



STRUCTURAL SSSA REPORT

St Ignatius' College Riverview: Ignis Stage 2

Tambourine Bay Road, Riverview NSW 2066

PREPARED FOR

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North Sydney NSW 2060
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Ref: SY192718-SR01
Rev: 4
Date: 05.11.2020

Structural SSDA Report

Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
25.03.2020	1	DRAFT Issue	L. Gaudion	J. Low
11.08.2020	2	FINAL Issue	L. Gaudion	J. Low
14.10.2020	3	Revised for SSDA	L. Gaudion	J. Low
05.11.2020	4	Revised for SSDA	L. Gaudion	J. Low

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Table of Contents

1.	Introduction	3
1.1	Description of Proposed Development	3
1.2	The Site	3
2.	Structural Engineering	5
2.1	Geotechnical Conditions	5
2.2	Structural Systems	6
2.3	Design Parameters	6
3.	Conclusion	7
	Appendix A: Preliminary Structural Drawings	8

1. Introduction

This report supports a State Significant Development Application for St Ignatius' College Riverview (SICR) at Tambourine Bay Road, Riverview.

This proposed development seeks detailed built form approval for the construction of the New Ignis Stage 2 STEMP building to provide new teaching and educational facilities at SICR. The development will involve refurbishing the existing O'Neil building and extending it with a new five storey development, including one level of basement. SICR consists of a junior school (years 5-6) and senior school (years 7-12), which caters for a total of approximately 1,640 students.

As the proposal is for the purposes of alterations and additions to an existing school and has a capital investment value in excess of \$30 million, it is a State Significant Development (SSD) for the purposes of the Environmental Planning and Assessment Act 1979 (the Act).

1.1 Description of Proposed Development

The State Significant Development Application (SSDA) will seek approval for:

- Construction of a new five (5) storey building with a maximum RL52.00 at the heart of the campus to accommodate modern, flexible teaching and learning spaces
- The provision of improved learning opportunities for Science, Technology, Engineering, Mathematics and PDHPE as a STEMP facility, along with six (6) Pastoral Care House areas and staff rooms
- A multi-purpose hall, C.O.L.A and canteen on ground floor with servicing by a loading area on basement level
- Refurbishment of the existing O'Neil building to allow integration of the new Ignis Stage 2 STEMP building to connect to existing fabric
- New North landscaped area
- New landscaped area between the existing Wallace building and new Ignis Stage 2 STEMP building
- Upgrade to the existing courtyard to improve the integration of the learning space and create a sense of place.

1.2 The Site

The subject site (SICR campus) comprises an area of approximately 40ha, including the Main Campus (Senior school) and Regis Campus (Junior school). The site is legally described as Lot 10 in DP1142773, which is owned by the Trustees of the Jesuit Fathers, a body corporate by virtue of the Roman Catholic Church Communities' Lands Act 1942 No 23 (NSW).

The site is located in the suburb of Riverview within the Lane Cove Local Government Area. The site is bounded by Riverview Street (to the North), Tambourine Bay Road (to the East), the Lane Cove River (to the South and West). The college is separated by Riverview Street into two campuses (the Main Campus and Regis Campus). The locational context of the site is shown in **Figure 1**.



Figure 1 - Location Plan

The existing campus is characterized by a collection of buildings and facilities. Of significance the College includes (amongst other buildings and land uses) the following:

- Chapel
- Administration buildings
- Classrooms and learning spaces
- Library
- Halls
- Refectory, kitchen and canteen
- Boarding houses
- Health centre
- Long day care centre
- Sporting facilities including playing fields, gymnasium, swimming pool, rowing sheds, sailing club, basketball courts, cricket nets, mountain biking track and tennis courts
- Observatory
- Wharf connecting to the Lane Cove river
- Staff and Jesuit residences
- Weather station
- Storage, maintenance, loading and waste management facilities

A vehicular/pedestrian loop road also exists through the Main Campus (Senior school) of the College providing two entrances and exits at Riverview Street. A further entrance and exit from Riverview Street services the Regis Campus (Junior school).

2. Structural Engineering

In this section we will outline the anticipated ground conditions, proposed footing solutions, proposed superstructure solutions, required design life and design parameters.

2.1 Geotechnical Conditions

A geotechnical investigation has been undertaken and the results are presented in Douglas Partners report reference 85108.04.R.001 Rev 0 (dated March 2020). The borehole locations are shown in Figure 2 below.



Figure 2 – Borehole locations

The ground conditions are summarised as follows:

- Fill to depths of 0.4m to 3.9m.
- Residual clays consisting of hard sandy clay between 3.9m to 4.2m thick.
- Sandstone bedrock from depths of between 0.4m to 4.2m of generally very low, low and medium strength.
- The groundwater level was measured at a depth of 5.7m but is considered to be perched seepage rather than the regional groundwater table.

The report recommends the new building can be founded on the existing bedrock using either pad footings or piles, depending on structural loading requirements. The minimum allowable bearing capacity for pad footings can be taken as 1000kPa and the minimum ultimate end bearing pressure for piles can be taken as 3000kPa (class V/IV sandstone).

2.2 Structural Systems

The proposed structural system for the new building is described below. Refer to the drawings in Appendix A for further detail:

- **Foundations:** Pad footings on Class V/IV bedrock under columns and walls, contiguous pile shoring wall on south-west edge of Level 0 (Ground) and around perimeter of Basement.
- **Ground Floor:** Concrete raft slabs on ground, post-tensioned concrete slab for suspended slab over basement.
- **Vertical Load-bearing system:** Reinforced concrete columns and reinforced concrete walls.
- **Lateral Load-resisting system:** Reinforced concrete lift and several reinforced concrete shear walls.
- **Suspended Floors:** Post-tensioned concrete slabs
- **Roof:** Post-tensioned concrete slab for level 4/roof plant area, steel framing elsewhere.

In addition to the new building, it is proposed that the renewal of Stair 3 in the existing O'Neil building be supported by the existing building slab as well as new load-bearing walls around the perimeter of the stair. Refer to drawing SK021 in Appendix A for further detail.

2.3 Design Parameters

2.3.1 Design Life

The design life is nominated as follows:

- | | |
|--|----------|
| • Structural elements including sub-structures | 50 years |
| • Floor structures | 50 years |
| • Roof structures (excluding secondary steel, purlins) | 50 years |
| • Internal structural walls | 50 years |

2.3.2 Design Loads

All buildings and structures will be designed with the loads determined from Australian Standards and the National Construction Code (NCC:2019).

