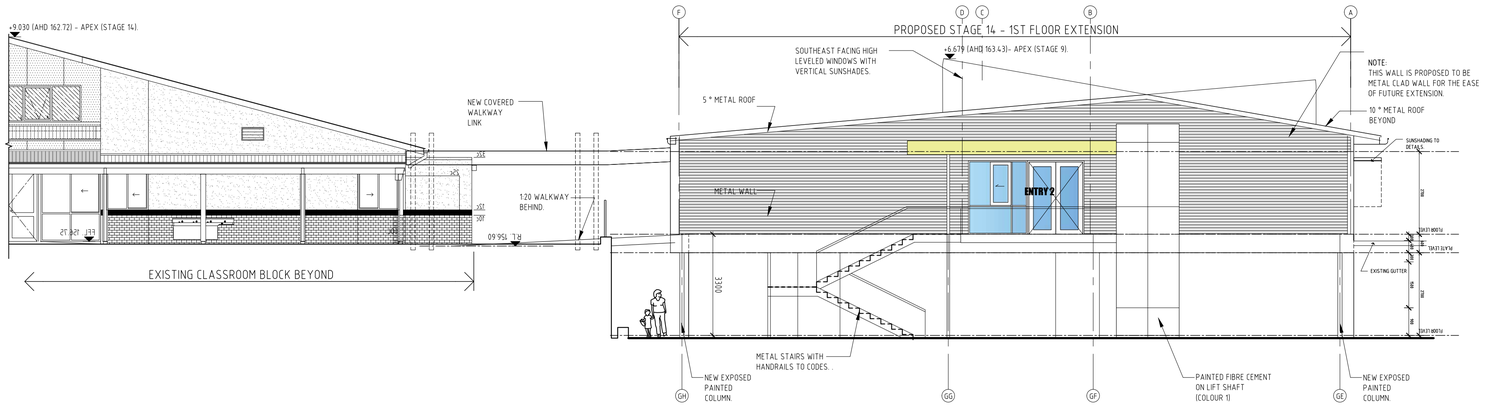
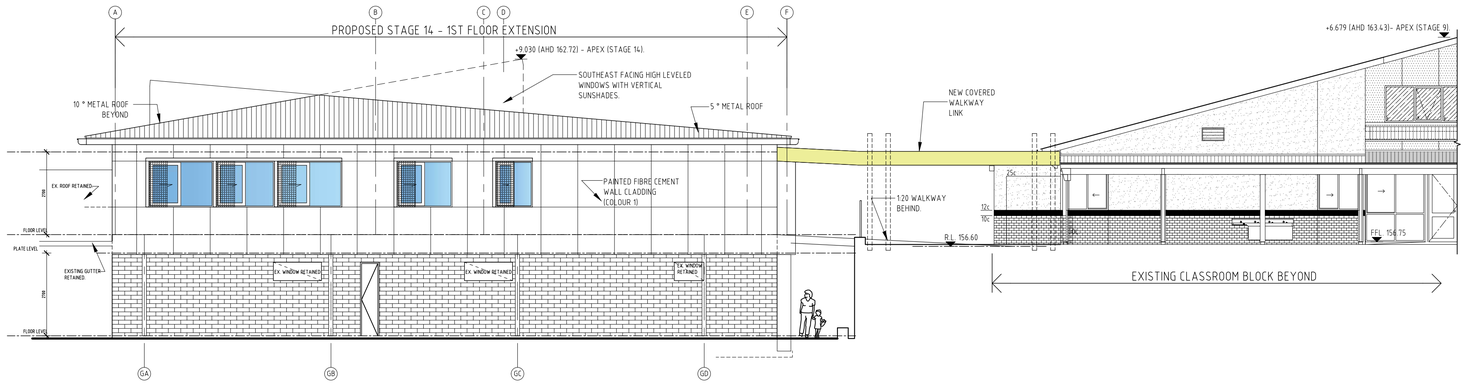


PORTION 'A' - FIRST FLOOR EXTENSION
PROPOSED ELEVATION 3 - NORTH EAST
SCALE 1:100 @A1



PORTION 'A' - FIRST FLOOR EXTENSION
PROPOSED ELEVATION 4 - SOUTH WEST
SCALE 1:100 @A1

0m 1m 2m 3m 4m 5m 10m

REV	Date	Drawn	Description
C	17.01.2025	CC	ISSUE FOR DA
B	02.12.2024	JD	DD COSTING ISSUE
A	19.11.2024	JD	BCA & SECTION J CONSULTANTS ISSUE
A	22.10.2024	JD	GENERAL ISSUE - START OF DESIGN DEVELOPMENT

santelli chong ARCHITECTS
ABN 59 670 160 826
TEL +61 8 9328 3711
13 / 99-101 FRANCIS ST.
NORTHBRIDGE WA 6003

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ALTERATIONS & ADDITIONS - STAGE 14

Drawing Name
PORTION 'A' - FIRST FLOOR EXTENSION
PROPOSED ELEVATIONS - SHEET 2

Drawn	Checked	Scale
JDV	CC	1:100 @ A1

Project Phase: DESIGN DEVELOPMENT

Project Number	Drawing Number	Revision
24004	WD.1FE.2EL.2	C

CAD DRAWING - DO NOT ALTER MANUALLY

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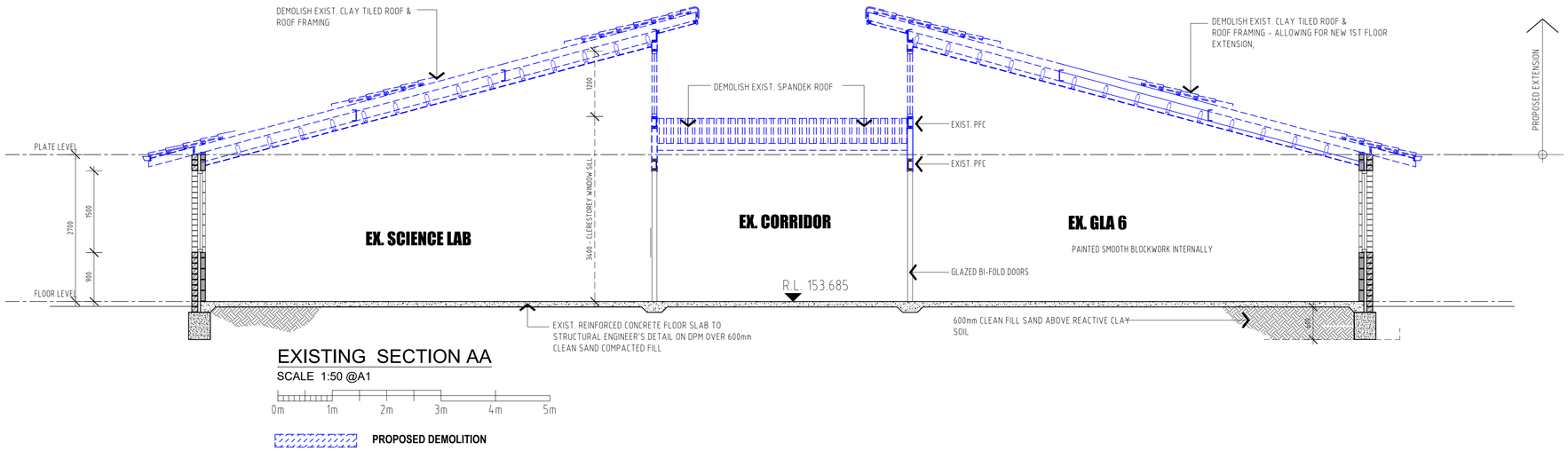
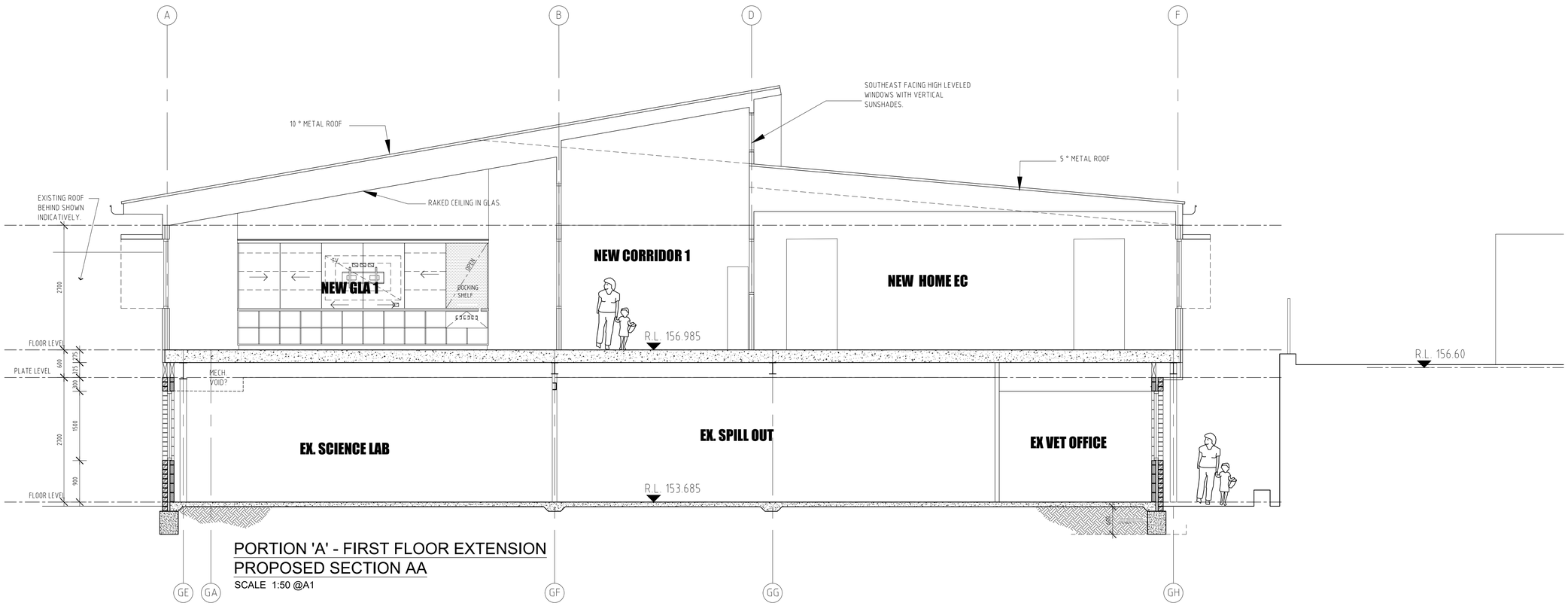


EXISTING SECTION AA

SCALE 1:50 @A1



PORTION 'A' - FIRST FLOOR EXTENSION PROPOSED SECTION AA

SCALE 1:50 @A1

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B	02.12.2024	JD	DD COSTING ISSUE
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ALTERATIONS & ADDITIONS - STAGE 14

Drawing Name: PORTION 'A' - FIRST FLOOR EXTENSION SECTION AA - EXISTING. & PROPOSED

Drawn	Checked	Scale
JDV	CC	1:50 @ A1

Project Phase: DESIGN DEVELOPMENT

Project Number	Drawing Number	Revision
24004	WD.1FE.3SE.1	C

CAD DRAWING - DO NOT ALTER MANUALLY

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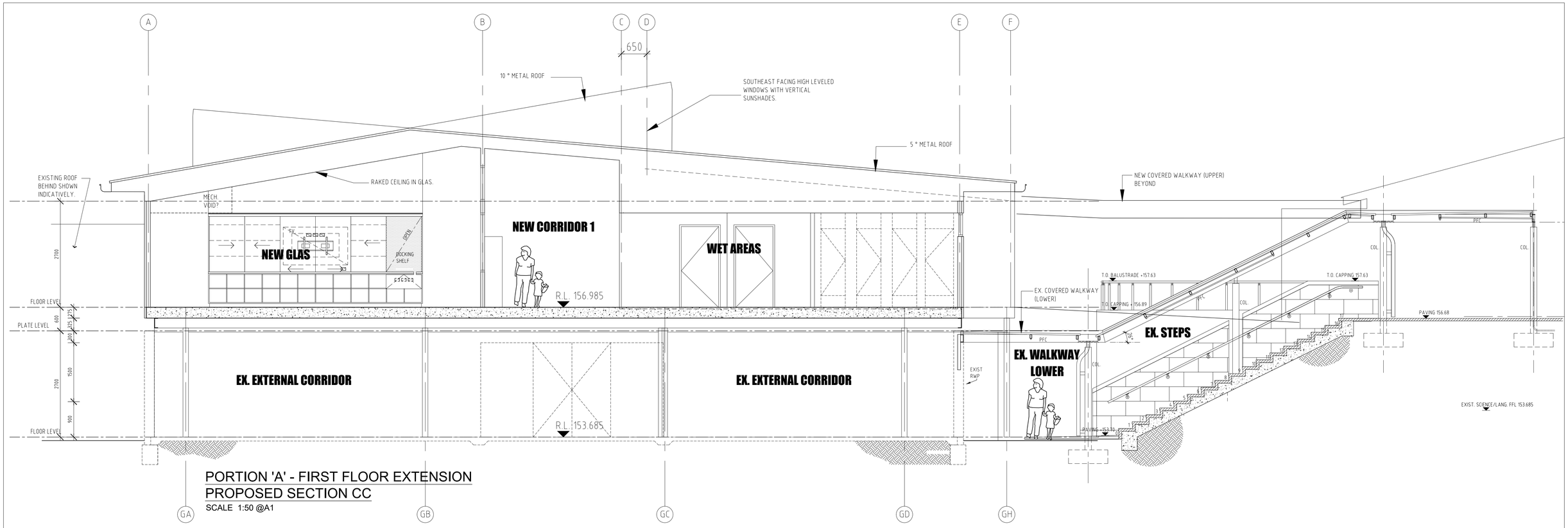

