Woolacotts.
CONSULTING ENGINEERS

Schools Infrastructure NSW

New Primary School in Mulgoa Rise

Structural Engineering Schematic Design Report

20-306 / 17 August 2021 / Rev C

Contents

Document control

Rev No	Date	Revision details	Approved	Verified	Prepared
D1	12/4/21	Draft Issue			KEC
A	20/4/21	Final issue	KEC		KEC
B	11/8/21	Revised Masterplan – SSDA submission	KEC		KEC
C	17/8/21	Sketches updated	KEC		KEC

1.0 Introduction

The proposed primary school at Mulgoa Rise / Glenmore Park is a new school on a brownfield site, the site is a former quarry that has been filled to the current surface levels.

The new primary school in Mulgoa Rise /Glenmore Park is to be designed and built to significantly improve educational outcomes and address the capacity shortfall across the area for an approximate 414 students initially, with the potential expansion to 1000 as demand grows.
This proposal will facilitate a Core 21 school with 18 learning spaces (also known as Home bases) + 2 support classes, with the selected core facilities at Core 35, for the Hall, Library, Staff facilities and Admin.

The current proposal includes the following buildings:

Building A	Administration and Library
Buildings B2	Home bases learning
Building B3.S	Home bases learning and Specialist learning area
Building C	Hall and ancillary facilities

Refer Figure 1 below for the proposed site plan.

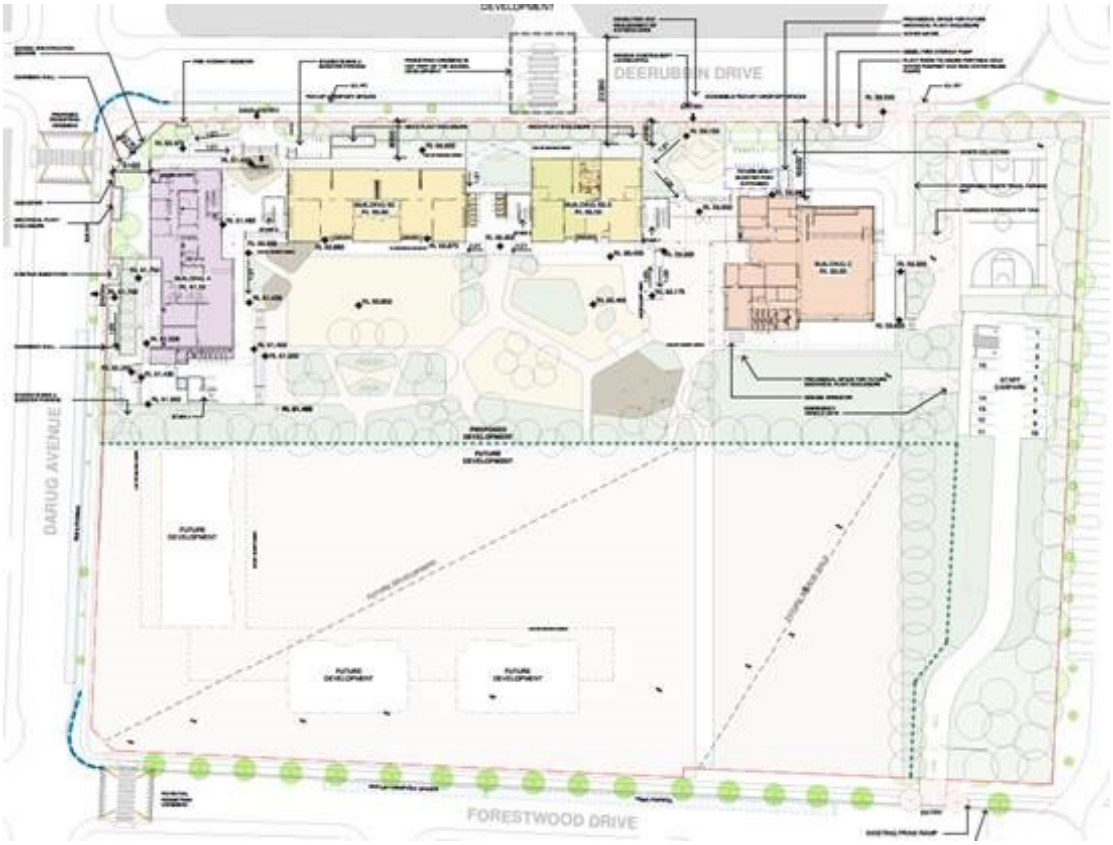


Figure 1 Site Plan

This report records the required structural design principles and nominates the proposed structural framing for the new buildings.

2.0 Structural Engineering Design Principles

2.1 Design Standards

The structural design shall be in accordance with the following:

- Building Code of Australia 2019 (BCA).
- Current versions of the relevant structural Australian Standards,
- NSW Department of Education's Educational Facilities Standards and Guidelines (EFSG)
- Relevant structural sections of the BCA and other statutory requirements.
- Schools Infrastructure NSW Design for Manufacture and Assembly (DfMA) construction methodologies.

In particular, the structural design will be in accordance with the following relevant Australian Standards:

- AS/NZS 1170.0 (2002) *Structural Design Actions Part 0 General Principles*
- AS/NZS 1170.1 (2002) *Structural Design Actions Part 1 Permanent, Imposed and Other Actions*
- AS/NZS 1170.2 (2011) *Structural Design Actions Part 2 Wind actions*
- AS 1170.4 (2007) *Structural Design Actions Part 4 Earthquake Actions in Australia*
- AS 2870 *Residential slabs and footings*
- AS 2159 (2009) *Piling – Design and Installation*
- AS 3600 (2018) *Concrete Structures*
- AS 3700 (2018) *Masonry Structures*
- AS 4100(1998) *Steel Structures*
- AS 4678 (2002) *Earth Retaining Structures*

2.2 Building Importance Level

The importance level, for all buildings, assessed in accordance with BCA table B1.2a is importance level 3. The buildings have been assessed as not essential for post-disaster recovery.

2.3 Design Life

The building structure to be designed to provide adequate performance for a minimum period of 50 years with a typical structural maintenance system.

2.4 Materials

The following structural materials are proposed to be used in the works. Typical values for the properties of these materials are listed. These values are to be adjusted where appropriate.

2.4.1 Concrete

Properties

Co-efficient of thermal expansion:	10 x10^{-6} per ^{o}C +/- 20% (AS3600 clause 3.1.6)
Basic shrinkage strain	In accordance with AS 3600 Clause 3.1.7, (but not exceeding 700 microstrain)
Basic creep factor	In accordance with AS 3600 Clause 3.1.8
Poisson's ratio	0.2 (AS3600 clause 3.1.5)
Density	24 kN/m3
Modulus of Elasticity (E)	In accordance with AS3600 Table 3.1.2

Durability

Member Type	Exposure Classification
Concrete piles (CFA or bored piers)	Non-aggressive
Surface of member in contact with ground: Protected by damp proof membrane. (e.g. Slab on Ground)	A1
Surface of member in contact with ground: Not protected by damp proof membrane. (e.g. Footings)	A2
Surfaces of members in interior environments – Non residential	A2
Surface of members in above ground exterior environments.	B1

Proposed Minimum Concrete Strengths (f'c)

Footings	32 MPa
Slabs on grade	32 MPa
Suspended Slabs and Beam	40 MPa
Columns	40 to 65 MPa
Walls	40 to 65 MPa

2.4.2 Reinforcement

Properties

Plain bars (R)	f_{sy} = 250 MPa
Deformed bars (N)	f_{sy} = 500 MPa
Welded wire fabric (L)	f_{sy} = 500 MPa
Young's modulus	E_s = 200 x 10^3 MPa

2.4.3 Structural steel

Properties

Grade (UNO)	300 MPa
Steelwork density:	7850 kg/m3
Young's modulus:	200 x 10^3 MPa
Poisson's ratio:	0.25
Coefficient of thermal expansion:	12 x 10^{-6} per ^oC

2.4.4 Masonry

Blockwork Properties

Characteristic Strength	15 MPa, minimum
Mortar mix (cement : lime : sand)	1 : 1 : 6 Unreinforced Blockwork
	1 :0.5: 4.5 Reinforced Blockwork
Core fill grout	20 MPa

Brickwork properties

Characteristic Strength	20 MPa
Mortar mix (cement : lime : sand)	1 : 1 : 6

2.5 Loading

Floor loading shall be in accordance with AS/NZS 1170.1 – *Structural design actions – Part 1: Permanent, imposed and other actions*, but not less than that required by the EFSG.

2.5.1 Vertical

General Floor and Classroom Areas:

SDL= 1.2 kPa;

LL = 3.0 kPa;

Library:

SDL= 1.2 kPa (excluding sacrificial topping);

LL = 7.5 kPa; (EFSG requirement)

Corridors:

SDL= 1.8 kPa (excluding sacrificial topping);

LL = 4.0 kPa;

Offices:

SDL= 1.8 kPa (excluding sacrificial topping).