Design Parameters

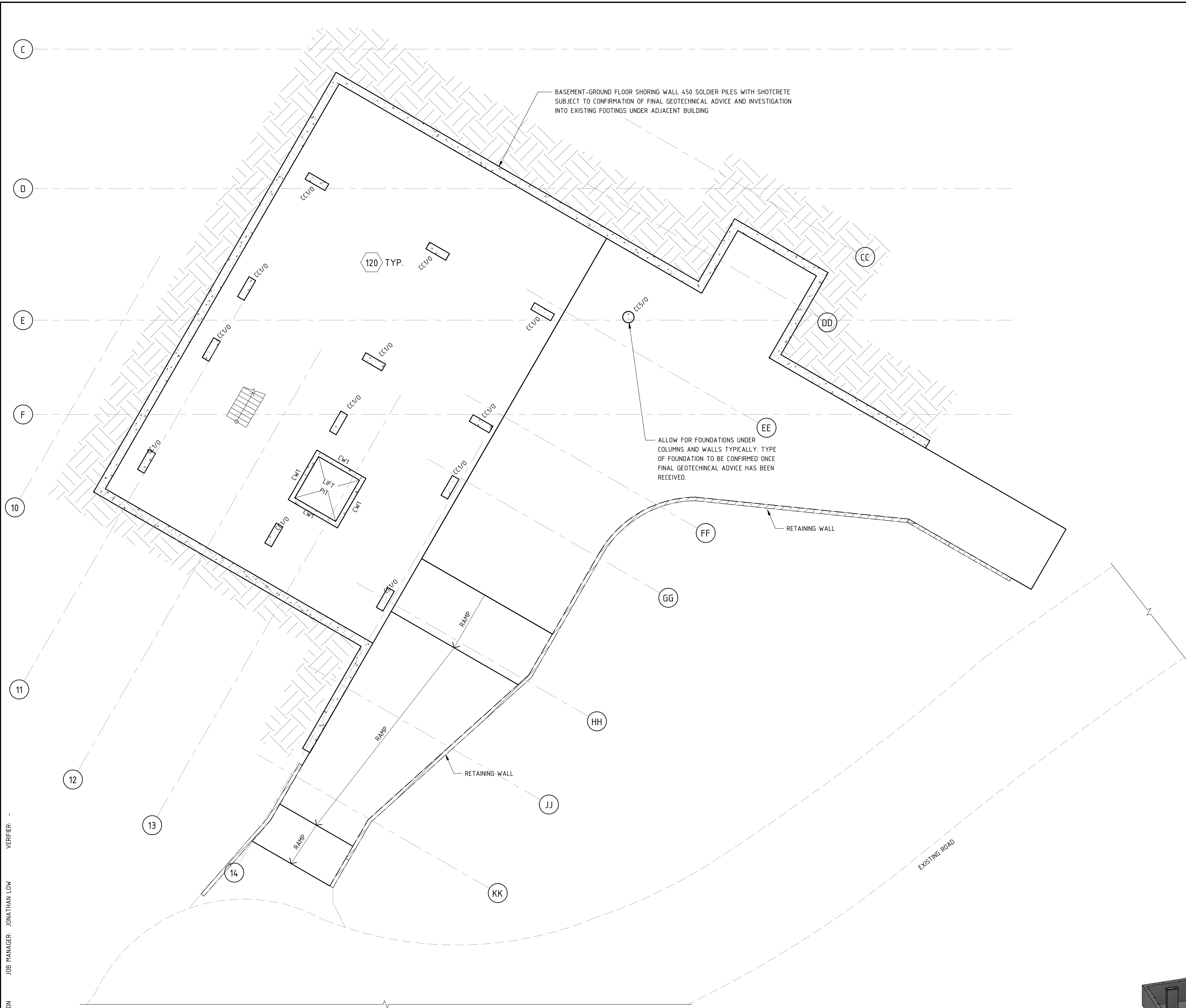
- Importance level 3 to AS1170.0
- Dead and live load to AS1170.1
- Wind loads to AS1170.2
 - o Region A2
 - o Terrain category 1.5 – 2.5
- Earthquake loads to AS1170.4
 - o Probability factor $k_p = 1.3$
 - o Hazard factor $Z = 0.08$ (Sydney)
 - o Site sub-soil class C_e – shallow soil

3. Conclusion

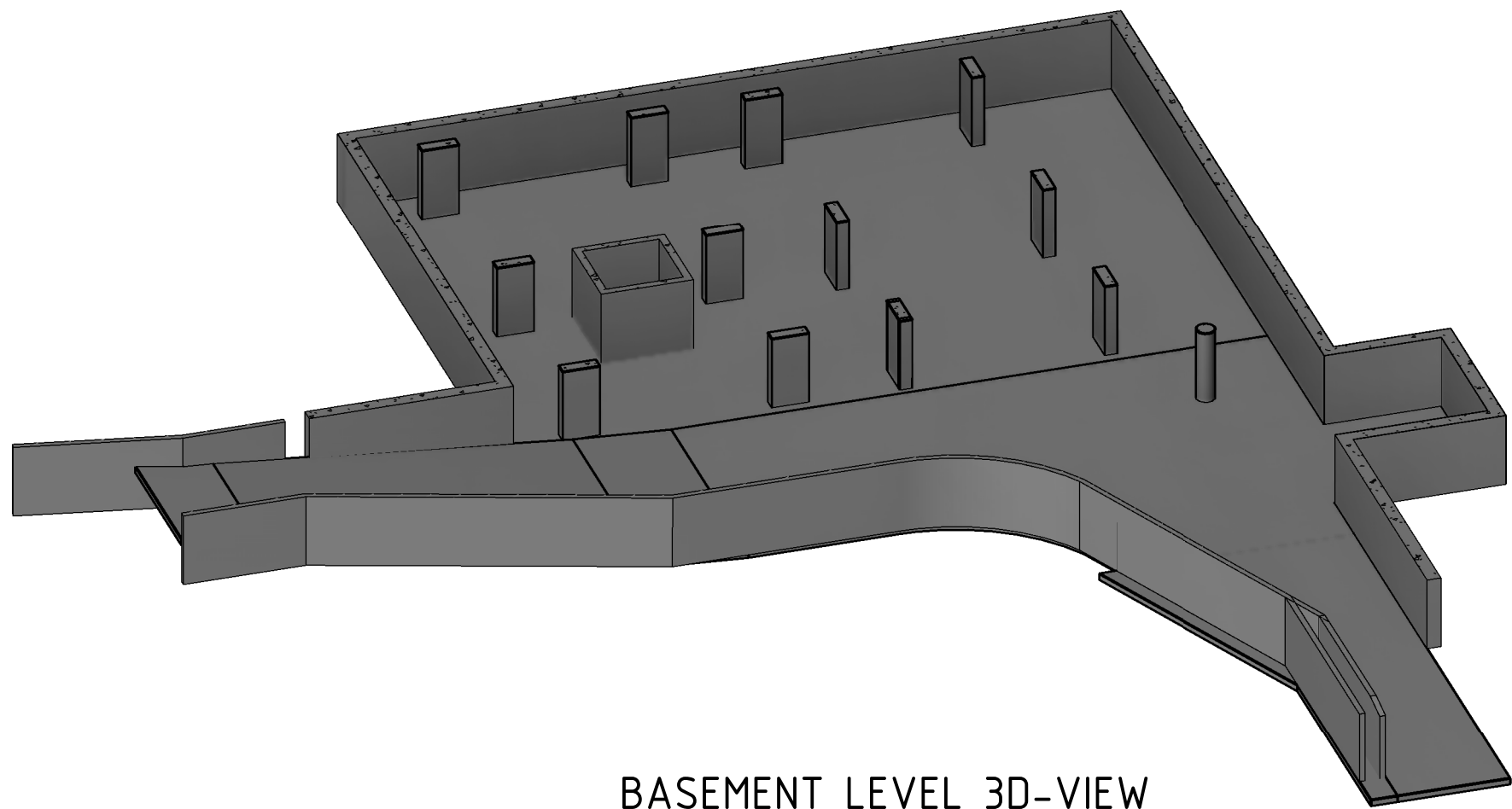
This report has been provided to support a State Significant Development Application for St Ignatius' College Riverview (SICR) at Tambourine Bay Road, Riverview. In particular, this report has outlined the project and site description, the existing geology of the site and the proposed structural solutions for design and construction of the new Ignis Stage 2 STEMP building.

Overall, the proposed built form approval seeks to provide a framework for the future physical development of the campus to ensure the best teaching and learning outcomes for its students and ongoing evolution of the school.