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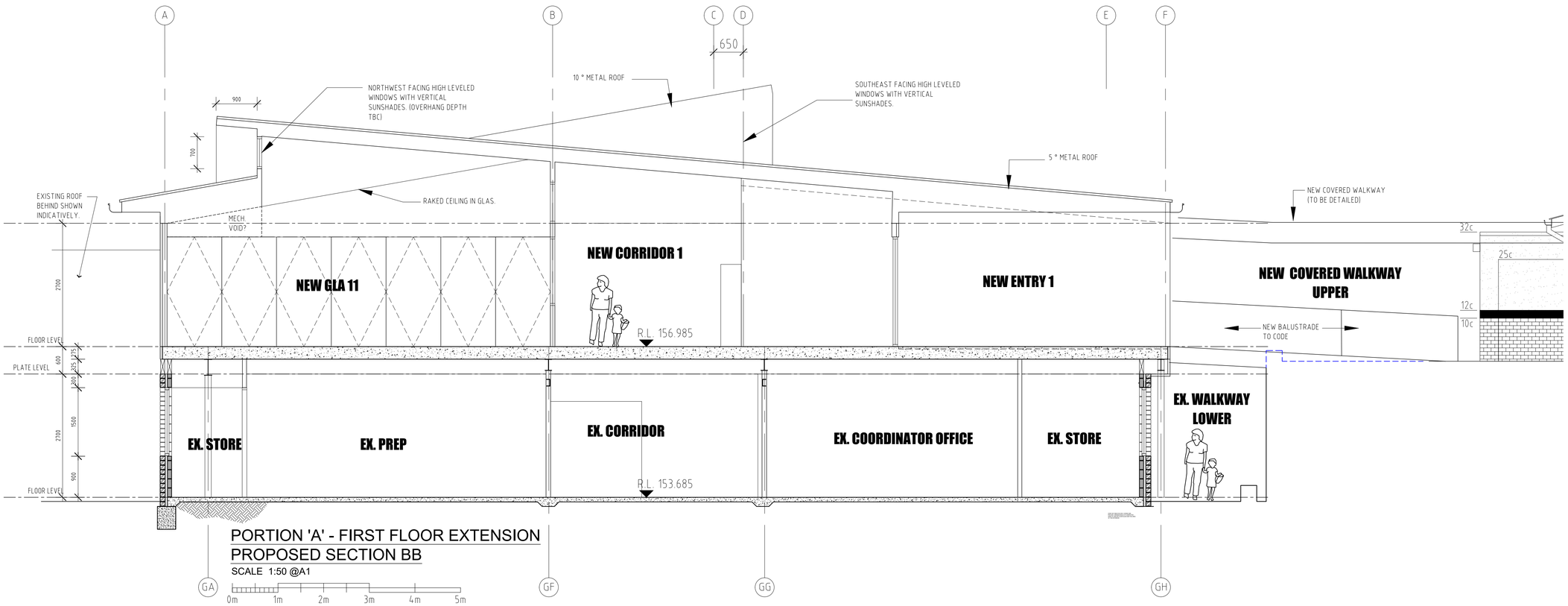
PROPOSED SECTION CC
SCALE 1:50 @A1



PORTION 'A' - FIRST FLOOR EXTENSION
PROPOSED SECTION BB
SCALE 1:50 @A1

REV	Date	Drawn	Description
C	17.01.2025	CC	ISSUE FOR DA
B	02.12.2024	JD	DD COSTING ISSUE
A	19.11.2024	JD	BCA & SECTION J CONSULTANTS ISSUE
A	22.10.2024	JD	GENERAL ISSUE - START OF DESIGN DEVELOPMENT

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ALTERATIONS & ADDITIONS - STAGE 14

Drawing Name
PORTION 'A' - FIRST FLOOR EXTENSION
PROPOSED SECTIONS BB & CC

Drawn	Checked	Scale
JDV	CC	1:50 @ A1

Project Phase: DESIGN DEVELOPMENT

Project Number	Drawing Number	Revision
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CAD DRAWING - DO NOT ALTER MANUALLY

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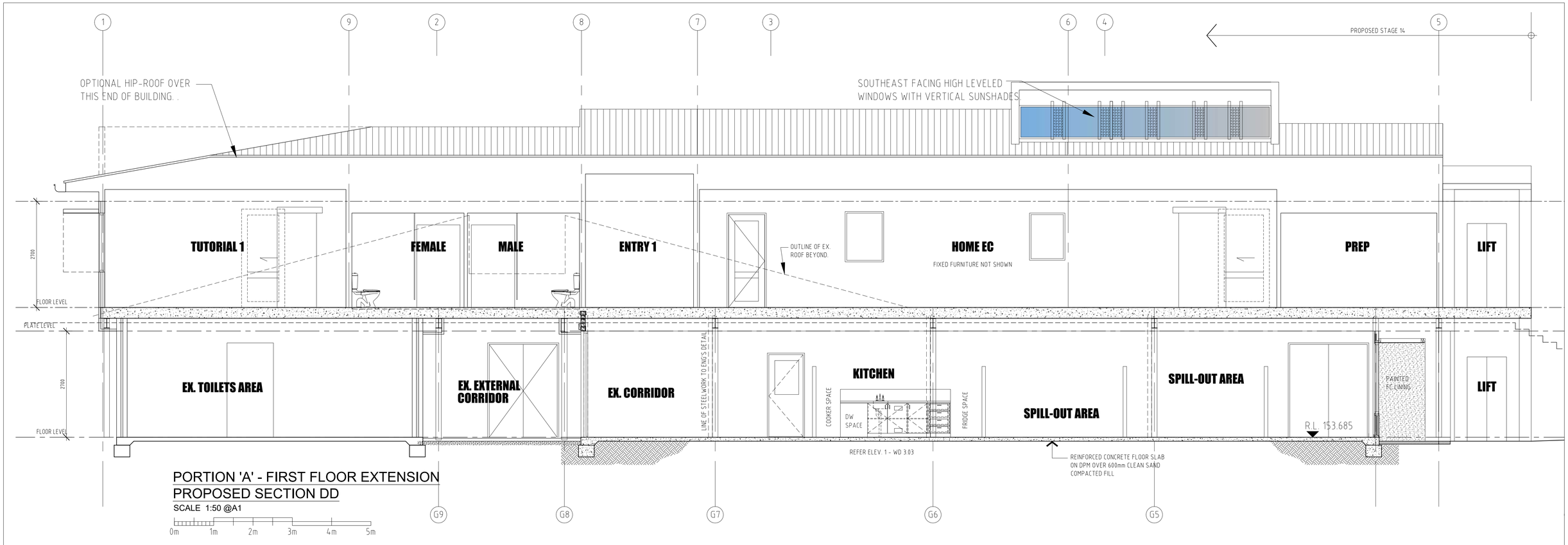

PORTION 'A' - FIRST FLOOR EXTENSION
PROPOSED SECTION DD

SCALE 1:50 @A1

0m 1m 2m 3m 4m 5m

REV	Date	Drawn	Description
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A	19.11.2024	JD	BCA & SECTION J CONSULTANTS ISSUE
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ALTERATIONS & ADDITIONS - STAGE 14

Drawing Name
PORTION 'A' - FIRST FLOOR EXTENSION
PROPOSED SECTION DD

Drawn	Checked	Scale
JDV	CC	1:50 @ A1

Project Phase: DESIGN DEVELOPMENT

Project Number	Drawing Number	Revision
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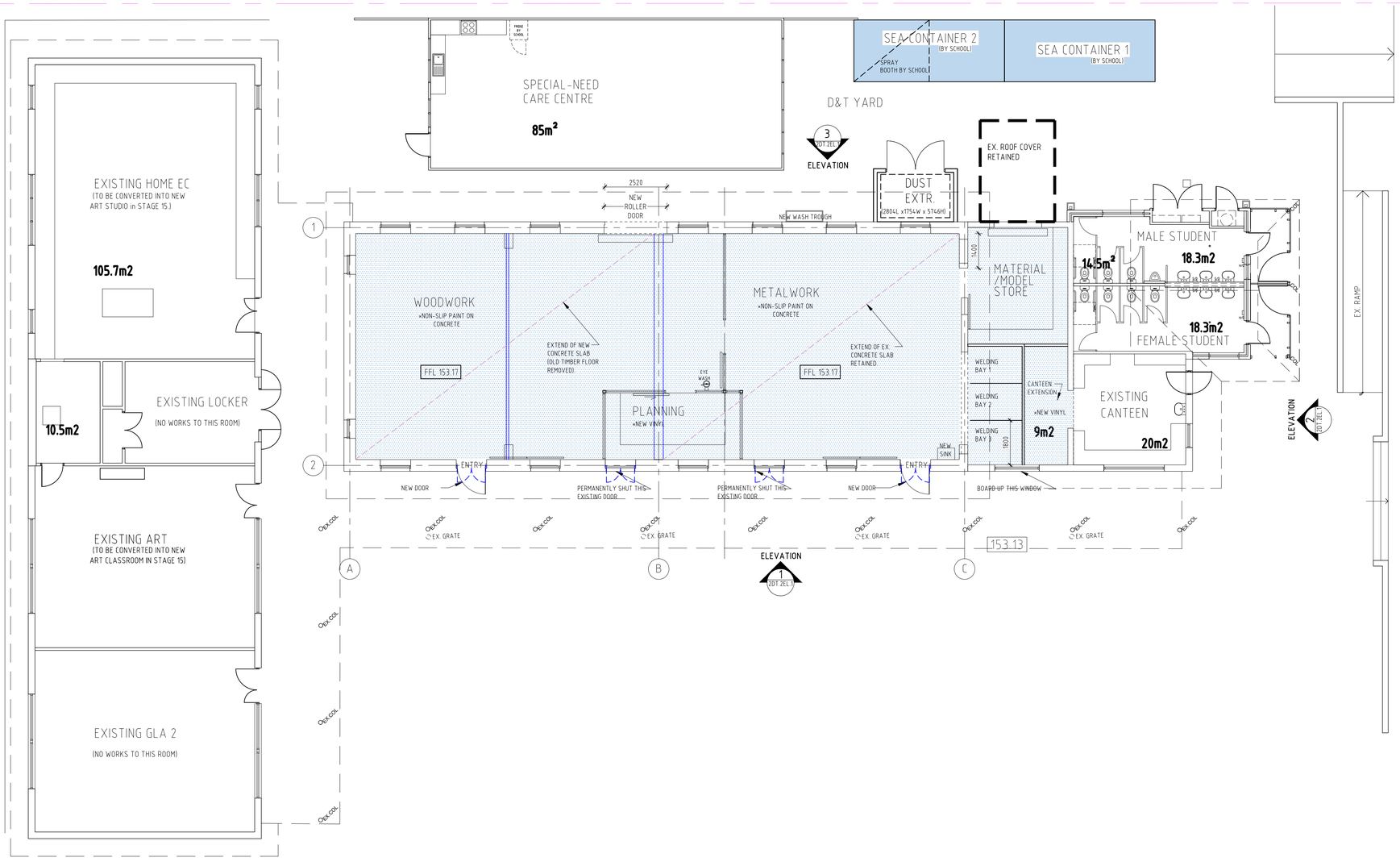

PORTION 'B' - D & T
PROPOSED FLOOR PLAN

SCALE 1:100@A1

0m 1m 2m 3m 4m 5m 10m

LEGEND

STAGE 14 - PORTION 'A'

PROPOSED 1ST FLOOR EXTENSION OVER EXISTING SCIENCE AND ABLUTION BUILDING.

- PROPOSED NEW BUILDING WORKS
- PROPOSED RENOVATION WORKS
- PROPOSED NEW TEMPORARY TRANSPORTABLE STRUCTURES

STAGE 14 - PORTION 'B'

DESIGN AND TECHNOLOGY (D&T) REFURBISHMENT.

- PROPOSED NEW BUILDING WORKS
- PROPOSED RENOVATION WORKS

STAGE 14 - PORTION 'C'

NEW TRANSPORTABLE CLASSROOM (1 OFF).

- PROPOSED NEW TEMPORARY TRANSPORTABLE STRUCTURES

REV	Date	Drawn	Description
C	17.01.2025	CC	ISSUE FOR DA
B	10.12.2024	JD	ISSUE FOR TIA REPORT
B	02.12.2024	JD	DD COSTING ISSUE
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ALTERATIONS & ADDITIONS - STAGE 14

Drawing Name
PORTION 'B' - D & T REFURBISHMENT
PROPOSED OVERALL FLOOR PLAN

Drawn	Checked	Scale
JDV	CC	1:100 @ A1

Project Phase: DESIGN DEVELOPMENT

Project Number	Drawing Number	Revision
24004	WD.2DT.1PL.1	C

CAD DRAWING - DO NOT ALTER MANUALLY

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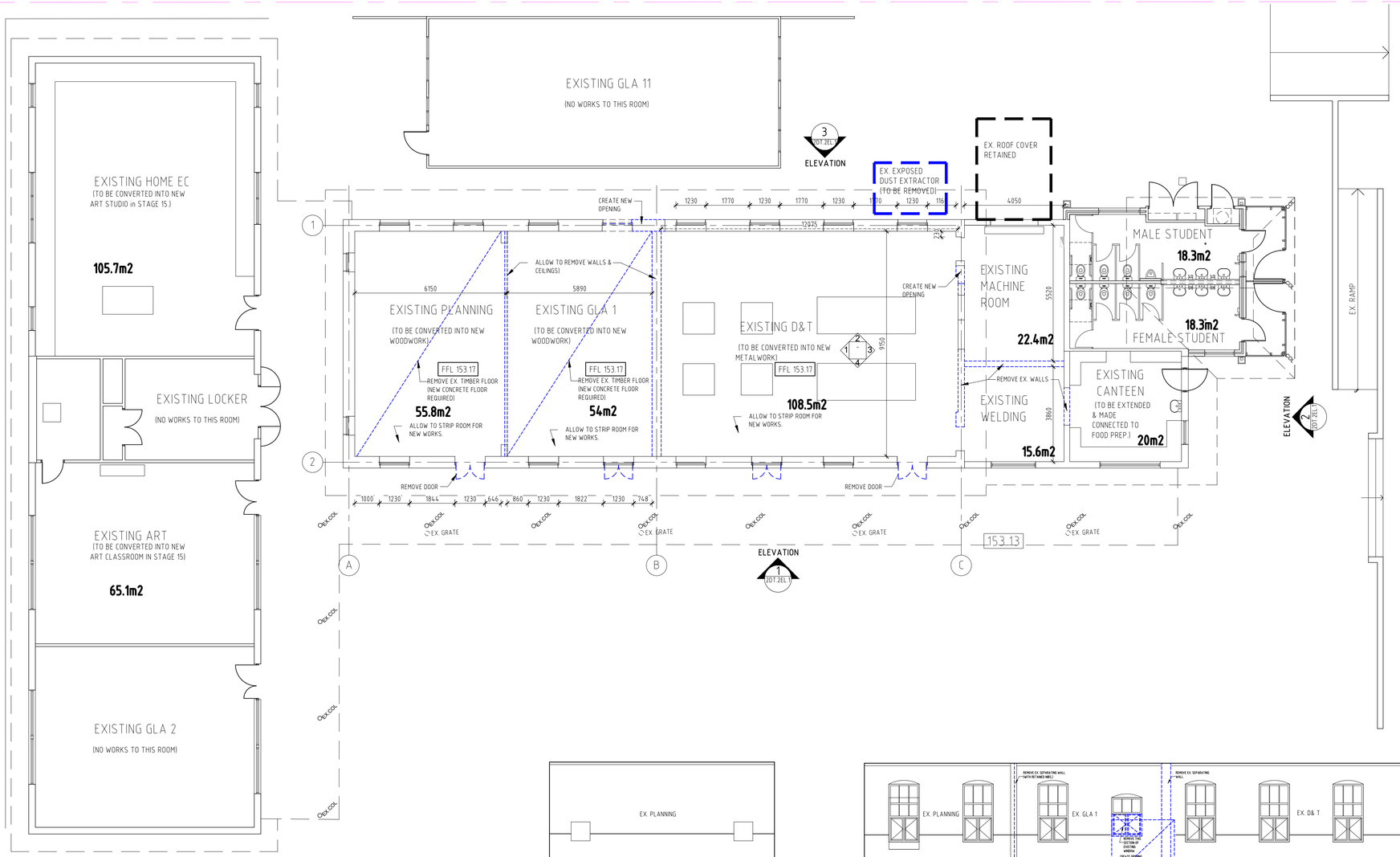
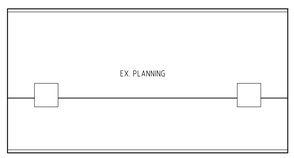
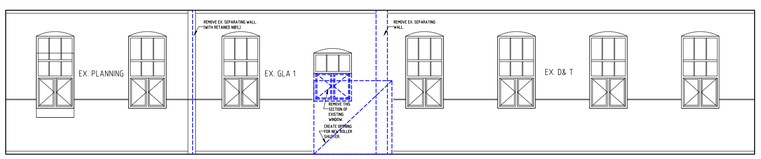
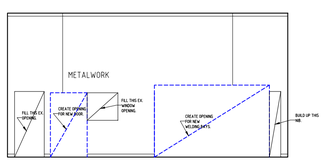