LL = 3.0 kPa;

Hall:

SDL= 1.2 kPa (excluding sacrificial topping);

LL = 5.0 kPa;

Stairs:

SDL= 1.0 kPa;

LL = 4.0 kPa;

Toilets/Bathrooms:

SDL= 1.8kPa (excluding sacrificial topping);

LL = 2.0kPa;

Non-Trafficable Metal Deck Roof Areas:

SDL = 0.6 kPa (including 0.2 kPa allowance for solar panels)

LL = 0.25 kPa minimum.

2.5.2 Wind

Wind loading is in accordance with AS/NZS 1170.2 – *Structural design actions Part 2: Wind actions* with the following parameters:

Importance Level 3

Annual probability of exceedance – 1:1000;

Region A2;

V_{1000} = 46 m/s;

V_{25} = 37 m/s (Serviceability)

Terrain Category TC3.

2.5.3 Robustness

Robustness loading in accordance with AS/NZS 1170.0 – Structural Design Actions General Principles with the following parameters:

Minimum lateral building load 1.5% of (G + ψ_cQ) load case;

Minimum lateral connection load 5% of (G + ψ_cQ) load at the connection;

2.5.4 Earthquake

Earthquake loading in accordance with AS 1170.4 – *Structural design actions Part 4: Earthquake actions in Australia* with the following parameters:
Importance Level 3

Annual probability of exceedance 1:1000;

Probability Factor k_p = 1.3;

Hazard Design Factor Z = 0.08;

Site Sub-soil Class Ce ;

Earthquake Design Category II;

2.6 Serviceability

The deflection limits shall comply with the EFSG requirements, but not less than the deflection limits specified in AS/NZS 1170.1, appendix C, table C1. Generally, the EFSG requirements will govern, and for reference these are tabulated below.

Structural Element	Maximum Deflections
Supporting face masonry walls	Span / 1000
Supporting rendered masonry walls	Span / 1800
Floors not supporting brittle elements	Span / 500
Floors supporting brittle elements	Limit to provide adequate serviceability of brittle elements
Stud walls under lateral loading	Span / 500
Roof members:	
• **Dead load**	Span / 360
• **Live Load**	Span / 250
• **Wind Load**	Span / 150
• **Relative horizontal deflection between adjacent frames at eaves levels**	Less than the smaller of floor to eaves height / 250 and frame spacing / 200

2.7 Durability

2.7.1 Concrete

Member Type	Exposure Classification
Concrete piles (CFA or bored piers)	Non-aggressive
Surface of member in contact with ground: Protected by damp proof membrane. (e.g. Slab on Ground)	A1
Surface of member in contact with ground: Not protected by damp proof membrane. (e.g. Footings)	A2
Surfaces of members in interior environments – Non residential	A2
Surface of members in above ground exterior environments.	B1

2.7.2 Structural Steel

To be in accordance with AS 2312 "*Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings*", but not less than the requirements of the EFSG. Based on this the structural steel protective coating systems are as follows:

External and exposed structural steel	Hot dip galvanised.
Columns and beams built into walls	Hot dip galvanised.
Remainder	Inorganic zinc silicate coating, 75 µm DFT (IZS1 system in accordance with AS2312.1)
Steel work buried in ground	In addition to above shall be concrete encase, 50 mm min cover

2.8 Fire resistance levels for structural elements

For this report, the required Fire resistance levels (FRLs) for structural elements are based on the preliminary BCA report prepared by BCA Logic, dated 4 March 2021. From this report the required FRLs are as follows:

- Columns supporting Level 1 link walkways 120/-/-
- Level 1 link walkways 120/30/30
- Lift shaft 120/120/120
- Stair 120/30/30
- Columns for Amenities block on level 1, adjacent to Bldg B3: 120/30/-
- Internal columns in Bldgs A, B2 & B3 120/-/-
- External columns in Bldg A, B2 & B3 within 18m of Bldg C of Stage 2 120/-/-
- Awning and canopy roofs between building TBA
  (Further assessment required based on construction details)

The Level 1 floors are proposed to post tensioned concrete slabs and beams supported by reinforced concrete columns and walls. The required FRLs for these elements will be achieved without a cost premium. The stairs and lift shaft are also proposed to be constructed in reinforced concrete.

Currently conventional steel columns and rafters are proposed for the upper floor structural framing (Buildings A, B2 & B3) and for building C. DfMA construction (kit of parts) will also be investigated for these structural elements. The required FRLs for these will need is still to be assessed and a performance solution may be required.

2.9 Sustainable Development Considerations

2.9.1 Off site fabrication

In accordance with SINSW DfMA guidelines, a “kit of parts” construction, to allow off site fabrication will be investigated for the upper storey wall and roof construction for buildings A, B2, B3, and for the ancillary facilities portion of building C.

Conventional insitu construction is proposed for the remaining buildings and structures.

2.10 Foundations

The geotechnical report prepared by JK Geotechnics (Reference 33177PN2rpt), dated 16 November 2020 indicates that the site was previously a quarry (1986 – 2000) which has been filled to current surface levels Generally the fill material is a clayey fill material with gravel inclusions, which is well compacted but there are pockets which are poorly compacted in the in the area proposed for the two-storey home base building B2. Rock was encountered at the base of the fill material at depths varying from 11.2m to 14.5m.

The report provides recommendation for both high level footings (raft or pad footings) founded on the fill material and piled footings founded on rock.

With respect to the high level footing option the report classifies the fill material as equivalent to Class H2, in accordance with characteristic surface movements in the order of 60 to 75 mm. The potential differential settlement associated with this order of movement would result in floor deflections that would exceed the acceptable deflection limits (refer section 2.6) and on this basis this footing option is not viable for the proposed buildings. In addition, the areas of poor compaction at the proposed location of the two-storey home base building also rules out high level footings in these areas.

For serviceability requirements the only viable footing option is pile footings to rock, approximate depth 14m.

With regard to piling, the report recommends either continuous flight auger (CFA) piles or cased bored piers. JKGeotechinics had further clarified, in an email dated 13 January 2021 that steel screw piles are not suitable because they may prematurely reach refusal on larger particles within the fill, and they would not be able to penetrate the bedrock profile. However other piling solutions maybe acceptable provided the piling contractor's installation methodology addresses the issue of potential refusal on large particles in the fill material, and embedment into the underlying bedrock.

Refer the sketches SK109, SK111[2], SK112[2] and SK113[2] in appendix A for preliminary footing details based on the bored pier / CFA pile recommendation in the Geotechnical investigation report.

2.11 Lateral System

The lateral support structures for the proposed buildings and associated elements, to resist wind and earthquake loading to be as follows.

For the upper storey of Buildings: A, B2 & B3, and for building C the lateral stability will be provided by structural roof and vertical wall bracing. Refer sketches SK201[2] and SK202[2] in appendix A for indicative details. If the DfMA “kit of parts” framing is adopted the lateral framing will be similar, with vertical bracing in wall elements.

The proposed lateral stability for the level 1 concrete structures will be provided by blade columns, typical located on around the perimeter walls of the ground floor, refer sketches SK111[2] to SK116[2] in appendix A for indicative details.

The proposed structure for the COLA roofs comprises structural steel roof framing and columns. The lateral stability is provided by roof bracing and frame action between the columns, roof beams, and footings. Refer sketch SK41 in appendix A for indicative details.

2.12 Vertical Structure

The proposed vertical structures to be as follows.

For the upper storey of Buildings: A, B2 & B3, and for building C, vertical support will be provided by structural steel columns. Refer sketches SK201[2] and SK202[2] in appendix A for indicative details. If the DfMA “kit of parts” framing is adopted the vertical support will be similar, with the roof support by steel load bearing walls.

The proposed vertical support for the level 1 concrete structures will be provided by reinforced concrete columns and walls. Refer sketches SK111[2] to SK116[2] in appendix A for indicative details.

The COLA roofs to be supported by structural steel columns. Refer sketch SK41 in appendix A for indicative details.

2.13 Floor Structures

The floor structures to be as follows:

The ground floor for all buildings is proposed to be suspended reinforced concrete slabs and beams, support on bored piers, refer sketches SK110, SK111[2] to SK113[2] in appendix A for indicative details.

The Level 1 floors are proposed to be post tensioned concrete slabs and beams supported by reinforced concrete columns and walls. The stairs and lift shaft are also proposed to be constructed in reinforced concrete. Refer sketches SK114[2] to SK116[2] in appendix A for indicative details.

The pavement slabs to be reinforced concrete slabs on grade but supported off the building floor structure at the doorways to prevent differential settlement at this interface.

2.14 Lifts and stairs

The lift shafts will be, in-situ reinforced concrete walls.Because the stairs are external, light gauge steel form systems are not recommended because of the long term durability implications. And as there only three stairs that are similar, developing a precast solution is not practical. The stairs shall be formed, cast insitu reinforced concrete.