Appendix A: Preliminary Structural Drawings



BASEMENT LEVEL 1



BASEMENT LEVEL 3D-VIEW

CONCRETE COLUMN SCHEDULE		
MARK	SIZE	COMMENT(S)
CONCRETE COLUMN		
CC1	1200 x 400	
CC2	650 x 400	
CC3	650 x 350	
CC4	450 DIA	
CC5	600 DIA	
CC6	2000 x 350	
WALL SCHEDULE		
MARK	THICKNESS	COMMENT(S)
CONCRETE UPSTAND		
CU1	200	
CONCRETE WALLS		
CW1	250	
CW2	300	
STEEL MEMBER SCHEDULE		
MARK	SIZE	COMMENT(S)
BRACING		
BR1	24 DIA. ROD	WITH P TYPE TURNBUCKLE
COLUMN		
SC1	100 x 100 x 5.0 SHS	
SC2	125 x 125 x 5.0 SHS	
SC3	200 x 200 x 5.0 SHS	
STC1	100 x 100 x 5.0 SHS	STUB COLUMN
PURLIN		
P1	SZ 20024 - 1200 CTS	3 ROWS OF BRIDGING
P2	SZ 20012 - 1200 CTS	3 ROWS OF BRIDGING
P3	SZ 20019 - 1200 CTS	3 ROWS OF BRIDGING
P4	SZ 25024 - 1200 CTS	3 ROWS OF BRIDGING
RAFTER		
R1	250 UB 25.7	
R2	310 UB 32.0	
R3	410 UB 53.7	
R4	360 UB 44.7	
STRUT		
ST1	125 x 125 x 5.0 SHS	
ST2	150 x 150 x 5.0 SHS	
ST3	200 x 200 x 5.0 SHS	
TRANSFER BEAM		
TB1	310 UB 32.0	
TB2	310 UB 40.4	
WALL ANGLE		
WA1	125 x 75 x 8 UA	FIXED TO CONCRETE WALL/UPSTAND
WALL BRACE		
WB1	125 x 125 x 5.0 SHS	
WB2	125 x 125 x 5.0 SHS	K-BRACE

GENERAL NOTES:

FOR STRUCTURAL SPECIFICATIONS REFER TO DRAWINGS S00.01 AND S00.02

SLAB TO BE 120mm THICK WITH S182 MESH TOP. POURED ON 0.2mm POLYTHENE SHEETING OVER 50mm DRAINAGE LAYER. SAWCUTS TO BE AT A MAXIMUM SPACING OF 6000mm.

2-N12 x 1500 LONG TRIMMER BARS IN TOP AT ALL RE-ENTRANT CORNERS (TYPICAL)

PROVIDE SUBSOIL DRAINAGE UNDER SLAB AND AT BASE OF SHORING WALL AS PER HYDRAULIC ENGINEER'S DETAIL.

ALL FALLS AND STEPS TO ARCHITECT'S DETAILS.

NON-STRUCTURAL HOBBS & KERBS ARE NOT SHOWN, REFER TO ARCHITECT'S DRAWINGS FOR EXTENT & LOCATION.

LEGEND	
	DENOTES CONCRETE THICKNESS
	DENOTES SLAB STEP
	DENOTES SETDOWN VALUE FOR WET AREAS
	DENOTES GRATED DRAIN
	DENOTES CONCRETE HOB
	DENOTES SAWN JOINT
	DENOTES DOWELLED JOINT
	DENOTES ISOLATION JOINT

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3	REVISED PRELIMINARY ADVICE	RS	LG		11.08.20

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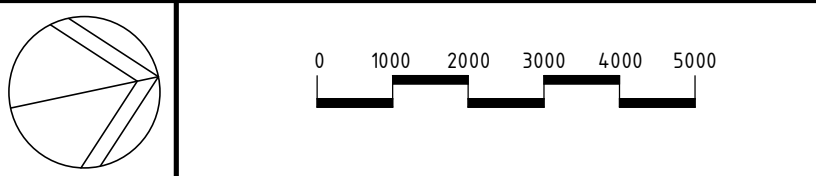
 **Saint Ignatius' College**
RIVERVIEW

PROJECT

ST IGNATIUS COLLEGE - STAGE 2
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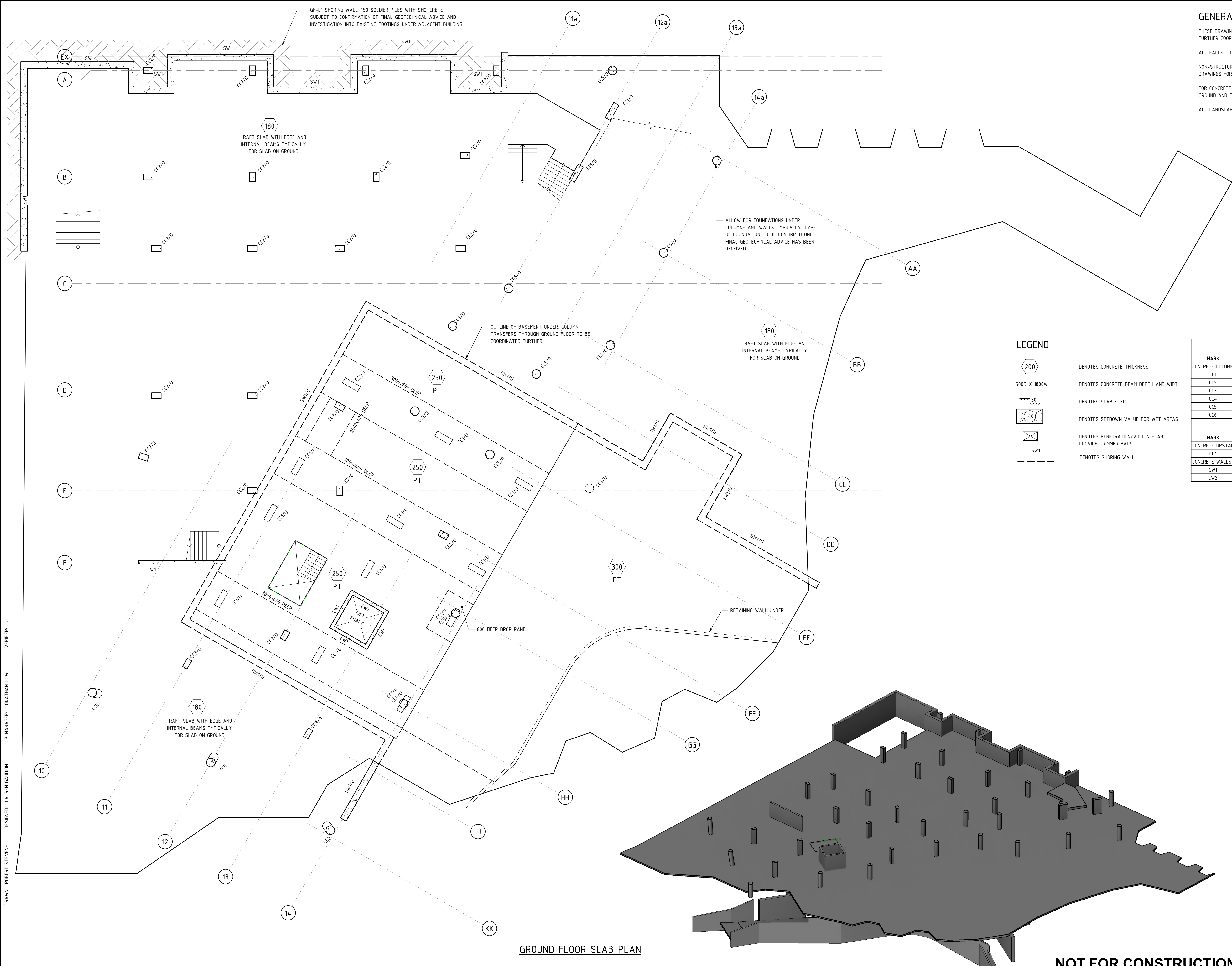
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STRUCTURAL DRAWING
BASEMENT SLAB PLAN