EXISTING D & T
INTERNAL ELEVATION 1
SCALE 1:100 @A1



EXISTING D & T
INTERNAL ELEVATION 2
SCALE 1:100 @A1



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INTERNAL ELEVATION 3
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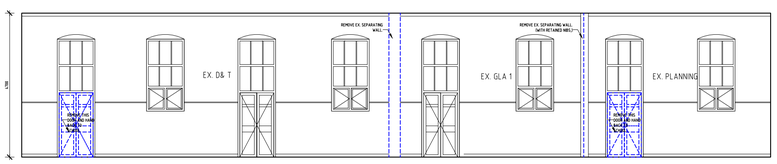

EXISTING D & T
INTERNAL ELEVATION 4
SCALE 1:100 @A1

PORTION 'B' - HOME EC, ART AND D&T
EXISTING FLOOR PLAN
SCALE 1:100@A1

0m 1m 2m 3m 4m 5m 10m

PROPOSED DEMOLITION

REV	Date	Drawn	Description
C	17.01.2025	CC	ISSUE FOR DA
B	10.12.2024	JD	ISSUE FOR TIA REPORT
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A	21.10.2024	JD	GENERAL ISSUE - START OF DESIGN DEVELOPMENT

santelli chong ARCHITECTS
ABN 59 670 160 826
TEL +61 8 9328 3711
13 / 99-101 FRANCIS ST.
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ALTERATIONS & ADDITIONS - STAGE 14

Drawing Name
PORTION 'B' - D & T REFURBISHMENT
EXISTING FLOOR PLAN

Drawn	Checked	Scale
JDV	CC	1:100 @ A1

Project Phase: DESIGN DEVELOPMENT

Project Number	Drawing Number	Revision
24004	WD.2DT.1PL.2	C

CAD DRAWING - DO NOT ALTER MANUALLY

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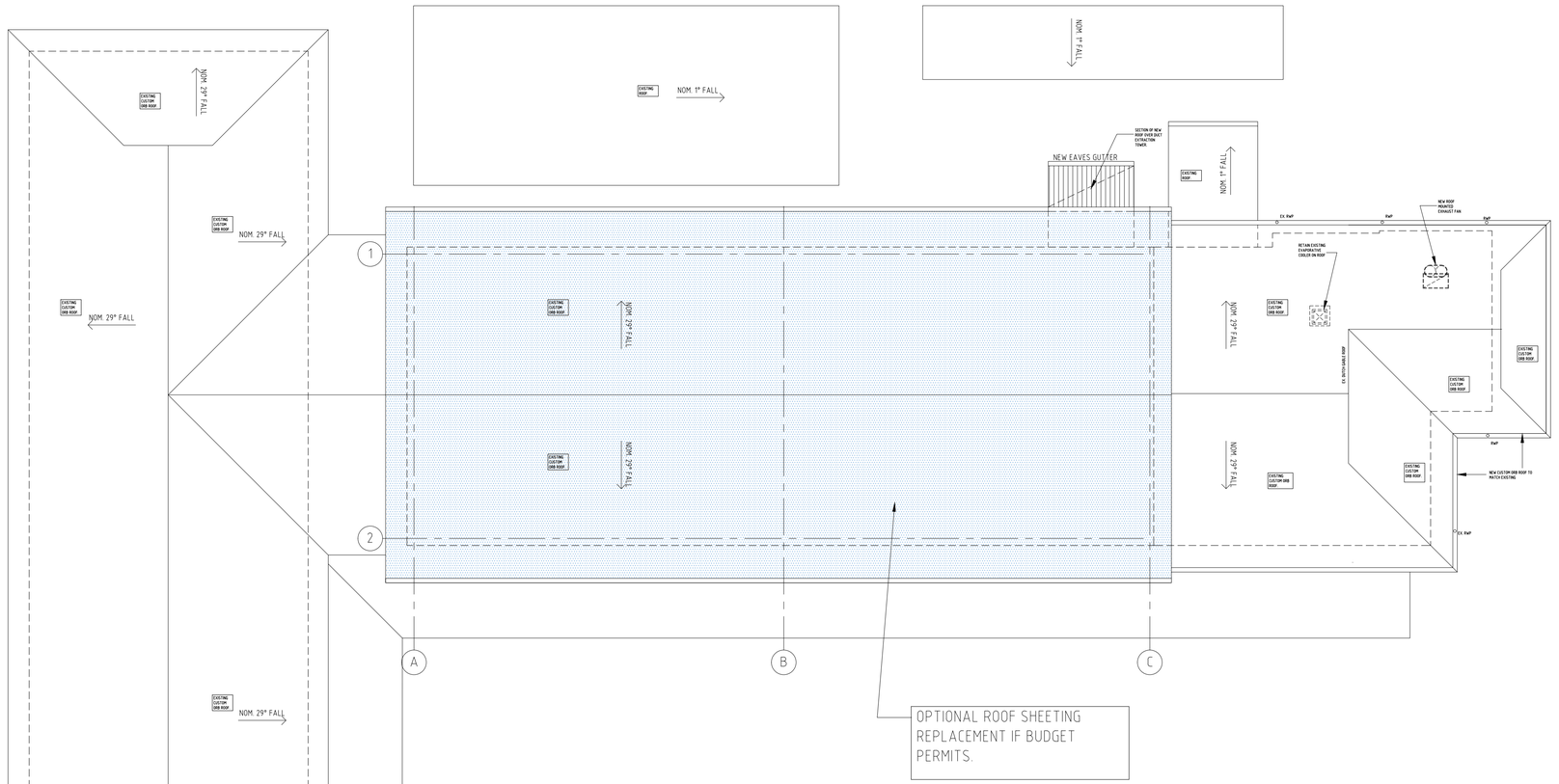
B O U N D A R Y



PORTION 'B' - D&T
PROPOSED ROOF PLAN

SCALE 1:100@A1

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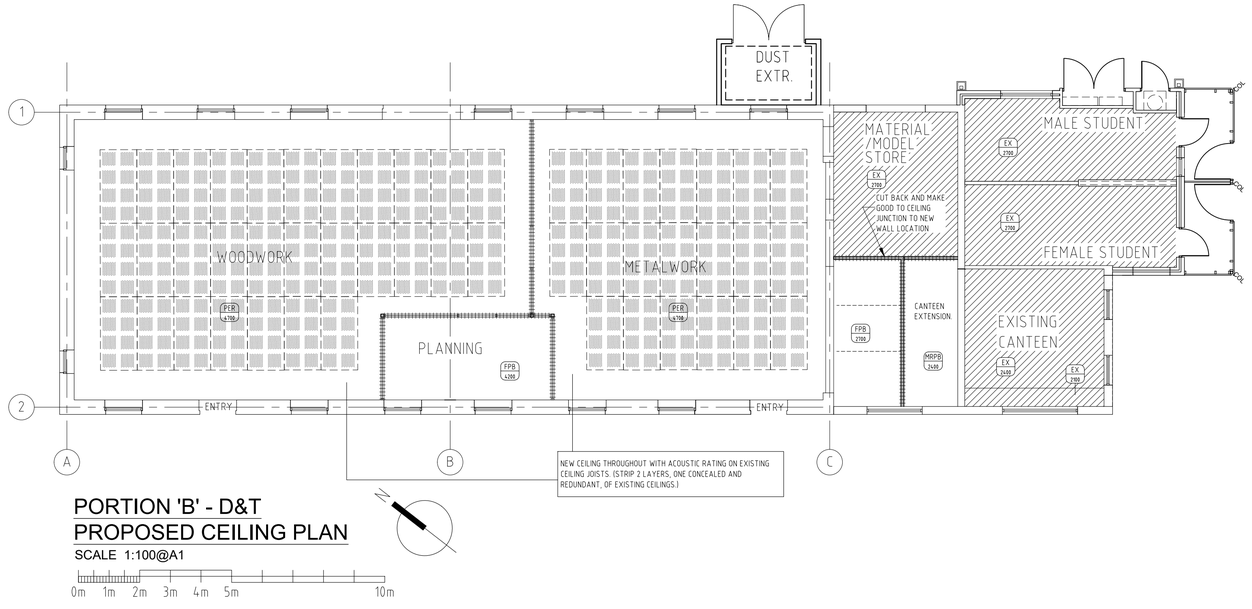

PORTION 'B' - D&T
PROPOSED CEILING PLAN

SCALE 1:100@A1

0m 1m 2m 3m 4m 5m 10m

CEILING LEGEND

FPB / 2.50 — CEILING MATERIAL DESCRIPTION / CEILING HEIGHT ABOVE FINISHED FLOOR LEVEL

AP — ACCESS PANEL - 600x600 FLUSH MOUNTED OPENINGS TO BE TRIMMED. EXACT LOCATION TO BE DETERMINED ON SITE

EXC — EXOTEC SOFFIT CLADDING SYSTEM 9mm THICK COMPRESSED FIBRE CEMENT EXPRESSED JOINTED CLADDING ON 35mm TOP-HAT SUPPORT FRAMING.- PAINTED AS SPECIFIED

MS — UNDERSIDE OF ROOF SHEETING ONLY

FPB — FLUSH PLASTERBOARD SUSPENDED CEILING - PAINTED, SHADOWLINE PERIMITER WALL ANGLE AS SPECIFIED

MRPB — FLUSH MOISTURE RESISTANT PLASTERBOARD SUSPENDED CEILING - PAINTED, SHADOWLINE PERIMITER WALL ANGLE AS SPECIFIED

PER — PERFORATED FLUSH PLASTERBOARD SUSPENDED CEILING (SHEETS 2400mm x 1200mm) WITH FLUSH PLASTERBOARD BORDER FRAMING @ 600mm CENTERS MAX., SHADOWLINE PERIMETER WALL ANGLE AS SPECIFIED

NOTES:

1. CONTRACTOR SHALL CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF WORKS
2. REFER TO SPECIFICATION FOR CEILING INSULATION TYPES.
3. THE REFLECTIVE CEILING PLANS SHALL BE READ IN CONJUNCTION WITH MECHANICAL AND ELECTRICAL DRAWINGS
4. THE CONTRACTOR SHALL LIAISE WITH THE ELECTRICIAN AND INSTRUCT THE STEEL FABRICATOR WHERE PRE-DRILLING OF THE STEEL MEMBERS IS REQUIRED TO ACCOMMODATE CONCEALED CABLING WITHIN STRUCTURAL STEEL TUBE MEMBERS TO SUPPLY FIXTURES AND FITTINGS MOUNTED ON THE STEELWORK
5. EXPOSED PURLINS OF VERANDAH NOT SHOWN FOR CLARITY.
6. INSTALLATION OF NEW SKYLIGHTS IN EXISTING TOILET - CONTRACTOR TO ALLOW FOR REPLACEMENT OF EXISTING ACM LIGHT WELL LINING WITH MOISTURE RESISTANCE PLASTERBOARD. MAKE GOOD TO ALL JUNCTIONS.

