve the following:

a When loaded in excess of 110% of rated capacity the lift shall be prevented from leaving that floor. The doors shall remain open, a warning buzzer shall sound and the lift overloaded indicator shall illuminate until the load is reduced to below this capacity.

b When loaded in excess of 80% of rated capacity the lift shall bypass landing calls. The bypass setting shall be readily adjustable between 50% and 80%.

c When no load is detected in the lift car, all car calls previously registered shall be cancelled.

7.1.10 DOOR NUDGING

1 The passenger protection device shall incorporate a nudging feature, which, after an adjustable pre-set time, shall cause the doors to close at a reduced speed and sound an audible buzzer. Such nudging feature to be initiated under any of the following conditions:

a Obstruction of the passenger protection device for an extended period.

b The passenger protection device becoming inoperative for any reason.

c Stuck landing button at a floor where the lift is parked.

d The door open button shall remain operative at all times.

7.1.11 ANTI-NUISANCE

1 Anti-nuisance feature, designed to cancel registered car calls in circumstances where the number of car calls exceeds the probable number of people in the lift car shall be provided.

7.1.12 AUTOMATED SWITCHING OFF OF APPOINTMENTS

1 Automated switching of light fittings and display screens in lift cars shall be provided, to reduce the electrical load to the minimum allowable when lifts are idle. Lights shall automatically be switched off whenever the lift has been idle for 2 minutes, except when the lift is in a special operation mode (exclusive, fire, etc.), or if the lift is in a failed start or fault condition.

7.1.13 ADVANCED DOOR OPENING

1 All passenger lifts shall have advanced door open operation. The car doors and levelling operation are to be synchronised such that the car doors shall open as the lift is levelling into the floor. The car doors shall be no more than three quarters open when the car is floor level. The floor approach speed of the lift shall be such that a tripping hazard is not created as the doors open.

7.1.14 INSPECTION CONTROL

1 Provide top of car operating devices on the roof of each lift car featuring the following controls:

- a Constant pressure up/down and common buttons.
- b Door open and door close switches.
- c Emergency stop switch.
- d Switch removing car from normal operation ready for inspection operation.

7.2 KEY SWITCHES AND KEYS

1 Keys switches shall be of a highly restricted Bi-Lock type for: Master keys, Car light key switches, Fire Service, and Exclusive Service key switches, and other such keys as may be required.

2 Supply three sets of standard regulatory keys for recall fire control, exclusive service and light test switches.

3 Supply one set of standard liftwell unlocking devices and keys as required in each LMR or controller cabinet in the case of MRL lifts.

4 Supply two sets of keys for key boxes as may be fitted.

5 Supply the above specified number of sets of suitably tagged and labelled keys at Practical Completion.

6 Note special Regulatory key requirements for recall fire service control switch

7.3 APPOINTMENTS

7.3.1 ENGRAVING

1 Engraving in stainless steel faceplates shall be of adequate depth for adhesion and filled with epoxy resin, as appropriate, that is rendered flush during the faceplate linish, or an alternative fill treatment to Approval that provides an equivalent permanency and durability. Paint is unacceptable.

2 Colours of infill: generally black or white; red where Code requires same; white for alarm/emergency telephone.

3 BCA signage regarding use of lifts in fire shall be engraved on the faceplate. The use of additional signage which is adhered to the lobby wall is not considered acceptable.

7.3.2 FIXINGS

1 This section is applicable to car operating panels, hall lanterns and hall button stations:

- a Fixings shall permit alignment of faceplate and removal without damaging adjacent wall finish.
- b Minimum of two fixings per faceplate.

c Adequate fixings to hold faceplate flat to adjacent wall finish.

7.3.3 LANDING CALL BUTTON STATIONS

1 Servicing and part replacement able to be readily done from lobby.

2 Removal of faceplate readily achievable without disturbing or damaging adjacent wall finish.

3 Alignment shall be parallel with landing frame and adjustable. Height above floor to suit disabled requirements.

4 Faceplate shall be engraved regarding use of lift in fire to Code requirements.

5 Incorporate access control card reader supplied where appropriate.

6 Incorporate Fire Service switch where required as required by regulation

7 Securely fixed as specified elsewhere.

7.3.4 LANDING INDICATORS

1 One per lift entrance at location to be advised either beside the architrave or over it.

2 Servicing and part replacement able to be readily done from lobby.

3 Removal of lens and faceplate readily achievable without disturbing or damaging adjacent wall finish.

4 Alignment shall be parallel with landing frame and adjustable.

5 It shall indicate direction of travel of arriving lift by visible and audible means.

6 Terminal floors shall only have a single arrows indicating in the only possible direction of travel.

7 It shall incorporate a device comprising electronic gong or chime located within lantern box to produce sound signal.

8 Two sound signals for downward travel of arriving lift and one sound signal for upward travel.

9 Sound signal devices shall be individually adjustable in sound output level.

10 Gong or chime shall be capable of being switched off by the activation of a signal from a time clock or a signal from the access control system.

11 Lens illumination shall be adequate and white and evenly distributed without bright spots.

12 Light leakage shall be eliminated.

13 Securely fixed as specified elsewhere.

14 The following requirements specifically apply to lift with destination control selection:

a It shall indicate the lift identification letter by visible means.

b It shall incorporate a device comprising electronic gong or chime located within lantern box to produce sound signal when the disabled button is pressed on the destination input panel and the user has been assigned to that lift.

c Two sound signals for downward travel of arriving lift and one sound signal for upward travel.

d Sound signal devices shall be individually adjustable in sound output level.

7.3.5 CAR OPERATING PANELS

1 All lifts shall be provided with car operating panel(s) incorporating the following:

MAIN CAR OPERATING PANEL

1 The Main Car Operating panel shall generally contain:

a Surface engraving describing functions. All functions shall be described in words as well as mandatory symbols.

b Floor call buttons.

c Door open and close buttons labelled “Door open” and “Door close” respectively.

d Access control card reader if applicable.

e Alarm and emergency communication button.

f Communication speaker hole approximately at 1500 above floor level.

g Communication loudspeaker behind engraved holes and above loudspeaker level.

h Key switches.

i Push button for fan with adjustable timer.

j Surface engraved regulation load notice.

k Surface engraved notice giving lift and building location.

l Car information display if not located centrally over entrance.

AUXILIARY CAR OPERATING PANEL

1 The Auxiliary Car Operating Panel shall generally contain:

2 All items as noted for the Main Car Operating Panel with the exception of the key switches.

LAYOUT PRINCIPALS

1 The layout of the car operating panel(s) shall generally be as follows:

a Full height (2,100h min) car operating panels to be provided.

b As simple and uncluttered appearance as practicable.

c Controls grouped to facilitate easy and ready recognition of functions.

d Related functions grouped together, and other functions located apart.

e Main functions of floor and door buttons grouped together.

f Floor buttons arranged in a single row unless prevented by requirements for access by the disabled.

g Necessary multiple rows of floor buttons arranged in “zig-zag” sequence rather than sequentially up each column then starting up the adjacent column.

h The car operating panel shall be sufficiently wide to allow all call buttons to be located within the height zone required by AS1735.12 for access by people with disabilities.

i Door open button closer to entrance side; door close button on other side.

j Alarm/emergency communication button the only control at that height if layout permits, located in bottom right hand corner as per AS1735.12.

k Access control card reader below floor buttons.

l Key switches shall be located well above or below general use functions.

CAR OPERATING PANEL CONSTRUCTION

1 Car operating panel faceplates shall be a minimum of 2.0 mm thick and shall be of stable construction and visually flat without perceptible deflection. Car operating panels shall sit flush against the car wall and not project past the lift wall finishes and shall be of the hinged type.

7.3.6 CAR INFORMATION DISPLAYS

1 A car information display shall be provided in each car operating panel and shall be mounted at a height of not less than 1,800mm above the car floor. The display shall be located between 1,800 and 2,100 above the car floor.

2 Car information displays shall consist of the following as a minimum:

STANDARD DISPLAYS

1 The display shall employ LCD digital position and direction of travel indication to approval with a minimum character height of 50mm.

2 The display shall display messages dependant on the lift status Including: name of floor at which lift is arriving, “Exclusive Service”, “Fire Service”, “Out of Service”, other fault/status messages as appropriate.

7.4 LIFT CAR

7.4.1 CAR PLATFORM

1 The car platform shall be designed and robustly constructed to cope adequately with all possible conditions of use to which a lift of its type could reasonably be subjected to.

2 The platform surface shall be smooth, free from flexing or drumming and isolated from the main car frame structure by purpose designed sound and vibration isolation mountings.

3 The front edge of the platform shall be fitted with extruded hard aluminium alloy sill together with a metal toe guard. Stainless steel may be used as an alternative.

4 The underside of platforms shall comply with fire proofing requirements.

5 The top side of the platform shall be built up with a suitable thickness, not less than 20mm, of marine grade plywood, smooth and level, ready to accept finish floor materials.

7.4.2 CAR FRAME CONSTRUCTION

1 Car frames shall be robustly constructed of structural steel members to suit the specified duty and to form a rigid structure.

2 The spacing between top and bottom cross members/channels shall be the maximum permissible within the specified overrun dimensions to ensure maximum vertical spacing of the car roller guides. Care should be taken to ensure roller guide centres do not coincide with rail fixing centres or rail joint centres.

3 Where 2:1 roping is used, car sheaves shall be enclosed, acoustically treated and effectively isolated from the car frame.

4 All car hoist and/or compensation rope/chain hitches shall be damped and suitable isolating pads fitted to prevent transmission of noise/vibration to car frame.

5 Compensation ropes/whisperflex where used, shall be effectively isolated to minimise transmission of sound and vibration and terminated at the centre of gravity on the lift car and near the top of counterweights.

6 Lift cars shall be statically balanced with particular attention to location of car pick up, arrangement and location of trailing flexes and roof mounted equipment.

7 Counterweights shall also be fully balanced after correct final weights are established.

7.4.3 CAR GUIDE SHOES

1 The car frame shall be fitted with guide shoes, spring loaded and adjustable to ensure sufficient contact with the guide rails.

2 Guide shoes are to be provided for all cars and counterweights. They shall be rubber or polyurethane tyred and shall be smooth and silent in operation.

3 Guide shoes shall be located at maximum vertical spacing permissible within the specified overrun dimensions. Care should be taken to ensure roller guide centres do not coincide with rail fixing centres or rail joint centres.

4 For speeds up to 1.6m/s sliding shoes are acceptable, for speeds above 1.6m/s and less than 3.0m/s roller guides shall be provided. For all speeds above 3.0m/s roller guides shall be provided and shall be high quality, spring loaded and adjustable.

5 All roller guides shall be fitted with high quality bearings.

6 Guide assemblies shall be effectively vibration isolated at point of fixing to car frames.

7 Guide assemblies shall be installed strictly in accordance with manufacturer's specifications with close attention to clearances, setting of spring ratings and pressures, and effective lubrication.

8 Springs shall be properly selected in relation to car mass. A small spring constant shall be used to ensure rigidity of mounting and to achieve early damping.

9 Guide shoe assemblies shall be adjusted to ensure optimal ride, once fitted.

7.4.4 CAR SUPERSTRUCTURE

1 The car superstructure shall be fabricated from mild steel, suitably braced and stiffened to eliminate flexing or drumming and designed to accept removable wall panels (panels removable from within lift car).

2 The car superstructure shall be effectively isolated from the car frame and shall be free of any racking, rattles or squeaks under all loading, unloading and operating modes.

3 Where car superstructures comprise two shells, the outer shell shall be effectively isolated from the car frame, and the inner shell supported on anti-vibration mountings. In spaces between the inner and outer shells fit approved acoustic material to absorb noise and vibration.

4 Exterior of lift cars shall feature flush surfaces to reduce turbulence and all joints shall be designed to dampen vibration and minimise noise.

5 Interior finishes for lift cars shall be of the highest standards of materials and finish.

6 Superstructures and finish materials shall be fully protected from when they leave the factory to when the lifts are accepted at practical completion.

7.4.5 CAR VENTILATION

1 Openings for natural ventilation shall be provided at the bottom and top of the side and rear wall panels and shall be located such that they are not directly visible from within the car.

2 Ventilation openings shall be fitted with baffles to minimise transmission of air borne noise.

3 Supply and install silent running, single phase, concealed, exhaust fans in each lift car capable of changing the air within the lift car at a minimum of 25 times per hour and having a sound level output of 45 dBA maximum measured at 1.5m above the lift car floor, inside car, doors closed, and car stationary at any floor.

4 Exhaust fans shall be isolated from the car structure with anti-vibration mountings.

CAR ACOUSTIC TREATMENT

1 Provide acoustic treatment as may be necessary to achieve the Specified acoustic performance:

2 Acoustic treatment shall consist of complying sound absorbing material to attenuate intrusion of mechanical and air movement noises in lift applied to outside surface of lift.

3 Sound absorbing material shall be selected and applied in a manner that prevents it leaving lift car surface.

4 It shall consist of sound absorbing material that does not allow build-up of dust on its surface and is impervious to oils and solvents.

CAR MECHANICAL VENTILATION

1 Car ventilation system shall consist of an extractor fan on car roof complete with sound isolated supports.

2 Type – Fan-Tech T2-150 diameter propeller fan or equivalent, subject to achieving acoustic requirements.

3 It shall be connected to a nearby isolating switch plug.

4 It shall be sound isolated from lift car ceiling.

5 It shall extract air from lift interior without drawing air directly from adjacent natural ventilation slots at top of car walls, achieved by necessary baffling or plenum installation.

7.4.6 CAR LIGHTING AND POWER

1 All lighting and power shall be in accordance with AS 3000.

2 Where required, a single phase socket outlet with a metal fascia shall be mounted on the COP.

7.4.7 EMERGENCY LIGHTING

1 Each car shall be provided with an emergency lighting unit to provide internal car illumination in the event of power failure. Illumination where provided shall be included in addition to general car illumination. Preference will be given to invertor type units which illuminate a minimum of 50% of the normal car lights. The unit shall provide continuous illumination for a minimum period of two (2) hours and be completely sealed and maintenance free.

2 The charger shall be solid state, completely automatic, providing fast and float charge modes of operation.

7.4.8 EMERGENCY ALARM

1 There shall be an audible alarm on the car.

2 The emergency alarm shall be powered by a standby battery system.

3 While the alarm button is pressed, the button shall illuminate and an audible alarm shall indicate its functionality.

4 Upon standby back up battery system the alarm button shall be illuminated.

5 Ancillary alarms shall be installed within the liftwell at the main entrance level. All volumes shall be adjustable.

6 The alarm system shall be capable of being connected to a building management system. This connection shall be via voltage free contacts or a more advanced method (providing this method interfaces with the building management system).

7.4.9 CAR DOORS

1 The car doors shall be power operated, type fitted with replaceable guides designed to prevent the doors from rattling while the lift is running and to run silently in the groove of the car sill.

2 Car and landing doors for passenger and fire lifts are to be of the manufacturers own design but must have a minimum of two bottom shoes engaged in the track at all times. All car and landing doors shall be fitted with retaining devices such that the door cannot come out of the bottom track if all of the shoes become worn or dislodged.

3 Landing doors are to be fitted with adhesive floor designations numbers on the shaft side.

4 Car doors shall be of the horizontal sliding type designed for use with power door operator.

5 Doors shall open to the specified clear opening width when open.

6 Doors shall be aligned with adjacent car and landing entrance jambs when open.

7 Doors shall consist of furniture steel underlying construction suitably reinforced to achieve rigid assembly.

8 Doors shall incorporate removable guides on bottom edge preventing lateral oscillation and noise.

9 Movement and discernible noise shall be prevented while car is travelling.

7.4.10 POWER DOOR OPERATION

1 Door operators shall be high performance VVVF closed loop type.

2 Both the landing and car doors shall operate automatically and simultaneously. Pre-opening of doors may be provided.

3 Door opening and closing speeds and door open dwell times shall be fully adjustable and set up to meet guaranteed performance without adversely affecting passenger comfort.

4 Operation of the passenger protection device or the door close button shall reduce all pre-set door open dwell times to less than one second.

5 The whole door operation shall be accomplished smoothly and quickly without undue noise, vibration or shock. Door movements shall be cushioned or checked at both limits of travel.

6 Door motor fuse and overtime protection shall be provided.

7 Rated open and close cycles to accommodate specified lift run tests.

8 Operate doors on car and landings quietly and smoothly.

9 Allow doors to reverse or to close at reduced speed or with reduced torque at normal speed without discernible shock or movement.

10 Opening, closing and dwell times shall be adjustable.

11 Commence doors opening during final levelling operation of car.

12 Power door operators shall incorporate closed loop feedback control allowing door torque to be sustained over the full closing cycle of the doors to avoid the impact of shaft windage and

internal/external pressure differences. Doors shall be driven by the door operator to the fully closed position and not rely on the landing door closer to close and lock.

7.4.11 PASSENGER PROTECTION DEVICE

1 Panachrome 3D or approved equivalent infra-red beams continually monitoring clear opening from 50mm above floor level to at least 1550 above floor level. Unaffected by dust, moisture, vibration and ambient light.

2 System shall incorporate coloured indicators that operate on door movement. The detectors shall illuminate green in the doors are opening, flash red as they start to close, and stay red as the doors move together.

3 The device shall function such that obstruction of the entrance shall hold doors open if in the open position, or reverse and fully reopen doors if closing.

4 The device shall be positioned to avoid the risk of damage and shall not intrude on the clear door opening.

5 The passenger protection device shall incorporate a nudging feature as specified elsewhere.

6 Interruption of the passenger protection device shall reduce the door open dwell time to less than one second once the entrance becomes clear.

7.4.12 LIFT CAR PROTECTIVE QUILTING

1 Supply quilted canvas protective quilts of fire retardant construction complete with fixings. The fixings shall consist of plastic coated hooks securely fastened to the screen and long enough to be supported from the top of the side and rear wall panels of the respective car superstructure. Where glass panels (including mirrors) are fitted inside the lift cars, appropriate warning notices shall be displayed on the protective quilting.

2 Each set of blankets shall be labelled as to lift and wall of lift.

7.4.13 COMMUNICATION SYSTEM

1 A self-dialling hands free telephone shall be mounted in the car operating panel. The telephone shall be activated by means of pressing the phone button (to illuminate on pressing) on the car operating panel for 3 seconds, and shall automatically dial a permanently attended location. The phone system shall also be capable of receiving calls, and automatically deactivating upon time-out (adjustable), busy tone, etc.

2 The system shall not require button to continue to be pressed once connection has been made.

3 The system shall automatically identify to the service centre the building and lift number from which the call was made.

4 Compliance with AS1735.12 is required.

7.4.14 VOICE ANNUNCIATION

1 Voice annunciation shall be provided in each lift car to the requirements of AS1735.12.

2 The volume of the voice annunciation shall with adjustable and the voice projection shall be clear and free from accent. The voice characteristics shall be to Approval.

7.5 LANDINGS

7.5.1 LANDING ENTRANCES

1 Entrances shall be certified with a – / 60 / – fire resistance rating to type tested prototype details.

2 The floor surface within the landing door jamb zone may slope slightly downwards away from the door sill; the jamb shall be made so as to accommodate a maximum slope of 20mm within the landing door jamb zone.

3 Frames shall be installed square to building grid, horizontally in line relative to the liftwell front wall and vertically in line throughout travel of lift.

4 Frame installed plumb within ±1.5 mm over height of frame.

5 If the front enclosure wall is of masonry construction or if door frames are not “grout-free” install a grout guard between masonry opening and frame to enable grouting of frame from outside liftwell.

6 The landing entrances jambs and heads for the goods lifts shall be solidly concrete-grouted in to provide a robust surface capable of withstanding heavy abuse from trolleys and the like. Groutless frames are not acceptable.

7 Door panels shall be reinforced to produce straight flush rigid panel free of distortion marks or blemishes or weld marks.

7.5.2 LANDING DOORS

1 Landing doors shall be of the horizontal sliding type designed for use with power door operator.

2 Doors shall open to the specified clear opening width when open.

3 Doors shall be aligned with adjacent car and landing entrance jambs when open.

4 Doors shall be constructed of furniture steel underlying construction suitably reinforced to achieve rigid assembly.

5 Doors shall incorporate removable guides on bottom edge preventing lateral oscillation and noise.

6 Movement and discernible noise shall be prevented while car is travelling.

7.5.3 LANDING SILLS

1 The landing sills shall be constructed of extruded hard aluminium alloy.

2 Sills shall be installed flush with the finished floor level.

3 Supply and fix all necessary support angles, brackets, bolts and hardware together with mild steel forming strips under sills to avoid slurry entering liftwells when sills are grouted in.

7.5.4 RECALL FIRE SERVICE CONTROL SWITCH

1 Fire recall control switch(s) shall be provided per AS1735.

2 They shall be located on the main floor call button station(s) or on a special faceplate for lifts with DSC. Location as specified elsewhere

3 Faceplates shall be surface engraved to requirements of Standard.

7.6 LIFT MACHINE EQUIPMENT

7.6.1 LIFT MACHINES

1 Permanent Magnet machines are preferred.

2 Gearless traction type machines shall consist of a motor, drive sheave and electro mechanical brake mounted on a common bed plate. The machine shall be designed, manufactured, assembled and balanced to ensure minimum vibration, noise or excessive wear.