JOB NUMBER	DRAWING NUMBER	REVISION
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DRAWING SHEET SIZE = B1		

NOT FOR CONSTRUCTION

DRAWN: ROBERT STEVENS
DESIGNED: LAUREN GAUDON
JOB MANAGER: JONATHAN LOW
VERIFIER: -



GENERAL NOTES:

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FOR CONCRETE STAIRS AND RAMP ON GROUND, ALLOW FOR 180 THICK SLAB ON GROUND AND THROAT THICKNESS (TYPICAL)

ALL LANDSCAPING ITEMS BY OTHERS (TYPICAL)

CONCRETE COLUMN SCHEDULE		
MARK	SIZE	COMMENT(S)
CONCRETE COLUMN		
CC1	1200 x 400	
CC2	650 x 400	
CC3	650 x 350	
CC4	450 DIA	
CC5	600 DIA	
CC6	2000 x 350	
WALL SCHEDULE		
MARK	THICKNESS	COMMENT(S)
CONCRETE UPSTAND		
CU1	200	
CONCRETE WALLS		
CW1	250	
CW2	300	

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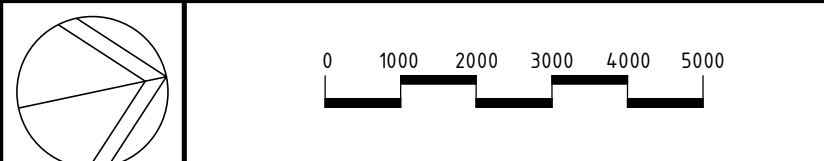
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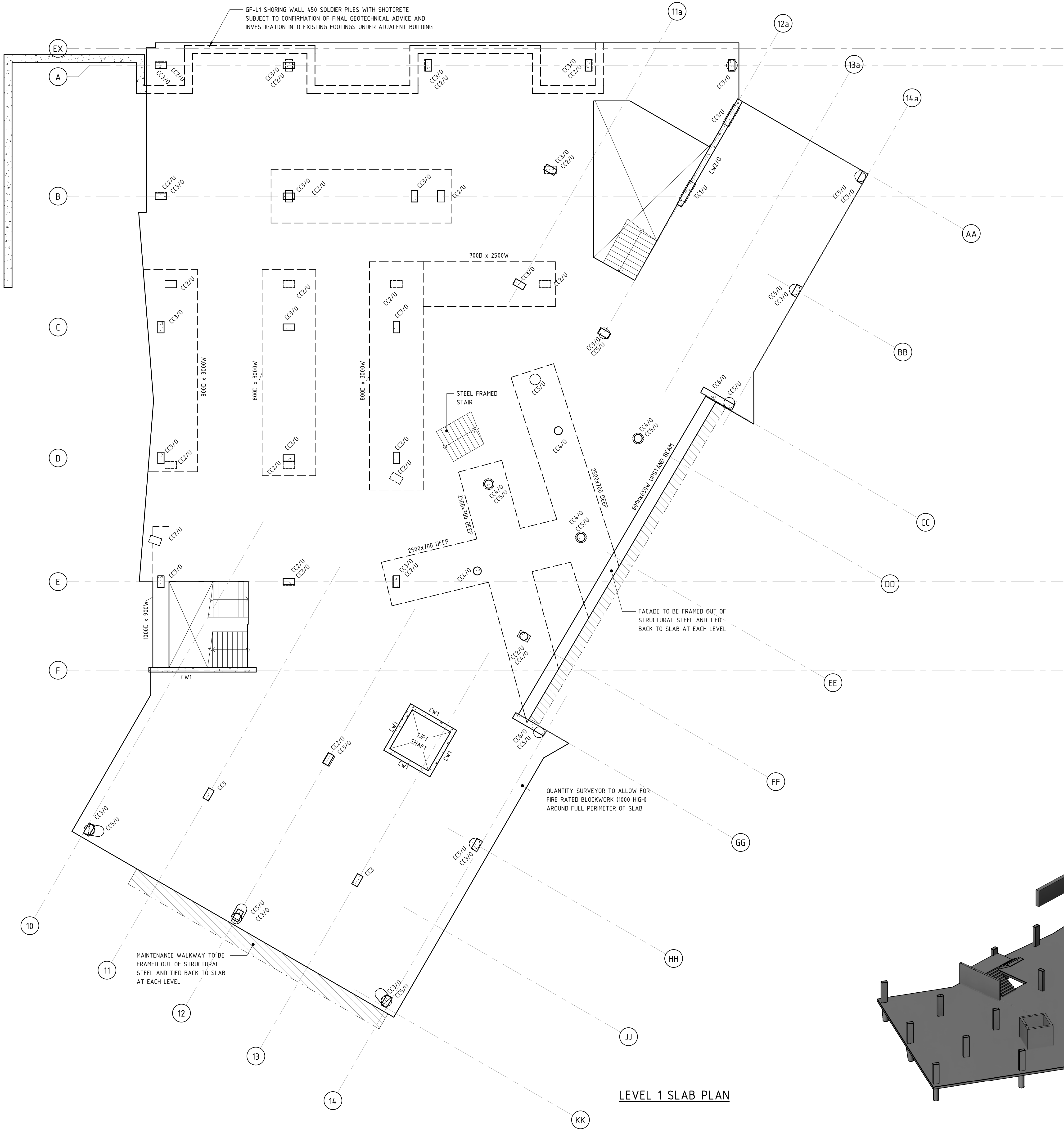