LEGEND

- UNDERSIDE OF EXISTING JARRAH BOARD EXPOSED
- CFC SOFFIT
- EXISTING CEILING TO REMAIN
- SKYLIGHT — 'SOLATUBE' SKYLIGHT - AS SPECIFIED OPENINGS TO BE TRIMMED

ACOUSTIC ISOLATION

- INTERNAL FULL HEIGHT ACOUSTIC WALL EXTEND TO UNDERSIDE OF ROOF SHEETING

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ALTERATIONS & ADDITIONS - STAGE 14

Drawing Name: PORTION 'B' - D & T REFURBISHMENT PROPOSED CEILING & ROOF PLANS

Drawn	Checked	Scale
JDV	CC	1:100 @ A1

Project Phase: DESIGN DEVELOPMENT

Project Number	Drawing Number	Revision
24004	WD.2DT.1PL.3	C

CAD DRAWING - DO NOT ALTER MANUALLY

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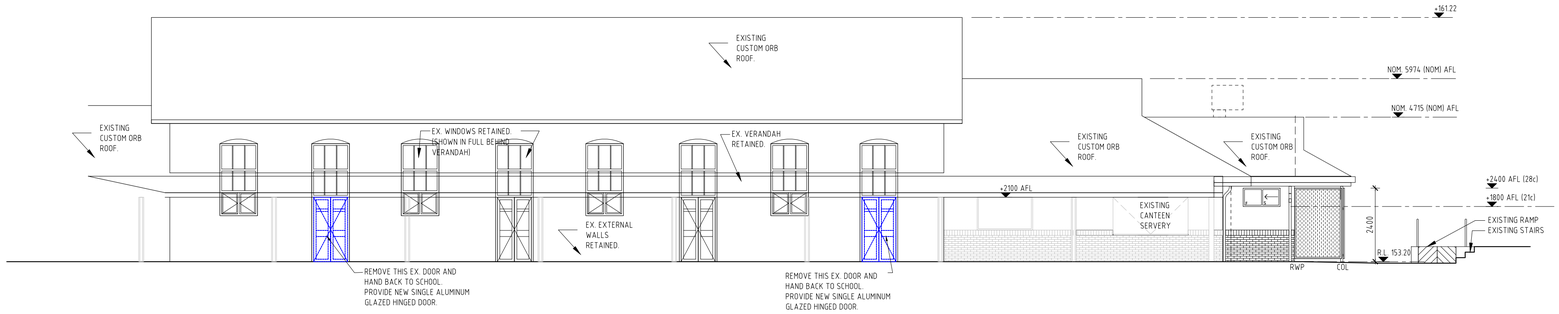
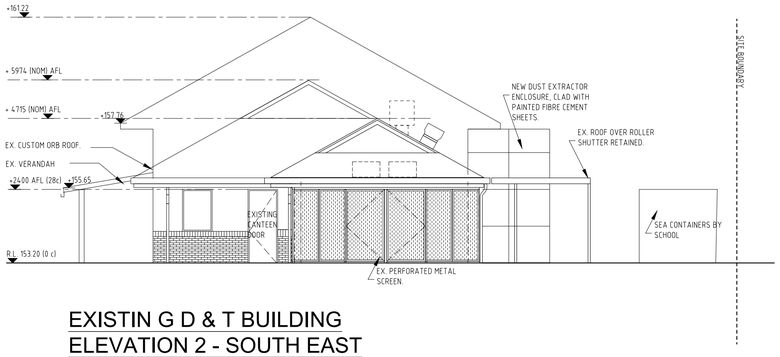


EXISTING D & T BUILDING
ELEVATION 1 - SOUTH WEST

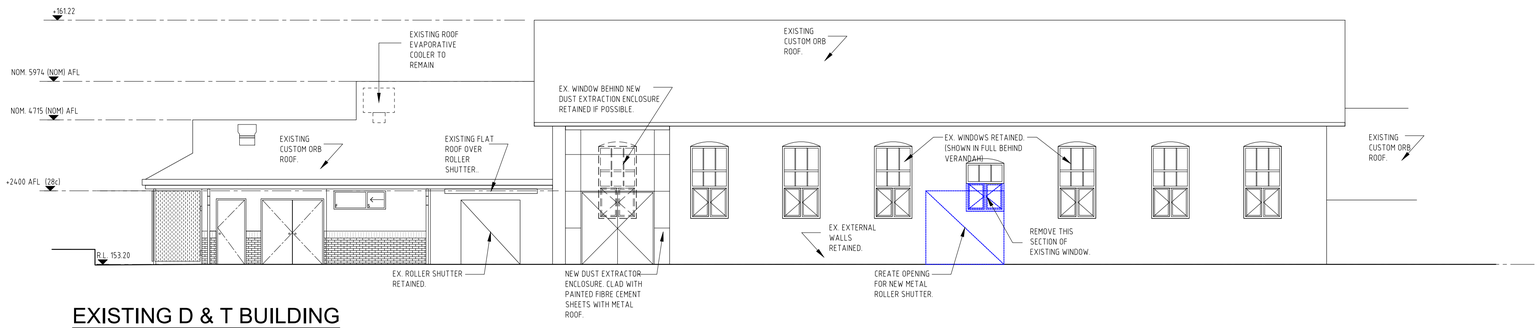
SCALE 1:100 @A1

0m 1m 2m 3m 4m 5m 10m



EXISTIN G D & T BUILDING
ELEVATION 2 - SOUTH EAST

SCALE 1:100 @A1



EXISTING D & T BUILDING
ELEVATION 3 - NORTH EAST

SCALE 1:100 @A1

PROPOSED DEMOLITION

REV	Date	Drawn	Description
A	17.01.2025	CC	ISSUE FOR DA

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ALTERATIONS & ADDITIONS - STAGE 14

Drawing Name
PORTION 'B' - D & T REFURBISHMENT ELEVATIONS

Drawn	Checked	Scale
JDV	CC	1:100 @ A1

Project Phase: DESIGN DEVELOPMENT

Project Number	Drawing Number	Revision
24004	WD.2DT.2EL.1	A

CAD DRAWING - DO NOT ALTER MANUALLY

S:\N 14 - WD 2DT - D&T REFURBISHMENT DWG
22.01.2025 11:34 AM

Appendix B

Heritage Impact Assessment

Griffiths Architects

Job No. 24202

St Josephs School
Alterations + Additions Stage 14

77 Wellington Street
Northam, WA

Heritage Impact Statement

Prepared for Santelli Chong Architects

January 2025

Griffiths Architects

Griffiths Architects

ABN 28 678 339 743
1/315 Rokeby Road, Subiaco
Western Australia 6008
Telephone 08 9381 1666
mail@griffithsarchitects.com.au
www.griffithsarchitects.com.au

Cover: *Griffiths Architects,* August 2024

Revision History

Date of this revision: 07h January 2025

Document	Version	Author	Status	Date	Distribution
HIS	01	Griffiths Architects	Draft	04/12/2024	SCA
HIS	02	Griffiths Architects	Draft	06/12/2024	SCA
HIS	03	Griffiths Architects	Draft	11/12/2024	SCA
HIS	04	Griffiths Architects	Final	07/01/2025	SCA

Contents

Introduction

The proposed works take place at St Josephs School, Northam. The school site is included within *St Josephs Convent* (State Register Place name) and located at 77 Wellington Street, Northam. There are three heritage buildings on the site; School, Convent and Church. These buildings, also as a group, are included on the Shire of Northam's Heritage List as a Management Category 2 Place (*St Josephs Catholic Group*).

The proposed Stage 14 work includes additions and alterations to the Science & Library and Design & Technology buildings in the School. The Design & Technology building is a single store brick building with a gable corrugated iron roof. The building was constructed in 1912 to operate as a School for the Catholic community in Northam. It is one of the three heritage buildings that form the *St Josephs Catholic Group. St Josephs Convent* (1890) and *St Josephs Church* (1902 + 1955) are the other two buildings forming part of this group.

In this HIS, the proposed works are assessed against the heritage values identified in the Statement of Significance from the State Register online entry data to consider the impact that these works will have on the existing site and its heritage values.

Executive Summary

The heritage values identified in the Statement of Significance for *St Josephs Catholic Group* and the Design & Technology building in particular will remain largely unimpaired by the proposed works. The works comply with the intent of the conservation policy by and large.

The proposed minor alterations are expressed in a contemporary manner and distinguishable from the existing heritage fabric. The location of the proposed works to the Science & Library building are to the rear of the site which means the development will not be readily visible from the street, nor will it impact any important views or vistas.

In summary the proposed alterations additions will not have negative impacts on the extant heritage values associated with the site, nor will the works have any negative impacts to set of heritage buildings as a whole and other places in its immediate context.

Location

St Josephs Catholic Group is lot 54, and is located on Wellington Street in the Shire of Northam.

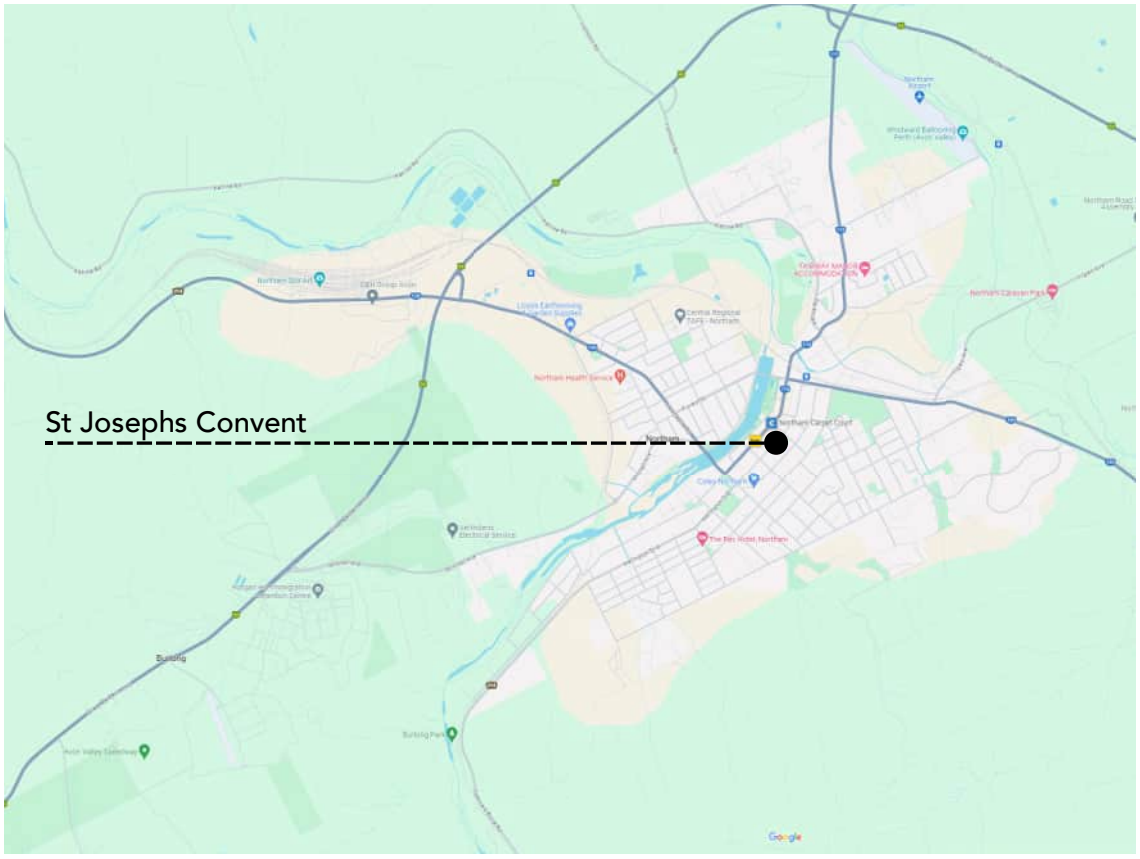


Figure A Location Plan – *St Josephs Catholic Group*. *Google Maps 2024*

Heritage Listings

St Josephs Catholic Group is included on the Shire of Northam's Heritage List, it was adopted on the list as a Management Category 2 Place in 2019.

Background

St Joseph's Church, built in 1902, replaced an earlier church which had been built with strong community support between 1877-79. The growth of the Catholic community in Northam led to the establishment of a separate parish, distinctive from Newcastle (Toodyay), in the 1890s. The old church became inadequate, and plans for a new church were drawn up and fundraising carried out. The Catholic community made large contributions to the district over the years. The St Joseph's Convent was established in 1890 and the first parish priest, Father Treacy was installed soon after. A new St Joseph's School opened in 1912 and today continues to provide education to many young people in the district.

Photograph 1 Historic photo of St Josephs Convent. Evidence of bullnose verandah and parapet wall.
Author/Date unknown

Photograph 2 Historic photo of St Josephs Convent. Evidence of bullnose verandah and parapet wall in background along with chimney. Former rear building in the background to the left.
Author/Date unknown

A Brief Description

St Josephs Catholic Group is part of a complex that includes the parish church on a separate adjacent site, and St Joseph's School. The site includes a teaching block from 1912 that is currently used for Design and Technology, together with more contemporary buildings commencing in the 1970s up to almost the present. The building aligns with and faces Wellington Street.

The Design & Technology building is a single store brick building with a gable corrugated iron roof. Rainwater goods and long length corrugated iron sheets are replacements. The original material would have been short length sheets similar to the material shown in the above photo. Windows and doors to the north and south elevations appear original. Brick paving extends most of the building perimeter. Paving level is flush with the internal floor level and is higher than what would have been the original ground levels would have been which has given rise to damp ingress..

Openings to the south elevation have been altered by an awning which runs the length of the facade. The awning extends further west and returns to the Art & Economics building which is attached to the Design & Technology building via its roof.

A single storey addition (canteen and toilets) is evident to the east of the building. The roof line and wall material of the addition differ from the original building.

Mechanical services and a transportable classroom have been added to the north side of the building.

Internally original timber floorboards remain insitu in the computer classroom and GLA 1. However they have been replaced with concrete in the machinery room. Dividing walls have been installed to create three rooms which are currently used for machinery and computing classrooms respectively. Modern machinery and suspended lighting have been installed. Former windows on the east elevation have been removed and converted into doorways. An internal fixed pane window has been installed adjacent the northern doorway. High level plasterboard ceilings have been installed previously covering the original raked timber ceilings which remain insitu. Evaporative mechanical services have been installed within the ceiling space. Mechanical exhausts have been installed to the north east section of roof.

Overall the place is in good condition with some remediation required.

Statement of Significance

This statement of significance is extracted from the Heritage List entry for *St Josephs Catholic Group*:

> *St Joseph's church has aesthetic significance, displaying many Gothic features. The church, school and convent have social significance in that it provides the focus for the Catholic community which has made a large contribution to the district over the years. St Joseph's catholic group is aesthetically pleasing and contributes to the streetscape and character of Northam.*

Proposals

Design & Technology Building

A) Demolition

Works will include:

- Removal of timber flooring to computing room and GLA 1;
- Removal of brickwork to form internal openings in eastern wall;
- Partial removal of window and brickwork to form external opening in northern wall;
- Removal of internal dividing walls between machinery room, computing classroom and GLA 1;
- Removal of internal dividing wall between metal work and welding room;
- Strip back ceiling to horizontal supports;
- Removal of external door panels to two openings on the south elevation; and,
- Removal of internal furniture, fixtures and fittings.

B) New Works

Works will include:

- Concrete slab to computing room and GLA 1;
- Partition walls and sliding doors to create new division between woodwork, metalwork and planning rooms;
- Roller door in north wall where brickwork and window was partly removed;
- Installation of dividing walls in former welding room to form new welding bays and storeroom;
- New acoustic plasterboard ceiling to woodwork and metalwork rooms;
- Installation of new doors where original doors removed to south elevation;
- Installation of new internal furniture, fixtures and fittings including machinery for woodwork and metalwork purposes.

Science & Library Building + Other Works

C) Works

Works will include:

- Alterations to ground floor rooms to form new 3rd Science and general learning areas;
- First floor extension northward to included additional general learning areas and staff workstation;
- Transportable classrooms to south area of sporting oval. These are to be installed prior to Stage 14 to accommodate the facility requirements of the School. The classrooms are to be on site for ~5 years or until the completion of Stage 15;
- Second story addition over science rooms to accommodate Home EC. Addition to be covered by a low pitched corrugated sheeting hipped roof;

Detrimental Impact and Mitigation

In reviewing the Statement of Significance for *St Josephs Catholic Group*, impacts might be measured. A review of the values and examination of the possible impacts as follows:

Value	Impact	Mitigation
St Joseph's church has aesthetic significance, displaying many Gothic features.	Minor impact. Existing doors are to be recovered and stored on site for potential reuse at a later date.	No mitigation required.
The church, school and convent have social significance in that it provides the focus for the Catholic community which has made a large contribution to the district over the years.	No Impact	No mitigation required
St Joseph's catholic group is aesthetically pleasing and contributes to the streetscape and character of Northam.	No Impact Works are not visible from streetscape.	No mitigation required

Conclusion

As this impact statement demonstrates there are largely no negative impacts on the heritage values of *St Josephs Catholic Group* caused by the proposed works. The majority of proposed external works are to the Science & Library building. Although a secondary storey addition is proposed but it does not physically effect and heritage building fabric and is not visible from the streetscape.