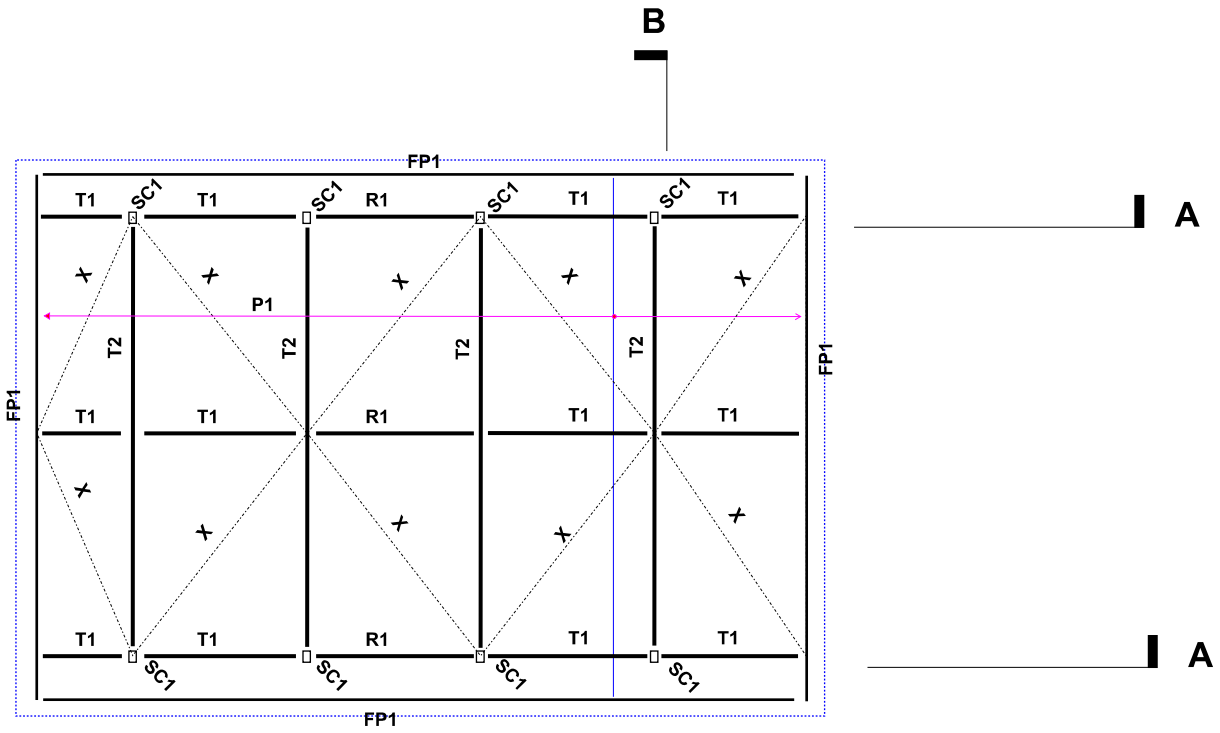
2.15 Roof structure

The roof structures to be as follows:

For the upper storey of Buildings: A, B2 & B3, and for building C the proposed structural framing is conventional rafters and purlins supported by steel columns. Refer sketches SK201[2] and SK202[2] in appendix A for indicative details. If the DfMA “kit of parts” framing is adopted the structural framing will likely consist of roof trusses at regular spacings supported by load bearing stud walls.

The COLA roofs to be structural steel rafters and purlins. Refer sketch SK41 in appendix A for indicative details.

Appendix A
Structural Sketches

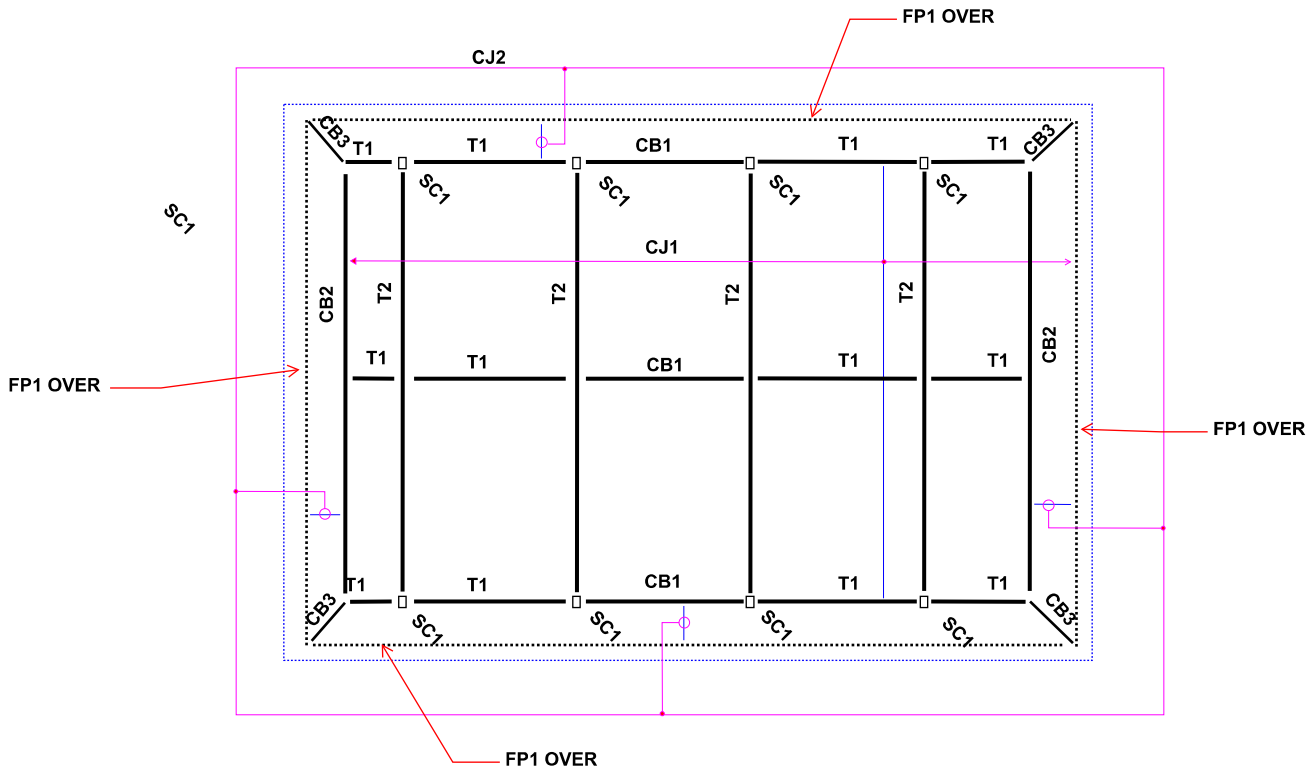


Roof Plan (upper)

Member Schedule

Purlins	P1	C20019 @ 1200 max cts + midspan bridging
Fascia beam	FP1	200PFC
Trusses	T1	200PFC chords (horizontal orientation) + 75 x 75 x 4 SHS diagonals
	T2	250UB31 chords (horizontal orientation) + 180UB18 (horizontal orientation)
Rafters	R1	150UC23
Bracing	X	75 x 75 x 6 EA at underside of purlin (fix to purlins for sag)
Columns	SC1	300 x 200 x 6 RHS (Hot dip galvanised)
Bracing Beam	BB1	200 x 200 x 6 SHS (Hot dip galvanised)

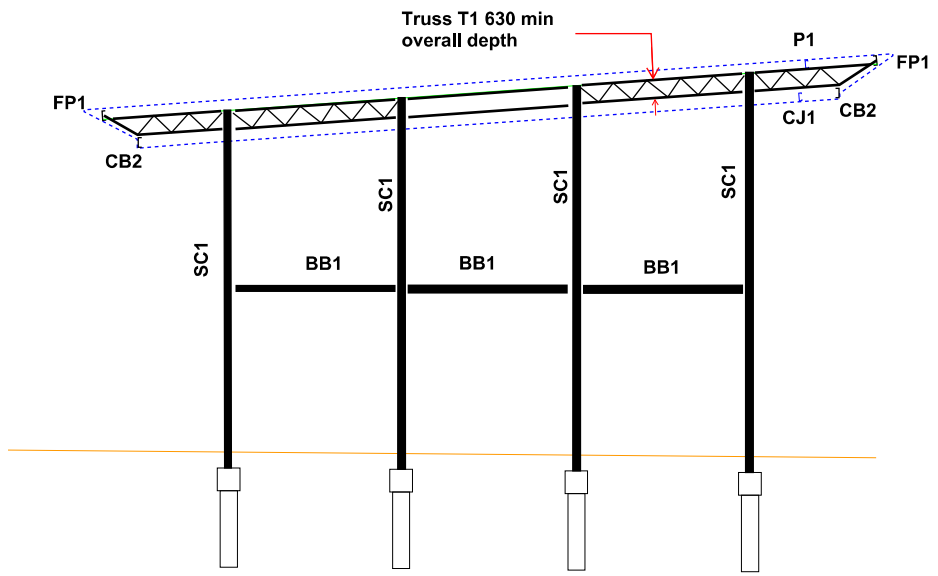
Surface treatment inorganic zinc silicate unless noted.