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GROUND FLOOR SLAB
PLAN

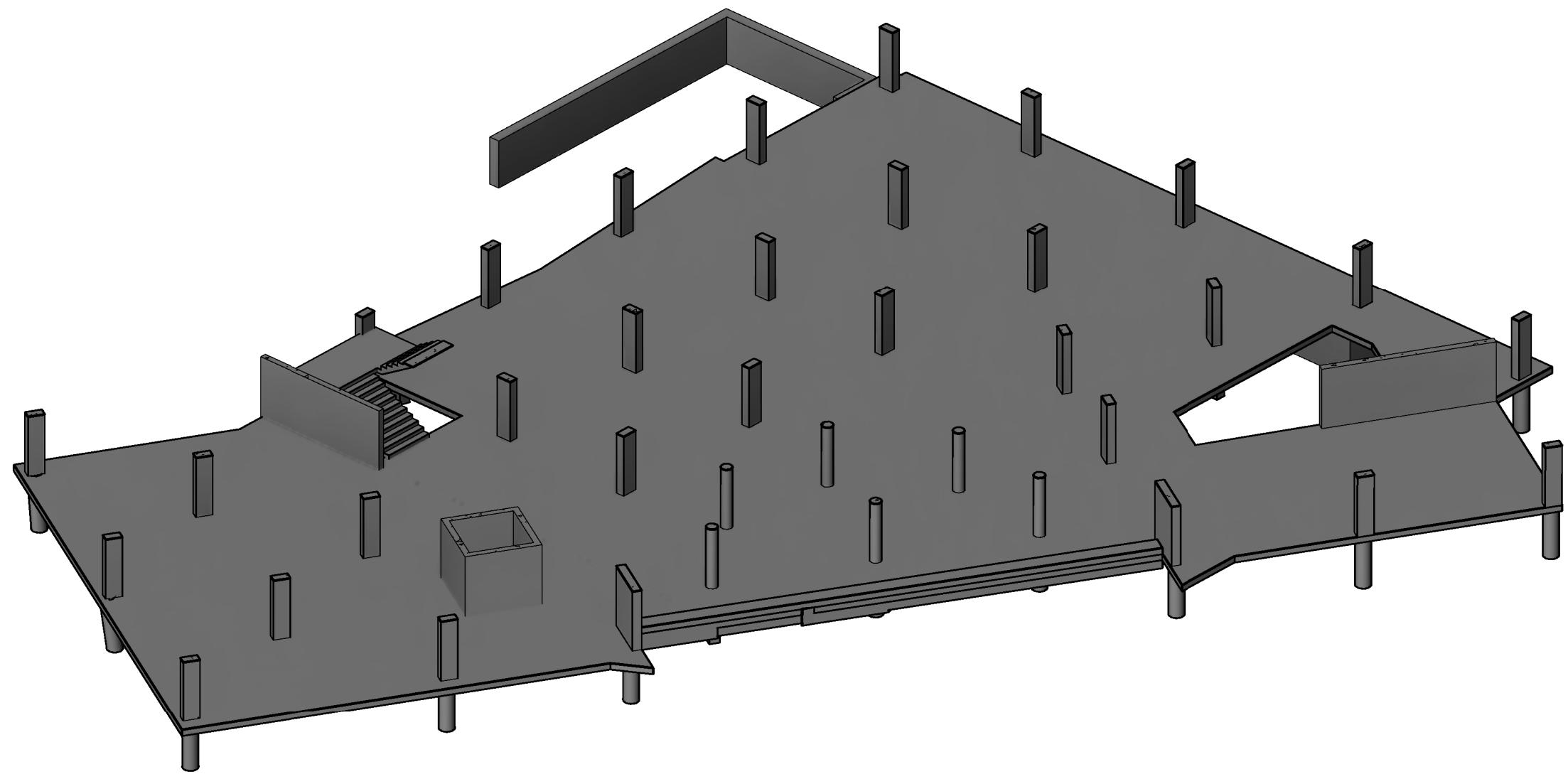
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DESIGNED: LAUREN GAUDIN
JOB MANAGER: JONATHAN LOW
VERIFIER: -



LEVEL 1 SLAB PLAN



LEVEL 1 3D-VIEW

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CONCRETE COLUMN SCHEDULE		
MARK	SIZE	COMMENT(S)
CONCRETE COLUMN		
CC1	1200 x 400	
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CONCRETE WALLS		
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MARK	SIZE	COMMENT(S)
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POST-TENSIONING NOTES:

SLAB AND BEAM THICKNESSES INDICATED ON PLAN ARE FOR PRELIMINARY PURPOSES ONLY. POST-TENSIONING CONTRACTOR TO CONFIRM.

P/A TO BE A MINIMUM OF 15MPa TO ALL EXTERNAL TERRACE AND PODIUM AREAS.

ANY CAST-IN PIPES FOR HYDRAULIC SERVICES ARE TO BE CO-ORDINATED WITH THE POST-TENSIONING CONTRACTOR.

LEGEND

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	DENOTES CONCRETE BEAM DEPTH AND WIDTH
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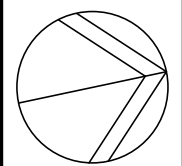
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DRAWING TITLE

STRUCTURAL DRAWING
LEVEL 1 SLAB PLAN

JOB NUMBER

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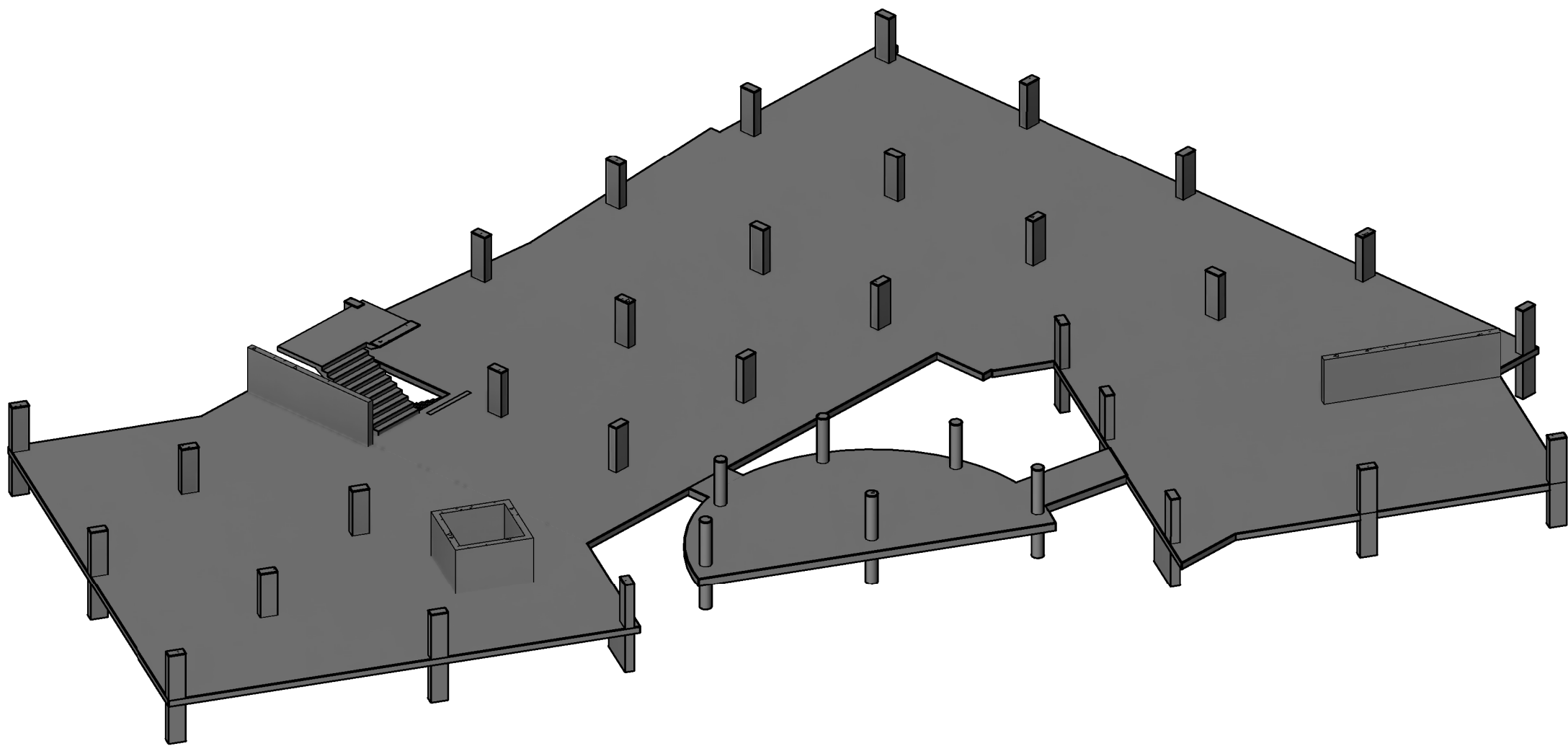
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3