References

Architectural drawings completed by Santelli Chong Architects dated December 2024.

Shire of Northam, Heritage List, Place Record Forms

Photographs

Photograph 3 Southern corner of D&T building. Canteen in foreground. *Griffiths Architects Aug 2024*

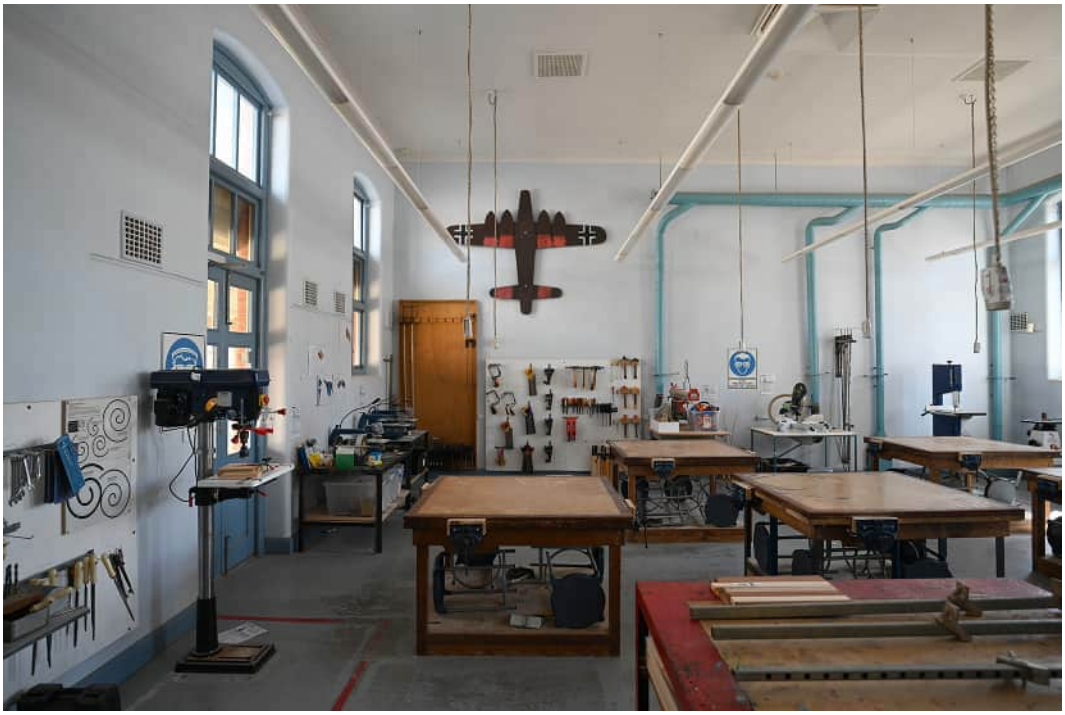
Photograph 4 D&T south elevation. Note awning cutting across openings. *Griffiths Architects Aug 2024*

Photograph 5 Western corner of D&T building under awning. Note awning cutting across openings. Art and Home Economics building to the left. *Griffiths Architects Aug 2024*

Photograph 6

Northern corner of D&T building under awning. Transportable classroom to the left.
Griffiths Architects Aug 2024

Photograph 7 Eastern corner of D&T building with toilets in foreground and mechanical exhaust in the background to the right. *Griffiths Architects Aug 2024*



Photograph 8 North western view within machinery room. Dividing wall in background to be removed as part of the works. *Griffiths Architects Aug 2024*

Photograph 9 South eastern view within machinery room. Openings to either side of wall are alterations of original window openings. *Griffiths Architects Aug 2024*

Photograph 10 View of replacement plaster glass ceiling concealing original timber raked ceiling . *Griffiths Architects Aug 2024*

Appendix A – Shire of Northam Heritage List

SHIRE OF NORTHAM
LOCAL PLANNING SCHEME NO. 6
REGISTER 1 – HERITAGE LIST

1. INTRODUCTION

The provisions for the adoption of a Heritage List under the provisions of the Northam Local Planning Scheme No. 5 are outlined in Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015* known as the Deemed Provisions.

Note: Deemed provisions are those provisions that are automatically incorporated into a local planning scheme.

2. SCHEME PROVISIONS UNDER SHIRE OF NORTHAM LOCAL PLANNING SCHEME NO. 6

The provisions state:

8. Heritage list

(1) The local government must establish and maintain a heritage list to identify places within the Scheme area that are of cultural heritage significance and worthy of built heritage conservation.

(2) The heritage list —
- (a) must set out a description of each place and the reason for its entry in the heritage list; and
- (b) must be available, with the Scheme documents, for public inspection during business hours at the offices of the local government; and
- (c) may be published on the website of the local government.

(3) The local government must not enter a place in, or remove a place from, the heritage list or modify the entry of a place in the heritage list unless the local government —
- (a) notifies in writing each owner and occupier of the place and provides each of them with a description of the place and the reasons for the proposed entry; and
- (b) invites each owner and occupier to make submissions on the proposal within 21 days of the day on which the notice is served or within a longer period specified in the notice; and
- (c) carries out any other consultation the local government considers appropriate; and
- (d) following any consultation and consideration of the submissions made on the proposal, resolves that the place be entered in the heritage list with or without modification, or that the place be removed from the heritage list.

(4) If the local government enters a place in the heritage list or modifies an entry of a place in the heritage list the local government must give notice of the entry or modification to —
- (a) the Heritage Council of Western Australia; and
- *(b)* each owner and occupier of the place.

3. HERITAGE LIST REGISTER

The following is the Heritage List Register.

Heritage List #	Common Name	Lot No.	House No.	Street	Suburb	Assess. No	Management Category	MHI Ref.	Inherit Ref.	Reason for Entry
1.	Northam Fire Station (fmr #2) & Quarters	158	87	Duke Street	Northam	A10590	1	13	1852	As per SRHP Statement of Significance.
2.	Uniting Church & Hall	611	103	Duke Street East	Northam	A14327	1	34	16300	As per SRHP Statement of Significance.
3.	Colonial Tavern & Stables	8-10	197	Duke Street East	Northam	A14398	1	8	1855	As per SRHP Statement of Significance.
4.	Bardeen Homestead Group	100, 104-105	866	Dumbarton Road	Irishtown	A425	1	3	3414	As per SRHP Statement of Significance.
5.	Union Bank (ANZ Bank)	15-16	133	Fitzgerald Street	Northam	A11041	1	1	1861	As per SRHP Statement of Significance.
6.	National Australia Bank	7	141	Fitzgerald Street	Northam	A11049	1	62	14788	As per SRHP Statement of Significance.
7.	Bank of New South Wales (fmr)	113	161	Fitzgerald Street	Northam	A11060	1	36	1872	As per SRHP Statement of Significance.
8.	Commonwealth Bank	111-112	181	Fitzgerald Street	Northam	A11079	1	9	1871	As per SRHP Statement of Significance.
9.	Co-op (fmr) (Community Health Building)	14	222	Fitzgerald Street	Northam	A11115	1	10	10880	As per MHI Place Record.

Heritage List #	Common Name	Lot No.	House No.	Street	Suburb	Assess. No	Management Category	MHI Ref.	Inherit Ref.	Reason for Entry
10.	Northam Post Office & Quarters	1	239-243	Fitzgerald Street	Northam	A13258	1	24	1867	As per SRHP Statement of Significance.
11.	Town Council Offices (fmr) & Library	17 & 18	298	Fitzgerald Street East (cnr Glebe St)	Northam	A11140	1	26	10907	As per SRHP Statement of Significance.
12.	Northam Railway Station	359 & 370 (Reserve 31355)	401	Fitzgerald Street West	Northam	A11190	1	25	1859	As per SRHP Statement of Significance.
13.	John Morrell's Grave	26637	-	Goomalling Road (cnr Gillett Rd)	Northam	A11264	1	17	1885	As per SRHP Statement of Significance.
14.	Byfield House	1-3	30	Gordon Street	Northam	A14058	1	5	1878	As per SRHP Statement of Significance.
15.	Uralia (Rosalyn, St John of God Hospital)	347	59	Gordon Street	Northam	A14343	1	35	1876	As per SRHP Statement of Significance.
16.	Northam Army Camp	28465		Great Eastern Highway	Burlong	A496	1	68	6126	As per SRHP Statement of Significance.
17.	The Residency (The Magistrate's Residence (fmr))	330	42	Habgood Street	Northam	A11407	1	31	1880	As per SRHP Statement of Significance.
18.	Mitchell House (Bona Vista)	33	15-17	Hawes Street (cnr Duke St)	Northam	A13332	1	18	1882	As per SRHP Statement of Significance.
19.	Buckland Homestead & Farm Buildings	60	972	Irishtown Road	Buckland	A15736	1	4	1843	As per SRHP Statement of Significance.

Heritage List #	Common Name	Lot No.	House No.	Street	Suburb	Assess. No	Management Category	MHI Ref.	Inherit Ref.	Reason for Entry
20.	Morby Farm Cottage	600	70	Katrine Road	Katrine	A13075	1	19	1837	As per SRHP Statement of Significance.
21.	Northam (Pioneer) Cemetery (1856+)	Avon Loc. 20511	160	Katrine Road	Northam	A14141	1	21	3976	As per SRHP Statement of Significance.
22.	Northam Senior High School	463	30	Kennedy Street	Northam	A14136	1	66	1883	As per SRHP Statement of Significance.
23.	Fermoy House (fmr), St Joseph's Primary School	236 & 60	1	Lance Street	Northam	A15718	1	47	1874	As per SRHP Statement of Significance.
24.	Railway Goods Shed	438	437	Morrell Street	West Northam	A12015	1	15	17618	As per Updated Place Record.
25.	Enfield House	1	12	Newcastle Road (Corner Enfield Terrace)	Northam	A12176	1	12	10882	As per Updated Place Record.
26.	Curdnatta	32	22	Newcastle Road	Northam	A12187	1	11	10881	As per SRHP Statement of Significance.
27.	St John's Anglican Church & Parish Hall	90	11	Wellington Street	Northam	A12502	1	33	1891	As per SRHP Statement of Significance.
28.	Northam State School (fmr) (Avon Valley Arts Workshop)	380	33	Wellington Street	Northam	A13095	1	29	1881	As per SRHP Statement of Significance.
29.	Northam Post Office (fmr) (Avon Valley Arts Centre)	380	33	Wellington Street	Northam	A13095	1	29	1892 1867	As per SRHP Statement of Significance.

Heritage List #	Common Name	Lot No.	House No.	Street	Suburb	Assess. No	Management Category	MHI Ref.	Inherit Ref.	Reason for Entry
30.	Northam Town Hall & Lesser Hall	86	85	Wellington Street (cnr Gordon Street)	Northam	A13409	1	27	1877	As per SRHP Statement of Significance.
31.	Northam Police Station & Court House	429	114	Wellington Street	Northam	A14132	1	23	1890	As per SRHP Statement of Significance.
32.	Northam Police Station (former)	254	128	Wellington Street (cnr Fitzgerald Street)	Northam	A12551	1	23	17372 & 1869	As per MHI Place Record.
33.	Railway Institute	453	182	Wellington Street	Northam	A12641	1	30	1898	As per MHI Place Record.
34.	Hoopers Winery & Surrounds (Keanes Vineyards)	5739	9	Yates Street	Bakers Hill	A2052	1	16	10917	As per SRHP Statement of Significance.
35.	Chauncy's Cairn			North of Cobb Road, Chidlow State Forest	Woottatting		1	6	8565	As per SRHP Statement of Significance.
36.	Clackline Bridge or Viaduct			Over Clackline Brook and Railway (500m east of Clackline townsite)	Clackline		1	7	10910	As per SRHP Statement of Significance.
37.	Goldfields Water Supply			Mundaring to Kalgoorlie	Northam LGA		1	14	25251	As per SRHP Statement of Significance.
38.	Methodist Manse (fmr)	62	100	Chidlow Street	Northam	A14199	2	59	24992	As per Updated MHI Place Record.
39.	Jacaranda House	7-8	25	Duke Street	Northam	A10556	2	NEW	26380	As per Place Record.
40.	Northam Flour Mill	100 & 34	334	Fitzgerald Street East	Northam	A15569	2	64	10889	As MHI Place Record & SRHP Interim Assessment.

Heritage List #	Common Name	Lot No.	House No.	Street	Suburb	Assess. No	Management Category	MHI Ref.	Inherit Ref.	Reason for Entry
41.	Grand Hotel (fmr)	146-147	426	Fitzgerald Street	Northam	A11194	2	51	1873	As per MHI Place Record.
42.	Quellington Hall	28631 (Reserve 3410)		Grass Valley South Road	Quellington	A995	2	72	26419	As per MHI Place Record.
43.	Stackallan Homestead	9501	29	Henty Place	Northam	A15800	2	NEW	26382	As per Place Record.
44.	Katrine Precinct	50	1418	Katrine Road	Katrine	A1722	2	54	16758	As per MHI Place Record.
45.	Lockyers Mill, Hampton Vineyard	1	633	Katrine Road	Irishtown	A384	2	57	3413	As per MHI Place Record.
46.	Carami House	26	38	Newcastle Road	Northam	A12198	2	41	10879	As per Updated MHI Place Record.
47.	Bakers Hill Railway Platform	254		Newman Street	Bakers Hill	A16442	2	NEW	26590	As per Place Record.
48.	St Peters Anglican Church	50	1277	Northam-Pithara Road	Jennapullin	A1643	2	78	1847	As per MHI Place Record.
49.	Egoline Homestead	100	439	Northam-Toodyay Road	Malabaine	A2050	2	46	3416	As per MHI Place Record.
50.	Glen Avon & Glen Avon Barn	204	1252	Northam-Toodyay Road	Katrine	A16114	2	32	3989	As per MHI Place Record.
51.	Warranine Homestead Group	75	91	Old Spencers Brook Road	Mokine	A1983	2	81	1886	As per MHI Place Record.
52.	Mokine Homestead	49	1662	Spencers Brook Road	Mokine	A15382	2	60	10919	As per MHI Place Record.
53.	Spencers Brook Tavern (fmr Brookton Hotel)	148	47	Thomas Street	Spencers Brook	A2725	2	74	1838	As per MHI Place Record.