3 The machine shall be designed, manufactured, assembled and balanced to ensure minimum vibration, noise or excessive wear.

4 The machine shall have isolation pads fitted to eliminate the transmission of sound and/or vibration.

5 Where integral fan cooling is provided to the hoist motors, the fan shall be thermostatically controlled or continue to run for a period of approximately 180 seconds after the motor has stopped.

6 All bearings shall be precision grade, self-aligning and quiet in operation.

7 The machine shall be provided with a nameplate setting out lift duty, motor speed, drive sheave diameter and size and gross lengths of hoist ropes for replacement purposes.

7.6.2 LIFT MOTOR ROOMS AND MRL CONTROLLER CABINETS

1 The following shall be provided in every lift machine room or controller cabinet in the case of MRL lifts:

- a Distribution boards incorporating:
  - i Complete distribution board designed to withstand the anticipated fault level determined in conjunction with the Electrical services provider.
  - ii Complete distribution board designed to appropriate IP level.
  - iii Adequate labelling of circuit breakers.
- b Locate adjacent to access point and incorporate terminations for installed submains and dedicated circuit breakers with lock off facility Including:

i Main switch for each lift.

ii Machine room light and power with RCD.

iii Machine room ventilation and/or cooling to suit installed mechanical equipment. Coordinate size with Mechanical services provider.

iv Liftwell lighting and pit power with RCD.

v Car light and power with RCD.

c One set of as-installed wiring diagrams in clear plastic envelopes suitably mounted.

d Each lift controller shall contain an engraved performance notice stating the guaranteed:

i Door open and close times.

ii Door dwell times.

iii Floor levelling accuracy.

iv Acceleration and deceleration rates.

v Jerk rate.

vi Contract speed.

vii Flight times (door open to door open) for one, two and four floor runs.

e Where a lift machine room is provided the Contractor shall provide:

i Metal dustbin with lid.

ii Long handled hair broom.

iii Liftwell access key and device in wall mounted receptacle.

iv Steel cupboard with adjustable shelves for storage of small parts.

v Machine room access key box on or in the wall adjacent to the entrance outside the machine room.

f Lighting and Power:

i All distribution boards and electrical connections shall be in accordance with the latest version of AS 3000.

ii Supply and install luminaries within the machine room, spaced to provide 200 lux of illumination.

7.6.3 MACHINE ROPE BRAKE

1 Where independent braking or dual direction safety gear is not provided, each traction machine shall be provided with a suspension rope brake or approved equivalent system. Such system shall operate in accordance with the code requirements. Any air supply required for the proper operation of this equipment shall be included within these works. Such compressor operation shall be silent and not detectable in any lift well or on any floor adjacent to the machine room or machine area space.

2 Compressor piping shall be arranged for automatic blowdown of accumulation vessels.

7.6.4 DYNAMIC BALANCING OF MACHINES

1 After installation and setup, dynamically balance all rotating equipment in the machine room for each lift including worm shafts, rotors, armatures, brake couplings and flywheels where applicable.

7.6.5 MACHINE AND HITCH BEAMS

1 The machine shall be mounted on structural steel beams supplied and installed with bearing plates or steel upstand.

2 Machines and/or machine beams shall be isolated from the machine beams and/or floor slabs by noise and vibration isolating mounts designed to suit the application.

3 Where 2:1 roping is used supply steel hitch beams, suitable steel bearing plates and isolating mounts for these beams.

4 The bearing plates and Unistrut inserts where required, shall be cast into masonry plinths or the structure as necessary.

5 Should machines be mounted directly on reinforced concrete upstands, provide structural engineering certification verifying the suitability of the upstands and floor slab to withstand the imposed dynamic loadings under all conditions.

7.7 LIFTWELL EQUIPMENT

7.7.1 LOWERING AND RELEASE OPERATION

1 Supply and install for each lift, all necessary devices to sense loss of main supply power to the lift and do all works such that a lowering and release operation is initiated.

2 Supply and install a self-contained automatic unit with charger and alkaline batteries and other devices necessary to provide the lowering and release operation for each lift.

3 The operation shall be such that in the event of loss of power and the lift is away from floor level, the lift shall run to the next floor where the doors will open and remain parked with 'Out of Service' displayed in the car.

7.7.2 GUIDE RAILS AND FIXINGS FOR ALL LIFTS

1 Guide rails shall be planed tee section. Deflections are to comply with the requirements of EN81.1 and AS 1735.1.

2 Extreme care shall be taken during storage, packing, handling and transporting of rails throughout the supply and erection process such that rail quality is maintained.

3 Sufficient consideration should also be given to the isolation of lift guide rails by which vibration may be transferred to the slabs

COUNTERWEIGHT

1 Counterweight guide rails shall be tee section.

GUIDE RAILS

1 Guide rails shall be installed plumb and parallel to ensure smooth riding quality.

2 Tee type guide rail joints shall be machined and factory matched tongue and groove type which employ fish plates of cross sectional area at least equivalent to guide rail cross section.

3 Rail clip design shall afford vertical rail movement during contraction, expansion, building settlement or safety gear application without distortion to rails. Any paint or corrosion treatment of rails should not interfere with this requirement.

4 Guide rails shall be either pinned below the lift well roof or bottomed on the pit frame with adequate provisions made for shortening of rails and/or adjusting jacking bolts to allow for building settlement.

5 Supply and install all trimmer beams, brackets, backings, stiffeners, packings, bolts and similar items necessary for the support and fixing of all guide rail systems.

7.7.3 WELL FLUSHING

1 Supply and install sheet steel fascia panels between the sill of each opening and the header plate of the opening below, above the top opening and below the bottom opening in the path of travel of the car door opening as required.

2 Flushing panels shall be suitably stiffened and painted prior to practical completion.

3 In scenarios where the distance between the liftwell face and the car sill is greater than 150mm or if the liftwell is glass, car door locking shall be provided.

7.7.4 SCREENS

1 Where required by code, supply and install pit, well and counterweight screens and any guarding necessary for the prevention of travelling cables being damaged by the shaft or lift equipment.

7.7.5 COUNTERWEIGHT

1 The counterweight shall be of structural frame and designed to be balanced as per AS 1735.1 requirements.

2 Counterweight and associated equipment shall be designed and installed to minimise noise. Noise from the counterweight or associated equipment should not be audible from within the lift car, or on any of the occupiable areas. Any noise evident in any of the areas shall be rectified.

3 Counterweight shall be painted bright yellow for safety purposes. For scenic lifts, the counterweights are to have aesthetically designed covers.

4 Each counterweight shall be fitted with guide shoes, spring loaded and adjustable to ensure sufficient contact with the guide rails.

5 Prior to the top set of guide shoes being finally bolted in position, adjustment shall be made to ensure the counterweight will hang vertical at the mid-point of travel.

7.7.6 PIT ACCESS

1 Supply and install a suitable access ladder to allow access from the level of the lowest floor served by each lift to the lift pit. Extend the ladder a minimum of 1,100mm above the lowest floor level. Means shall be provided to allow unlocking of the landing doors from the pit floor.

7.7.7 PIT STOP SWITCH

1 Suitable impact resistant STOP switches shall be provided adjacent to the top and bottom of each pit access ladder and labelled. All STOP switches to be push / pull type.

2 Provide overspeed governor wheel tension or broken rope detection switches in each lift pit.

7.7.8 PIT AND LIFTWELL LIGHTING AND POWER

1 Fluorescent luminaires, with a suitable impact resistant diffuser shall be supplied and installed in each pit and liftwell. In addition, one RCD protected socket outlet shall be provided in each lift pit. The power supply to this outlet, is to be provided from a separate supply to the pit lighting. The pit lighting shall have emergency lighting facility.

2 Fluorescent luminaires, with impact resistant covers, shall be installed at every floor and provide a minimum light level of 50 lux at the car top wherever the car is located in the shaft. The top and bottom fittings are to be located 500mm from the top of the shaft and pit floor. The bottom light fitting of the shaft lighting in all shafts shall have an emergency light facility.

3 Liftwell luminaires are to have switching points from the car top, machine area and pit. In the case of multiple shafts the lights shall be switched from any car top or any pit entry point for the bank of lifts.

4 Two adjacent liftwells may share a single riser and three or four adjacent liftwells may share two risers where effective illumination level of 50 lux one metre above car roof can be achieved at any point of travel.

7.7.9 BUFFERS AND SUPPORTS

1 Provide buffers designed to the requirements of AS1735 in the bottom overrun pit.

2 Hydraulic buffers shall be fitted with graduated dip sticks to enable checking of the oil level, capped filler openings to facilitate topping up and suitable drain plugs. Oil reservoirs shall be sealed to prevent leakage and contamination.

3 Bolt buffers to mild steel bases fixed to the pit floor between the guide rails. Pit steel, bases, buffers and any braces required shall be supplied and installed.

4 Manufacture pedestals to allow buffers to be supported above the pit floor from steel sections. Pedestals shall be suitably plated at each end to allow adequate fixing of the buffer to the spacer and of the pedestal to the pit floor bases.

5 Where the vertical height from the pit floor exceeds 760 mm to the top of the compressed buffer, the top of the buffer shall be supported in a steel framework fixed at the ends to the guide rails.

7.7.10 LIFTWELL COMMUNICATIONS

1 An integrated communication system shall be provided that allows communication between the lift machine room, lift car, top of car and lift pit. DesignCom or approved equivalent.

7.7.11 LIFT TRAVELING CABLE REQUIREMENTS

1 In addition to those cables specified two spare shielded twisted pair cables shall be included.

2 All cable cores shall be terminated on appropriate termination terminals to allow 3rd party connecting to be achieved, as close as possible to the lift machine room entrance. The twisted pair cables and co-axial cables shall be terminated in an accessible location to allow one access for the connection of a 3rd parties equipment, e.g., access control, CCTV, etc.

7.7.12 LIFTWELL EQUIPMENT FINISHING

1 Paint liftwell equipment in standard gloss enamel colour.

2 All lift steelwork is to be painted in a gloss enamel colour to be selected by the architect. This lift is installed in a glass lift shaft and as such all steelwork is to be painted in a colour nominated by the architect.

7.7.13 BUILDING TOLERANCE

1 Lifts shall be designed to be capable of being installed in a lift shaft built within the building tolerance required by the Contractor.

7.7.14 ATTENUATION OF LIFT SHAFT NOISE & VIBRATION

1 Lift shaft equipment shall be provided with noise attenuating guards, enclosures and vibration isolation mounting to enable the noise and vibration criteria of the specification to be achieved. Consideration must be given to treating electric drives, controllers, machines, sheaves, and support beams in order to meet the stringent project noise and vibration criteria. Design of the proposed methods of noise and vibration attenuation shall be coordinated with the project acoustic consultant.

8 MONITORING

8.1 BUILDING MANAGEMENT SYSTEM

LIFTS

1 A relay based BMS interface for all lifts to monitor status and fault alarms shall be provided as follows:

- a Signal 1 – Consolidated Fault, which would be activated when any one or more of the following conditions has occurred:
  - i Lift failed to start.
  - ii Lift power failure.
  - iii Lift turned off.
  - iv Lift on independent or fire service.
  - v Lift out of service (maintenance).
  - vi Lift safety device operated.
- b Signal 2 – Alarm button pressed, which would be activated when the following condition has occurred:
  - i Car alarm button pressed for more than 3 seconds.

TENDER FORM

FOR

TRANSPORTATION SERVICES

AT

MAINSBRIDGE PUBLIC SCHOOL

I/We, the undersigned, hereby tender to carry out the complete works in accordance with the Specification, Drawings, General Conditions of the proposed contract and addenda, for the sum set out hereunder:

Fixed Lump Sum Tender excluding Goods & Services Tax (GST) for the complete Transportation Service Works Package as specified:	$
Provisional Sums:	$
GST:	$
TOTAL INCLUDING GST:	$

ADDENDUM

We, the undersigned, acknowledge having received the following addenda and have incorporated them in our tender proposal:

NUMBER	DESCRIPTION	DATE RECEIVED

DATED THIS ..... DAY OF 2017

SIGNATURE OF TENDERER .....

COMPANY .....

ADDRESS .....

T.1 Contract Maintenance after Final Completion

We, the undersigned, tender to carry out Contract Maintenance for Transportation Services in the above project in accordance with the Specification document and any noted Addenda if we are appointed for the supply and installation of the equipment.

Validity Period - we agree that this offer may be accepted by the building owner or agent at any time up to the expiration of the Defects Liability Period.

Total Tender Price for Transportation Services Comprehensive Maintenance after Final Completion subject to Rise and fall from date of tender, price per year, for the sums below.

Item	Whole dollars
Total fixed lump sum annual maintenance price – 3 years	$ .....
Total fixed lump sum annual maintenance price – 5 years	$ .....

T.2 Compliance Statements

The following compliance statements override any and all other statements and contents in the tender documents.

The Equipment provided in accordance with the Total Fixed Lump Sum Tender price for Transportation Services to Final Completion including Defects Liability Period Maintenance will be fully Complying as regards the following:

1 The Specification and Addenda including Specification Drawings (Yes/No) ..... (attach full list of deviations if No)

2 Relevant Regulations and Acts (Yes/No) ..... (attach full list of deviations if No)

T.3 Tender Price Schedule

The total fixed lump sum tender price excluding GST and excluding PC sums for the complete Transportation Service Works Package as specified **is the total of** the following prices excluding GST and excluding PC sums:

Item	Whole dollars
Lift No. 1	$ .....
Total fixed lump sum tender price as above excluding GST and excluding PC sums for the complete Transportation Service Works Package as specified	$ .....

T.4 Major Tender Price Components

The total fixed lump sum tender price excluding GST and excluding PC sums for the complete Transportation Service Works Package as specified **is the total of** the following prices excluding GST and excluding PC sums:

Item	Whole dollars

Materials and manufactured equipment	$
Imported equipment	$
Site installation labour	$
Maintenance between Practical completion and Final Completion	$
Total fixed lump sum tender price as **above excluding** GST and **excluding** PC sums for the complete Transportation Service Works Package as specified	$

T.5 Other Tender Price Components

The total fixed lump sum tender price excluding GST and excluding PC sums for the complete Transportation Service Works Package as specified **contains** the following prices excluding GST and excluding PC sums:

Item	**Whole dollars**
Specified car finishes	$
Regenerative Drive	$
Protective Blanket	$
	$
	$

Signature of Tenderer: _____ Date: _____

T.6 Alternatives and Options

The following alternatives and/or options are offered as variations to the above total fixed lump sum tender price excluding GST and excluding PC sums for the complete Transportation Service Works Package as specified. Attach details where items are not fully specified.

Item	Total saving - whole dollars	Total extra - whole dollars
Contractors lift fit out	$	$
Contractors lift intercoms	$	$
Contractors lift maintenance per lift per week	$	$
Contractors lift rectification	$	$
	$	$

T.7 Program

We propose the following as the earliest normal delivery and installation program, where "Week No." means the start of that week number, in calendar weeks, counting in successive weeks from week No. 1, and where areas are weatherproof and suitable to take over, and subject to the necessary progressive completion of works to be performed by others:

LIFT

STAGE	LIFT NO.1
Receipt of written instruction to proceed	Week 1
Produce of shop drawings	
Approval of shop drawings	
Imported equipment ready to place on site	
Contractor's lift available (if req'd)	
Contractor's lift returned	
Practical Completion	

T.8 Defects Liability Maintenance

AVERAGE RESPONSE TIME TO SERVICE CALL OUT		GUARANTEED MAXIMUM RESPONSE TIME TO SERVICE CALL OUT		
During normal working hours	Outside normal working hours	During normal working hours	Outside normal working hours	Trapped passengers
..... minutes	..... minutes	..... minutes	..... minutes	..... minutes

T.9 Reference Installations

Recent installations where equipment of a similar design to that specified has been installed and completed.

LIFT

Project name	Installed Date	Location	Load / speed	No. floors
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....

T.10 Proposed Subcontractors

Work proposed to be subcontracted by the tenderer:

Description of Work	Proposed Subcontractor	Reference Project where subcontractor has previously done this kind of work for the tenderer
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

T.11 Lift Equipment Description:

The lift equipment offered is as per the below:

PARAMETER	LIFT NO. 1
Design Code	
Rated Load (kg)	
No. Passengers	

Signature of Tenderer: _____ Date: _____

PARAMETER	LIFT NO. 1
Speed (m/s)	
Rating (Pass or Goods A etc)	
Car Width between applied finishes (mm)	
Car Depth between applied finishes (mm)	
Clear height to false ceiling	
Entrance Type	
Entrance Size (W x H)	
No. COP's per car	
Communication system type	
Button type	
Drive (G'd, G'less)	
Gearbox type if G'd	
Roping (1:1, 2:1)	
Motor rating (kW)	
Rated starts per hour	
Maximum Demand (A)	
Maximum current duration	
Heat output (kW)	
Controller manufacturer	
Power door operator model description	
Power door operator rated starts per hour	
Door jamb description	
Guide shoe type	
Rope brake manufacturer (if req'd)	
Car indicator display manufacturer / Type (LED, Dot Matrix)	

Signature of Tenderer: _____ Date: _____

T.12 Deviations from Specification

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Signed for and on behalf of the tenderer

In signing below the signatory personally warrants that he/she has the actual authority to bind the Tenderer to this tender.

Tenderer (name of Company tendering)	.....
Tenderer's ACN	Tenderer's ABN
.....	.....
Name of person signing for and on behalf of the tenderer	.....
Office held by person signing for and on behalf of the tenderer	.....
Signature	.....

Signature of Tenderer: _____ Date: _____

Date of signing .....

Signature of Tenderer: _____ Date: _____

APPENDIX A
TECHNICAL DATA

A1 TECHNICAL DATA

The following technical data form shall be submitted during the shop drawing phase of the project.
One form shall be completed for each group of lifts provided on the site.

Shop Drawing Technical Data

Lift Numbers: ……..

MAINSBRIDGE PUBLIC SCHOOL

1. Lift Numbers: _____
2. Name and Address of VT Subcontractor: _____
3. Name and Address of the Owner/Principal: _____
4. Name and Address of the Contractor: _____

Duty Information:

1. Type of lift equipment (Conv Overhead or MRL): _____
2. Lift Classification (Pass or Pass/Goods Class ?) _____
3. Rated Load (Pass / kg): _____
4. Rated Speed: _____
5. Levels served: _____
6. Travel of lift: _____

Machine and Controller Information:

1. Machine type (geared or gearless): _____
2. Machine size (kW): _____
3. Machine reference model number: _____
4. Control type (Conv or Destination Control) _____
5. Controller Model number: _____
6. Drive type (VVVF, VFAC, etc): _____
7. Regen drive: _____

Governor Information:

1. Governor model number: _____
1. Governor mechanical tripping speed: _____

Shop Drawing Technical Data

Lift Numbers: ……..

MAINSBRIDGE PUBLIC SCHOOL

2. Governor electrical tripping speed: _____

3. Rope diameter: _____

4. Rope type: _____

5. Rope construction: _____

6. Breaking load: _____

Car Information:

1. Car guide rail size and type: _____

2. Car roller guide type and size: _____

3. Safety gear type: _____

4. Safety gear model number: _____

5. Roping ratio (i.e. 2:1) _____

6. No. hoisting ropes: _____

7. Size of hoisting ropes: _____

8. Hoisting rope type: _____

9. Hoisting rope construction: _____

10. Hoisting rope breaking load: _____

11. Compensation (rope or chain): _____

12. Compensation type (lockdown or non-lockdown): _____

13. Compensation size and number of ropes: _____

14. Compensation rope type and construction: _____

15. Compensation rope breaking load: _____

16. Mass of car (kg): _____

Counterweight Information:

1. Counterweight guide rail size and type: _____

2. Counterweight roller guide type and size: _____

3. Counterweight safety gear type: _____

4. Counterweight safety gear model number: _____

5. Mass of the counterweight: _____

Buffer Information:

Shop Drawing Technical Data

Lift Numbers: ……..

MAINSBRIDGE PUBLIC SCHOOL

1. Car buffer type (Spring, oil, neoprene): _____

2. Car buffer model number: _____

3. No. of car buffers: _____

4. Counterweight buffer type (Spring, oil, neoprene): _____

5. Counterweight buffer model number: _____

6. No. of counterweight buffers: _____

Door Operator Information:

1. Door operator model number: _____

Electrical Information:

1. No. submain supplies: _____

2. Submain circuit breaker size: _____

3. Electrical Maximum Demand (total): _____

4. Running current per lift: _____

5. Starting current per lift: _____

6. Fault level: _____

7. Heat liberation (total): _____

Commissioning Data:

1. Emergency phone directed to (lift manufacturer or on site location): _____

2. Governor mechanical tripping speed: _____

3. Governor electrical tripping speed: _____

4. Safety gear test date (pass or fail): _____

5. Fire service operation successful: _____

BCA LOGIC PTY LTD AS T/F BCA LOGIC UNIT TRUST
Building Regulation, BCA, Fire, Access and Energy Consultants

Level 6, 210 Clarence Street, Sydney NSW 2000
All Correspondence to: PO Box Q1440
Queen Victoria Building NSW 1230
BCA Logic ABN: 29 077 183 192 | Unit Trust ABN: 96 402 469 940
Phone: 02 9411 5360 | Fax: 02 9411 5420
Email: info@bcalogic.com.au | Web: www.bcalogic.com.au

30 August 2018

Rob Chan
Hayball Pty Ltd
Ground Floor, 11-17 Buckingham Street
Surrey Hills NSW 2010
rchan@hayball.com.au

Dear Rob,

Re: Mainsbridge SSP, 95 Lawrence Hargrave Rd, Warwick Farm, Sydney
Performance Based Solution Report – Screening to Sanitary Facilities

Reference is made to our engagement to undertake and develop a Performance Based Solution (PBS) with regards to the omission of screening outside sanitary facilities located in the public assembly areas of Mainsbridge School for Specific Purposes (SSP) located at 95 Lawrence Hargrave Road, Sydney as the proposed omission is not in compliance with the Deemed to Satisfy provisions of the Building Code of Australia (BCA).