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DRAWING SHEET SIZE = B1		

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LEVEL 3 SLAB PLAN

CONCRETE COLUMN SCHEDULE		
MARK	SIZE	COMMENT(S)
CONCRETE COLUMN		
CC1	1200 x 400	
CC2	650 x 400	
CC3	650 x 350	
CC4	450 DIA	
CC5	600 DIA	
CC6	2000 x 350	

WALL SCHEDULE		
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CONCRETE WALLS		
CW1	250	
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STEEL MEMBER SCHEDULE		
MARK	SIZE	COMMENT(S)
BRACING		
BR1	24 DIA. ROD	WITH P TYPE TURNBUCKLE
COLUMN		
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- DENOTES CONCRETE BEAM DEPTH AND WIDTH
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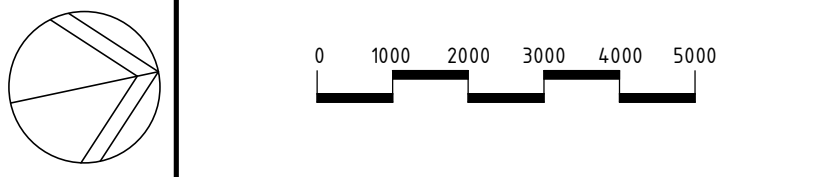
Saint Ignatius' College RIVERVIEW

PROJECT

ST IGNATIUS COLLEGE - STAGE 2
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DRAWING TITLE
STRUCTURAL DRAWING
LEVEL 3 SLAB PLAN

JOB NUMBER

S192718

DRAWING NUMBER

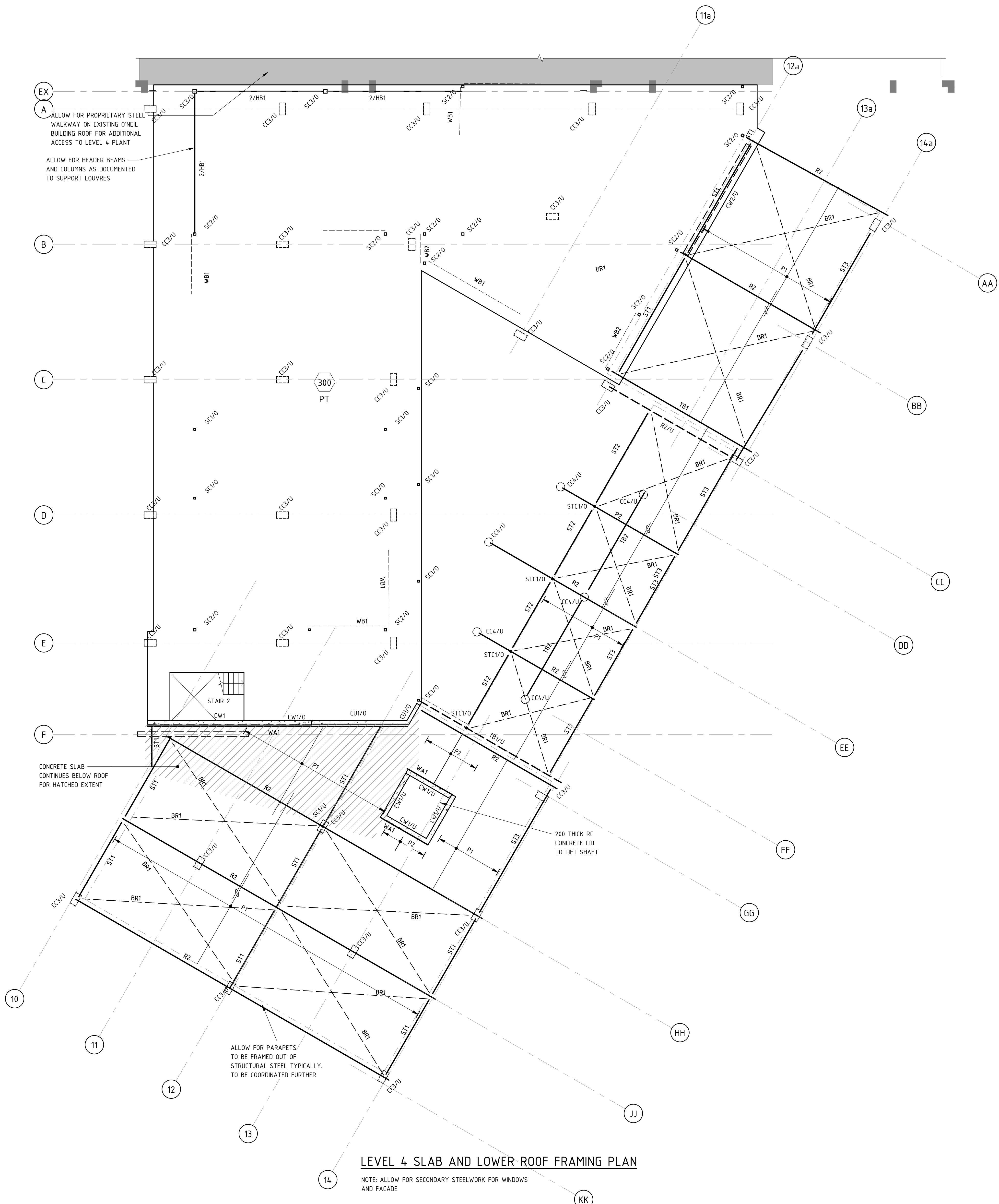
S01.50

REVISION

3

DRAWING SHEET SIZE = B1

NOT FOR CONSTRUCTION



CONCRETE COLUMN SCHEDULE		
MARK	SIZE	COMMENT(S)
CONCRETE COLUMN		
CC1	1200 x 400	
CC2	650 x 400	
CC3	650 x 350	
CC4	450 DIA	
CC5	600 DIA	
CC6	2000 x 350	
WALL SCHEDULE		
MARK	THICKNESS	COMMENT(S)
CONCRETE UPSTAND		
CU1	200	
CONCRETE WALLS		
CW1	250	
CW2	300	
STEEL MEMBER SCHEDULE		
MARK	SIZE	COMMENT(S)
BRACING		
BR1	24 DIA. ROD	WITH P TYPE TURNBUCKLE
COLUMN		
SC1	100 x 100 x 5.0 SHS	
SC2	125 x 125 x 5.0 SHS	
SC3	200 x 200 x 5.0 SHS	
STC1	100 x 100 x 5.0 SHS	STUB COLUMN
PURLIN		
P1	SZ 20024 - 1200 CTS	3 ROWS OF BRIDGING
P2	SZ 20012 - 1200 CTS	3 ROWS OF BRIDGING
P3	SZ 20019 - 1200 CTS	3 ROWS OF BRIDGING
P4	SZ 25024 - 1200 CTS	3 ROWS OF BRIDGING
RAFTER		
R1	250 UB 25.7	
R2	310 UB 32.0	
R3	410 UB 53.7	
R4	360 UB 44.7	
STRUT		
ST1	125 x 125 x 5.0 SHS	
ST2	150 x 150 x 5.0 SHS	
ST3	200 x 200 x 5.0 SHS	
TRANSFER BEAM		
TB1	310 UB 32.0	
TB2	310 UB 40.4	
WALL ANGLE		
WA1	125 x 75 x 8 UA	FIXED TO CONCRETE WALL/UPSTAND
WALL BRACE		
WB1	125 x 125 x 5.0 SHS	
WB2	125 x 125 x 5.0 SHS	K-BRACE

GENERAL NOTES:

THESE DRAWINGS ARE PRELIMINARY AND ARE SUBJECT TO CHANGE BASED ON FURTHER COORDINATION WITH ARCHITECT AND OTHER CONSULTANT

ALL SLABS TO BE 200mm THICK AND POST-TENSIONED BY OTHERS, UNLESS NOTED OTHERWISE. POST-TENSIONING AND REINFORCEMENT RATES BY POST-TENSIONING CONTRACTOR.