Heritage List #	Common Name	Lot No.	House No.	Street	Suburb	Assess. No	Management Category	MHI Ref.	Inherit Ref.	Reason for Entry
54.	Barndon House	851	14	Wellington Street	Northam	A12499	2	NEW	26381	As per Place Record.
55.	Bushmans' House (fmr) (Northam Guest House/ Clearview House/ Temperance Hostel)	7	51	Wellington Street	Northam	A12507	2	41	1889	As per MHI Place Record.
56.	St Joseph's Catholic Church Group (Convent & School)	54	77	Wellington Street	Northam	A15185	2	76	1897	As per MHI Place Record.
57.	St James Anglican Church	97	185	Wellington Street (cnr Morrell St)	West Northam	A13532	2	75	1899	As per MHI Place Record.
58.	Dr Burrow's Wife's Grave			Mt Ommaney	Northam		2	45		As per MHI Place Record.
59.	St Simon & St Jude Anglican Church	157	34	Boronia Avenue (cnr Banksia Ave)	Wundowie	A1571	3	111	11646	As per MHI Place Record.
60.	Grass Valley Hotel (fmr Tavern)	4 & 132	8	Carter Street (cnr George Street)	Grass Valley	A1961	3	97	1846	As per MHI Place Record.
61.	Wundowie Foundry – Factory Office	28416	52	Hawke Avenue	Wundowie	A16025	3	113	10922	As per MHI Place Record.
62.	Pensioner Guard Cottage (fmr)	123	1	McMillan Place	Northam	A13174	3	106	2661	As per MHI Place Record.
63.	Exhibition Building & Commemorative Arch	217	44	Peel Terrace	Northam	A14137	3	91	18797	As per MHI Place Record.
64.	Northam Care & Share	401	88	Wellington Street	Northam	A12529	3	104	25048	As per Updated Place Record.

Heritage List #	Common Name	Lot No.	House No.	Street	Suburb	Assess. No	Management Category	MHI Ref.	Inherit Ref.	Reason for Entry
65.	Our Lady Queen of Heaven Church	205	4	Zamia Terrace (Cnr Orchid Tce)	Wundowie	A1585	3	105	13106	As per MHI Place Record.
66.	Agricultural Hall	Avon Loc. 00440		Irishtown Rd	Irishtown	A385	2	37	1844	As per Updated Place Record.
67.	Australasia Bank (fmr)	123	85	Fitzgerald St East	Northam	A11019	2	38	1858	As per Updated Place Record.
68.	Cody House	120	77	Gordon St	Northam	A16213	2	42	1879	As per Updated Place Record.
69.	Commercial Hotel (Hotel 190)	340	190	Fitzgerald St East	Northam	A13530	2	43	1864	As per Updated Place Record.
70.	Dempster Homestead, Muresk Institute	12	1	Muresk Rd	Muresk	A2390	2	44	10914	As per Updated Place Record.
71.	Government Building	223	303	Fitzgerald St East	Northam	A11146	2	50	1875	As per Updated Place Record.
72.	Homeswest (fmr)	14	129	Fitzgerald St East	Northam	A11071	2	52	1870	As per Updated Place Record.
73.	Lands Office (fmr)	384	263	Fitzgerald St East	Northam	A11149	2	55	1866	As per Updated Place Record.
74.	Link Theatre	1-2	89	Duke St East	Northam	A10591	2	56	1854	As per Updated Place Record.
75.	Masonic Hall (fmr)	6	16	Gordon St	Northam	A15461	2	58	10890	As per Updated Place Record.
76.	Northam RSL Memorial Hall & Senior Citizens Centre	131	265	Fitzgerald St East	Northam	A11138	2	65	13503	As per Updated Place Record.

Heritage List #	Common Name	Lot No.	House No.	Street	Suburb	Assess. No	Management Category	MHI Ref.	Inherit Ref.	Reason for Entry
77.	Monument – Chidlow & Jones	5		Dr Dunlop Grove	Northam	A11237	2	61	1840	As per Updated Place Record.
78.	National Bank (fmr)	750	55	Fitzgerald St East	Northam	A13318	2	62	1858	As per Updated Place Record.
79.	The Northam Advertiser Officer (fmr)	600	245	Fitzgerald St East	Northam	A11126	2	63	1860	As per Updated Place Record.
80.	Northam Tavern	151	75	Fitzgerald St East	Northam	A11014	2	67	1862	As per Updated Place Record.
81.	G J Coles (fmr)	1	178	Fitzgerald St East	Northam	A11077	2	68	10886	As per Updated Place Record.
82.	Pine Park	16	61	Duke St	Northam	A10577	2	69	1853	As per Updated Place Record.
83.	Platelayers Cottage (fmr)	29575		Spencers Brook Rd (opp. 38 Rose Terrace)	Spencers Brook	A1474	2	70	16633	As per Updated Place Record.
84.	Poole St Bridge	505 / R46412		Poole St (spanning over Avon River)	Northam	A16360	1	28	3549	As per SRHP Statement of Significance.
85.	Prospect House	2	402	Fitzgerald St West	Northam	A11181	2	71	10908	As per Updated Place Record.
86.	RAAF Anson Aircraft Monument	28827 / R39847		Avro Anson Rd (adjacent No. 35)	Mokine	A1647	2	73	13509	As per Updated Place Record.
87.	Shamrock Hotel (Dome & Farmers Home Hotel)	800	112	Fitzgerald St West	Northam	A16102	1	32	1865	As per SRHP Statement of Significance.

Heritage List #	Common Name	Lot No.	House No.	Street	Suburb	Assess. No	Management Category	MHI Ref.	Inherit Ref.	Reason for Entry
88.	St Nicholas' Anglican Church	159	4605	Great Eastern Hwy	Bakers Hill	A1526	2	77	1842	As per Updated Place Record.
89.	The Riverside Hotel (Avon Bridge Hotel)	450	322	Fitzgerald St East	Northam	A11142	1	39	1863	As per Updated Place Record.
90.	Throssell Emporium (fmr)	3	11	Peel Terrace	Northam	A12434	2	79	10891	As per Updated Place Record.
91.	Throssell Fountain	500	1	May Park, May St	Northam	A16321	2	92	10883	As per Updated Place Record.

Register of Entries /Amendments

HList#	Date of Update	Date of Decision	File reference
1	May 2022	17 August 2022	3.1.8.19

Appendix C

Geotechnic Assessment

Galt Geotechnics

Galt GEOTECHNICS

Report on:

GEOTECHNICAL STUDY
PROPOSED ADDITIONS
ST JOSEPH'S SCHOOL – SECONDARY CAMPUS
77 WELLINGTON STREET, NORTHAM

WAG240472-01 002 R Rev1

Submitted to:

Santelli Chong Architects
Suite 13, 99-101 Francis Street
NORTHBRIDGE WA 6003

21 January 2025

CONTENTS

1. INTRODUCTION

This report presents the outcomes of Galt Geotechnics' (Galt's) geotechnical study for the proposed additions to St Joseph's School – Secondary Campus at 77 Wellington Street, Northam ("the site").

This report is to be read in conjunction with the appended "Understanding Your Report" at the back of this report.

2. KEY FINDINGS

Subsurface conditions are relatively consistent across the proposed sites of the building additions and transportables and can be summarised as comprising:

- a thin layer of sand fill over
- very stiff to hard, medium to high and high plasticity gravelly sandy clay.

Groundwater was not encountered to the maximum depth investigated of 2.8 m.

Site classifications of Class H1 and M are considered appropriate for the building additions and transportable sites respectively.

The addition of a second storey over most of the area of the existing science and library building and the associated extra footing load is not expected to cause significant additional settlement or associated cracking. This is provided footing bearing pressures are limited to 100 kPa. If bearing pressures above 100 kPa are proposed Galt should be contacted for further advice.

The building design will need to account for differential movement between the existing building and the new section of two storey building to be constructed over the area of the existing covered area.

Site preparation procedures and advice is provided for construction on clay sites. Construction in the drier months is recommended to minimum the impact of rainfall on construction.

Likely cause/s of inundation of the south-east corner of the existing science and library building are provided along with possible remedial measures.

3. SITE DESCRIPTION

Site details are summarised below.

Table 1: Summary of Site Details

Item	Comment
Approximate Site Dimensions	Overall site ~2.36 ha Science & Library Block and covered area – north-west wing 45 m x 21 m; north-east wing 30 m x 12 m Transportable classrooms – 17 m x 12 m.
Current Site Surface Levels[1]	About RL 153 m AHD in the north-west to about RL 155 m AHD in the north-east
Vegetation	Site for transportable classrooms is grassed.
Existing Infrastructure	Single storey Science and Library block and single storey covered shelter structure surrounded by paving
Site History[2]	Aerial imagery from 1956 and 1960 shows the sites for the additions comprised open ground. The 2000 imagery shows that the north-west wing of the Science and Library block was in place. The covered shelter structure surrounded by paving is present in the 2008 imagery. The north-east wing of the Science and Library block is present in the 2012 imagery. The site for the additions has remained relatively unchanged since this time.

NOTES: ***1.*** *Site levels based on supplied levels.*

2. *Site history based on aerial imagery (Landgate)*

4. PROPOSED DEVELOPMENT

Development details are summarised below.

Table 2: Summary of Proposed Development

Item	Comment
Proposed Development	Two storey addition to most of Science & Library Block and covered area – north west wing 45 m x 21 m; north-east wing 30 m x 12 m Single storey transportable classrooms – 17 m x 12 m..
Basements Proposed	None proposed.
Proposed Finished Floor Levels	Unknown but assumed close to current ground levels.
Cut/Fill	Assume minimal fill and cut of <1 m
Assumed Foundation Type	Shallow footings and on-ground slabs
Assumed Retaining Walls	Low height wall may be required
Assumed Stormwater Disposal	Assumed off site via council drainage system
Assumed Sewage Disposal	Off-site via sewer network

It is noted that the southern corner of the Science and Library block is subject to inundation.

A site sketch showing the location and proposed extent of the two-storey addition and transportable classrooms is presented in Appendix A.

5. PROJECT OBJECTIVES

The objectives of the study were to:

- assess subsurface soil and groundwater conditions across the site;
- provide a site classification(s) in accordance with AS 2870-2011 “Residential Slabs and Footings”;
- provide recommendations and geotechnical design parameters for earth retaining structures;
- recommend site preparation procedures including compaction criteria;
- assess the area subject to inundation adjacent the southern corner of the Science and Library block; and
- provide advice on remediation of the area subject to inundation.

6. FIELDWORK

Fieldwork was carried out by a representative from Galt on 25 October 2024 and comprised:

- a site walkover including taking photographs;
- clearing of test locations for services by a service locator;
- drilling of four machine auger boreholes, BH01 to BH04, to depths ranging from 1.5 m to 2.8 m;
- drilling of three hand auger boreholes, HA01 to HA03, extending to depths ranging from 0.9 m to 1.4 m;
- testing with a dynamic cone penetrometer (DCP) adjacent each test pit, extending to refusal at depths ranging from 0.5 m to 0.9 m; and
- collection of representative soil samples for inspection and laboratory testing.

General

Fieldwork was carried out in accordance with AS1726-2017, Geotechnical site investigations.

A senior engineer from Galt conducted the site walkover. A geotechnical engineer from Galt positioned the test locations, observed the drilling, drilled the hand auger boreholes, logged the materials encountered, performed the field tests and collected representative samples for inspection and laboratory testing.

Test locations are shown on Figure 1. Photographs of the site are presented in Appendix A. Details of the tests are shown in Attached Table 1 at the end of the text.

Machine Auger Boreholes

Machine auger boreholes were drilled using a truck mounted Melvelle drilling rig supplied and operated by Ground Breaking Investigations (GBI).

Machine auger borehole reports are presented in Appendix C, along with a method of soil and rock description and a list of explanatory notes and abbreviations used in the reports.

Hand Auger Boreholes

Hand auger boreholes were drilling using a 90 mm nominal diameter auger.

Hand auger borehole reports are presented in Appendix C.

Dynamic Cone Penetrometer (DCP) Tests

DCP tests were undertaken in accordance with AS1289.6.3.2. DCP test results are presented in Table 3.

Table 3: Dynamic Cone Penetrometer (DCP) Test Results

Test Location	BH01	BH02	BH03	BH04	HA01	HA02	HA03
Depth (mm)	Blows per 100 mm penetration						
0 – 100	3	5	3	3	3	3	2
100 – 200	10	2	8	5	2	4	3
200 – 300	8	3	12	13	4	3	2
300 – 400	5	7	15	14	6	4	3
400 – 500	5	12	20	3	8	4	2
500 – 600	5	14	R	2	3	4	2
600 – 700	9	R		2	10	6	2
700 – 800	12			5	HB	7	2
800 – 900				5		10	4
900 - 1000				4			6
1000 - 1100				9			8
100 - 1200				11			10
1200 - 1300				14			R
1300 - 1400				R			

NOTES: *R – Refusal*
HB – Hammer bounce

7. LABORATORY TESTING

Laboratory testing was conducted by Western Geotechnical and Laboratory Service (WGLS), a National Association of Testing Authorities (NATA) accredited laboratory. The testing comprised determination of:

- particle size distribution on 3 samples; and
- Atterberg limits and linear shrinkage on 3 samples;

The laboratory test results are presented in Appendix D along with the test methods followed. A summary of the test results is presented in Attached Table 2.

8. SITE CONDITIONS

8.1. Geology

Table 4: Summary of Geology Mapping

Map Sheet	Map Scale	Mapped Soils
Perth	1:250,000	Alluvium – clay, sand and loam.

8.2. Groundwater

We do not have groundwater information for this site. However, we note that perched water is likely to develop on shallow clayey soils during the wetter times of the year.

Groundwater was not encountered during our investigation to the maximum investigated depth of 2.8 m (October 2024).

8.3. Subsurface Conditions

The subsurface conditions are relatively consistent across the site. The typical soil profiles are described below:

Area of Additions (BH01 and BH02)

- FILL: SAND (SP & SP-SC) – fine to coarse grained, sub-angular to sub-rounded, brown and yellow, trace to with low to medium plasticity fines, dense, extending from the ground surface to a depth of 0.1 m; overlying
- Sandy CLAY (CH & CL-CI) – high plasticity and low to medium plasticity, pale brown to brown, very stiff to hard; extending to a depth of 0.9 m; overlying
- Gravelly Sandy CLAY (CI-CH) – medium to high plasticity, brown becoming red brown, with sand, with lateritic gravel, extending to the maximum depth investigated of 2.8 m.

A variation was noted in borehole BH04 where a layer of Clayey SAND (SC) is present between the clays over the depth range of 0.9 m to 1.8 m.