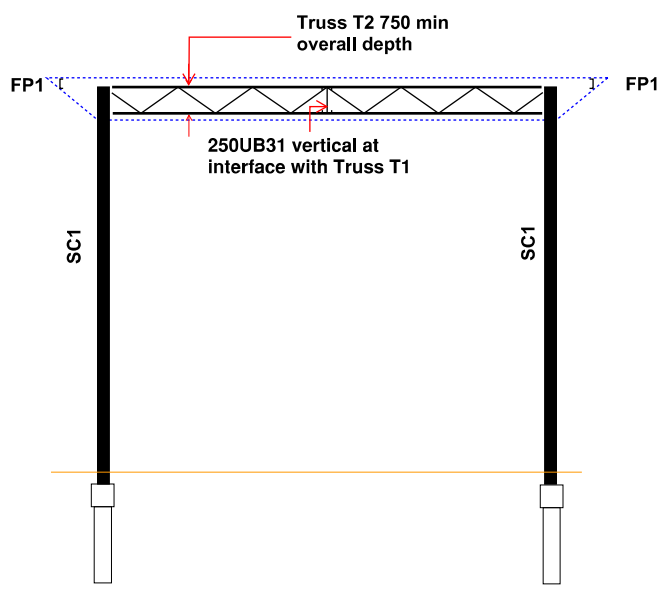
Roof Ceiling Plan

Ceiling Joists	CJ1	C20019 at 1200 max cts + midspan bridging
	CJ2	C10015 @ 600 max cts + midspan bridging
Ceiling Beams	CB1	150UC23
	CB2	200PFC
	CB3	150PFC

Surface treatment inorganic zinc silicate unless noted.



Section A



Section B

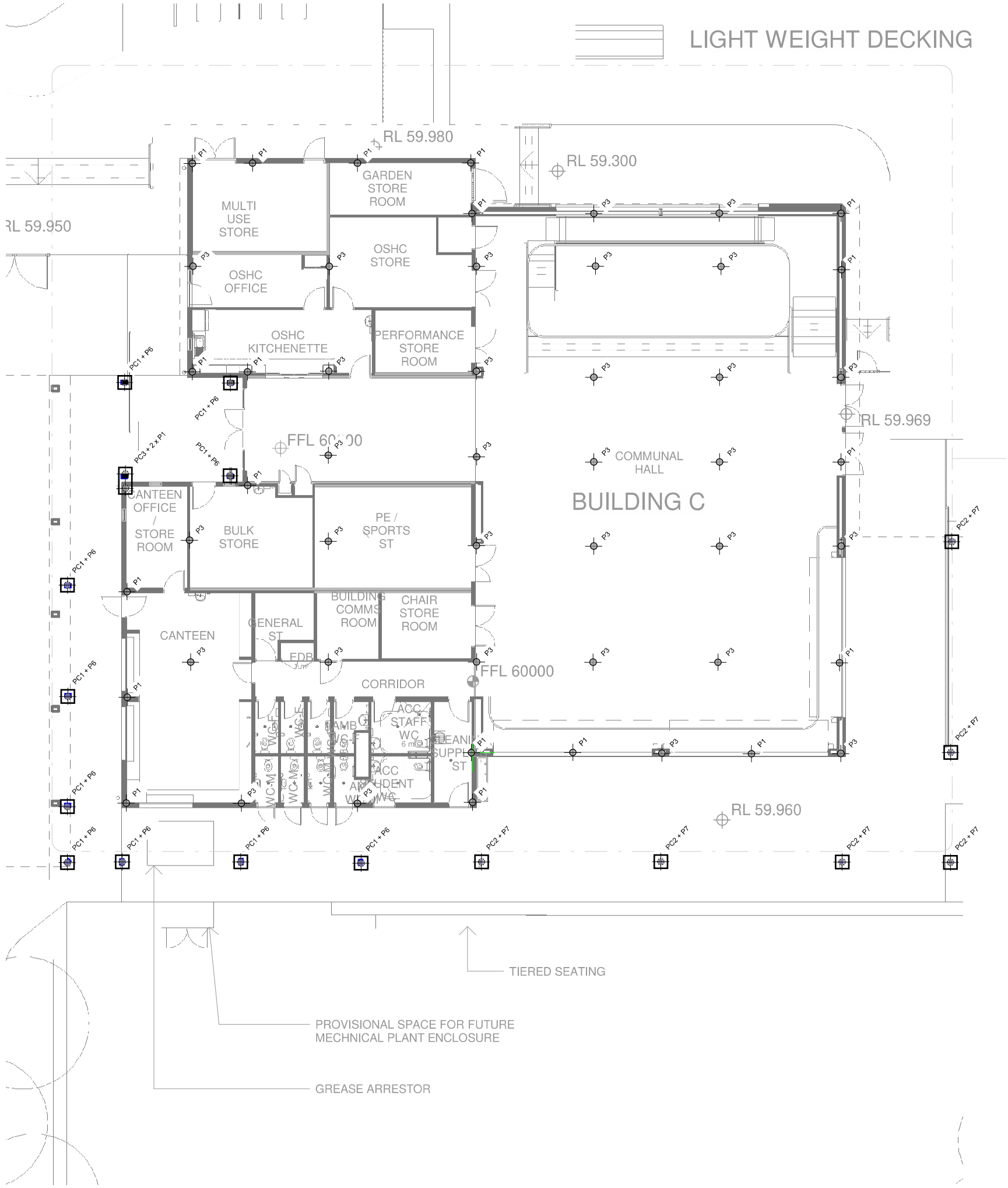
CONCEPT DETAILS FOR BUDGET COSTING

WOOLACOTTS
MULGOA RISE PS

COLA

20-306

SK 41



Footing Plan

Piles to socketed into rock with a minimum allowable bearing capacity of 1500 kPa.

Refer schedules for pile, pile cap and footing beam sizes

All Concrete 32 MPa

Pile Schedule

Mark	Dia	Socket depth into rock
P1	400	300
P2	400	500
P3	400	1000
P4	500	300
P6	400	300
P7	300	300

Pile Cap Schedule

Mark	Size
PC1	600 x 600 x 600 deep
PC2	Not used
PC4	1700 x 700 x 600 deep

CONCEPT DETAILS FOR BUDGET COSTING

WOOLACOTTS

MULGOA RISE PS

BUILDING C - FOOTING PLAN

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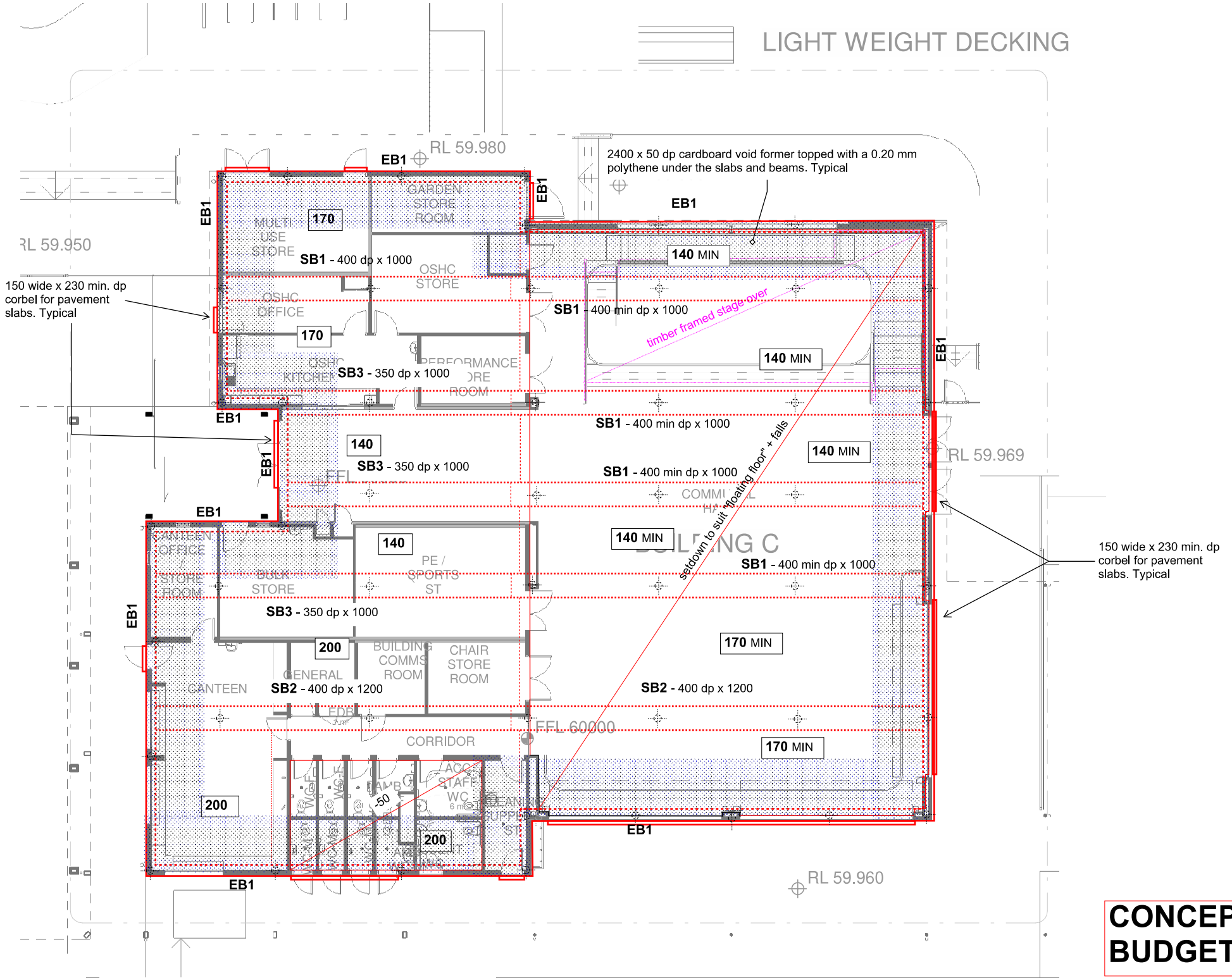
SK 109



Ground Floor Plan

Building (Hall) Slab:
Slabs to be 140 thick, unless noted otherwise poured on 75 mm thick drainage layer topped with a 0.20 mm polythene membrane. Where noted ⁙ on plan the drainage laer to be replaced with 50 cardboard void former topped with a 0.20 mm polythene membrane.