This PBS is as result of the identification by the PCA of student sanitary facilities within the school classrooms and library not being provided with adequate screening being a technical non-compliance with the deemed-to-satisfy requirements (DTS) of the BCA Clause F4.8 – Restriction on location of sanitary compartments and F4.9 - Airlocks. The following student sanitary facilities are not provided with screening to the entry door and are to be addressed in this PBS Report:

- Block A & B: Ground Floor sanitary facilities (x3) in the Library and Multipurpose Hall.
- Block C: Ground Floor sanitary facilities (x8) throughout the storey which open into the classroom and learning areas.
- Block D: Ground Floor sanitary facilities (x6) throughout the storey which open into the classroom and learning areas.
- Block D: Level 1 sanitary facilities (x6) throughout the storey which open into the classroom and learning areas.

The table below details the DTS provisions that are not satisfied by the proposed design and the relevant Performance Requirements (PR) to be addressed by the PBS.

Affected Building Part	Non-compliance	DTS Provision	Performance Clause	Assessment Method
Block A & B: Ground Floor Block C: Ground Floor Block D: Ground Floor & Level 1	Student sanitary facilities open directly into a room used for public assembly and are not provided with adequate screening of the doorway to the facility	F4.8 & F4.9	FP2.1	A0.2(c), A0.5(c) & (d), A0.7 (b)

The purpose of this report is to define the scope of the Performance Based Solution (PBS) applicable to this project; describe the approaches and methods of analyses; and propose the acceptance criteria for the analysis, as well as to document the results of an evaluation of the Performance Based Solution (PBS) formulated to address the following deviation from the Deemed-to-Satisfy (DTS) Provisions of the Building Code of Australia (BCA2016):

1. To allow the provision of student sanitary facilities within a room for public assembly, being the classrooms and learning areas, without the provision of adequate screening to the entry door to the facility.

1. Introduction

This report is as result of the identification by the PCA of student sanitary facilities within the school classrooms and library not being provided with adequate screening being a technical non-compliance with the deemed-to-satisfy requirements (DTS) of the BCA Clause F4.8 – Restriction on location of sanitary compartments and F4.9 - Airlocks. Clause F4.8 does not permit sanitary facilities in a secondary school to open directly into a room used for public assembly, subject to compliance with Clause F4.9. For a Class 9b secondary school building, F4.9(b) provides two options for compliance either by providing an airlock entry to the facility or the doorway to the room should be adequately screened from view.

The proposed design of the classrooms and learning areas have student sanitary facilities open directly into the public room without an airlock or adequate screening in non-compliance with Clause F4.8 & F4.9(b) of the BCA. Drawings of the affected floor plans are shown below where the non-compliances can be identified.

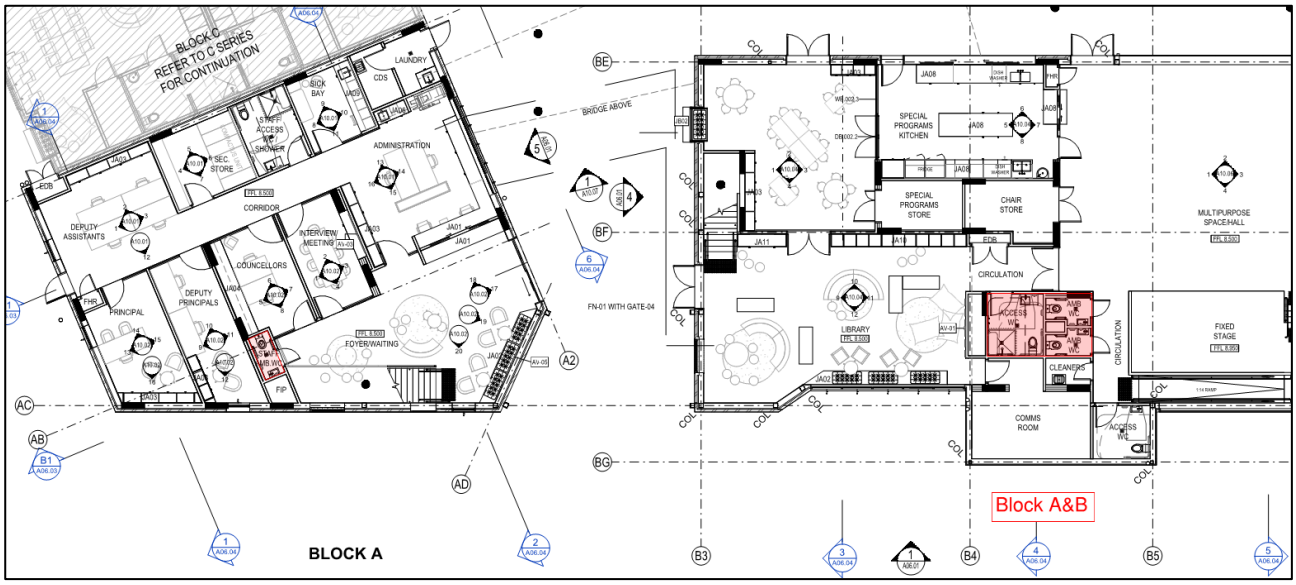


Figure 1: Block A Public toilet in Foyer & Block B Student sanitary facilities in the Library & Multipurpose Hall.

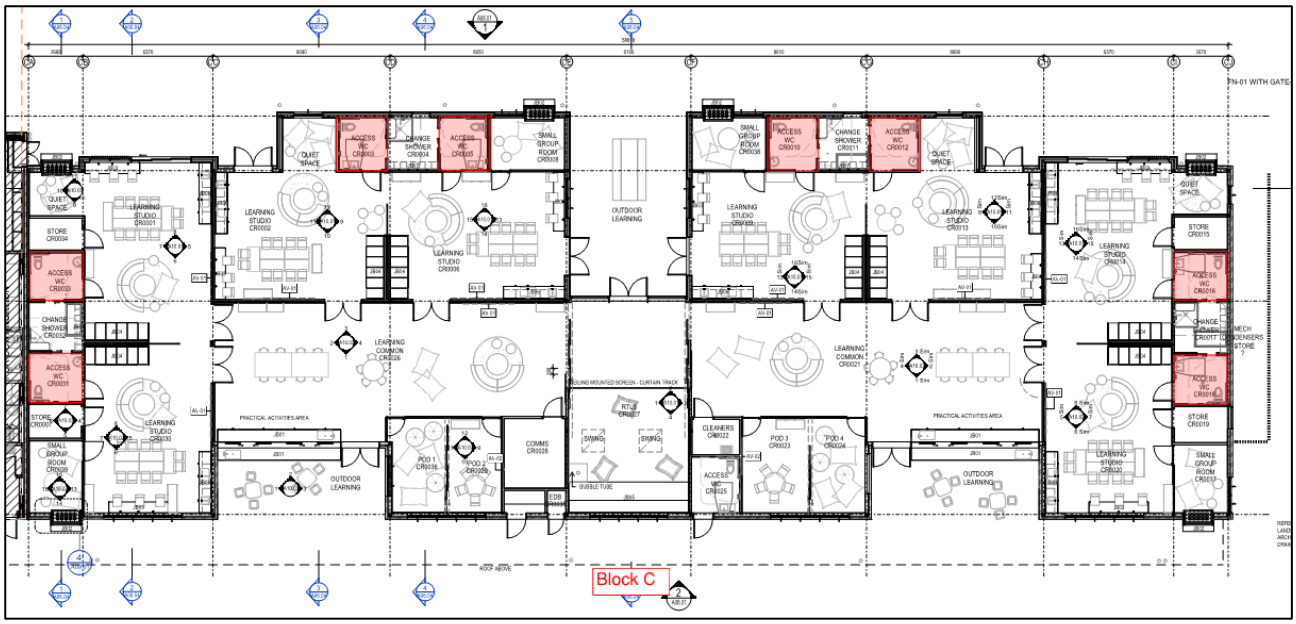


Figure 2: Block C: Student sanitary facilities in the classrooms

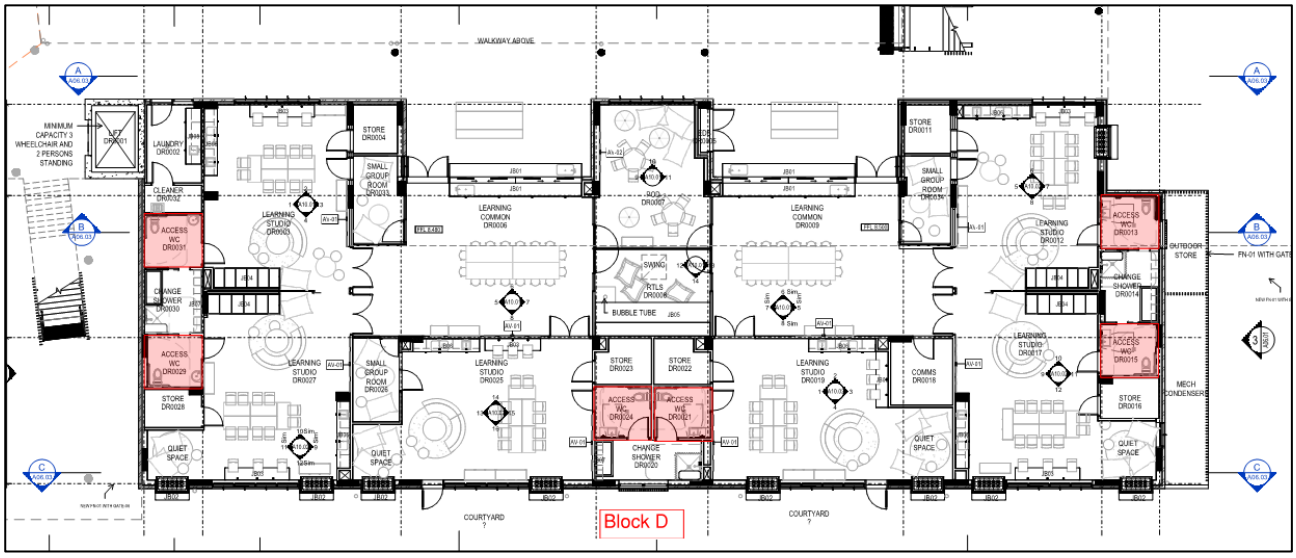


Figure 3: Block D: Ground Floor Student sanitary facilities in the classrooms

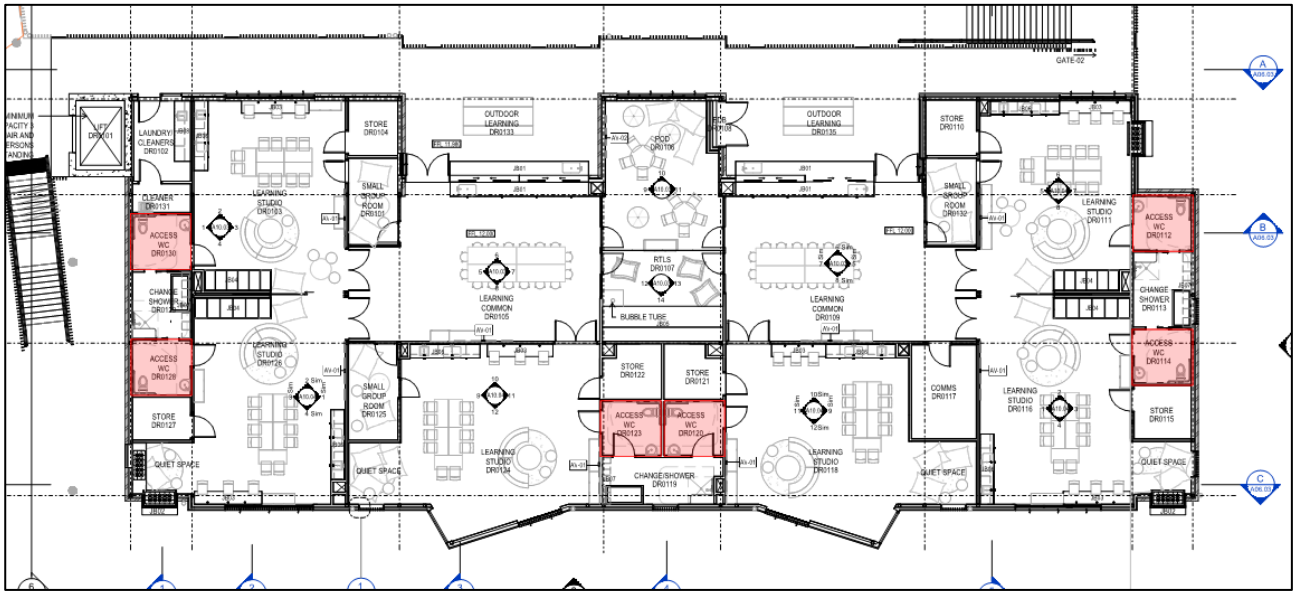


Figure 4: Block D: Level 1 Student sanitary facilities in the classrooms

2. Deemed-to-Satisfy Provisions

The deemed-to-satisfy provision applicable to the subject DtS non-compliance is found in Clause F4.8 & F4.9 of the BCA2016 which states as follow:

F4.8 Restriction on location of sanitary compartments

Sanitary compartments must not open directly into—

(a) a kitchen or pantry; or

(b) a public dining room or restaurant; or

(c) a dormitory in a Class 3 building; or

(d) a room used for public assembly (which is not an early childhood centre, primary school or open spectator stand); or

(e) a workplace normally occupied by more than one person.

F4.9 Airlocks

If a sanitary compartment is prohibited under F4.8 from opening directly to another room—

(a) in a sole-occupancy unit in a Class 2 or 3 building or Class 4 part of a building—

(i) access must be by an airlock, hallway or other room; or

(ii) the sanitary compartment must be provided with mechanical exhaust ventilation; and

(b) in a Class 5, 6, 7, 8 or 9 building (which is not an early childhood centre, primary school or open spectator stand)—

(i) access must be by an airlock, hallway or other room with a floor area of not less than 1.1 m2 and fitted with self-closing doors at all access doorways; or

(ii) the sanitary compartment must be provided with mechanical exhaust ventilation and the doorway to the room adequately screened from view.

3. Performance Requirements FP2.1

The performance requirement to be satisfied in this PBS Report is as follow:

FP2.1

Suitable sanitary facilities for personal hygiene must be provided in a convenient location within or associated with a building, to the degree necessary, appropriate to—

(a) the function or use of the building; and

(b) the number and gender of the occupants; and

(c) the disability or other particular needs of the occupants.

4. Design Assessment

It is considered that a Performance Based Solution relating to the omission of adequate screening of the student sanitary facilities entry doorway within classrooms, as referred above, is warranted in this case, as the DTS provisions of BCA2016 are technically restrictive in terms of the special needs of students within Mainsbridge School for Specific Purposes.

The proposed design of the student sanitary facilities within classrooms and learning areas are considered to satisfy the Performance Requirement FP2.1 on account of the following pertinent matters:

A. Mainsbridge School for Specific Purposes is a secondary school for students with moderate to high learning and support needs. The school will cater for students with a range of intellectual disability, mental health disorder or autism spectrum disorder, physical disability and students with learning difficulties or behaviour disorder.

B. The single toilet in the Administration Block A in the Foyer is for students, staff or parents waiting within the foyer. The facility could be used by students and therefore requires supervision by administration staff, teachers or parents of persons with a disability. It is deemed appropriate for the facility not to have the entry door screened from view as it is appropriate for the particular needs of the occupants.

C. The proposed design includes a student accessible sanitary facility in each classroom (learning studio) to ensure students can use a sanitary facility under the supervision of teachers and support staff without travelling outside the supervised classroom environment. This also prevents a teacher or support staff member having to leave the classroom to supervise and assist students wanting to use a sanitary facility. In accordance with these requirements the following analysis is made:

F4.8 Restriction on location of sanitary compartments	
DTS Clause	**Assessment**
Sanitary compartments must not open directly into—	
(a) a kitchen or pantry; or	N/A
(b) a public dining room or restaurant; or	N/A
(c) a dormitory in a Class 3 building; or	N/A
(d) a room used for public assembly (which is not an early childhood centre, primary school or open spectator stand)	Mainsbridge SSP is a secondary school. Student sanitary facilities which open into the classrooms and learning areas are addressed within this Report.
F4.9 Airlocks	
DTS Clause	**Comment**
If a sanitary compartment is prohibited under F4.8 from opening directly to another room—	
(a) in a sole-occupancy unit in a Class 2 or 3 building or Class 4 part of a building	N/A

(b) in a Class 5, 6, 7, 8 or 9 building (which is not an early childhood centre, primary school or open spectator stand)—	Mainsbridge SSP is a secondary school.
(i) access must be by an airlock, hallway or other room with a floor area of not less than 1.1 m2 and fitted with self-closing doors at all access doorways; or	
(ii) the sanitary compartment must be provided with mechanical exhaust ventilation and the doorway to the room adequately screened from view.	Sanitary facilities will be provided with mechanical ventilation in accordance with AS 1668.2-2012 to comply with F4.5 of BCA2016. Omission of screening is addressed below.
FP2.1	
Suitable sanitary facilities for personal hygiene must be provided in a convenient location within or associated with a building, to the degree necessary, appropriate to—	
(a) the function or use of the building; and	Mainsbridge School for Specific Purposes is a secondary school for students with moderate to high learning and support needs. The school will cater for students with a range of intellectual disability, mental health disorder or autism spectrum disorder, physical disability and students with learning difficulties or behaviour disorder. Therefore, sanitary facilities are provided to the degree necessary for a school for specific purposes. Refer clause (c) below for further assessment.
(b) the number and gender of the occupants; and	Number of sanitary facilities for Staff and Students complies with F2.3 & F2.4 of BCA2016.
(c) the disability or other particular needs of the occupants.	The sanitary facilities for students are all unisex accessible facilities to comply with F2.4 of BCA 2016. The sanitary facilities will not be provided with screening and will open direct into the classrooms. Due to the moderate to high learning and support needs of students, classroom teachers and support staff are required to monitor and assist students in all aspects of their daily routine within the school environment. This specialised support includes, but not limited to, monitor, supervision and physical assistance for students using the accessible sanitary facilities as appropriate. Therefore, it is deemed entirely appropriate for the omission of screening to sanitary facilities to ensure classroom teachers and support staff can satisfactorily carry out their daily functions to monitor, supervise and physically assist students using the accessible sanitary facilities as appropriate.

5. Conclusion

Based on the above assessment and discussion, it is our opinion that the proposed design of the student sanitary facilities within the classrooms and learning areas to the degree necessary to satisfy the performance requirement FP2.1 of BCA2016.

Yours faithfully,

Written by	Approved by
Alex Newberry **Senior Building Regulations Consultant** **BCA Logic Pty Ltd**	Stuart Boyce **A1 Accredited Certifying Authority – BPB 0044** **BCA Logic Pty Ltd**

Annexure A

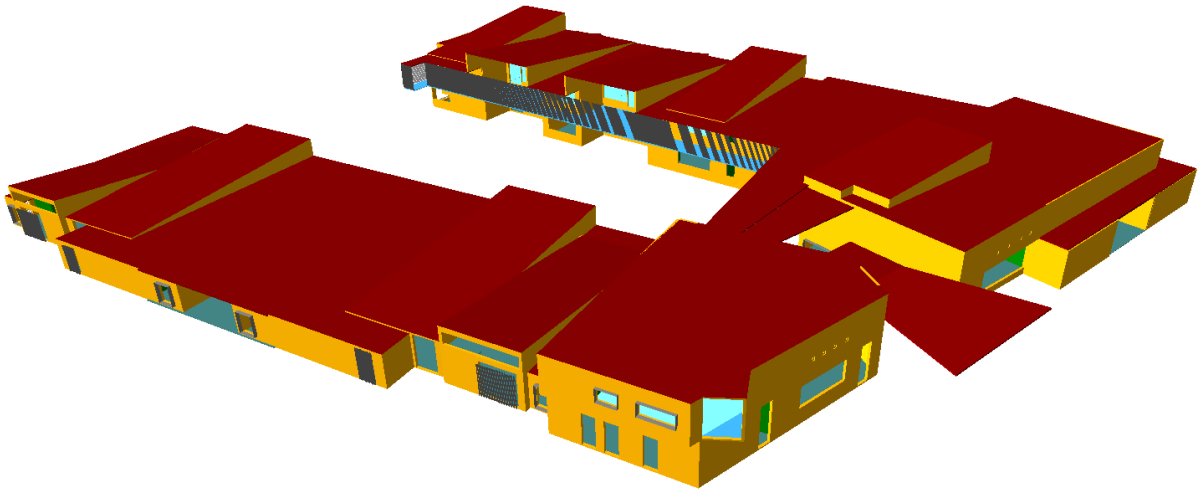
Site Plan of the Proposed Mainsbridge School

HAYBALL ARCHITECTURE

SECTION J REPORT: JV3

MAINSBRIDGE SCHOOL BLOCKS A-D

OCTOBER 2018



Question today
Imagine tomorrow
Create for the future

Section J Report: JV3
Mainsbridge School Blocks A-D

Hayball Architecture

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REV	DATE	DETAILS
00	31/05/2018	Draft
01	09/10/2018	Tender

	NAME	DATE	SIGNATURE
Prepared by:	Sophie Robinson	09/10/2018	
Reviewed by:	Sean Holmes	09/10/2018	
Approved by:	Sean Holmes	09/10/2018	

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EXECUTIVE SUMMARY

WSP has been engaged by Hayball Architecture to carry out a Performance Solution assessment of the building envelope using Verification Method JV3 under Section J Energy Efficiency, Volume 1 of the National Construction Code (NCC) 2016 for the Blocks A-D development of Mainsbridge School in Liverpool, NSW.