Area of Transportables (BH03 and BH04)

- FILL: SAND (SP & SP-SC) – fine to coarse grained, sub-angular to sub-rounded, brown and brown, trace to with medium plasticity fines, dry, dense to very dense, extending from the ground surface to depths ranging from 0.4 m to 0.5 m; overlying
- Sandy CLAY and Gravelly Sandy CLAY (CI & CI-CH) – medium plasticity and medium to high plasticity, brown to reddish brown, firm to stiff into very stiff to hard; extending to the maximum depth investigated of 2.0 m.

Area Subject to Inundation (HA01 to HA03)

- FILL: SAND (SP) – fine to coarse grained, sub-angular to sub-rounded, commonly brown, trace fines, dry, medium dense to dense, extending from the ground surface to depths ranging from 0.9 m to 1.1 m; overlying
- Sandy CLAY (CI-CH) – medium to high plasticity, reddish brown, very stiff; extending to the maximum depth investigated of 1.4 m.

Borehole HA03 contained a thin layer of Sandy CLAY (CI-CH) fill within the sand fill over the depth range of 0.6 m to 0.8 m.

9. GEOTECHNICAL ASSESSMENT

9.1. Areas of Additions and Transportables

9.1.1. Site Classification

We have assessed the site classification in accordance with AS2870 (2011) "Residential Slabs and Footings". Based on the depth of medium and high plasticity clayey soil, we consider the following site classification are applicable:

- Area of Additions Class H1
- Area of Transportables Class M

To improve the site classification to at least a Class M and Class S in the areas of the additions and transportables would require the following thicknesses of inert granular material to be present over the buried surface of the clay (this is inclusive of the thickness of sand fill already present):

- Class M – Minimum 0.7 m inert granular material.
- Class S – Minimum 1.0 m inert granular material.

The above are based on the assumption that the site preparation guidelines in Section 9.1.5 are followed.

If over-excavation of clay and replacement with inert granular material is required, it will be important to provide adequate drainage to ensure stormwater is not able to infiltrate the permeable fill and pond on the clay. This could involve:

- grading the surface of the clay to drain prior to placement of granular fill. A minimum grade of 1% is recommended.
- using subsoil drainage to ensure the backfilled excavation is able to drain.

We refer you to the CSIRO's pamphlet BTF18-2011: Foundation Maintenance and Footing Performance: A Homeowner's Guide. This provides practical advice to reduce the risk of future heave moments. This pamphlet is presented in Appendix E.

NOTE: *Footing and slab details in AS 2870-2011 are for single or double storey residential structures supported on shallow footings with a maximum bearing pressure of 100 kPa. This must be taken into account by the structural designers.*

9.1.2. Existing Science and Library Building

An inspection of the exterior face of part of the walls of the existing science and library building was conducted to check for the presence of any cracking or displacement that may be attributed to seasonal shrink swell movements of clayey soils.

The exterior walls consist of a masonry face brick. No cracking or movement commonly associated with seasonal shrink swell movements was observed.

9.1.3. Possible Issues for Building Additions

The addition of a second storey over most of the science and library building will impose a greater load and increased bearing pressure on the existing footings. This will lead to further settlement of the footings. The magnitude of this settlement will depend on the size of the footing and the magnitude of the applied pressure.

Given that the subgrade supporting the building consists of clay soils in a very stiff to hard condition, we expect the extra settlement to be negligible (<5 mm) for total bearing pressures up to 100 kPa. This magnitude of settlement should be able to be tolerated by the existing building structure without causing excessive cracking although some minor hairline cracking can be expected.

However, footings with an applied bearing pressures in excess of 100 kPa will need to be assessed on an individual basis to establish if they are likely to cause significant cracking and, if so, the appropriate construction procedures to be adopted in the build phase.

The two-storey building is to extend over the site currently occupied by the covered area. The footprint of this part of the build extends outside the envelope of the existing covered area. Therefore, new footings will be required to support the building in this area. In light of this, there is likely to be differential movement between the footings supporting the existing structure and those supporting the new building. To avoid cracking associated with this, movement joints should be incorporated between the structures to allow for any differential movement.

9.1.4. Drainage and Stormwater Disposal

We note that stormwater will likely pond on clayey surfaces during the wetter parts of the year. This may cause difficulties during construction, including:

- heaving and rutting of saturated clayey soils when trafficked; and
- softening of clayey soils when water is allowed to pond at the base of excavations.

We therefore recommend that:

- earthworks are conducted during the summer months, although careful moisture conditioning will still be required and measures undertaken to avoid excessive moisture loss and shrinkage cracking (e.g. limiting exposure of the clay etc.);
- clayey horizons and finished pavements are shaped to promote positive water run-off away from pavements and structures;
- subsoil drains are used in critical areas to direct subsurface water away from structures and any pavements where required.

9.1.5. Site Preparation

9.1.5.1. Area of Addition

The following recommendations apply to subgrade preparation for the new structure and any new pavements.

- Install cut off drains around the perimeter of the building site or as required to capture and dispose any stormwater runoff.
- Remove concrete slab and brick paving as required from below and around covered area structure.
- Demolish existing covered area structure and dispose of materials off site.
- Remove any remaining debris, below-ground structures including old footings and services from site of covered area structure.
- Remove sand fill to expose clayey soils and shape surface of clay to drain. A minimum grade of 1% should be adequate.
- Backfill up to level of shaped surface any holes left in the clay surface from removal of old footings and other buried structures using lean mix concrete or stabilised sand (minimum cement content 2%).
- Excavate for pad and strip footings as required.
- Check density of exposed shaped base and at base of footing excavations.
- Remove any clay subgrade that does not achieve the density as required in Section 9.1.6 and backfill using lean mix concrete or stabilised sand.
- Place approved granular fill (Section 9.1.7) up to underside of paving or ground slab level. The fill is to be compacted to the density specified in Section 9.1.6

9.1.5.2. Area of Transportables

- Remove topsoil and grass from area proposed for transportables. We consider on average a 100 mm strip should be adequate, although locally deeper stripping may be required.
- Excavate for pad and strip footings as required.
- Check density at base of footing excavations.
- Remove any clay subgrade that does not achieve the density specified in Section 9.1.6 and backfill using lean mix concrete or stabilised sand.
- Compact exposed surface of sand fill to achieve the density specified in Section 9.1.6;
- Where required place approved granular fill (Section 9.1.7) up to underside of paving or ground slab level. The fill is to be compacted to the level of density given in Section 9.1.6.

9.1.6. Compaction

Imported and site derived granular fill must be moisture conditioned to within 2% of modified optimum moisture content and compacted to a minimum dry density ratio (DDR) of 95% as determined in accordance with AS1289.5.2.1.

In situ clayey foundations should be compacted to a minimum dry density ratio of 95% standard maximum dry density as determined in accordance with AS1289.5.1.1.

The use of clayey fill is not recommended on the site given the complexity of small-scale use of clay fill (which must be carefully moisture conditioned and compacted within about ±2% of optimum moisture content). However, if such fill is to be used (including the clayey sand and clays on the site), it must be compacted to a minimum dry density ratio of 95% SMDD (standard modified dry density) as determined in accordance with AS1289.5.1.1.

Compaction control must be undertaken with a nuclear density gauge (NDG) in accordance with AS1289.5.8.1. Below structures, we recommend testing to a minimum depth of 0.3 m:

- at each pad footing location;
- at 5 m centres below strip footings;
- on a grid of 10 m centres below other on-ground slabs.

Over-excavation and replacement of loose/soft materials must be done where the minimum dry density ratio cannot be achieved.

Granular fill (imported granular fill, sand, sandy gravel) must be placed and compacted in layers no greater than 0.3 m loose thickness.

Each layer must be compacted by suitable compaction equipment, and carefully controlled to ensure even compaction over the full area and depth of each layer.

Large compaction equipment (self-propelled vibrating rollers, etc.) must not be used within 2 m behind retaining walls. Hand compaction plant must be used in this instance.

9.1.7. Approved Fill

Imported granular fill must comply with the material requirements as stated in AS 3798-2007, “Guidelines on Earthworks for Commercial and Residential Developments”. We consider that the sand fill is suitable for re-use as structural fill.

Any deleterious material, organic-rich sand or sand containing significant proportions of fines (>5% of material less than 0.075 mm in size) must not be used as inert structural fill.

Where doubt exists, a geotechnical engineer must be engaged to inspect and approve the use of potential fill materials.

9.1.8. Excavation

Based on the soils encountered in our drilling we expect the soils should be readily excavated to a depth of at least 1.5 m using a 10 tonne or larger excavator.

9.1.9. Retaining Structures

9.1.9.1. General

Retaining structures must be designed in accordance with AS4678 (2002) "Earth-Retaining Structures". The following parameters may be used for the design of retaining structures.

Table 5: Design Parameters for Retaining Structures

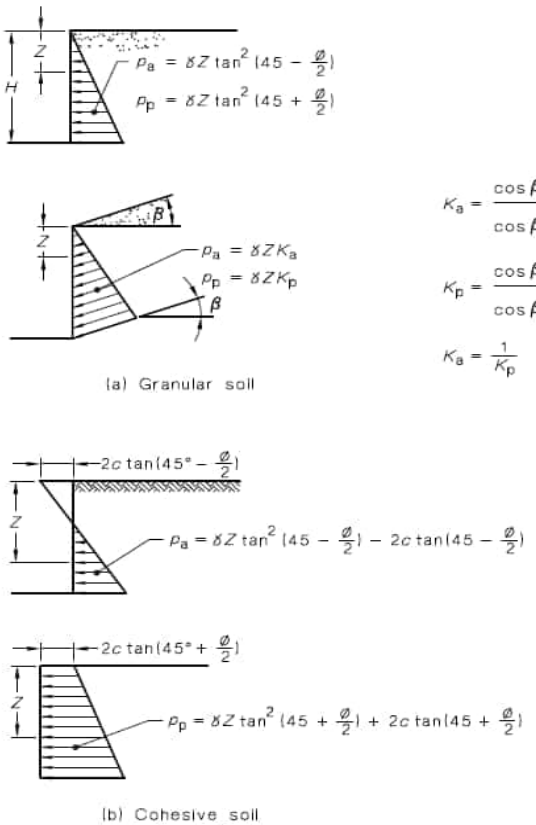
Material Type	γ_b (kN/m^3)	φ' (°)	c' (kPa)	φ_u (°)	c_u (kPa)
Imported Granular Fill	18	34	0	N/A	N/A
Sandy CLAY/CLAY (>35% fines, compacted FILL and/or Natural)	18	25	5	0	50

NOTES: *γ_b – bulk unit weight (t/m^3)* *ϕ' – effective soil friction angle* *c' – effective cohesion* *ϕ_u – undrained soil friction angle* *c_u – undrained cohesion .*

The undrained strength parameters indicated above should be used for analysis of short-term stability, or stability under sudden loading of clayey soils.

The effective strength parameters should be used for analysis of free-draining granular soils and the long-term stability of clayey soils. The formulae for active and passive pressures are shown below for cohesionless soil and cohesive soil[1].

Inline Image 1 – Passive and Active Loads (from AS4678-2002)



Retaining walls must be designed to accommodate full hydrostatic water pressure behind the wall (10 kPa per metre height). In this instance, calculation of lateral earth pressures must include the addition of pore pressure. A separator

[1] *refer Figure E2 from AS4678-2002 Earth-retaining structures*

geotextile ("Bidim A14", or similar, or heavier) must also be used between the interface of any granular backfill and clayey backfill behind the wall.

Compaction plant can augment the lateral earth pressure acting on retaining walls. Hand operated compaction equipment is recommended within 2 m of any retaining walls to minimise compaction pressures.

It is important to note that some ground movement is to be expected behind any soil retaining system, including gravity retaining walls, sheet pile walls and shored and strutted excavations.

9.1.10. Shallow Footings

The additions and transportable buildings may be founded on shallow strip and pad footings within the in situ clay soils or compacted sand fill across the site, provided the site preparation recommendations outlined in Section 9.1.5 are followed.

Allowable bearing pressures of up to 100 kPa may be assumed for footings designed in accordance with AS2870 (2011) subject to requirements of the standard. Refer to Section 9.1.1 for associated site classification. We must be consulted if higher bearing pressures are required.

9.2. Area Subject to Inundation

9.2.1. General

We understand the south-east part of the area along the south-west side of the existing Science and Library Building is subject to inundation during and following rain events. The area is estimated to be about 20 m long and about 4.5 m wide (refer Figure 1).

In our site walkover we noted that:

- the area is surrounded by gravity retaining walls at the south-east end;
- there appears to be a low point at the south-east end adjacent the retaining walls;
- the retaining walls appear to act as a dam and water marks are present on the retaining walls;
- the area is lower than the adjacent car park of the church and a relatively steep slope is present along the common boundary;
- stormwater downpipes from the roof of the existing Science and Library Building discharge into open concrete box drains (refer Photograph 6);
- leaf debris was present in the open concrete box drains where the downpipes discharge (refer Photograph 9).

9.2.2. Cause of Inundation

The most likely cause of the inundation is the limited capacity of the open box drains to collect and discharge stormwater flows into the buried 100 mm nominal PCV stormwater drain pipe aligned parallel to the building. This situation is likely to be exacerbated by clogging of the box drains with leaf matter.

As the box drains cannot discharge the flow quickly enough, the stormwater builds up at the surface and flows to the low point adjacent the retaining walls. The water that collects adjacent the retaining wall would be expected to gradually dissipate by seeping into the sandy trench backfill surrounding and over the 100 mm nominal PCV stormwater drain pipe.

There is also the possibility that some flow enters the area of inundation from the adjacent bitumen sealed car park of the church.

9.2.3. Remedial Works

The following should be undertaken:

- estimation of roof runoff into the area of inundation for the design storm event;
- installation of a sufficient number of downpipes to collect the design flow;
- installation of larger drainage boxes that can collect and discharge the design flow from the downpipes without causing a build up at the entrance to the boxes;
- design and installation of a drainage pipe that can adequately handle the design flow;
- grade the ground along the south-west wall of the building to allow gravity flow of surface water from south-east to north-west; and
- conduct remedial works (if required) to ensure stormwater flows do not enter the area of inundation from the adjacent church car park.

Instead of discharging the flows from the downpipes into drainage boxes, a closed system could be installed so that flows from the downpipes are discharged directly into the main drainage pipe.

If the roof drainage system is designed for the design storm event, including outlets of the downpipes, little if any overflow from the downpipe discharge should be expected to occur at ground level. The only flow that would be expected to occur at ground level would be from incident rainfall falling directly on the ground. Grading of the ground surface along the south-west wall of the building to allow gravity flow of surface water from south-east to north-west would be expected to be able to deal with this flow.