Edge beams EB1 450 min. deep x 450 width plus corbel where noted on plan

Internal beams SB1 400 min deep x 1000 wide
SB2 400 deep X 1200 wide
SB3 350 deep x 1000 wide

CONCEPT DETAILS FOR BUDGET COSTING

WOOLACOTTS
MULGOA RISE PS

BUILDING C - GROUND FLOOR

20-306 **SK 110**

CONCEPT DETAILS FOR BUDGET COSTING

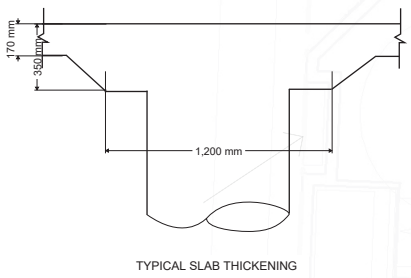
P1 - 450 dia. pile with 1200 dia thickening

P2 - 450 dia. pile with 1200 dia thickening

P3 - 750 dia. pile with 1200 dia thickening

P4 - 750 dia. pile with 1200 dia thickening

PC1 + 2P4 - 2 x 750 dia. piles with 900 wide x 3000 long x 600 deep pile cap



TYPICAL SLAB THICKENING

Unless noted otherwise slabs to be poured on 75 mm thick drainage layer topped with a 0.20 mm polythene membrane. Where noted on plan the drainage layer to be replaced with 50 cardboard void former topped with a 0.20 mm polythene membrane.

Ground Floor

denotes 400 x 400column

denotes 1500 x 350 column

denotes 200 RC Blk wall

Pile Schedule

Mark	Dia	Socket depth into rock
P1	450	300
P2	450	1750
P3	750	600
P4	750	2200

WOOLACOTTS

MULGOA RISE PS

BUILDING A - GRD FLOOR PLAN

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SK 111[2]

CONCEPT DETAILS FOR BUDGET COSTING

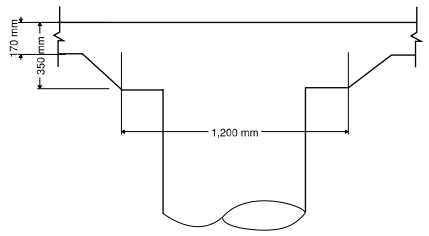
P1 - 450 dia. pile with 1200 dia thickening

P2 - 450 dia. pile with 1200 dia thickening

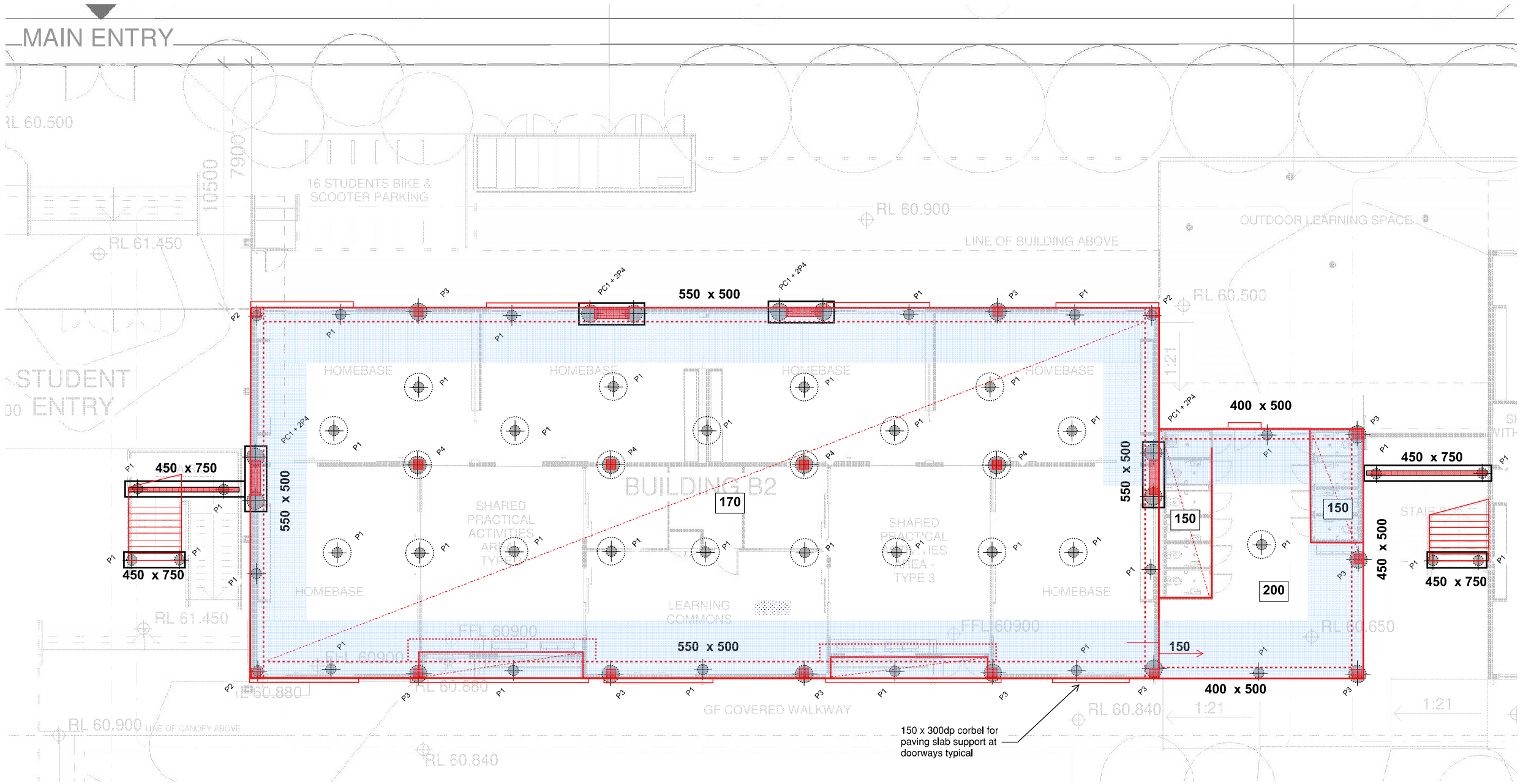
P3 - 750 dia. pile with 1200 dia thickening

P4 - 750 dia. pile with 1200 dia thickening

PC1 + 2P4 - 2 x 750 dia. piles with 900 wide x 3000 long x 600 deep pile cap



TYPICAL SLAB THICKENING



Ground Floor

- denotes 400 x 400column
- denotes 1500 x 350 column
- denotes 200 RC Blk wall

Pile Schedule

Mark	Dia	Socket depth into rock
P1	450	300
P2	450	1750
P3	750	600
P4	750	2200

Unless noted otherwise slabs to be poured on 75 mm thick drainage layer topped with a 0.20 mm polythene membrane. Where noted on plan the drainage layer to be replaced with 50 cardboard void former topped with a 0.20 mm polythene membrane.