Verification Method JV3 requires a comparison between a Reference Building – constructed in accordance with the deemed-to-satisfy (DTS) provisions detailed in the Parts of Section J – and the Proposed Building – constructed in accordance with the design intent.

The following simulations have been carried out:

- Reference Building + Reference Services – modelling of the building with the building envelope and services meeting the DTS provisions
- Proposed Building + Reference Services – modelling of the building with the building envelope meeting the design intent and the services meeting the DTS provisions

Table ES.1 and Figure ES.1 demonstrate the predicted annual energy consumption for the simulations performed.

Based on the modelling performed, the proposed building envelope is deemed to comply with the performance requirements. The calculated annual energy consumption of the Proposed Building is less than the Reference Building.

Table ES.1 Simulation Results

BUILDING	ANNUAL ENERGY CONSUMPTION (KWH/YEAR)						
	Heating	Cooling	Auxiliary	Equipment	Lighting	**Total**	**Pass/Fail**
Reference Building + Reference Services	28,669	164,914	306,184	67,165	96,088	663,019	
Proposed Building + Reference Services	27,691	167,255	298,669	67,165	96,088	656,867	**0.93% Improvement**

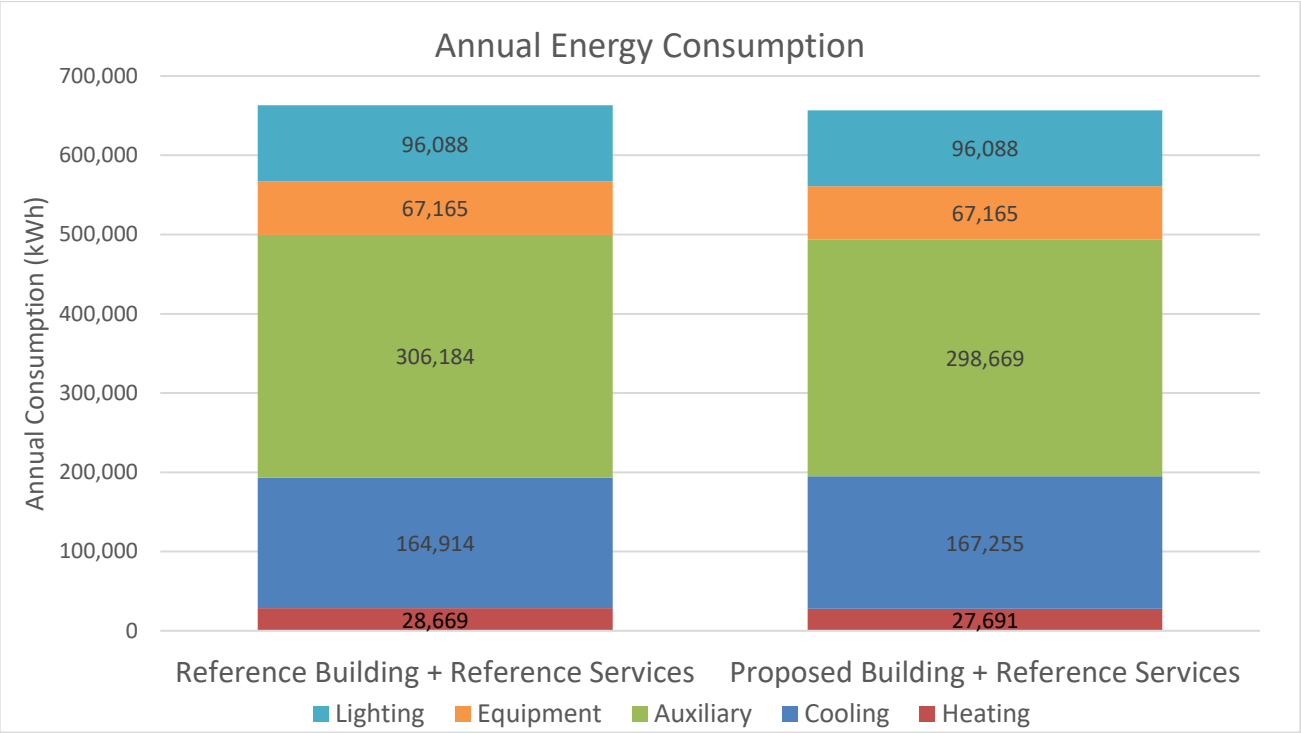

Figure ES.1 Simulation Results

1 INTRODUCTION

1.1 PURPOSE OF REPORT

WSP has been engaged by Hayball Architecture to carry out a Performance Solution assessment of the building envelope using Verification Method JV3 under Section J Energy Efficiency, Volume 1 of the National Construction Code (NCC) 2016 for the Blocks A-D development of Mainsbridge School in Liverpool, NSW.

Verification Method JV3 requires a comparison between a Reference Building – constructed in accordance with the deemed-to-satisfy (DTS) provisions detailed in the Parts of Section J – and the Proposed Building – constructed in accordance with the design intent. The following simulations have been carried out:

- Reference Building + Reference Services—modelling of the building with the building envelope and services meeting the DTS provisions
- Proposed Building + Reference Services—modelling of the building with the building envelope meeting the design intent and the services meeting the DTS provisions

This report presents the methodology used for the JV3 modelling and the results of the simulations undertaken.

1.2 PERFORMANCE REQUIREMENTS

Volume One of the NCC Series 2016 Clause A0.7 Requirements

The relevant DTS Provisions considered in the Reference Building and the Proposed Building are as follows:

- Section J Part J0 Energy Efficiency
- Section J Part J1 Building Fabric
- Section J Part J2 Glazing
- Section J Part J3 Building Sealing
- Section J Part J5 Air Conditioning and Ventilation System
- Section J Part J6 Artificial Lighting and Power

There are no performance requirements from other Sections or Parts of Volume One of the NCC Series 2016 that are relevant to any aspects of the Reference Building and the Proposed Building or that are affected by the application of the DTS provisions that are the subject of the Reference Building and the Proposed Building.

Volume One of the NCC Series 2016 JP1 Requirements

A building, including its services, must have, to the degree necessary, features that facilitate the efficient use of energy appropriate to:

- The function and use of the building and its services
- The internal environment
- The geographic location of the building
- The effects of nearby permanent features such as topography, structures and buildings
- Solar radiation being utilised for heating and controlled to minimise energy for cooling
- The sealing of the building envelope against air leakage
- The utilisation of air movement to assist heating and cooling
- The energy source of the services

2 METHODOLOGY

2.1 ASSESSMENT METHOD AND BUILDING CLASSIFICATION

Clause A0.5 of Volume One of the NCC Series 2016 stipulates that the following assessment methods, or any combination of them, can be used to determine that a building solution complies with the performance requirements:

- Evidence to support that the use of a material, form of construction or design meets a Performance Requirement or a Deemed-to-Satisfy provision as described in A2.2
- Verification Methods such as the Verification Methods in the NCC; or such other Verification Methods as the appropriate authority accepts for determining compliance with the Performance Requirements
- Expert judgement
- Comparison with the Deemed-to-Satisfy provisions

The development seeks to demonstrate compliance with JP1 by using:

- Evidence to support that the use of a material, form of construction or design meets a Performance Requirement or a Deemed-to-Satisfy provision as described in A2.2
- Verification Method JV3; determining that the annual energy consumption of the Proposed Building is not more than the annual energy consumption of the Reference Building for the hotel development.

In accordance with Part A3.2 of NCC Volume 1, the proposed building comprises spaces with the following classifications:

- Class 5 Office
- Class 9b School

The site is located within Climate Zone 6.

2.2 MODEL INFORMATION

2.2.1 SOFTWARE

The computer package used for the thermal simulation was Tas version 9.4.2 by Environmental Design Solutions Limited. It is an EN ISO 13791 validated dynamic simulation modelling (DSM) software tool and is approved under the *ABCB Protocol for Building Energy Analysis Software*, *Version 2006.1*.

2.2.2 SOURCES OF INFORMATION

The following sources of information were used to generate the thermal model:

- Parts J1 – J3, Section J, Volume One of the NCC Series 2016
- Australian Building Codes Board (ABCB) glazing calculator 2014 (current version)
- Glazing candidates: products listed on the Viridian Window Performance Data Estimating Tool
- Architectural drawings: Hayball Architecture “Tender Issue” dated 08/09/2018

2.2.3 EQUIPMENT LOADS

The simulations apply the following air conditioning parameters, per Volume One of the NCC Series 2016, including:

- Specification JV Tables 2b and 2g for the appliances and equipment schedule
- Specification JV Table 2h for equipment loads

2.2.4 MECHANICAL SERVICES

The simulations apply the following air conditioning parameters, as per Volume One of the NCC Series 2016, including:

- Specification JV Tables 2b and 2g for the air conditioning operational schedule
- Clause JV3 (d), sub clause (i) (D) for the air conditioning temperature range
- Maximum fan motor power, as per Specification J5.2, Table J5.2
- Minimum EER for heat pump, as per Table 2b in Specification J5.2e

2.2.5 OCCUPANCY LOADS

The simulations apply the following air conditioning parameters, as per Volume One of the NCC Series 2016, including:

- Specification JV Tables 2b and 2g for the occupancy schedule
- Specification JV, Table 2j, other applications (a) for sensible and latent occupancy heat gain
- Table D1.13 for occupant density

2.2.6 LIGHTING LOADS

The simulations apply the following air conditioning parameters, as per Volume One of the NCC Series 2016, including:

- Specification JV Tables 2b and 2g for artificial lighting schedule
- Table J6.2a for maximum illumination power density

3 BUILDING FABRIC PERFORMANCE PARAMETERS

This section summarises the building fabric as modelled for the JV3 analysis. It details changes to the building elements currently specified to achieve compliance.

Table 3.1 lists the building fabric performance parameters used in the reference and the proposed building. The R-value listed shows the total system R-value, see Appendix A for drawings showing where the total construction values need to be applied. The markup of Appendix A reflects the parameters used for the modeling.

The BCA Section J1 Building Fabric and J2 Glazing assesses the building envelope only. Therefore, the following values are only applicable between typical conditioned spaces that adjoin an unconditioned space or the outside.

Table 3.1: Building Fabric Performance Parameters

BUILDING FABRIC ELEMENT	REFERENCE BUILDING	PROPOSED BUILDING
Slab on ground	**None**	As Per the Reference building
Suspended Floor	**R 2.0 m².K/W** – to the outside or enclosed space with more than 1.5 air changes per hour.	
External walls	**R 2.8 m².K/W**	
Envelope walls other than external walls	**R 1.0 m².K/W** – where the non-conditioned space has mechanical ventilation of not more than 1.5 air changes per hour of outside air per hour. **R 1.8 m².K/W** – where the non-conditioned space has mechanical ventilation of more than 1.5 air changes per hour of outside air during occupied hours.	
Ceilings to unconditioned areas	**R 3.2 m².K/W** Downwards.	
Roof	**R 3.2 m².K/W** Downwards.	

4 BUILDING GLAZING PERFORMANCE PARAMETERS

The reference building glazing is developed in compliance with the National Construction Code Glazing Calculators (Volume One) using available glazing products.

Refer to Appendix B for the completed Glazing Calculators and Table 4.1 which summarises the glazing parameters used for the proposed building in the JV3 analysis.

Table 4.1: Proposed Building Glazing Parameters

ORIENTATION	LEVEL	REFERENCE BUILDING (Whole of System Values)	PROPOSED BUILDING (Whole of System Values)
All	All	Per the glazing calculators in Appendix B Aluminum Frame	Viridian Comfort Plus Neutral 6.38mm U-Value = 4.28, SHGC = 0.48 Aluminium Frame

5 RESULTS

The following simulations have been carried out:

- Reference Building + Reference Services—modelling of the building with the building envelope and services meeting the DTS provisions.
- Proposed Building + Reference Services—modelling of the building with the building envelope meeting the design intent and the services meeting the DTS provisions.

Table 5.1 and Figure 5.1 demonstrate the predicted annual energy consumption for the simulations performed.

Based on the modelling performed, the proposed building envelope is deemed to comply with the performance requirements. The calculated annual energy consumption of the **Proposed Building is 0.93%** less than the Reference Building.

Table 5.1: Simulation Results

BUILDING	ANNUAL ENERGY CONSUMPTION (KWH/YEAR)						
	Heating	Cooling	Auxiliary	Equipment	Lighting	**Total**	**Pass/Fail**
Reference Building + Reference Services	28,669	164,914	306,184	67,165	96,088	663,019	
Proposed Building + Reference Services	27,691	167,255	298,669	67,165	96,088	656,867	**0.93% Improvement**

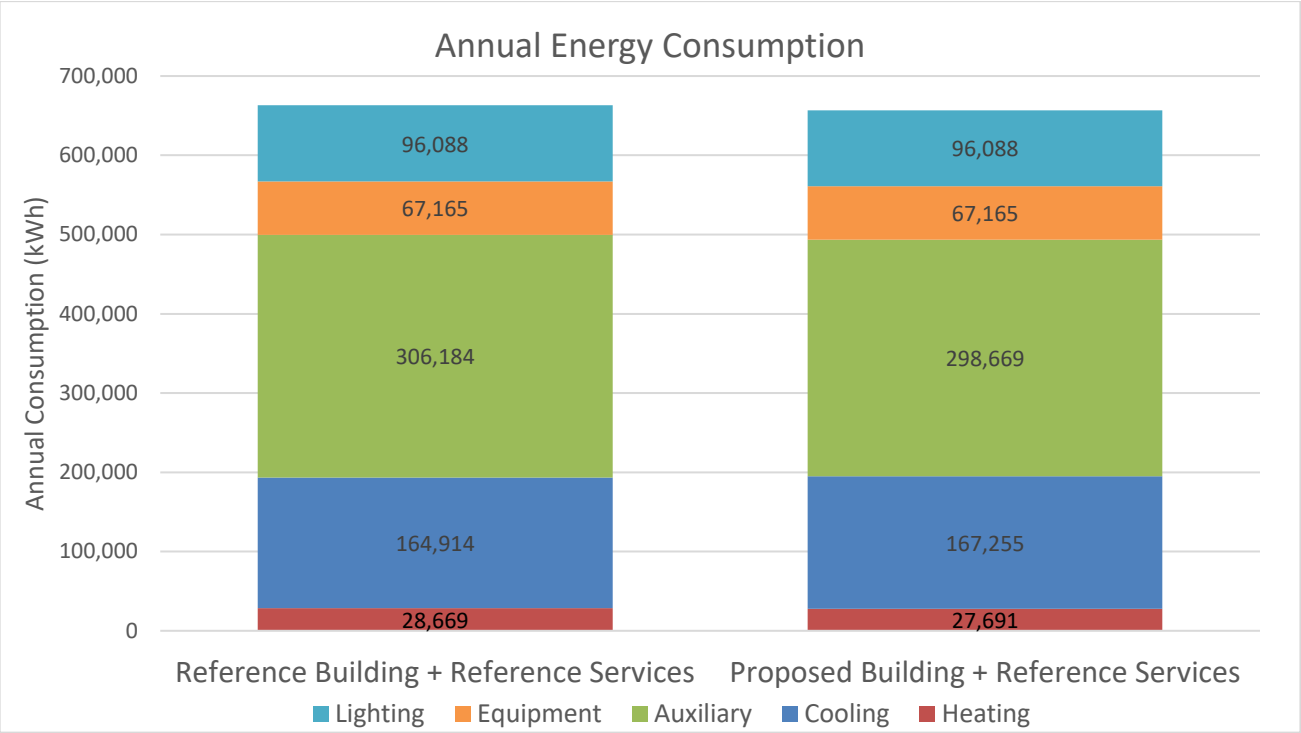

Figure 5.1: Simulation Results

APPENDIX A

WALL, FLOOR AND ROOF INSULATION LOCATIONS

Insulation Key

- R2.8 External Wall
- R2.0 Exposed Floor
- R3.2 Roof

Rev	Description	Date
B	B01A ADDENDUM	10/11/17
A	TENDER ISSUE	02/11/17

ADDENDUM ISSUE

Melbourne
4/135 Sturt Street Southbank,Victoria Australia 3006
T 0+61 3 9699 3644
www.hayball.com.au

Sydney
71/ 26-32 Pirrama Road, Pyrmont NSW 2009
T +61 2 9660 9329

Brisbane
Level 12, 324 Queen Street, Brisbane Qld 4000
T +61 7 3211 9821

NSW Nominated Architects:
Tom Jordan 7521, Richard Leonard 7522, David Tordoff 8028
ABN 84 006 394 261

Builders/Contractors shall verify job dimensions before any job commences. Figured dimensions shall take precedence over scaled work. Work shall also conform to the specification, other drawings and job dimensions. All shop drawings shall be submitted to the Architect/Consultant and manufacture shall not commence prior to the return of inspected shop drawings signed by the Architect/Consultant. © Copyright 2008 All rights reserved

Client:

NSW GOVERNMENT Education

Mainsbridge SSP

102 Lawrence Hargrave Rd, Warwick Farm NSW 2170

DRAWINGTITLE
PRECINCT PLAN - GROUND

DRAWN BY	MD
CHECKED	CS
DATE PRINTED	13/11/2017 4:07:16 PM
SCALE	**1 : 200@A1**

PROJECT NUMBER	DWG NO	REVISION
2141.01	**01.A01.05**	**B**

EXISTING
CHILDCARE
CENTRE

SITE BOUNDARY

SITE BOUNDARY

BLOCK A

BLOCK B

BLOCK C

BLOCK D

BLOCK E

SITE BOUNDARY

BLOCK WC4

EXISTING
WARWICK
FARM
BLOCK C2

Insulation Key

- R2.8 External Wall
- R2.0 Exposed Floor
- R3.2 Roof

Rev	Description	Date
B	B01A ADDENDUM	10/11/17
A	TENDER ISSUE	02/11/17

ADDENDUM ISSUE

Melbourne
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DRAWINGTITLE
PRECINCT PLAN - LEVEL 01

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DATE PRINTED	13/11/2017 4:07:43 PM
SCALE	**1 : 200@A1**

PROJECT NUMBER	DWG NO	REVISION
2141.01	**01.A01.06**	**B**

EXISTING
CHILDCARE
CENTRE

SITE BOUNDARY

BLOCK A

BLOCK C

BLOCK B

BLOCK D

BLOCK E

BLOCK WC4

EXISTING
WARWICK
FARM
BLOCK C2

SITE BOUNDARY

SITE BOUNDARY

97°
74°
106°

Insulation Key

- R2.8 External Wall
- R2.0 Exposed Floor
- R3.2 Roof

Rev	Description	Date
B	B01A ADDENDUM	10/11/17
A	TENDER ISSUE	02/11/17

ADDENDUM ISSUE

Melbourne
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Mainsbridge SSP

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NSW 2170

DRAWINGTITLE
PRECINCT PLAN - ROOF

DRAWN BY	Author
CHECKED	Checker
DATE PRINTED	13/11/2017 4:08:24 PM
SCALE	**1 : 200@A1**

PROJECT NUMBER	DWG NO	REVISION
2141.01	**01.A01.07**	**B**

APPENDIX B

COMPLIANT NCC GLAZING CALCULATORS

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **Block A**

Application: **other**

Climate zone: **6**

Storey: **Ground**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A				47.3m²			48m²	32.6m²	
Option B									n/a
Glazing area (A)				16.5m²			12.2m²	5.82m²	