If after completion of the remedial works water is still found to puddle in the previous area of inundation during and after rainfall events a subsoil drain can be installed in this area. The subsoil drain should be located at least 1.5 m away from the building line and at a minimum depth of 0.4 m.

10. CLOSURE

GALT GEOTECHNICS

Fred Davenport
Geotechnical Engineer

https://galtgeo.sharepoint.com/sites/wag240472/shared documents/01 santelli chong si/03 correspondence/wag240472-01 002 r rev0.docx

Attached Table 1: Summary of Boreholes

Test Number	Test Depth (m)	Reason for Termination	Stratigraphy
BH01	2.8	Target depth	FILL: SAND with fines over Clayey SAND over Gravelly Sandy CLAY
BH02	2.0	Refusal	FILL: SAND over Sandy Gravelly CLAY over Gravelly CLAY
BH03	1.5	Refusal	FILL: SAND over Sandy Gravelly CLAY
BH04	2.0	Target depth	FILL: Clayey SAND over FILL: SAND over Sandy CLAY over Gravelly CLAY
HA01	0.9	Refusal	FILL: SAND
HA02	0.9	Refusal	FILL: SAND
HA03	1.4	Target depth	FILL: SAND over FILL: Sandy CLAY over FILL: SAND over Sandy CLAY

Notes *1. Refusal on inferred on very stiff to hard clay*

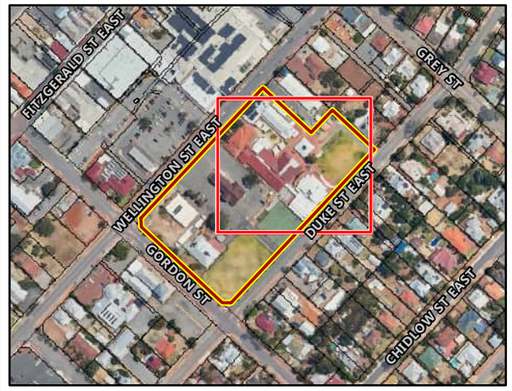
Attached Table 2: Summary of Laboratory Test Results

Test Name	Sample Depth (m)	Soil Class (AS1726 2017)	Gravel (%)	Sand (%)	Fines (%)	LL (%)	PI (%)	LS (%)
BH01	1.1 – 1.8	Clayey Gravelly SAND (SC)	25	47	28	43	24	9.0
BH02	0.2 – 0.9	Sandy Gravelly CLAY (CH)	24	26	50	60	42	10.5
BH04	0.5 – 1.0	Sandy CLAY (CI)	11	45	44	37	23	7.5

Notes

1. *Particle size distribution (by mass)*
   Gravel: 2.36 mm – 63 mm *Sand: 0.075 mm – 2.36 mm* *Fines: <0.075 mm*
2. *Atterberg Limits*
   LL: Liquid limit *PI: Plasticity index* *LS: Linear shrinkage*

Figure



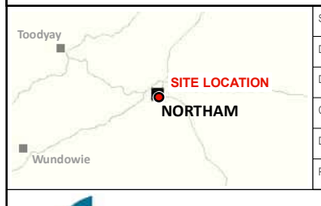
Legend

- Site Boundary
- Area Subject to Inundation
- Borehole
- Hand Auger Borehole

N

0 8 16 24 32 40
Meters

NOTES
Aerial Imagery and Cadastre sourced from Landgate/SLIP



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DRAWN	CED	
DATE DRAWN	14/11/2024	
CHECKED	FAD	
DATE CHECKED	14/11/2024	
PROJECTION	GDA 1994 MGA Zone 50	

Galt Geotechnics Pty Ltd
ACN : 138 490 865
Tel : +61 (0)8 6272-0200
Address : 50 Edward Street
Osborne Park WA 6017

CLIENT	**SANTELLI CHONG ARCHITECTS**
PROJECT	PROPOSED ADDITIONS
LOCATION	ST JOSEPHS SCHOOL SECONDARY CAMPUS 77 WELLINGTON STREET EAST, NORTHAM
TITLE	SITE & LOCATION PLAN

Job No	Fig No	Rev
WAG240472-01	FIGURE 1	A

Appendices

Appendix A: Supplied Plans

DESIGN BUILDING

LOT 200

LOT 99

56.29m

BOUNDARY

DRIVEWAY

EX. SHED

EX. SHED

EX. SHED

50.16m BOUNDARY

PART LOT 100

PART LOT 100
NUMBER 68
1702 m2

BOUNDARY

BOUNDARY

TELSTRA JB

OVERHEAD POWER LINE

WOODEN PP

POLE LIGHT

TELSTRA JB

BOUNDARY

54.47m

90° 13' 30"

89° 56' 30"

90° 13' 30"

CLASSROOM TRANSPORTABLE
GLA11

ART & HOME ECONOMICS

HOME ECONOMICS

LOCKERS

ARTS

GLA 2

COMPUTER/ DESIGN/ PLANNING

GLA1

DESIGN & TECHNOLOGY

MACHINE ROOM

EX. WELDING

EX. CANTEEN

FFL 153.20

ECB

POWER SWITCH BOX

S/W GRATE

BOUNDARY

OUTLINE OF POSSIBLE 1ST FLOOR EXTENSION

PROPOSED LOCATION FOR GEOTECH INVESTIGATION (Hole 4)

COVERED AREA

PROPOSED LOCATION FOR GEOTECH INVESTIGATION (Hole 3)

OVAL

FUTURE TRANSPORTABLE CLASSROOM 1

FUTURE TRANSPORTABLE CLASSROOM 2

PROPOSED LOCATION FOR GEOTECH INVESTIGATION (Hole 2)

SECTION

VERANDAH

LANGUAGE PRAC AREA

V.E.T OFFICE

STUDENT LOUNGE

STUDENT LOUNGE

SCIENCE LAB (GENERAL)

LANGUAGE LAB (GLA 6)

KITCHENETTE

PREP AREA

SPILL OUT AREA

CO-ORDINATOR OFFICE

STORE

GLA 7

CLASSROOMS

GLA 8

75 m2

GLA 9

GLA 10

POLE LIGHT

EXISTING VERANDAH

MULTI - PURPOSE

TBC

TBC

TBC

TBC

TBC

COMMON ROOM

ENTRY

EXISTING VERANDAH

FFL 153.685

GLA 3

STORE ROOM

GLA 4

FFL 153.685

SCIENCE & LIBRARY

LIBRARY

GLA 5

PREP ROOM

SCIENCE LAB (CHEMISTRY)

EX VERANDAH

ABLUTION BUILDING

FFL 153.67

ADMINISTRATION

205.23m

174.99m

WELLINGTON STREET

DUKE STREET EAST

PROPOSED LOCATION FOR GEOTECH INVESTIGATION (Hole 5)

OUTLINE OF POSSIBLE 1ST FLOOR EXTENSION

PROPOSED LOCATION FOR GEOTECH INVESTIGATION (Hole 1)

GAS TANKS

LEGEND

POTENTIAL 1ST FLOOR EXTENSIONS (OVER 2 TO 3 STAGES)

EXISTING GROUND FLOOR PLAN

santelli chong ARCHITECTS

ABN 59 670 160 826
TEL +61 8 9328 3711
13 / 99-101 FRANCIS ST.
NORTHBRIDGE WA 6003

ST JOSEPH'S SCHOOL - SECONDARY CAMPUS | MASTER PLAN

WELLINGTON STREET | STAGE 14 & 15

DATE: Updated on 28.08.2024

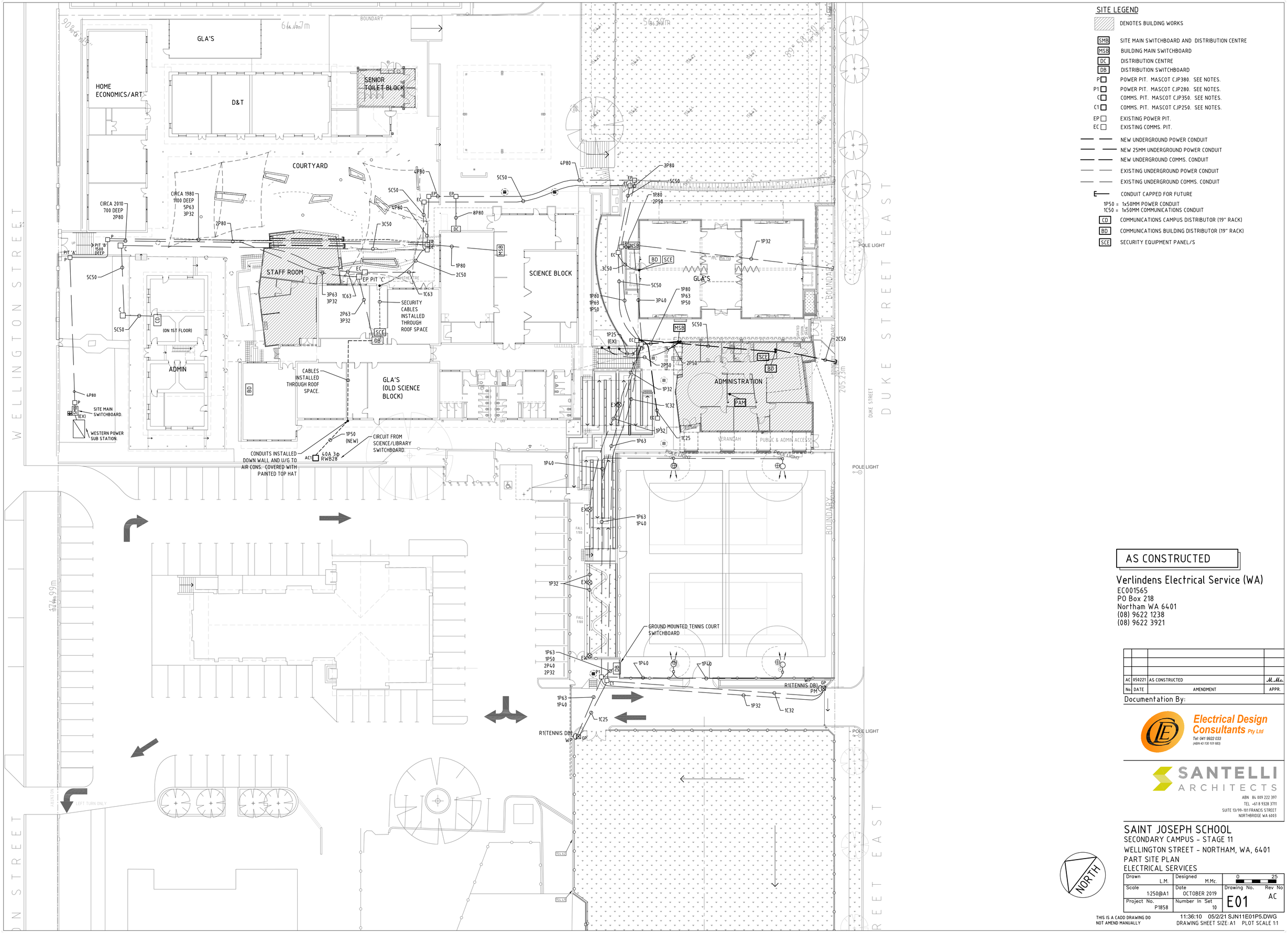
DRAWN: CC
CHECKED: AS
SCALE: 1:200 @ A1

CAD DRAWING - DO NOT ALTER MANUALLY

PROJECT PHASE
SKETCH DESIGN
DRAWING NAME
GROUND FLOOR PLAN
PROJECT NUMBER
2210

DRAWING NUMBER
SK.01C

02.06.2023 1:25 PM 2210 - SKETCH A_UPDATED _R12.DWG



SITE LEGEND

- DENOTES BUILDING WORKS
- SMB — SITE MAIN SWITCHBOARD AND DISTRIBUTION CENTRE
- MSB — BUILDING MAIN SWITCHBOARD
- DC — DISTRIBUTION CENTRE
- DB — DISTRIBUTION SWITCHBOARD
- P — POWER PIT. MASCOT CJP380. SEE NOTES.
- P1 — POWER PIT. MASCOT CJP280. SEE NOTES.
- C — COMMS. PIT. MASCOT CJP350. SEE NOTES.
- C1 — COMMS. PIT. MASCOT CJP250. SEE NOTES.
- EP — EXISTING POWER PIT.
- EC — EXISTING COMMS. PIT.
- NEW UNDERGROUND POWER CONDUIT
- NEW 25MM UNDERGROUND POWER CONDUIT
- NEW UNDERGROUND COMMS. CONDUIT
- EXISTING UNDERGROUND POWER CONDUIT
- EXISTING UNDERGROUND COMMS. CONDUIT
- CONDUIT CAPPED FOR FUTURE

1P50 = 1x50MM POWER CONDUIT
1C50 = 1x50MM COMMUNICATIONS CONDUIT

- CD — COMMUNICATIONS CAMPUS DISTRIBUTOR (19" RACK)
- BD — COMMUNICATIONS BUILDING DISTRIBUTOR (19" RACK)
- SCE — SECURITY EQUIPMENT PANEL/S

AS CONSTRUCTED

Verlindens Electrical Service (WA)
EC001565
PO Box 218
Northam WA 6401
(08) 9622 1238
(08) 9622 3921

No	DATE	AMENDMENT	APPR.
AC	050221	AS CONSTRUCTED	M.Mc.

Documentation By:

Electrical Design Consultants Pty Ltd
Tel: 041 9922 033
(ABN 43 130 101 683)

SANTELLI ARCHITECTS
ABN 84 009 222 397
TEL +61 8 9328 3711
SUITE 13/99-101 FRANCIS STREET
NORTHBRIDGE WA 6003

SAINT JOSEPH SCHOOL

SECONDARY CAMPUS - STAGE 11
WELLINGTON STREET - NORTHAM, WA, 6401
PART SITE PLAN
ELECTRICAL SERVICES

Drawn L.M.	Designed M.Mc	0 25	
Scale 1:250@A1	Date OCTOBER 2019	Drawing No.	Rev No
Project No. P1858	Number In Set 10	E01	AC

THIS IS A CADD DRAWING DO NOT AMEND MANUALLY

11:36:10 05/2/21 SJN11E01P5.DWG
DRAWING SHEET SIZE: A1 PLOT SCALE 1:1

Appendix B: Site Photographs

Photograph 1: Facing north-west: drill rig in left foreground at borehole BH02

Photograph 2: Facing west: borehole BH02 in foreground.

Photograph 3: Facing south-east across proposed transportable building area.

Photograph 4: Facing north-west along south-west side of building; drilling of borehole HA02 in progress.

Photograph 5: Facing north-west along south-west side of building; drilling of borehole HA02 in progress.

Photograph 6: Facing east to south-west face of building; note downpipes discharging into small square drainage boxes