WOOLACOTTS

MULGOA RISE PS

BUILDING B2 - GRD FLOOR PLAN

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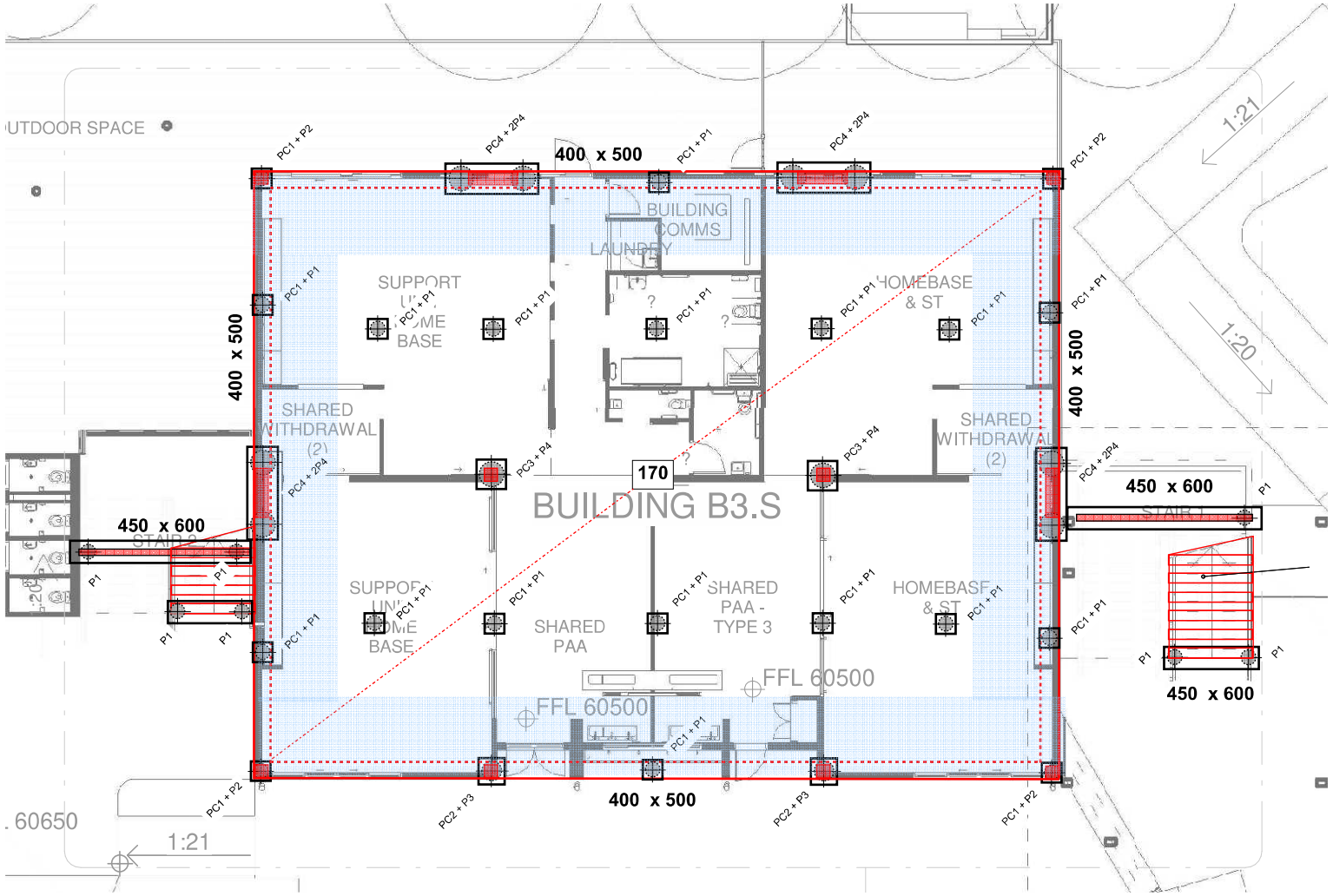
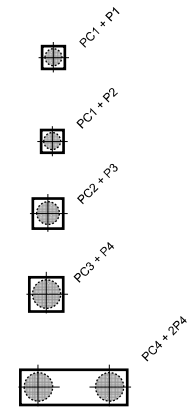
SK 112[2]





Ground Floor

- denotes 400 x 400column
- denotes 1500 x 350 column
- denotes 200 RC Blk wall

Pile Schedule

Mark	Dia	Socket depth into rock
P1	450	300
P2	450	1750
P3	600	1500
P4	750	2200

Unless noted otherwise slabs to be poured on 75 mm thick drainage layer topped with a 0.20 mm polythene membrane. Where noted on plan the drainage layer to be replaced with 50 cardboard void former topped with a 0.20 mm polythene membrane.

WOOLACOTTS

MULGOA RISE PS

BUILDING B3 - GRD FLOOR PLAN

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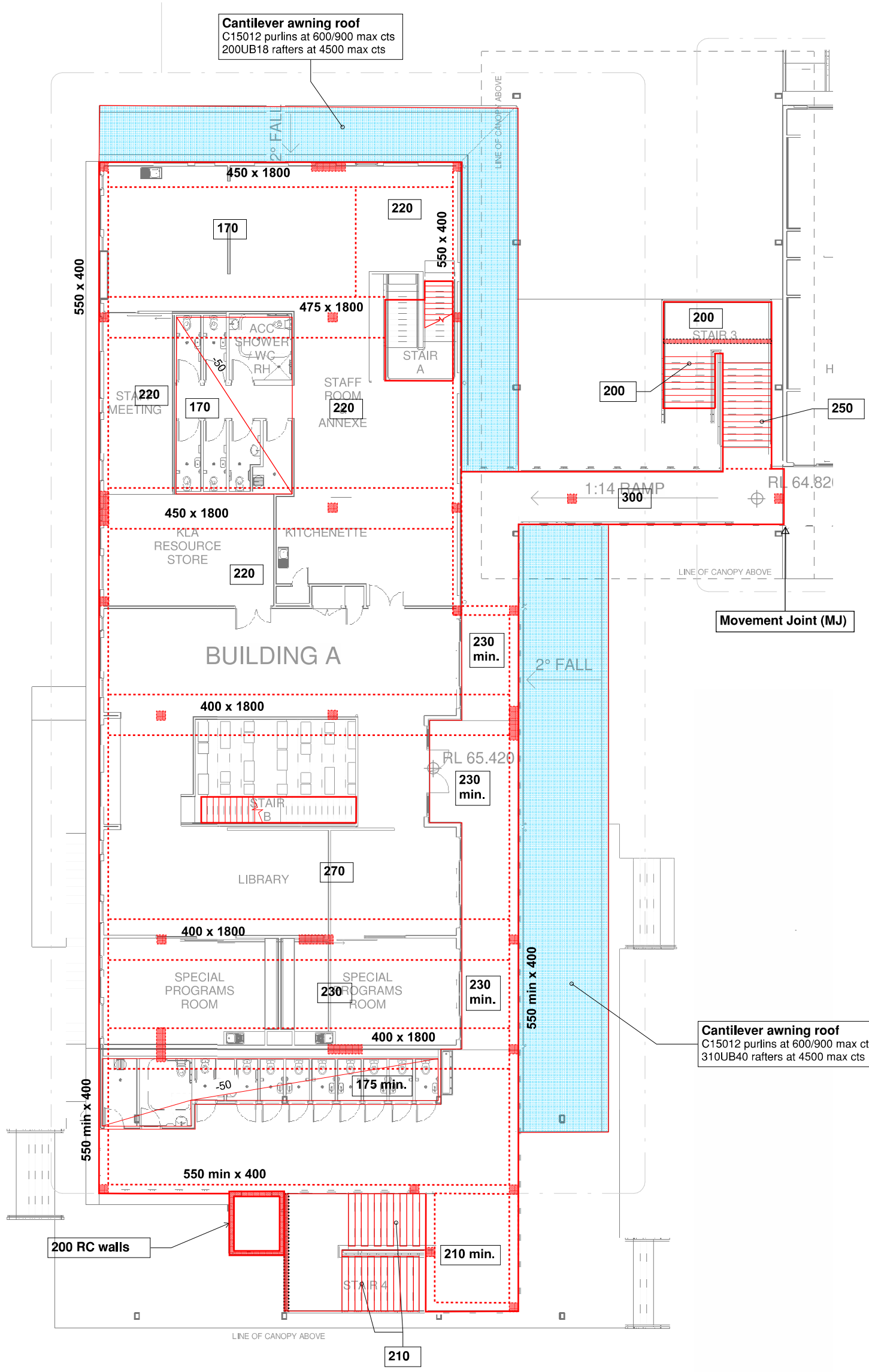
SK 113[2]



Level 1 (Post tensioned beams and slabs)