ALL FALLS TO ARCHITECT'S DETAILS.

NON-STRUCTURAL HOBS AND KERBS ARE NOT SHOWN, REFER TO ARCHITECT'S DRAWINGS FOR EXTENT AND LOCATION.

POST-TENSIONING NOTES:

SLAB AND BEAM THICKNESSES INDICATED ON PLAN ARE FOR PRELIMINARY PURPOSES ONLY. POST-TENSIONING CONTRACTOR TO CONFIRM.

P/A TO BE A MINIMUM OF 15MPa TO ALL EXTERNAL TERRACE AND PODIUM AREAS.

ANY CAST-IN PIPES FOR HYDRAULIC SERVICES ARE TO BE CO-ORDINATED WITH THE POST-TENSIONING CONTRACTOR.

LEGEND

DENOTES CONCRETE THICKNESS

DENOTES CONCRETE BEAM DEPTH AND WIDTH

DENOTES SLAB STEP

DENOTES SETDOWN VALUE FOR WET AREAS

DENOTES PENETRATION/VOID IN SLAB, PROVIDE TRIMMER BARS

DRAWINGS NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED. THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHPROP CONSULTING ENGINEERS PTY LTD. ALL SETOUT TO ARCHITECT'S DRAWINGS. DIMENSIONS TO BE VERIFIED WITH ARCHITECT AND BUILDER BEFORE COMMENCING SHOP DRAWINGS OR SITE WORK. NORTHPROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY.

REV	DESCRIPTION	ISS'D	VER'D	APP'D	DATE
1	ISSUED FOR PRELIMINARY ADVICE	RS		LG	28.02.20
2	REVISED PRELIMINARY ADVICE	RS		LG	17.03.20
3	REVISED PRELIMINARY ADVICE	PV		LG	08.07.20
4	REVISED PRELIMINARY ADVICE	RS		LG	11.08.20

ARCHITECT

PMDL ARCHITECTURE INTERIORS MASTERPLANNING

PROJECT MANAGER

epm projects

CLIENT

Saint Ignatius' College RIVERVIEW

PROJECT

ST IGNATIUS COLLEGE - STAGE 2
TAMBOURINE BAY RD, LANE COVE NSW 2066

NORTHPROP Sydney
Level 11, 345 George Street, Sydney, N.S.W. 2000
Ph: (02) 9241 4188 Email: sydney@northrop.com.au
ABN 81 094 433 100

0 1000 2000 3000 4000 5000

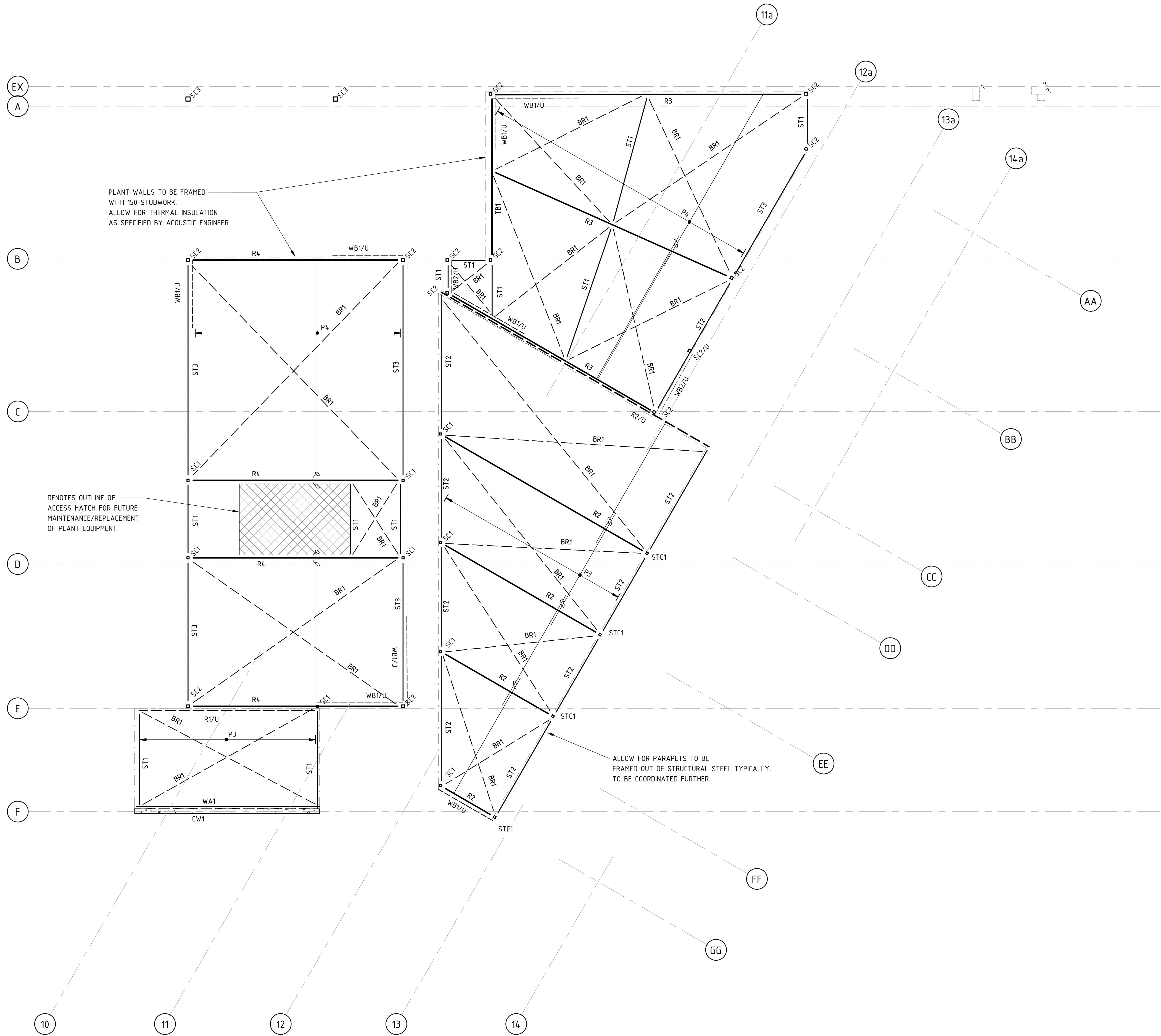
DRAWING TITLE

STRUCTURAL DRAWING
LEVEL 4 SLAB AND FRAMING PLAN

JOB NUMBER	DRAWING NUMBER	REVISION
S192718	S01.60	4

DRAWING SHEET SIZE = B1

NOT FOR CONSTRUCTION



ROOF FRAMING PLAN
NOTE: ALLOW FOR SECONDARY STEELWORK FOR WINDOWS AND FACADE

CONCRETE COLUMN SCHEDULE		
MARK	SIZE	COMMENT(S)
CONCRETE COLUMN		
CC1	1200 x 400	
CC2	650 x 400	
CC3	650 x 350	
CC4	450 DIA	
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WALL SCHEDULE		
MARK	THICKNESS	COMMENT(S)
CONCRETE UPSTAND		
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CONCRETE WALLS		
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MARK	SIZE	COMMENT(S)
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BR1	24 DIA. ROD	WITH P TYPE TURNBUCKLE
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REV	DESCRIPTION	ISS'D	VER'D	APP'D	DATE
1	REVISED PRELIMINARY ADVICE	PV		LG	08.07.20