Number of rows preferred in table below: **13** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS										SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	WA.001.1_WA.013.1	NW		1.80	1.90		4.5	0.70					0.00	1.00	1.00	3.42	59% of 100%
2	DA.001.1	NW		2.40	1.00		4.5	0.70					0.00	1.00	1.00	2.40	41% of 100%
3												ROW SKIPPED (OK if intentional)					
4	WA.006.1	SE		1.00	0.90		3.0	0.80		22.331	3.200	0.00	2.20	1.00	1.00	0.90	5% of 100%
5	WA.006.1	SE		1.00	0.90		3.0	0.80		22.121	3.200	0.00	2.20	1.00	1.00	0.90	5% of 100%
6	WA.006.1	SE		1.00	2.70		3.0	0.80		Device		2.00	0.00	0.37	0.39	2.70	17% of 100%
7	DA.007.1	SE		3.20	3.00		3.0	0.80		Device		2.00	0.00	0.37	0.39	9.60	59% of 100%
8	DA.005.1	SE		2.40	1.00		3.0	0.80					0.00	1.00	1.00	2.40	14% of 100%
9												ROW SKIPPED (OK if intentional)					
10	WA.012.1	W		2.60	1.00		3.5	0.80					0.00	1.00	1.00	2.60	21% of 100%
11	WA.007.8	W				1.74	3.5	0.80					0.00	1.00	1.00	1.74	14% of 100%
12	WA.007.2	W				5.23	3.5	0.80					0.00	1.00	1.00	5.23	43% of 100%
13	WA.007.1	W		2.60	1.00		3.5	0.80					0.00	1.00	1.00	2.60	21% of 100%

if inputs are valid

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NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **Block A**

Application: **other**

Climate zone: **6**

Storey: **Lv 1**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A			51.9m²	60.5m²	25m²		72.8m²	32.9m²	
Option B									n/a
Glazing area (A)			*7.28m²*	*8.98m²*	*1.69m²*		*0.5m²*	*8.18m²*	

Number of rows preferred in table below: **13** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	WA.101.1	NW		0.90	1.40		4.0	0.48	0.300	1.400	0.21	0.50	0.98	0.94	1.26	15% of 100%
2	WA.107.2	NW		0.90	1.58		4.0	0.48				0.00	1.00	1.00	1.42	18% of 100%
3	WA.107.1	NW		3.00	1.83		4.0	0.48				0.00	1.00	1.00	5.50	68% of 100%
4											ROW SKIPPED (OK if intentional)					
5	WA.105.2	SE		1.35	1.35		7.2	0.80				0.00	1.00	1.00	1.82	20% of 100%
6	DA.105.2	SE		2.46	1.92		7.2	0.80				0.00	1.00	1.00	4.73	53% of 100%
7	WA.105.1	SE		1.35	1.80		7.2	0.80				0.00	1.00	1.00	2.43	27% of 100%
8											ROW SKIPPED (OK if intentional)					
9	WA.007.3, WA.007.5, WA.(	W				0.30	8.0	0.80				0.00	1.00	1.00	0.30	60% of 5%
10	WA.007.6	W				0.20	8.0	0.80				0.00	1.00	1.00	0.20	40% of 5%
11											ROW SKIPPED (OK if intentional)					
12	WA.105.2	E		1.40	5.20		8.0	0.73				0.00	1.00	1.00	7.28	100% of 100%
13	WA.007.4	S		1.30	1.30		8.0	0.20	0.500	1.300	0.38	0.00	0.87	0.81	1.69	100% of 65%

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if inputs are valid

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NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **Block B**

Application: **other**

Climate zone: **6**

Storey: **Ground**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	54.1m²		123m²		55.5m²		126m²		
Option B									n/a
Glazing area (A)	*7.96m²*	.....	*39.8m²*	.....	*7.44m²*	.....	*29.4m²*		

Number of rows preferred in table below: **15** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	WB.019.1	W		1.20	6.66		5.2	0.55	*0.800*	3.250	*0.00*	*2.05*	*1.00*	*1.00*	7.99	29% of 100%
2	WB.010.1	W		3.20	6.70		5.2	0.55	2.368	3.000	0.79	-0.20	0.53	0.52	21.45	71% of 100%
3											ROW SKIPPED (OK if intentional)					
4	DB.005.2	E		3.20	2.09		3.9	0.45				0.00	1.00	1.00	6.70	22% of 100%
5	DB.005.2	E		3.20	2.09		3.9	0.45				0.00	1.00	1.00	6.70	22% of 100%
6	DB.005.2	E		3.20	2.09		3.9	0.45	Device		2.00	0.00	0.01	0.29	6.70	14% of 100%
7	DB.002.1, DB.002.1, DB.00	E		2.47	4.86		3.9	0.45	Device		2.00	0.00	0.01	0.29	12.00	25% of 100%
8	WB.002.1	E		1.50	5.15		3.9	0.45	Device		2.00	0.00	0.01	0.29	7.73	16% of 100%
9											ROW SKIPPED (OK if intentional)					
10	WA.001.1	N		1.77	1.44		4.0	0.71				0.00	1.00	1.00	2.55	32% of 100%
11	DB.019.1	N		2.39	1.89		4.0	0.71				0.00	1.00	1.00	4.51	57% of 100%
12	WB.019.2	N				0.70	4.0	0.71				0.00	1.00	1.00	0.70	9% of 100%
13	WB.019.3	N				0.20	4.0	0.71				0.00	1.00	1.00	0.20	3% of 100%
14											ROW SKIPPED (OK if intentional)					
15	DB.005.3	S		3.20	2.33		8.0	0.70				0.00	1.00	1.00	7.44	100% of 100%

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if inputs are valid

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NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **Block B**

Application: **other**

Climate zone: **6**

Storey: **Lv 1**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	56.3m²		78.3m²		33.7m²		102m²		
Option B									n/a
Glazing area (A)	*0.65m²*	.....	*6.22m²*	.....	*8.69m²*	.....	*0.35m²*		

Number of rows preferred in table below: **15** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS										SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	WB.019.7	W				0.05	7.0	0.80					0.00	1.00	1.00	0.05	14% of 3%
2	WB.019.6	W				0.05	7.0	0.80					0.00	1.00	1.00	0.05	14% of 3%
3	WB.019.5	W				0.05	7.0	0.80					0.00	1.00	1.00	0.05	14% of 3%
4	WB.019.4	W				0.20	7.0	0.80					0.00	1.00	1.00	0.20	57% of 3%
5												ROW SKIPPED (OK if intentional)					
6	WB.101.1	E		1.80	0.90		8.0	0.80					0.00	1.00	1.00	1.62	26% of 61%
7	DB.101.1	E		2.39	1.92		8.0	0.80					0.00	1.00	1.00	4.60	74% of 61%
8												ROW SKIPPED (OK if intentional)					
9	WB.101.4	N				0.20	6.0	0.80		Device		2.00	0.00	0.00	0.30	0.20	31% of 4%
10	WB.101.6	N				0.10	6.0	0.80		Device		2.00	0.00	0.00	0.30	0.10	15% of 4%
11	WB.101.7	N				0.05	6.0	0.80		Device		2.00	0.00	0.00	0.30	0.05	8% of 4%
12	WB.101.5	N				0.10	6.0	0.80		Device		2.00	0.00	0.00	0.30	0.10	15% of 4%
13	WB.101.8	N				0.20	6.0	0.80		Device		2.00	0.00	0.00	0.30	0.20	31% of 4%
14												ROW SKIPPED (OK if intentional)					
15	WB.101.2	S		1.30	6.70		3.9	0.28					0.00	1.00	1.00	8.69	100% of 100%

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Building name/description: **Block C**

Application: **other**

Climate zone: **6**

Storey: **Ground**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		16.8m²		190m²		34.8m²		148m²	
Option B									n/a
Glazing area (A)		*13.7m²*		*78.3m²*		*6.94m²*		*82.1m²*	

Number of rows preferred in table below: **24** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS										SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	WC.001.1, WC.014.2	NW		1.97	2.88		3.1	0.20		0.500	1.970	0.25	0.00	0.90	0.79	5.67	7% of 100%
2	DC.001.1, WC.001.2, WC.0	NW		2.80	10.00		3.1	0.20		0.500	4.100	0.12	1.30	1.00	0.99	28.00	39% of 100%
3	WC.001.4, WC.014.1(clere	NW		0.75	11.34		3.1	0.20		0.500	1.200	0.42	0.46	0.93	0.81	8.45	10% of 100%
4	DC.002.1, DC.013.1	NW		2.80	3.84		3.1	0.20		3.000	2.800	1.07	0.00	0.12	0.37	10.76	11% of 100%
5	WC.002.1, WC.013.1	NW		1.40	2.60		3.1	0.20		0.430	2.800	0.15	1.40	1.00	0.99	3.63	5% of 100%
6	WC.008.1, WC.038.1	NW		1.41	2.88		3.1	0.20		0.430	1.700	0.25	0.29	0.97	0.92	4.07	5% of 100%
7	WC.006.2, WC.038.2	NW		1.97	2.90		3.1	0.20		0.430	2.400	0.18	0.43	0.98	0.96	5.72	8% of 100%
8	WC.027.2, DC.027.1, WC.0	NW		2.80	5.65		3.1	0.20		9.700	2.800	3.46	0.00	0.00	0.29	15.82	16% of 100%
9												ROW SKIPPED (OK if intentional)					
10	WC.020.1	SE		1.35	7.68		2.8	0.80		2.248	2.800	0.80	1.45	0.93	0.88	10.37	12% of 100%
11	WC.039.1, WC.037.1	SE		2.04	3.03		2.8	0.80		2.248	2.800	0.80	0.76	0.87	0.82	6.19	7% of 100%
12	WC.026.2, WC.026.1, WC.(	SE		1.93	12.60		2.8	0.80		5.992	4.700	0.00	2.77	1.00	1.00	24.31	32% of 100%
13	WC.026.3, WC.021.3 (clere	SE		0.70	16.09		2.8	0.80		5.992	4.700	0.00	4.00	1.00	1.00	11.27	15% of 100%
14	DC.021.1, DC.026.1	SE		2.80	3.63		2.8	0.80		2.248	4.700	0.00	1.90	1.00	1.00	10.16	14% of 100%
15	WC.029.1, WC.027.1, WC.(	SE		1.35	11.82		2.8	0.80		2.248	2.800	0.80	1.45	0.93	0.88	16.00	19% of 100%
16												ROW SKIPPED (OK if intentional)					
17	WC.014.3	NE		2.40	1.75		5.7	0.23					0.00	1.00	1.00	4.20	51% of 100%
18	WC.037.2	NE		0.90	2.80		5.7	0.23					0.00	1.00	1.00	2.52	31% of 100%
19	?	NE		2.40	1.90		5.7	0.23		Device		2.00	0.00	0.00	0.28	4.56	12% of 100%
20	?	NE		1.35	1.76		5.7	0.23		Device		2.00	0.00	0.00	0.28	2.38	6% of 100%
21												ROW SKIPPED (OK if intentional)					

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS										SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m^2)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m^2)	Element share of % of allowance used
22	?	SW		2.40	1.90		4.8	0.50		Device		2.00	0.00	0.38	0.38	4.56	66% of 100%
23	?	SW		1.35	1.76		4.8	0.50		Device		2.00	0.00	0.38	0.38	2.38	34% of 100%

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NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **Block D**

Application: **other**

Climate zone: **6**

Storey: **Ground**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		23.3m²		129m²				114m²	
Option B									n/a

Glazing area (A) ..... *6.32m²* ..... *48.1m²* *50.4m²*

Number of rows preferred in table below: **18** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	DD.002.1	NW		2.40	0.92		3.7	0.39	2.500	3.100	0.81	0.70	0.92	0.75	2.21	5% of 100%
2	WD.003.1, WD.002.1	NW		1.39	4.07		3.7	0.39	2.500	3.100	0.81	1.71	0.96	0.85	5.65	14% of 100%
3	WD.006.2, WD.006.1, WD.(	NW		1.91	11.91		3.7	0.39	6.010	3.100	1.94	1.20	0.37	0.39	22.68	39% of 100%
4	WD.007.1	NW		1.33	3.85		3.7	0.39	2.500	3.100	0.81	1.77	0.96	0.85	5.14	13% of 100%
5	DD.006.1, DD.009.1	NW		2.80	3.90		3.7	0.39	6.010	3.100	1.94	0.30	0.03	0.32	10.92	22% of 100%
6	WD.012.1	NW		1.35	2.85		3.7	0.39	4.306	3.125	1.38	1.78	0.85	0.64	3.83	7% of 100%
7											ROW SKIPPED (OK if intentional)					
8	WD.012.2	NE		1.97	1.44		6.2	0.38				0.00	1.00	1.00	2.83	45% of 100%
9	WD.017.1	NE		3.17	1.10		6.2	0.38				0.00	1.00	1.00	3.49	55% of 100%
10											ROW SKIPPED (OK if intentional)					
11	WD.027.3, WD.027.1, WD.(	SE		1.94	8.98		3.1	0.80	0.500	1.936	0.26	0.00	0.87	0.83	17.39	36% of 99%
12	WD.027.2, WD.017.3	SE		1.34	7.57		3.1	0.80				0.00	1.00	1.00	10.15	22% of 99%
13	DD.025.2	SE		2.36	1.00		3.1	0.80	1.347	3.150	0.43	0.79	0.95	0.93	2.36	5% of 99%
14	WD.025.2	SE		1.34	3.78		3.1	0.80	1.789	2.117	0.85	0.78	0.86	0.81	5.07	10% of 99%
15	WD.025.1	SE		1.99	1.46		3.1	0.80	0.973	2.792	0.35	0.80	0.97	0.95	2.90	6% of 99%
16	WD.019.3	SE		1.99	1.42		3.1	0.80	0.973	2.792	0.35	0.80	0.97	0.95	2.82	6% of 99%
17	WD.019.2	SE		1.34	3.77		3.1	0.80	1.789	2.117	0.85	0.78	0.86	0.81	5.06	10% of 99%
18	DD.019.2	SE		2.38	1.00		3.1	0.80	1.347	3.150	0.43	0.78	0.95	0.93	2.38	5% of 99%

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m^2)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m^2)	Element share of % of allowance used

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Building name/description: **Block D**

Application: **other**

Climate zone: **6**

Storey: **Lv 1**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		20.3m²	38.8m²	150m²		46.4m²		143m²	
Option B									n/a
Glazing area (A)		*6.14m²*	*9.81m²*	*40.6m²*		*10.7m²*		*48.2m²*	

Number of rows preferred in table below: **19** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS										SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	WD.111.1	NW		1.33	2.87		5.2	0.50		4.306	2.800	1.54	1.47	0.79	0.59	3.82	7% of 100%
2	DD.101.5, DD.101.4	NW		2.78	3.88		5.2	0.50		5.662	2.800	2.02	0.03	0.00	0.29	10.76	23% of 100%
3	WD.109.2, WS.109.1, WD.1	NW		1.87	11.90		5.2	0.50		5.663	2.800	2.02	0.93	0.33	0.38	22.22	41% of 100%
4	WD.106.1, WD.103.1, WD.1	NW		1.33	8.58		5.2	0.50		2.424	2.800	0.87	1.47	0.95	0.83	11.41	29% of 100%
5												ROW SKIPPED (OK if intentional)					
6	WD.111.2	NE		1.97	1.44		8.0	0.38		0.300	1.970	0.15	-0.00	0.95	0.89	2.84	42% of 99%
7	WD.116.1	NE		3.00	1.10		8.0	0.38					0.00	1.00	1.00	3.30	58% of 99%
8												ROW SKIPPED (OK if intentional)					
9	?	E		2.77	1.60		3.5	0.44					0.00	1.00	1.00	4.42	45% of 100%
10	?	E		2.77	1.95		3.5	0.44					0.00	1.00	1.00	5.39	55% of 100%
11												ROW SKIPPED (OK if intentional)					
12	WD.124.2	SW		2.77	1.60		5.3	0.80					0.00	1.00	1.00	4.42	41% of 99%
13	?	SW		2.77	1.95		5.3	0.80					0.00	1.00	1.00	5.41	51% of 99%
14	WD.126.3	SW		0.88	0.98		5.3	0.80					0.00	1.00	1.00	0.87	8% of 99%
15												ROW SKIPPED (OK if intentional)					
16	WD.126.2, WD.116.2	SE		1.94	2.84		4.1	0.80		0.300	1.970	0.15	0.03	0.92	0.90	5.52	14% of 100%
17	WD.126.1, WD.116.3	SE		2.70	8.90		4.1	0.80		0.500	2.800	0.18	0.10	0.91	0.88	24.02	58% of 100%
18	WD.126.4, WD.116.4	SE		0.94	11.77		4.1	0.80					0.00	1.00	1.00	11.10	28% of 100%
19	WD.124.3, Wd.118.1																

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m^2)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m^2)	Element share of % of allowance used

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SECTION J REPORT: JV3

MAINSBRIDGE PUBLIC SCHOOL BLOCK E

wsp

JANUARY 2019

Question today
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Section J Report: JV3
Mainsbridge Public School Block E

Hayball Architecture

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REV	DATE	DETAILS
00	28/08/2018	For Draft Issue
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EXECUTIVE SUMMARY

WSP has been engaged by Hayball Architecture to carry out a Performance Solution assessment of the building envelope using Verification Method JV3 under Section J Energy Efficiency, Volume 1 of the National Construction Code (NCC) 2016 for the building envelope performance requirements of Block E of Mainsbridge Public School, located at 95 Lawrence Hargrave Road, Warwick Farm, NSW.

Verification Method JV3 requires a comparison between a Reference Building – constructed in accordance with the deemed-to-satisfy (DTS) provisions detailed in the Parts of Section J – and the Proposed Building – constructed in accordance with the design intent.

The following simulations have been carried out:

- Reference Building + Reference Services – modelling of the building with the building envelope and services meeting the DTS provisions
- Proposed Building + Reference Services – modelling of the building with the building envelope meeting the design intent and the services meeting the DTS provisions

Table ES.1 and

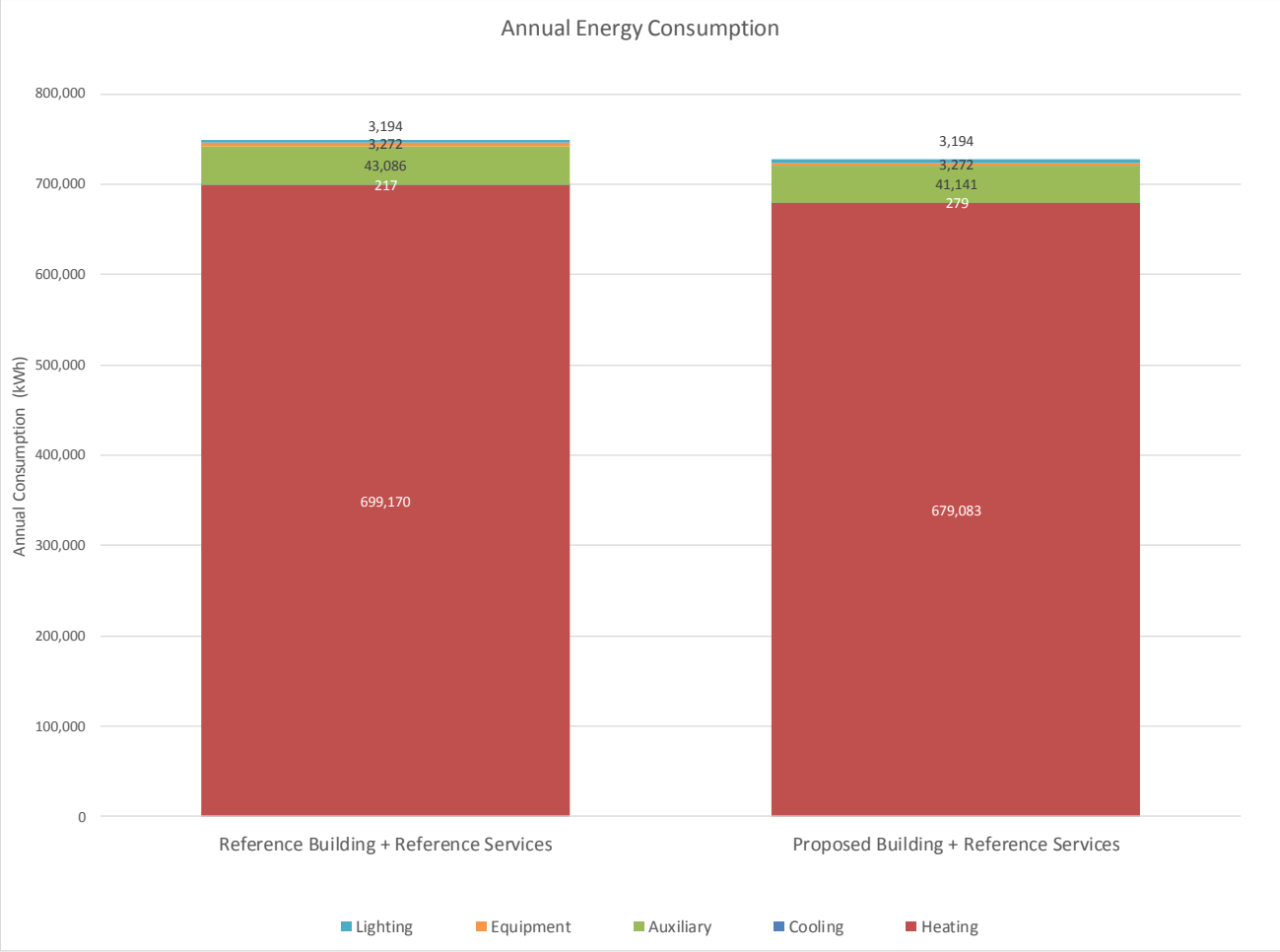

Figure ES.1 demonstrate the predicted annual energy consumption for the simulations performed.