denotes 400 x 400column

denotes 1500 x 350 column

denotes 200 RC Blk Wall

CONCEPT DETAILS FOR BUDGET COSTING

WOOLACOTTS

MULGOA RISE PS

BUILDING A - LEVEL 1 PLAN

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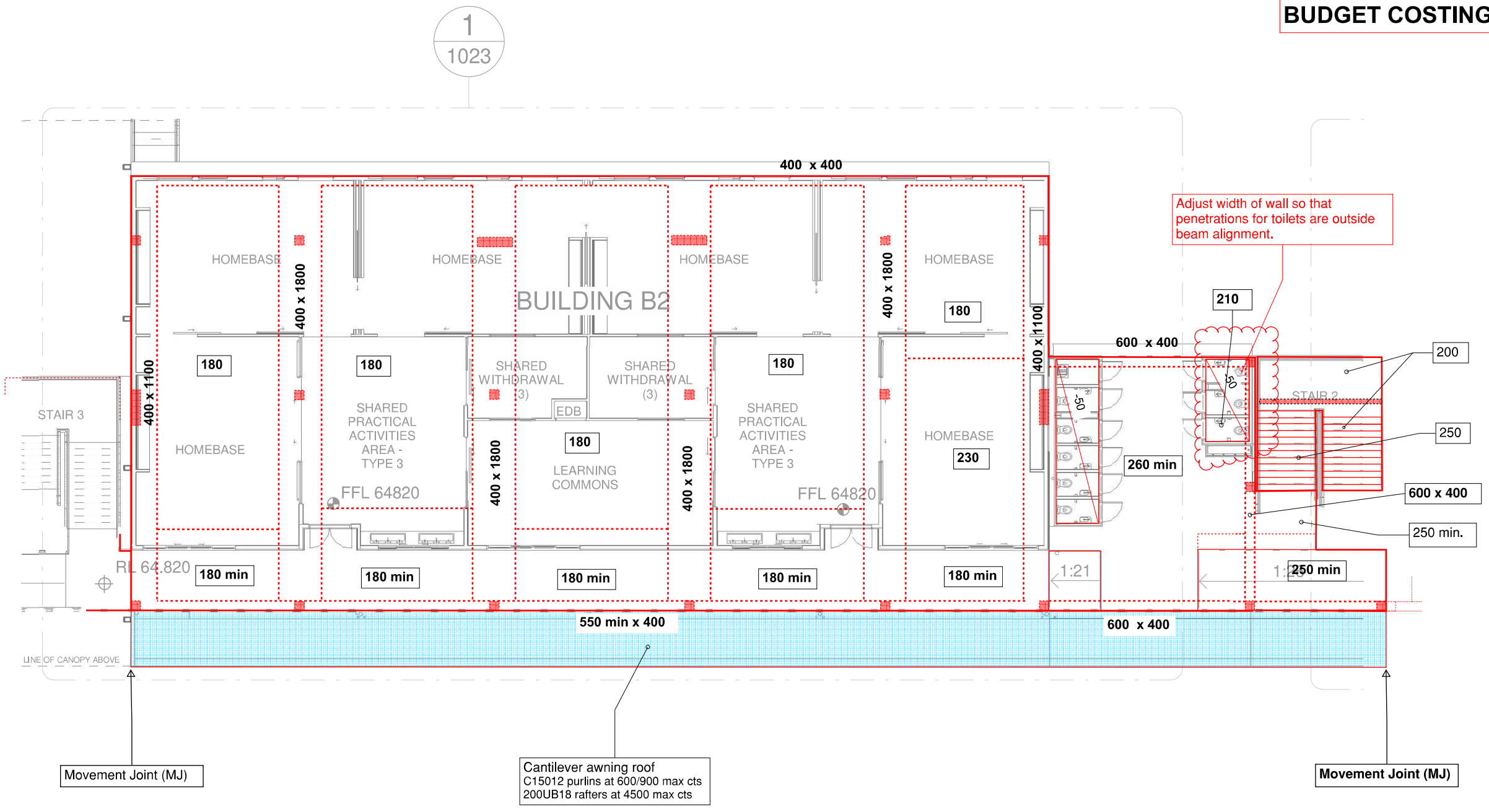
SK 114[2]

CONCEPT DETAILS FOR BUDGET COSTING



Level 1 (Post tensioned beams and slabs)

- denotes 400 x 400column
- denotes 1500 x 350 column
- denotes 200 RC Blk wall

WOOLACOTTS

MULGOA RISE PS

BUILDING B2 - LEVEL 1 PLAN

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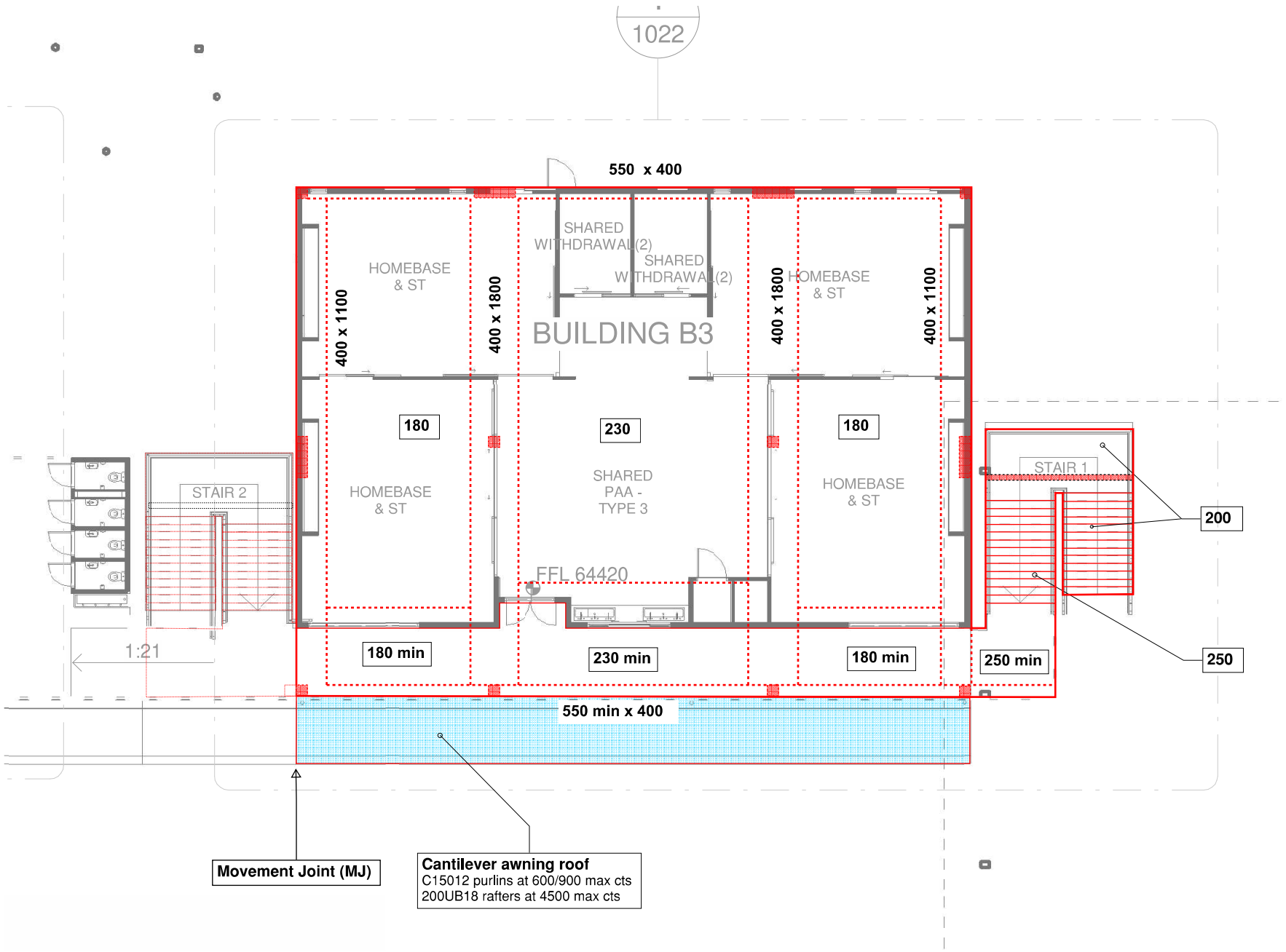

Level 1 (Post tensioned beams and slabs)

denotes 400 x 400column

denotes 1500 x 350 column

denotes 200 RC Blk wall

CONCEPT DETAILS FOR BUDGET COSTING

WOOLACOTTS

MULGOA RISE PS

BUILDING B3 - LEVEL 1 PLAN

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SK 116[2]

SITE BOUNDARY

1/1021 1/1023 1/1022

REFER TO SK41 FOR CANOPY ROOF FRAMING

REFER TO SK41 FOR CANOPY ROOF FRAMING

BUILDING A

BUILDING B2

BUILDING B3

STAFF MEETING

STAFF ROOM & ANNEXE

KLA RESOURCE STORE

KITCHENETTE

LIBRARY

SPECIAL PROGRAMS ROOM

SPECIAL PROGRAMS ROOM

STAIR A

STAIR 3

STAIR 2

STAIR 1

STAIR 4

HOMEBASE

HOMEBASE & ST

SHARED PRACTICAL ACTIVITIES AREA - TYPE 3

SHARED WITHDRAWAL (3)

SHARED WITHDRAWAL (2)

SHARED PAP - TYPE 3

LEARNING COMMONS

EDB

1:14 RAMP

1:21

1:26

2% FALL

2' FALL

4' FALL

FFL 64.820

FFL 64.820

FFL 64.820

RL 64.820

RL 65.420

LINE OF CANOPY ABOVE

Movement Joint (MJ)

REFER TO SK41 FOR CANOPY ROOF FRAMING

REFER TO SK41 FOR CANOPY ROOF FRAMING

RAFTERS___R1___250UB26

COLUMNS___SC1___100*6 SHS

VERTICAL BRACING___VB1___100*6 SHS (LOCATED WITHIN PARTITION WALLS. ALLOW FOR MIN 2m LENGTH AT EACH LOCATION)

WALL HEAD BEAMS___WH1___250PFC (HORIZONTAL ORIENTATION)
WH2___200PFC (HORIZONTAL ORIENTATION)

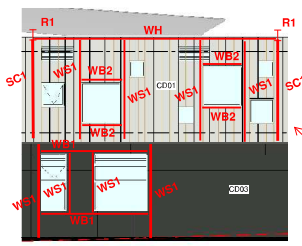
WALL BEAMS___WB1_150*100*4 RHS (HORIZONTAL ORIENTATION)
WB2_100*100*5 SHS

WALL STIFFENER___WS1___100*100*6 SHS

ROOF BRACING___X___75*75*6 EA AT UNDERSIDE OF PURLINS (FIX TO PURLINS FOR SAG)
Y___139.7*5 CHS

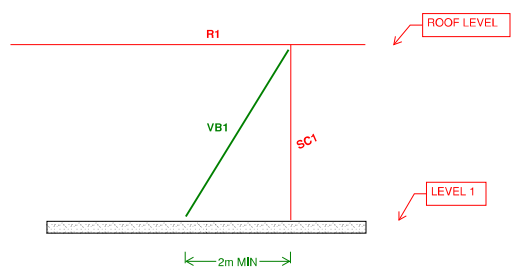
PURLINS___P1___C25019 @ 900 CTS + MIDSPAN BRIDGING
P2___C25019 @ 1200 CTS + MIDSPAN BRIDGING

U.N.O. SURFACE TREATMENT TO BE INORGANIC ZINC SILICATE.