ARCHITECT

PMDL ARCHITECTURE
INTERIORS
MASTERPLANNING

PROJECT MANAGER

epm
projects

CLIENT

Saint Ignatius' College
RIVERVIEW

PROJECT

ST IGNATIUS COLLEGE - STAGE 2
TAMBOURINE BAY RD, LANE
COVE NSW 2066

NORTHROP

Sydney
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Ph: (02) 9241 4188 Email: sydney@northrop.com.au
ABN 81 094 433 100



DRAWING TITLE

STRUCTURAL DRAWING
ROOF FRAMING PLAN

JOB NUMBER

S192718

DRAWING NUMBER

S01.70

REVISION

1

DRAWING SHEET SIZE = B1

NOT FOR CONSTRUCTION

VERIFIER: -

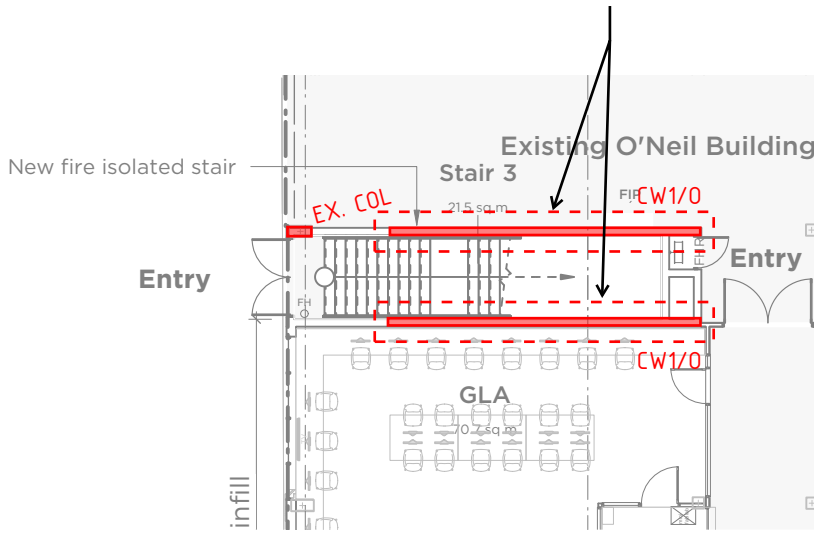
JOB MANAGER: JONATHAN LOW

DESIGNED: LAUREN GAUDON

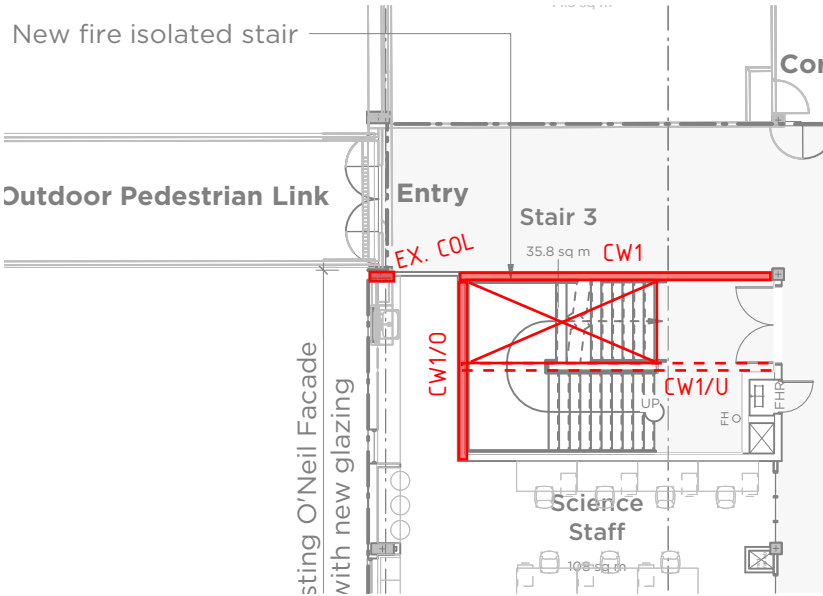
DRAWN: ROBERT STEVENS

CONCRETE MEMBER SCHEDULE:
CW1 - 250 THICK LOAD BEARING CONCRETE WALL

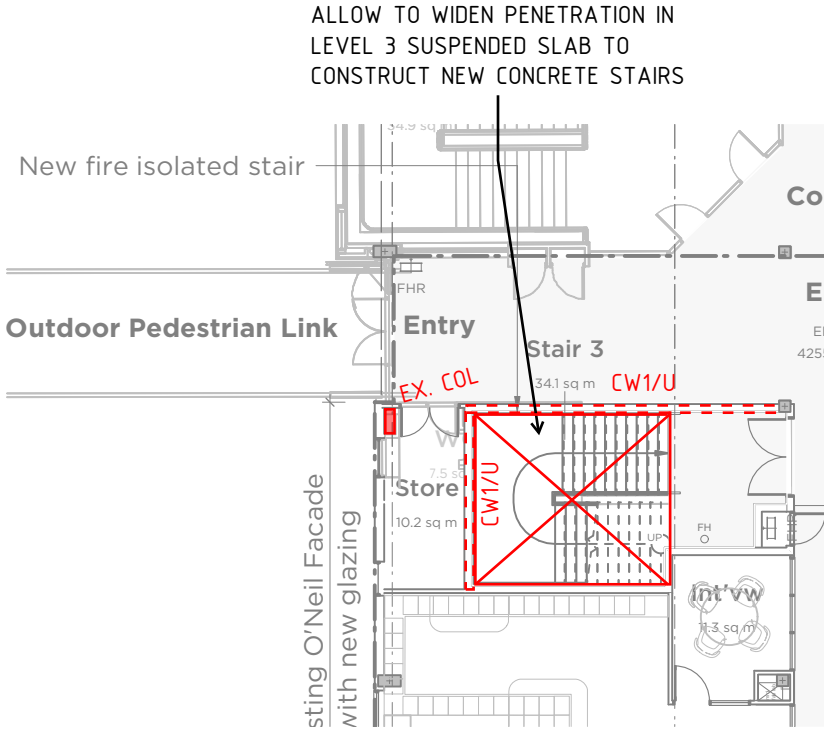
ALLOW TO DEMOLISH SECTION OF
EXISTING L1 SLAB ON GROUND TO
CONSTRUCT NEW STRIP FOOTINGS
UNDER CW1 WALLS



STAIR 3 (EXISTING O'NEIL BUILDING)
LEVEL 1





STAIR 3 (EXISTING O'NEIL BUILDING)
LEVEL 2



STAIR 3 (EXISTING O'NEIL BUILDING)
LEVEL 3

NOT FOR CONSTRUCTION

REV	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	<div> Sydney Level 11, 345 George St, Sydney NSW 2000 T (02) 9241 4188 sydney@northrop.com.au ABN 81 094 433 100</div> <div>CLIENT </div>	PROJECT		DRAWING TITLE		JOB NUMBER	
1	ISSUED FOR PRELIMINARY ADVICE	LG		JL	05.11.2020		ST IGNATIUS COLLEGE		STAIR 3		192718	
							IGNIS STAGE 2		PRELIMINARY ADVICE		DRAWING NUMBER	REVISION
											SK021	1
											DRAWING SHEET SIZE = A3	