Based on the modelling performed, the proposed building envelope is deemed to comply with the performance requirements. The calculated annual energy consumption of the Proposed Building is less than the Reference Building.

Table ES.1 Simulation Results

BUILDING	ANNUAL ENERGY CONSUMPTION (KWH/YEAR)						
	Heating	Cooling	Auxiliary	Equipment	Lighting	**Total**	**Pass/Fail**
Reference Building + Reference Services	699,170	217	43,086	3,272	3,194	**748,939**	
Proposed Building + Reference Services	679,083	279	41,141	3,272	3,194	**726,969**	**2.93% Improvement**

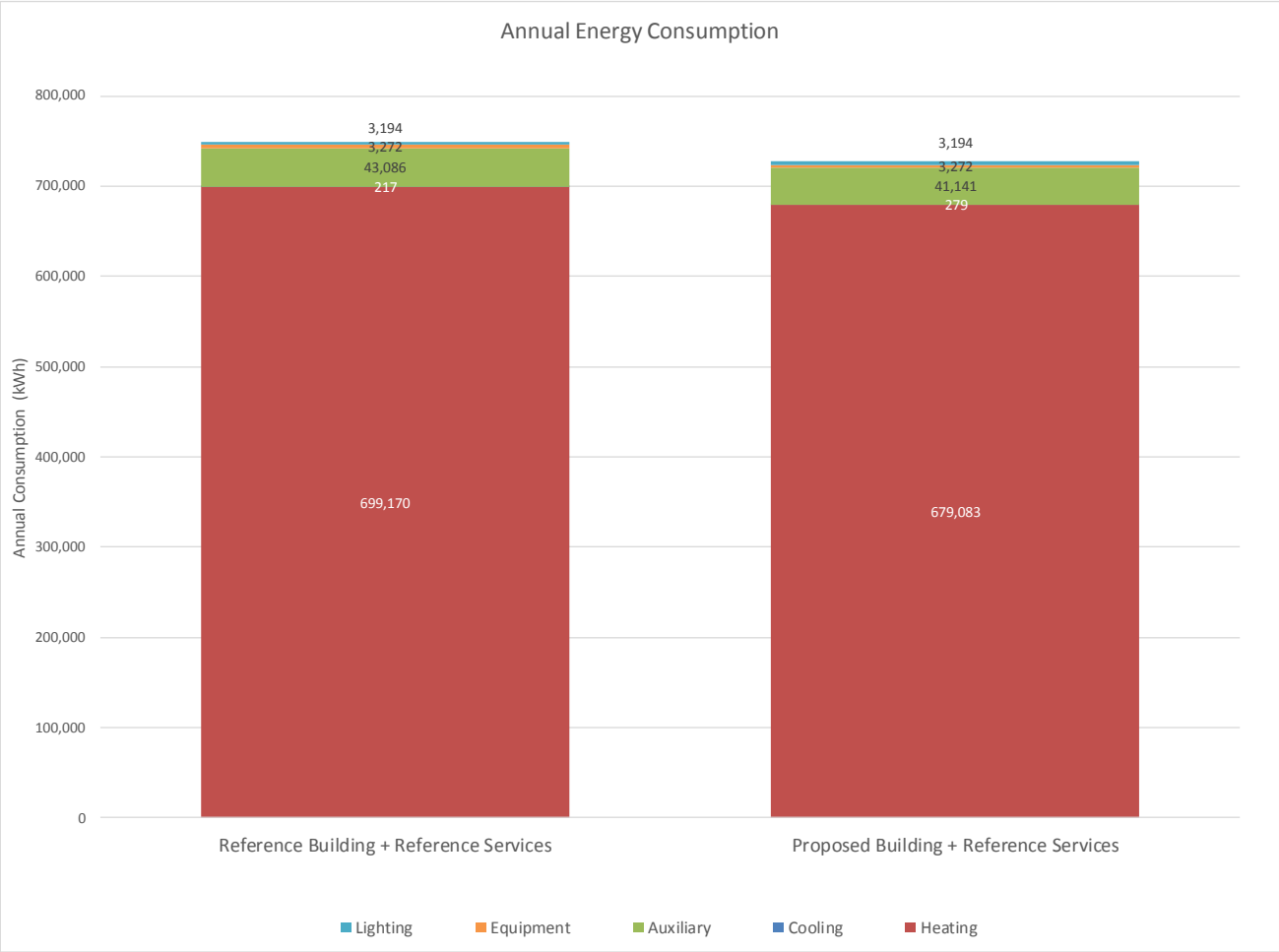

Figure ES.1 Simulation Results

1 INTRODUCTION

1.1 PURPOSE OF REPORT

WSP has been engaged by Hayball Architecture to carry out a Performance Solution assessment of the building envelope using Verification Method JV3 under Section J Energy Efficiency, Volume 1 of the National Construction Code (NCC) 2016 for the building envelope performance requirements Mainsbridge Public School, Block E, 95 Lawrence Hargrave Road, Warwick Farm, NSW, 2170

Verification Method JV3 requires a comparison between a Reference Building – constructed in accordance with the deemed-to-satisfy (DTS) provisions detailed in the Parts of Section J – and the Proposed Building – constructed in accordance with the design intent. The following simulations have been carried out:

- Reference Building + Reference Services—modelling of the building with the building envelope and services meeting the DTS provisions
- Proposed Building + Reference Services—modelling of the building with the building envelope meeting the design intent and the services meeting the DTS provisions

This report presents the methodology used for the JV3 modelling and the results of the simulations undertaken.

1.2 PERFORMANCE REQUIREMENTS

Volume One of the NCC Series 2016 Clause A0.7 Requirements

The relevant DTS Provisions considered in the Reference Building and the Proposed Building are as follows:

- Section J Part J0 Energy Efficiency
- Section J Part J1 Building Fabric
- Section J Part J2 Glazing
- Section J Part J3 Building Sealing
- Section J Part J5 Air Conditioning and Ventilation System
- Section J Part J6 Artificial Lighting and Power

There are no performance requirements from other Sections or Parts of Volume One of the NCC Series 2016 that are relevant to any aspects of the Reference Building and the Proposed Building or that are affected by the application of the DTS provisions that are the subject of the Reference Building and the Proposed Building.

Volume One of the NCC Series 2016 JP1 Requirements

A building, including its services, must have, to the degree necessary, features that facilitate the efficient use of energy appropriate to:

- The function and use of the building and its services
- The internal environment
- The geographic location of the building
- The effects of nearby permanent features such as topography, structures and buildings
- Solar radiation being utilised for heating and controlled to minimise energy for cooling
- The sealing of the building envelope against air leakage
- The utilisation of air movement to assist heating and cooling
- The energy source of the services

2 METHODOLOGY

2.1 ASSESSMENT METHOD AND BUILDING CLASSIFICATION

Clause A0.5 of Volume One of the NCC Series 2016 stipulates that the following assessment methods, or any combination of them, can be used to determine that a building solution complies with the performance requirements:

- Evidence to support that the use of a material, form of construction or design meets a Performance Requirement or a Deemed-to-Satisfy provision as described in A2.2
- Verification Methods such as the Verification Methods in the NCC; or such other Verification Methods as the appropriate authority accepts for determining compliance with the Performance Requirements
- Expert judgement
- Comparison with the Deemed-to-Satisfy provisions

The development seeks to demonstrate compliance with JP1 by using:

- Evidence to support that the use of a material, form of construction or design meets a Performance Requirement or a Deemed-to-Satisfy provision as described in A2.2
- Verification Method JV3; determining that the annual energy consumption of the Proposed Building is not more than the annual energy consumption of the Reference Building for the school development.

In accordance with Part A3.2 of NCC Volume 1, the proposed building comprises spaces with the following classifications:

- Class 9b School
- Class 5 Office

The site is located within Climate Zone 6.

2.2 MODEL INFORMATION

2.2.1 SOFTWARE

The computer package used for the thermal simulation was Tas version 9.4.3 by Environmental Design Solutions Limited. It is an EN ISO 13791 validated dynamic simulation modelling (DSM) software tool and is approved under the *ABCB Protocol for Building Energy Analysis Software*, *Version 2006.1*.

2.2.2 SOURCES OF INFORMATION

The following sources of information were used to generate the thermal model:

- Parts J1 – J3, Section J, Volume One of the NCC Series 2016
- Australian Building Codes Board (ABCB) glazing calculator 2014 (current version)
- Glazing candidates: products listed on the Viridian Window Performance Data Estimating Tool
- Architectural drawings: Hayball Architecture "Tender Issue" dated 11/02/2017

2.2.3 EQUIPMENT LOADS

The simulations apply the following air conditioning parameters, per Volume One of the NCC Series 2016, including:

- Specification JV Table 2b and 2g for the appliances and equipment schedule
- Specification JV Table 2h for equipment loads

2.2.4 MECHANICAL SERVICES

The simulations apply the following air conditioning parameters, as per Volume One of the NCC Series 2016, including:

- Specification JV Table 2b and 2g for the air conditioning operational schedule
- Clause JV3 (d), sub clause (i) (D) for the air conditioning temperature range
- Maximum fan motor power, as per Specification J5.2, Table J5.2
- Minimum EER for heat pump, as per Table 2b in Specification J5.2e

2.2.5 OCCUPANCY LOADS

The simulations apply the following air conditioning parameters, as per Volume One of the NCC Series 2016, including:

- Specification JV Table 2b and 2g for the occupancy schedule
- Specification JV, Table 2j, other applications (a) for sensible and latent occupancy heat gain
- Table D1.13 for occupant density

2.2.6 LIGHTING LOADS

The simulations apply the following air conditioning parameters, as per Volume One of the NCC Series 2016, including:

- Specification JV Table 2b and 2g for artificial lighting schedule
- Table J6.2a for maximum illumination power density

3 BUILDING FABRIC PERFORMANCE PARAMETERS

This section summarises the building fabric as modelled for the JV3 analysis. It details changes to the building elements currently specified to achieve compliance.

Table 3.1 lists the building fabric performance parameters used in the reference and the proposed building. The R-value listed shows the total system R-value, see Table 3.1 for drawings showing where the total construction values need to be applied. The markup of Appendix A reflects the parameters used for the modeling.

The BCA Section J1 Building Fabric and J2 Glazing assesses the building envelope only. Therefore, the following values are only applicable between typical conditioned spaces that adjoin an unconditioned space or the outside.

Table 3.1: Building Fabric Performance Parameters

BUILDING FABRIC ELEMENT	REFERENCE BUILDING	PROPOSED BUILDING
Slab on ground	**None**	As Per the Reference building
External walls	**R 2.8 m².K/W**	
Envelope walls other than external walls	**R 1.0 m².K/W** – where the non-conditioned space has mechanical ventilation of not more than 1.5 air changes per hour of outside air per hour. **R 1.8 m².K/W** – where the non-conditioned space has mechanical ventilation of more than 1.5 air changes per hour of outside air during occupied hours.	
Ceilings to unconditioned areas	**R 3.2 m².K/W** Downwards.	
Roof	**R 3.2 m².K/W** Downwards.	

4 BUILDING GLAZING PERFORMANCE PARAMETERS

The reference building glazing is developed in compliance with the National Construction Code Glazing Calculators (Volume One) using available glazing products.

Refer to Appendix A for the completed Glazing Calculators and Table 4.1 which summarises the glazing parameters used for the proposed building in the JV3 analysis.

Table 4.1: Proposed Building Glazing Parameters

ORIENTATION	LEVEL	REFERENCE BUILDING (Whole of System Values)	PROPOSED BUILDING (Whole of System Values)
All	All	Per the glazing calculators in Appendix A Aluminum Frame	Viridian COM Centre Pocket (150mm) U-Value = 6.3, SHGC = 0.76 Aluminium Frame

5 RESULTS

The following simulations have been carried out:

- Reference Building + Reference Services—modelling of the building with the building envelope and services meeting the DTS provisions.
- Proposed Building + Reference Services—modelling of the building with the building envelope meeting the design intent and the services meeting the DTS provisions.

Table 5.1 and

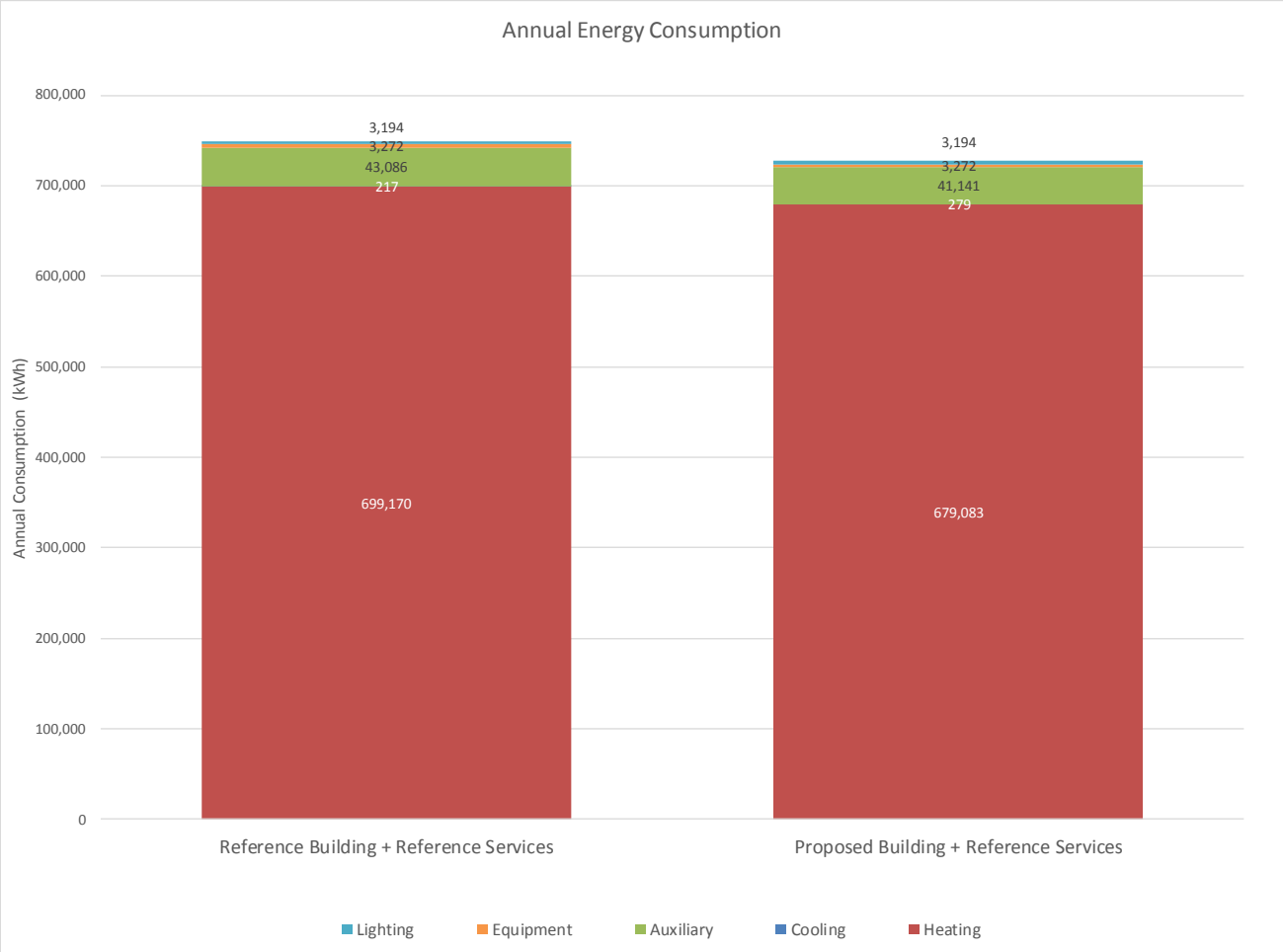

Figure 5.1 Simulation Results

demonstrate the predicted annual energy consumption for the simulations performed.

Based on the modelling performed, the proposed building envelope is deemed to comply with the performance requirements. The calculated annual energy consumption of the **Proposed Building is 2.93%** less than the Reference Building.

Table 5.1: Simulation Results

BUILDING	ANNUAL ENERGY CONSUMPTION (KWH/YEAR)						
	Heating	Cooling	Auxiliary	Equipment	Lighting	**Total**	**Pass/Fail**
Reference Building + Reference Services	699,170	217	43,086	3,272	3,194	**748,939**	
Proposed Building + Reference Services	679,083	279	41,141	3,272	3,194	**726,969**	**2.93% Improvement**

WSP note that due to the nature of the building, there is a reasonable likelihood that condensation may occur on the inner surface of the building fabric and glazing. WSP recommend that a condensation risk analysis is undertaken to determine the risk of condensation occurring to inform the design team of the additional thermal performance requirement to limit this occurrence. WSP can provide this service if requested.

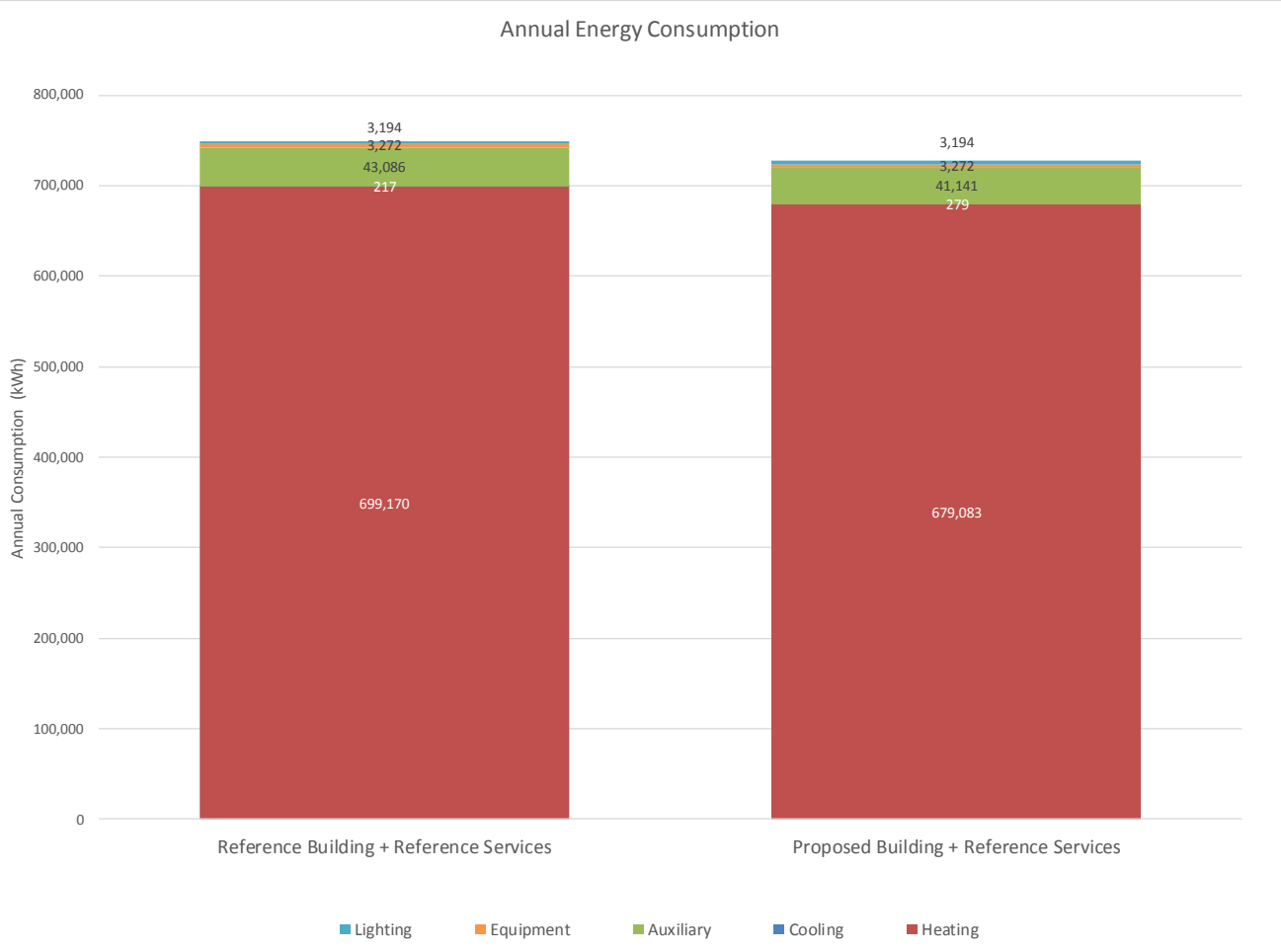

Figure 5.1 Simulation Results

APPENDIX A

COMPLIANT NCC GLAZING CALCULATORS

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: Mainsbridge Public School, Laurence Hargrave Rd, Warwick Farm, NSW 2170

Application: other

Climate zone: 6

Storey: Ground

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	88.7m²		58.6m²				66.8m²	7.37m²	
Option B									n/a
Glazing area (A)	*76.1m²*		*19.8m²*				*1.53m²*	*4.42m²*	

Number of rows preferred in table below: 6 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element			Facing sector		Size			Performance		P&H or device		Shading	Multipliers		Size	Outcomes
ID	Description (optional)		Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Window 01		N		4.80	14.00		8.0	0.18				0.00	1.00	1.00	67.20	88% of 96%
2	Window 02		N		3.40	2.00		8.0	0.18				0.00	1.00	1.00	6.80	9% of 96%
3	Window 02		N		3.00	0.70		8.0	0.18				0.00	1.00	1.00	2.10	3% of 96%
4	Window 03		E		3.00	6.60		4.7	0.25				0.00	1.00	1.00	19.80	100% of 100%
5	Window 04		W		1.70	0.90		8.0	0.80				0.00	1.00	1.00	1.53	100% of 17%
6	Window 05		NW		2.60	1.70		2.0	0.18				0.00	1.00	1.00	4.42	100% of 99%

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters. While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are valid

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Defire
Innovative fire safety

Exova

An Exova Group Company

Performance solution report

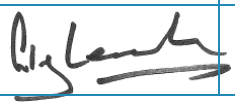
Hayball Pty Ltd

Mainsbridge SSP, 95 Lawrence Hargrave Road

SY180238

Revision R1.0 | 29 November 2018

Amendment schedule

Version	Date	Information relating to report			
R1.0	29/11/2018	Reason for issue	Report issued to Hayball for review and comment.		
			Prepared by	Reviewed by	Approved by
		Name	Jason Forrest	Greg Leach	Greg Leach
		Signature			

Executive summary

This report documents the findings of a fire safety engineering assessment undertaken to determine whether the development at Mainsbridge SSP located at 95 Lawrence Hargrave Road, complies with the relevant performance requirements of the National Construction Code 2016 Amendment 1 Volume One – Building Code of Australia (BCA). Exova Defire undertook the assessment in accordance with the International Fire Engineering Guidelines (IFEG) at the request of Hayball Pty Ltd.

The project involves the development of a new Mainbridge school for specific purposes (SSP). The project comprises of two buildings, a main building consisting of blocks A, B, C and D, and block E building. The main building is a two storey school building including a staff room, library, covered outdoor learning area (COLA) and learning spaces. Block E is a single storey building including an indoor hydrotherapy pool. The school caters for students with a variety of intellectual and/or physical difficulties, requiring building specific evacuation management procedures.

The design of the buildings includes areas that do not comply with the deemed-to-satisfy (DTS) provisions of the BCA. Table 1 describes the BCA requirements associated with the performance solutions.

No	Description of performance solutions	DTS provision	Performance requirements	Method of meeting performance requirements	Assessment method
1.	Required exits and exit paths leading to a road are proposed to be locked internally with an access control exit arrangement via an access swipe card.	Clauses D1.10 and D2.21	DP4 and DP6	Equivalent to DTS A0.3(a)(ii) and A0.3(b)	Comparison to DTS A0.5(d)
2.	An automatic sliding door is provided as an exit from the block A administration building instead of a door that swings in the direction of egress.	Clause D2.20	DP4 and DP6	Equivalent to DTS A0.3(a)(ii) and A0.3(b)	Comparison to DTS A0.5(d)

Table 1 BCA requirements associated with the performance solutions

The fire safety engineering assessment found that the design of the building achieves compliance with the relevant performance requirements of the BCA, subject to the following recommendations:

- This report and the fire safety measures listed in section 5 must be implemented into the design and identified on the fire safety schedule for the building. They must be maintained and certified in accordance with the Environmental Planning and Assessment Regulations 2000 and relevant Australian standards.
- If there are building alterations or additions, a change in use or changes to the fire safety system in the future, a reassessment will be needed to verify consistency with the assessment contained in this report.

Contents

1. Introduction

This report documents the findings of a fire safety engineering assessment undertaken to determine whether the development at Mainsbridge SSP, 95 Lawrence Hargrave Road located at 95 Lawrence Hargrave Road, complies with the relevant performance requirements of the National Construction Code 2016 Amendment 1 Volume One – Building Code of Australia (BCA)[1]. Exova Defire undertook the assessment in accordance with the International Fire Engineering Guidelines (IFEG)[2] at the request of Hayball Pty Ltd.

2. Fire engineering brief

The purpose of the fire engineering brief (FEB) is to consult with the relevant stakeholders to define the scope of the project and to agree on the objectives, fire safety measures, methods of analysis and acceptance criteria for the performance solutions. The IFEG states that the scope of the project and the method by which it will receive regulatory approval dictates the extent of the FEB process required.

2.1 Stakeholders

The relevant stakeholders identified for this project are listed in Table 2.

Name	Role	Organisation
Lyndall Smith Vida Lam Robyn Bale	Operator	NSW Department of Education
Melissa Stojanovic Zoe Gillespie	Project manager	GHD
Rob Chan	Architect	Hayball
Steve Watson	Certifying authority - ABC1	Steve Watson & Partners
Michael Lokic	BCA consultant	Steve Watson & Partners
Jason Forrest	Fire safety engineer	Exova Defire
Greg Leach	Accredited fire safety engineer C10 – BPB 2402	Exova Defire

Table 2 Stakeholders

2.2 FEB process

FEB report SY180238 FEB1.0 dated 23 August 2018 was issued to the design team for review and comment. It summarises the issues to be addressed and forms the basis of the analysis and fire safety measures documented in this fire safety engineering report.

The proposed design documented in this report is consistent with the information presented to the stakeholders during the FEB process.

[1] National Construction Code 2016 Amendment 1, Volume One – Building Code of Australia, Australian Building Codes Board, Australia.
[2] International Fire Engineering Guidelines – Edition 2005, Australian Building Codes Board, Australia.

3. Description of the building and performance solutions

3.1 Building description

The project involves the proposed development of a new Mainbridge school for specific purposes (SSP). The project comprises of two buildings, a main building consisting of blocks A, B, C and D, and block E building. The main building is a two storey school building including a staff room, library, covered outdoor learning area (COLA) and learning spaces. Block E is a single storey building including an indoor hydrotherapy pool. The school caters for students with a variety of intellectual and/or physical difficulties, requiring building specific evacuation management procedures.

Table 3 shows the main characteristics of the building for determining compliance with the BCA. Table 4 shows the proposed use and classification of the building or part in accordance with clause A3.2 of the BCA.

Characteristic	BCA provision	Description
Effective height	A1.1	Less than 12m
Type of construction required	C1.1	Main Building – type B Block E – type C
Rise in storeys	C1.2	Main Building – 2 Block E – 1

Table 3 Main building characteristics

Part of building	Use	Classification (A3.2)
Main building (blocks A, B, C, & D)	School	Class 9b
Block E	Swimming pool	Class 9b

Table 4 Use and classification

3.2 Preventive and protective measures

The building will be provided with the following major fire safety measures required by the DTS provisions of the BCA[3].

- Automatic fail-safe devices
- Automatic shutdown of mechanical air handling systems
- Automatic fire detection and alarm system
- Building occupant warning system
- Emergency evacuation plan
- Exit signs
- Fire dampers
- Fire doors
- Fire hose reel system
- Fire hydrant system
- Fire rated lightweight construction
- Emergency lighting
- Stand-by power systems
- Portable fire extinguishers

A comprehensive list of fire safety measures is to be provided by the certifier as part of the building approval process. Additional fire safety measures required as part of the performance solution are listed in Section 5.

[3] BCA assessment report R1.3 2016/2297 - Steve Watson & Partners issued 8 May 2018.

3.3 Occupant characteristics

The characteristics of the occupants expected to be in the building have been discussed with the NSW Department of Education and are listed in Table 5.

Characteristic	Description
Familiarity	Students will have moderate to severe intellectual disability, and many students have high physical support needs. They are expected to have varying degrees of familiarity and will rely on assistance from staff to evacuate. Trained staff are expected to be present at all times and are familiar with the layout of the building and location of exits.
Awareness	Students will have varying degrees of awareness. Children within the early childhood centre and primary school may be asleep at the time of an emergency. Staff will be present at all times and capable of assisting in an evacuation.
Mobility	Students will have varying degrees of mobility and reliant on staff in an evacuation. Staff are expected to be present at all times and aware of the level of assistance required by residents in an evacuation. There will be a staff to student ratio of 1:4 and an emergency evacuation plan developed for the controlled evacuation of students and children.
Age	Students will be between 4 to 12 years of age. Staff are expected to be between 18-65 years of age.
Language	Students will have moderate to severe intellectual disability therefore limited communication will impact evacuation. Staff may have English as their second language however they are expected to understand signs and verbal instructions in English. All staff will be aware of the building's emergency evacuation plan.
Occupant load	It is understood the maximum student population is 180 people and the school will have 46 permanent staff members.

Table 5 Occupant characteristics

3.4 Performance solutions

The design of the building includes areas that do not comply with the DTS provisions of the BCA. We intend to use a performance solution to meet relevant performance requirements of the BCA. Table 6 shows the BCA requirements associated with the performance solutions.

No	Description of performance solutions	DTS provision	Performance requirements	Method of meeting performance requirements	Assessment method
1.	Required exits and exit paths leading to a road are proposed to be locked internally with an access control exit arrangement via an access swipe card.	Clauses D1.10 and D2.21	DP4 and DP6	Equivalent to DTS A0.3(a)(ii) and A0.3(b)	Comparison to DTS A0.5(d)
2.	An automatic sliding door is provided as an exit from the block A administration building instead of a door that swings in the direction of egress.	Clause D2.20	DP4 and DP6	Equivalent to DTS A0.3(a)(ii) and A0.3(b)	Comparison to DTS A0.5(d)

Table 6 BCA requirements associated with the performance solutions

4. Scope, objective and assumptions

4.1 Scope and objective

- The scope of this report is limited to the performance solutions described in section 5.
- The objective of this report is to demonstrate compliance with the fire safety aspects of the performance requirements of the BCA. Matters such as property protection (other than protection of adjoining property), business interruption, public perception, environmental impacts and broader community issues – such as loss of a major employer and impact on tourism – have not been considered as they are outside the scope of the BCA.
- This report considers fires involving a single ignition point. Arson or destructive acts involving:
  - large amounts of accelerants which significantly change the expected burning behaviour of materials
  - multiple ignition sources
  - terrorism

  are not considered in the scope of this assessment.
- The scope of our works is limited to considering evacuation and fire safety issues for people with disabilities to the same degree as the DTS provisions of the BCA. Specifically, the evacuation from the building of people with disabilities under the provisions of the Disability Discrimination Act 1992 is excluded.
- If there are building alterations or additions, a change in use or changes to the fire safety systems in the future, a reassessment will be needed to verify consistency with the assessment in this report.
- The data, methodologies, calculations and conclusions documented in this report specifically relate to the building and must not be used for any other purpose.
- The documentation that forms the basis for this report is listed in 8.6.
- This report has been prepared based on information provided by others. Exova Defire has not verified the accuracy and/or completeness of this information and will not be responsible for any errors or omissions that may be incorporated into this report as a result.

4.2 Assumptions

- The design complies with the current DTS provisions of the BCA relating to fire safety except for the specific performance solutions described within section 5.
- All of the fire safety systems are assumed to be designed, installed and operate in accordance with the appropriate Australian standards, other design codes, legislation and regulations relevant to the project unless specifically stated otherwise.
- For a satisfactory level of fire safety to be achieved, regular testing and maintenance of all fire safety systems and measures, including management-in-use systems, is essential and is assumed in this report.

5. Fire safety measures

The fire safety measures required as part of the performance solution are listed in the following sections:

5.1 General

1. The design must comply with the current DTS provisions of the BCA relating to fire safety unless specifically mentioned. This section does not provide a comprehensive list of fire safety measures required by the DTS provisions of the BCA. The fire safety measures listed within this section relate only to the performance solutions. The fire safety measures must be read in conjunction with the DTS provisions of the BCA.
2. This report and the requirements listed in this section must be implemented into the design and identified on the fire safety schedule for the building. They must be maintained and certified in accordance with the Environmental Planning and Assessment Regulations 2000 and relevant Australian standards.

5.2 Access and egress

3. The exit doors within the building must be provided with fail-safe devices in compliance with clause D2.21(b)(iv) of the BCA.
4. The locking mechanism to the exit doors within the building must release upon confirmed fire alarm within the building, in compliance with clause D2.21(b)(iv) of the BCA.
5. The external exit gates in the paths of travel to the road are permitted to not release upon confirmed alarm within the building, providing that –
    a. The exit gates are provided with a fail-safe mechanism in the event of power-outage in compliance with clause D2.21(b)(iv).
    b. The exit gates can be operated my members of staff using an access swipe card.
    c. Staff members must be present at all time with no students left unattended.
    d. Operation of the external exit gates is documented within the building's emergency evacuation plan.
6. An automatic sliding door is permitted to be provided to block A providing that –
    a. The sliding door is power operated and will automatically open with the use of an access card or via use of a break glass release button. The break glass button is not required to be interlinked with the building's fire alarm.
    b. An uninterrupted power supply is provided to the automatic door, such that the door will continue to operate in the event of power failure.
    c. In the event of power or mechanical failure, the door can be opened manually under a force of not more than 110N.

5.3 Smoke detection and occupant warning systems

7. All building blocks must be provided with an automatic smoke detection and alarm system in accordance with clause 4 of specification E2.2a of the BCA and AS1670.1-2015.
8. A building occupant warning system must be provided in accordance with clause 6 of specification E2.2a of the BCA.

5.4 Fire safety management and training

9. The building must be provided with an emergency evacuation plan with the building's specific emergency procedures documented in compliance with AS 3745-2010. The emergency evacuation plan must detail the building's access control arrangements.

6. Safety in design

Our scope of works is to assess the level of fire safety and demonstrate the design achieves compliance with the relevant performance requirements of the BCA. A preliminary safety in design review considered whether the recommended fire safety measures in section 5 could reasonably be expected to introduce unique or unusual hazards that would not otherwise be present in the construction, installation and/or maintenance of building. The fire safety measures in section 5 are performance specifications for other consultants to incorporate into their designs. The detailed designers retain discretion over where and how systems and structures are installed and are therefore responsible for the safety in design for the detailed design. It is important to note that the outcomes of our review are limited to issues that could reasonably be foreseen by a fire safety engineer within our limited scope and involvement in the project. It is likely that other parties involved in detailed design, installation and/or maintenance will identify additional issues.

No unique or unusual hazards that would not otherwise be present in the construction, installation and/or maintenance of the building have been identified in relation to the performance solution as a result of our preliminary safety in design review.

Note: Residual risks are to be considered and addressed by appropriate persons within the design, construction and maintenance teams who have duties under the health and safety legislation.

7. Performance solution 1 – Release of exit doors

7.1 Introduction

Clause D1.10 of the BCA states that, 'an exit must not be blocked at the point of discharge' and clause D2.21(a) of the BCA states that, 'a door in a required exit, forming part of a required exit or in the path of travel to a required exit must be readily openable without a key from the side that faces a person seeking egress, by –

i. a single hand downward action on a single device which is located between 900mm and 1.1m from the floor and if serving an area required to be accessible by Part D3 –

   d. be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch; and

   e. have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35 mm and not more than 45 mm; or

ii. a single hand pushing action on a single device which is located between 900 mm and 1.2 m from the floor.'

Clause D2.21(b)(iii) provides the following concession –

'The requirement of (a) do not apply to a door that –

iii. serves –

   a. Australian government security zones 4 or 5; or

   b. the secure parts of a bank, detention centre, mental health facility, early childhood centre or the like; and

   it can be immediately unlocked –

   c. by operating a fail-safe control switch, not contained within a protective enclosure, to actuate a device to unlock the door; or

   d. by hand by a person or persons, specifically nominated by the owner, properly instructed as to the duties and responsibilities involved and available at all times when the building is lawfully occupied so that persons in the building or part may immediately escape if there is a fire; or

iv. is fitted with a fail-safe device which automatically unlocks the door upon the activation of any sprinkler system complying with Specification E1.5 or smoke, or any other detector system deemed suitable in accordance with AS 1670.1 installed throughout the building.'

Required exit doors and exit gates in the path of travel leading to a road are proposed to be locked within the building with access control exit arrangements adopted, using staff swipe cards which release electronic door strikes.

The exit doors within the building will be provided with fail-safe mechanisms and be linked to the building's fire alarm panel for release upon confirmed alarm. External exit gates leading to a road will not release upon alarm, however they will be provided with a fail-safe mechanism and can be operated by staff.

The building is considered to not strictly meet the description of clause D2.21(b)(iii) of the BCA. Therefore the exit control measures do not comply with clauses D1.10 and D2.21(a) of the BCA.

The assessment was undertaken to demonstrate that the design complies with performance requirements DP4 and DP6 of the BCA.

7.2 Intent of the BCA

The Guide to the BCA[4] states that the intent of clause D1.10 is 'to require the safe discharge from an exit to a road or open space' and that the intent of clause D2.21 is 'to minimise the risk that evacuation will be delayed by the operation of a door latch.' The guide explains that –

'If the opening action of a door latch cannot be a pushing action, it must be a single downward action, capable of being activated with a single hand.

D2.21 prohibits the use of devices such as deadlocks and knobs (where the knobs must be operated in a twisting or similar motion).

This provision takes account of the need for an emergency opening mechanism to be operable by people with a hand or arm related disability, burns to their hands, or with perspiring or wet hands'.

D2.21(b)(iv) provides an exemption for buildings fitted with automatic "fail-safe devices", where the devices are activated by another active system.

In this case, the appropriate authority must be satisfied that:

- the device is genuinely "fail-safe" (while not specifically referenced in D2.21(b)(iv), this would include during power failures); and
- in the event of an emergency, access to exits will be enabled immediately, with effectively no time delay.'

The Guide to the BCA also states –

'D2.21(b)(iii) provides for special arrangements to be made where particular security issues arise including Australian Government Security Zones 4 and 5. If this option is taken, the appropriate authority will need to be satisfied that, in the event of an emergency, access to exits will be enabled immediately with effectively no time delay.

Where the option for human control is exercised under D2.21(b)(iii)(D), the person controlling the unlocking system must be available at all times while the building is lawfully occupied. It is not acceptable for the system to be left uncontrolled. Nor is it acceptable for that person to be absent from the control post while carrying out any other work duties. A beeper or some other type of personally carried device warning of an emergency is not adequate to effect immediate opening of the locked doors. If the controlling person is absent for any reason, there must be a process enabling their relief by an equally trained person'.

7.3 Methodology

The approach and method of assessment used to determine whether the performance solution meets the performance requirements of the BCA are summarised in Table 7.

Assessment approach	
Method of meeting performance requirements of the BCA	Clauses A0.3(a)(ii) and A0.3(b): Demonstrating equivalence to the DTS provisions
BCA assessment methodology	Clause A0.5(d): Comparison to the DTS provisions
Type of assessment	Qualitative comparative
Fire safety sub-systems addressed	Sub-system E – Occupant evacuation and control

Table 7 Performance solution approach and method of assessment

7.4 Acceptance criteria

The acceptance criteria for the assessment is that the building's specific use and exit control measures are equivalent to a building complying with clause D2.21(b)(iii) of the BCA.

[4] Guide to NCC Volume One 2016 Amendment 1 – Building Code of Australia, Australian Building Codes Board, Australia.

7.5 Fire hazards

7.5.1 Hazard identification

Table 8 identifies potential fire hazards associated with the departures from the DTS provisions of the BCA.

Hazards	Preventative and protective measures
In the event of fire within the building, occupant evacuation may be delayed by the building access control measures.	• In the event of confirmed alarm, occupants will be able to evacuate to a place of relative safety without obstruction. • Occupants will be evacuated within a controlled manner to assure the safety of the students in the event of an emergency. • Staff will be present at all times and be provided with swipe cards which can release exit doors / gates within the path of travel.

Table 8 Hazards and preventative / protective measures related to the assessment

7.6 Assessment

The building's access control and egress measures have been discussed and agreed with the NSW Department of Education (DoE) and are detailed herein.

7.6.1 Requirement for additional security measures

The BCA provides an exemption to the requirements of clause D2.21(a) where a door serves the secure parts of a bank, detention centre, mental health facility, early childhood centre or the like. Whilst the primary building use is classified as educational, the building is a school for specific purposes (SSP) and will cater for students with moderate to severe intellectual disability. The characteristics of the students has been advised by the NSW Department of Education, as detailed in section 3.3 of this report.

The building has similar egress control challenges to facilities that are exempt from the requirements of clause D2.21(a). It is of high importance that appropriate security measures are in place within the SSP, to manage students in a safe environment during the escalation of behavioural habits and in the event of alarm, to stage the evacuation process of the multiple students who are reliant on staff for assistance.

7.6.2 Operation of exit doors

The BCA provides an exemption to the requirements of clause D2.21(a) where a door can be operated by suitability trained personnel whom are available at all times when the building is lawfully occupied so that persons in the building or part may immediately escape if there is a fire.

The internal doors within the building are released by swipe cards which are carried by all members of staff. The students have varying degrees of mobility, hence will be accompanied by staff members at all times and will not be left unattended. Staff within the building will use the swipe cards on a regular basis and will therefore be familiar with the operation of the doors. Staff must also be provided with regular evacuation training and have a clear understanding of the building's emergency evacuation plan.

7.6.3 Fail-safe of exit doors

The BCA provides an exemption to the requirements of clause D2.21(a) where a door is fitted with a fail-safe device which automatically unlocks the door upon the activation of a sprinkler or detection system deemed suitable in accordance with AS 1670.1 installed throughout the building.

The internal exit doors are provided with fail-safe devices interfaced with the building's fire alarm panel. In the event of confirmed alarm or power outage, the internal exit doors will be released. The external exit gates in the path of travel to the road (refer to Figure 1) will not release upon alarm, however they will be provided with a fail-safe in the event of power outage. The external exit gates are located within a place of relative safety at the outdoor courtyard areas where students will be held as part of the school's staged evacuation procedures.

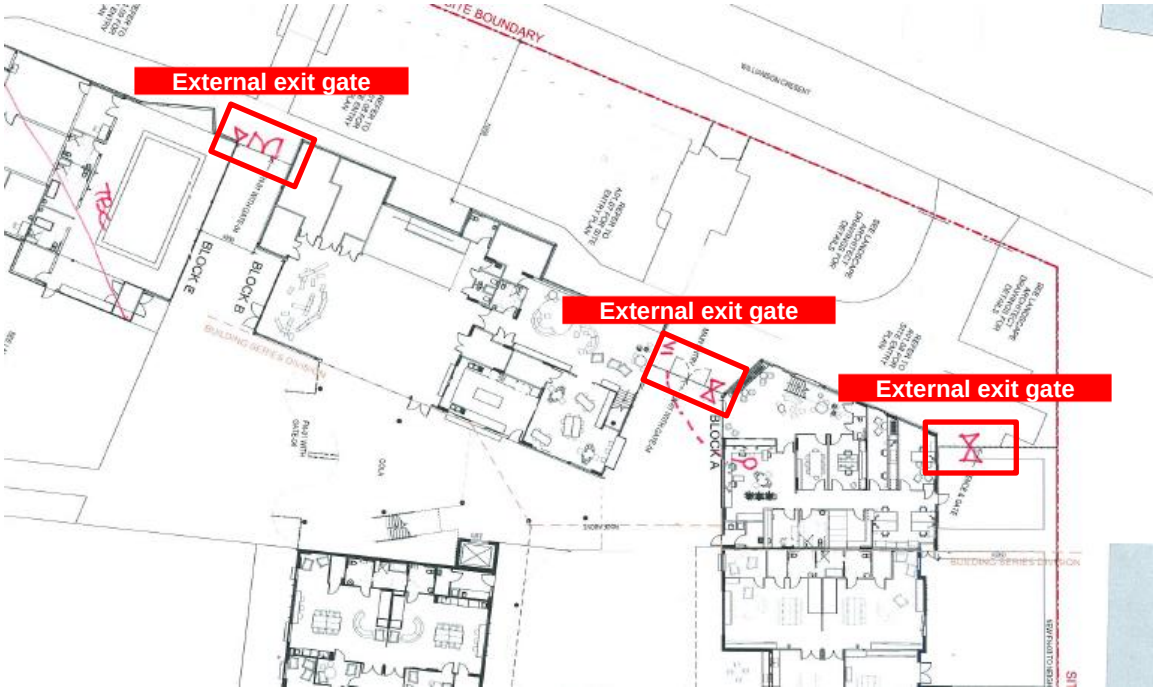


Figure 1 Location of external exit gates from the main building

7.7 Conclusion

The assessment demonstrates that the building's specific use and exit control measures are equivalent to a building complying with clause D2.21(b)(iii) of the BCA. The proposed design of the building is therefore considered to comply with performance requirements DP4 and DP6 of the BCA, subject to compliance with the fire safety measures given in section 5.

8. Performance solution 2 – Sliding exit door

8.1 Introduction

Clause D2.20(b) of the BCA states that, 'A swinging door in a required exit or forming part of a required exit must swing in the direction of egress unless –

i. it serves a building or part with a floor area not more than 200m², it is the only required exit from the building or part and it is fitted with a device for holding it in the open position; or

ii. it serves a sanitary compartment or airlock (in which case it may swing in either direction)'

An automatic sliding door is provided as an exit from the block A administration building, which has an area of approximately 240m², instead of a door that swings in the direction of egress – refer to Figure 2.

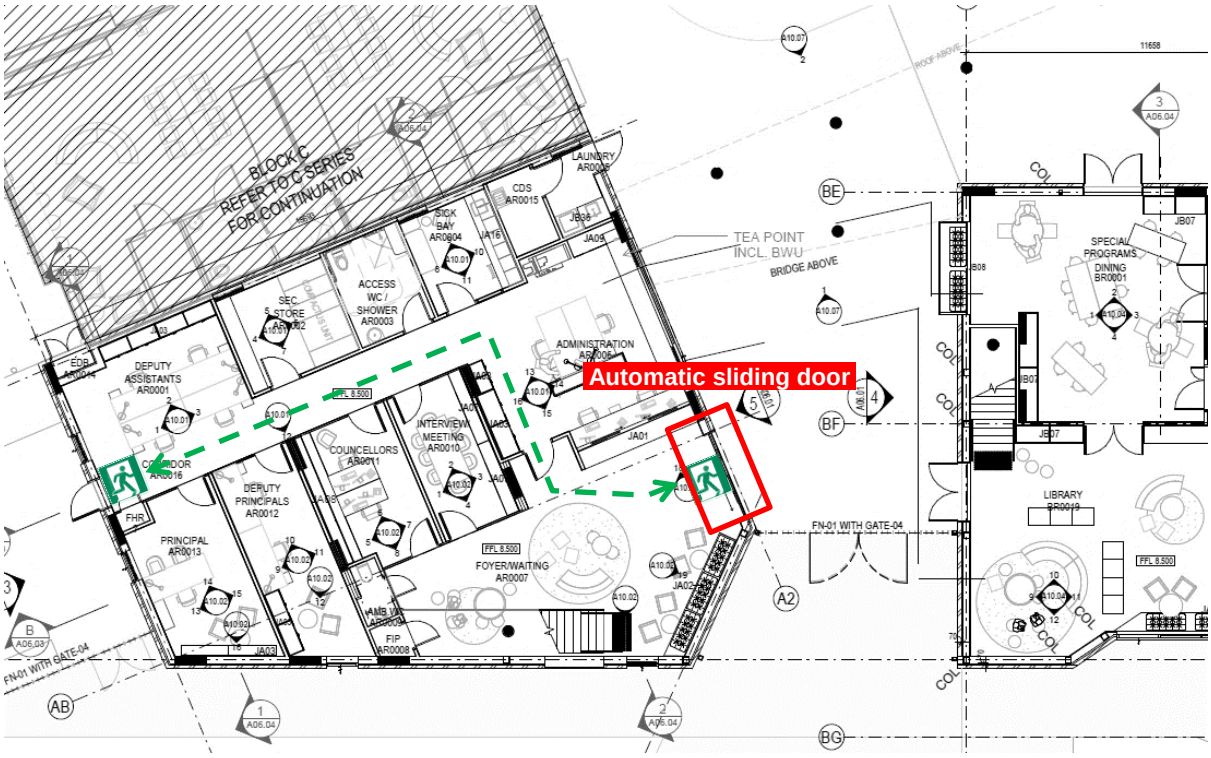


Figure 2 Block A plan identifying the automatic sliding door location

The assessment was undertaken to demonstrate that the design complies with performance requirements DP4 and DP6 of the BCA.

8.2 Intent of the BCA

The Guide to the BCA states that the intent of clause D2.20 is 'to minimise the risk that a door may obstruct a person evacuating.' The guide explains that –

'doors are required to swing in the direction of egress to aid evacuation. If a door swings against the direction of egress, the first person to it may not be able to open it because of the pressure of the other people behind them. This could delay evacuation.'

Clause D2.20(b) o the BCA provides concessions for small buildings or parts of building, the Guide to the BCA also states –

'D2.20(b) provides a concession (under specified criteria) for small buildings or parts of buildings. The reason for allowing a door to swing against the direction of travel in such buildings is because the number of people likely to use the door will probably be low. This in turn minimises the risk caused by delays induced by opening a door towards the person attempting to gain egress.

D2.20(b)(i) requires these doors that swing against the direction of egress to be fitted with a device for holding the door in the open position. D2.20(b)(i) does not require the door to be fixed in the open position at all times that the building is legally occupied. Although this may be desirable, because of climatic conditions, the weather conditions on a particular day, or for security reasons it may not be possible or desirable for the occupants'.

8.3 Methodology

The approach and method of assessment used to determine whether the performance solution meets the performance requirements of the BCA are summarised in Table 9.

Assessment approach	
Method of meeting performance requirements of the BCA	Clauses A0.3(a)(ii) and A0.3(b): Demonstrating equivalence to the DTS provisions
BCA assessment methodology	Clause A0.5(d): Comparison to the DTS provisions
Type of assessment	Qualitative comparative
Fire safety sub-systems addressed	Sub-system E – Occupant evacuation and control

Table 9 Performance solution approach and method of assessment

8.4 Acceptance criteria

The acceptance criteria for the assessment is that the sliding door in block A which does not swing in the direction of egress, represents an equivalent risk of obstruction to a doorway complying with clause D2.20(b).

8.5 Fire hazards

8.5.1 Hazard identification

Table 8 identifies potential fire hazards associated with the departures from the DTS provisions of the BCA.

Hazards	Preventative and protective measures
The automatic sliding door may impede occupant evacuation.	• The sliding door is operated by staff who are familiar with the operation of the door. • The sliding door is power operated via use of an access card or via use of a break glass release button. • In the event of power or mechanical failure the door can be opened manually under a force of not more than 110N.

Table 10 Hazards and preventative / protective measures related to the assessment

8.6 Assessment

The sliding door serves the block A administration building which will primarily consist of staff. Visitors and student may be present within the foyer/waiting area. Students will always be accompanied by staff members who are familiar with the operation of the sliding door. An alternative exit is provided from the block A via the administration corridor, which is expected to reduce the risk of over-crowding at an exit in the event of emergency.

The sliding door is power operated and will automatically open with the use of a staff access swipe card. In the event of an emergency, a request to exit break glass button is also provided adjacent to the door. The break glass button is not required to be interlinked with the building's fire alarm. Staff must carry an access swipe card at all times, be provided with regular evacuation training and have a clear understanding of the building's emergency evacuation plan.

An uninterrupted power supply (UPS) is provided to the automatic sliding door, such that the door will continue to operate in the event of power failure. In the event of secondary power or mechanical failure, the door can be opened manually under a force of not more than 110N.

It is also noted that clause D2.20b applies a maximum compartment size of 200 m^2 regardless of the use of the space. The total occupant load within the 240m^2 administration building is expected to be significantly less than that of a 200m^2 class 9b occupancy used for the purposes of holding functions or similar.

8.7 Conclusion

The assessment demonstrates that the sliding door in block A, which does not swing in the direction of egress, represents an equivalent risk of obstruction to a doorway complying with clause D2.20(b). The proposed design of the building is therefore considered to comply with performance requirements DP4 and DP6 of the BCA, subject to compliance with the fire safety measures given in section 5.

Appendix A Drawings and information

Drawing title	Dwg no	Date	Drawn
General arrangement plan – Ground (17)	2141.01_A01.A03.01	22/08/2018	Hayball
General arrangement plan – Level 1 (17)	2141.01_A01.A03.02	22/08/2018	Hayball
Wall set out plan - Ground (12)	2141.01_A01.A03.03	22/08/2018	Hayball
Wall set out plan – Level 1 (11)	2141.01_A01.A03.04	22/08/2018	Hayball
General arrangement plan – Ground (15)	2141.01_B01aA03.01	22/08/2018	Hayball
Wall set out plan (12)	2141.01_B01aA05.02	22/08/2018	Hayball
General arrangement plan – ground (16)	2141.01_B01bA03.01	22/08/2018	Hayball
General arrangement plan – Level 1 (16)	2141.01_B01bA03.02	22/08/2018	Hayball
Wall set out plan - Ground (12)	2141.01_B01bA05.03	22/08/2018	Hayball
Wall set out plan – Level 1 (12)	2141.01_B01bA05.04	22/08/2018	Hayball
Door schedule (11)	2141.01_01.A23.01	22/08/2018	Hayball
Door schedule 2(10)	2141.01_01.A23.02	22/08/2018	Hayball
Door schedule 3(10)	2141.01_01.A23.03	22/08/2018	Hayball
Electrical services	WSP-MB-EL-000-L00-300	15/06/2018	WSP

Other information	Ref no	Date	Prepared by
BCA Assessment Report R1.2	2016/2297	08/05/2018	Steve Watson & Partners
Minutes of meeting - Technical stakeholder group meeting 4	21/2581710	11/07/2018	GHD
Minutes of meeting – Classroom security workshop	21/2581710	21/05/2018	GHD
Minutes of meeting – EFSG meeting	21/2581710	11/07/2018	GHD

STEVE WATSON & PARTNERS

DEVELOPMENT CONSENT CHECKLIST REQUIREMENTS FOR CERTIFICATION

CHK-004 Version 1 Release Date: 06/11/2017

Project	Mainsbridge School
This checklist identifies the requirements necessary to permit Construction and Occupation Certificat	HAYBALL ROWS

(CC's and OC's) to be issued to SWP under Part 4a of the EP&A Act.

The checklist must be read in conjunction with the Development Consent and any S96 modifications

The applicant must manage compliance with the Consent and provide the nominated deliverables at each stage.

Note that the conditions cannot be set aside except by a formal S96 application to Council.

SWP use only

Keep notes for items in progress

Identify what was received from whom in each box to close out requirement at each stage

Put a flag in the MIR columns if an inspection is needed

Otherwise columns can stay blank until items are received.

DA #	Issue	Deliverables prior to Crown Certificate 1	Deliverables during construction	CC Requirement Filter (Y/N)	OC Requirement Filter (Y/N)	Responsibility	Submitted	Notes	Status Crown Certificate 1	Deliverables during construction 3	Status OC	Check MIR OC?
A8	Long Service Levy	Evidence of Long Service Levy payment to be submitted to SWP		Y		Hutchinson	Y		provided			
A14	Demolition		Statement of compliance must be submitted to SWP	N - no demolition		Hutchinson				Outstanding		
B1	Notification of Commencement	The Department must be notified in writing of the dates of commencement of physical work and operation at least 48 hours before. Evidence of written statement to be submitted to SWP		Y		Hutchinson			provided			
B3	External Walls and Cladding	Design Certificate for External Walls and Cladding to be submitted for approval to SWP		Y		Hayball	14/06/2019		provided			
B4	Protection of Public Infrastructure	Applicant to consult with the relevant owner and provider of services to make suitable arrangements for access to, diversion, protection and support of the affected infrastructure. Evidence of dilapidation report to be submitted to the Planning Secretary, Council and SWP		Y		Hutchinson	Y		provided			
B5	Site Contamination	The updated VSAQP must be provided to the accredited site auditor for review and endorsed prior to remediation commencing. Evidence of endorsement to be provided to SWP		Y		Auditor		EIS completed. Awaiting Auditor endorsement.	provided			
B7	Site Contamination		The Site Audit Report and Section A Site Audit Statement to be providedy SWP	N - during construction only						Outstanding		
B8	Unexpected Contamination Procedure	An unexpected contamination procedure part of the CEMP in Condition B18 to be submitted to SWP		Y		Hutchinson	Y		provided			
B9	Utilities and Services		The Applicant must obtain relevant approvals from service providers. Evidence of approval to be submitted to SWP	Y		GHD	12/07/2019	Substation awaiting GHD payment. Section 73 complete.		Outstanding		
B10	Utilities and Services		Evidence of written advice obtained from the electricity supply authority, an approved telecommunications carrier and an approved gas carrier (where relevant) stating that satisfactory arrangements have been made to ensure provisions of adequate services to be submitted to	Y		WSP		WSP Site Investigation Report		Outstanding		
B13	Community Communication Strategy	Community Communication Strategy must be submitted to the Planning Secretary for approval no later than two weeks before the commencement of any work. Evidence of approval to be submitted to SWP		Y		GHD	Y		provided			
B14	Ecologically Sustainable Development	Evidence of registration of a minimum 4-star Green Star rating with the Green Building Council Australia to SWP		Y		Hutchinson	Y		provided			
B15	Outdoor Lighting	Design Certificate in accordance with this condition is to be submitted for approval to SWP		Y		WSP	14/06/2019		provided			
B16	Access for People with Disabilities	Design Certificate for Accessibility and Report to be submitted for approval to SWP		Y	Y	MGAC	21/06/2019		provided		**Outstanding**	
B18	Construction Environmental Management Plan	Construction Environmental Management Plan (CEMP) to be submitted for approval to SWP		Y		Hutchinson	Y		provided			
B19	Construction Environmental Management Plan	Approval of CEMP to SWP to be submitted to Planning Secretary prior to commencement of works		Y		Hutchinson		Council approval required	provided			
B20	Construction Environmental Management Plan	Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP) which is appravoed by council and RMS is to be submitted to SWP		Y		Hutchinson		Council approval required RMS approval required	provided			

B21	Construction Environmental Management Plan	Construction Noise and Vibration Management Sub-Plan to be submitted SWP		Y		Hutchinson	Y		provided			
B22	Construction Environmental Management Plan	Construction Soil and Water Management Plan (CSWMSP) to be submitted to SWP		Y		Hutchinson	Y		provided			
B23	Construction Environmental Management Plan	Construction Soil and Water Management Plan (CSWMSP) which is appravoed by counci to be submitted to SWP		Y		Hutchinson	Y	Council approval required	provided			
B24	Construction Environmental Management Plan	The Biodiversity Management Sub-Plan (BMSP) to be submitted to SWP		Y		Hutchinson	Y		provided			
B25	Construction Environmental Management Plan	The Flood Emergency Response Sub-Plan (FERSP) for this scope is to be submitted to SWP		Y		Hutchinson	Y		provided			
B26	Construction Parking	Applicant must provide sufficient parking facilities on-site, including for heavy vehicles and for site personnel. Evidence of parking facilities to be submitted to SWP		Y		Hutchinson			provided			
B27	Stormwater Management System	Stormwater Management System to be submitted for approval to SWP		Y		WSP			provided			
B28	Flood Management	Design Certificate for Structure to be submitted for approval to SWP		Y		WSP	Y		provided			
B29	Flood Management	Design Certificate for Structure to be submitted for approval to SWP		Y		WSP	Y		provided			
B30	Operational Noise – Design of Mechanical Plant and Equipment	Design Certificate for Noise and Construction to be submitted for approval to SWP		Y		Acoustic Logic		Send CC drawings to Acoustic Logic	provided			
B31	Biodiversity	Evidence of purchase of Biodiversity credits to be submitted to SWP		Y		Hutchinson			provided			
B32	Construction and Demolition Waste Management		Evidence of RMS notification to be submitted to SWP	Y		Hutchinson				Outstanding		
B33	Operational Waste Storage and Processing	Evidence of Council agreement for waste removal to be submitted to SWP		N - agreed previously		Hutchinson		Waste is an independent contractor, not council.	provided			
B34	Mechanical Ventilation	Design Certificate and plans for Ventilation to be submitted for approval to SWP		Y		WSP	14/06/2019		provided			
B35	Rainwater Harvesting	Evidence of rainwater re-use plan to be prepared by and certified by an experienced hydraulic engineer. Evidence to be submitted to SWP		Y		WSP	14/06/2019		provided			
B36	Roadworks and Access	Evidence of RMS approval to be submitted to SWP		Y		Hutchinson			provided			
B37	Car Parking and Service Vehicle Layout	Report from traffic engineer to be submitted to SWP		Y		PDC	18/06/2019		provided			
B38	Bicycle Parking and End-of-Trip Facilities	Report from traffic engineer to be submitted to SWP		Y		PDC	18/06/2019		provided			
B39	Public Domain Works		Council approval of public domain works to be submitted to SWP	Y		Hutchinson		Check with Hutchinson		Outstanding		
B40	Compliance Reporting	Evidence that CMRP has been submitted to the department 2 week before commencement to be provided to SWP		Y		Hutchinson	Y		provided			
B44	Landscaping	Landscape management plan to be sumbitted to SWP		Y		Tract	14/06/2019		provided			
C4	Demolition		Work plans and statement of compliance to be submitted to SWP	N - no demolition		Hutchinson				Outstanding		
C37	Independent Environmental Audit	Evidence of auditor approval to be provided to SWP		Y		Hutchinson	Y		provided			
C38	Independent Environmental Audit	Audit to be undertaken no less than 4 week before start date and sumbitted to the departmnet and SWP		Y		Hutchinson	Y		provided			
D22	Compliance with Food Code		Design Certificate for Design, construction and fit-out of food premises to be submitted for approval to SWP	Y	Y	Hayball	?	Variation - Awaiting fee proposal from Mack Group		Outstanding	Outstanding	

Satisfaction of DA Conditions

Checked by _____ sign and dated

Verified by _____ sign and dated