PROPRIETARY LIGHTWEIGHT STUD FRAMING (SUCH AS RONDO) TO BE USED FOR OPENNING DIMENSIONS LESS THAN 1800*1800

PRELIMINARY STEEL FRAMING AT WALL OPENINGS



TYPICAL VB1 SECTION VIEW

WOOLACOTTS
MULGOA RISE PS

BUILDING A, B2, B3 - ROOF PLAN

20-306 **SK 201 [2]**

SCALE 1:125

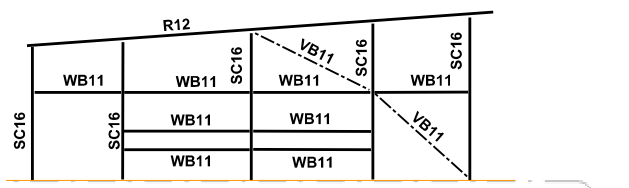
Member Schedule

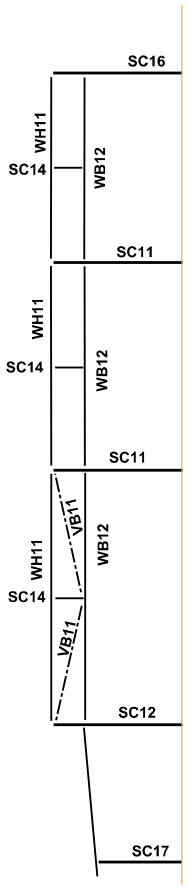
Purlins	P11	Z25019 (Lapped) @ 1200 max cts + midspan bridging
	P12	C20019 @ 1200 max cts + midspan bridging
Rafters	R11	460UB75
	R12	150UC30
	R13	180PFC
	R14	200 x 200 x 5 SHS
Columns	SC11	150UC30
	SC12	200UC52
	SC13	200 x 200 x 9 SHS
	SC14	150 x 100 x 6 RHS
	SC15	114CHS4.5
	SC16	150 x 150 x 9 SHS
	SC17	300 x 200 x 6 RHS (Hot dip galvanised)

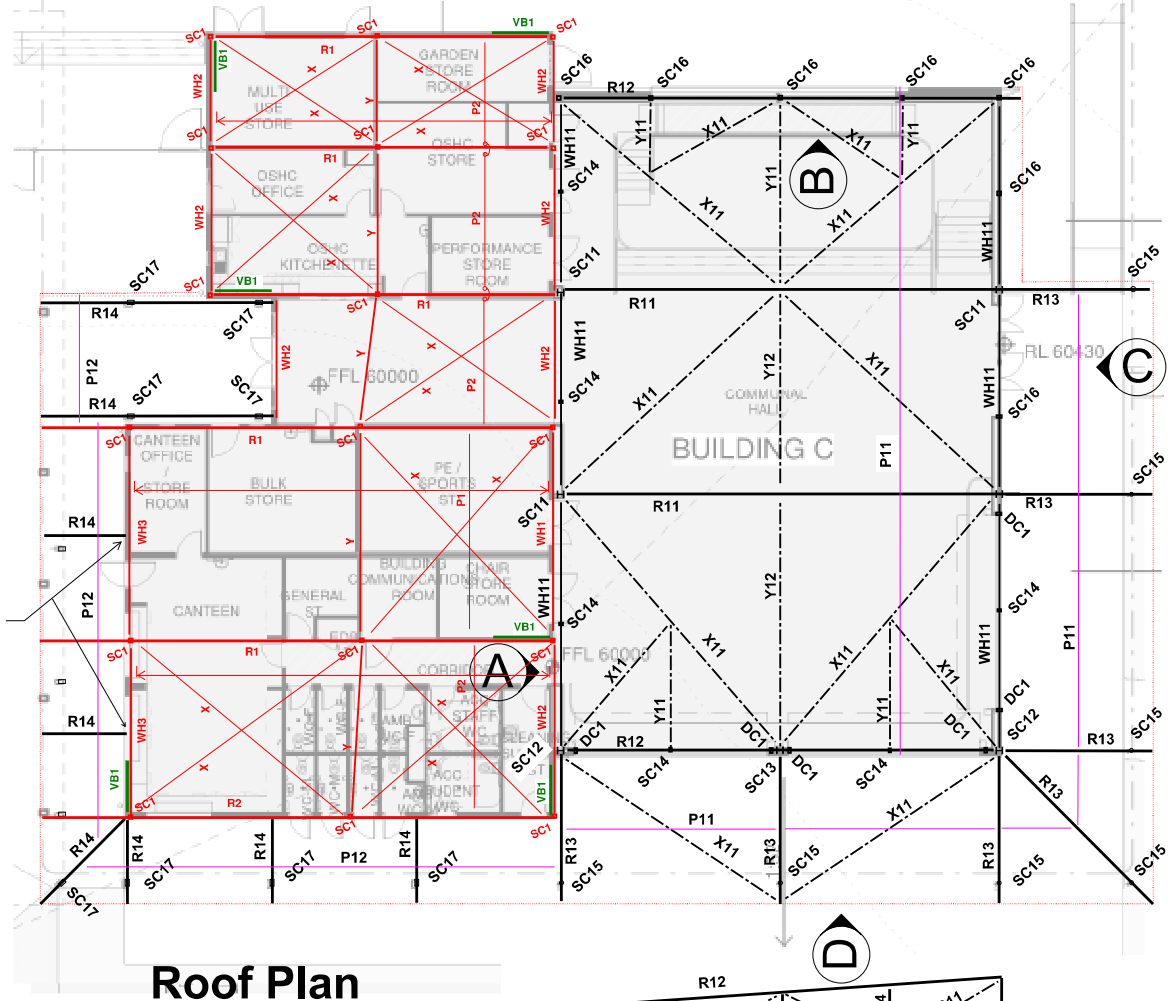
Surface treatment inorganic zinc silicate unless noted.

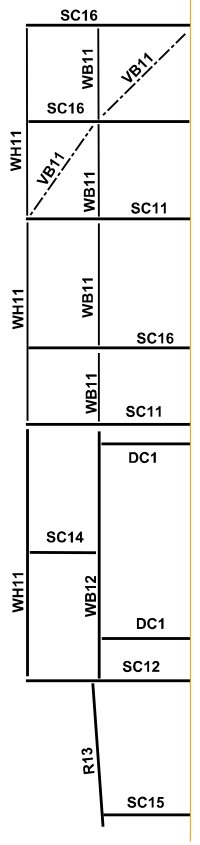
Wall Head beams	WH1	250PFC (horizontal orientation)
Wall beams	WB11	150 x 100 x 4 RHS (horizontal orientation)
	WB12	250 x 150 x 9 RHS (horizontal orientation)
Bracing	X11	75 x 75 x 6 EA at underside of purlin (fix to purlins for sag)
	Y11	140 CHS 5
	Y12	165 CHS 5.4
Vertical bracing	VB1	150 x 100 x 4 RHS (horizontal orientation)

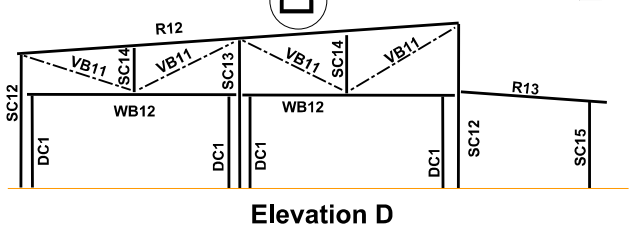
Surface treatment inorganic zinc silicate unless noted.











STEEL MEMBER SCHEDULE FOR MEMBERS MARKED UP IN RED

RAFTERS___R1___250UB26
R2___250*150*6 RHS

COLUMNS___SC1___100*6 SHS

VERTICAL BRACING___VB1___100*6 SHS (LOCATED WITHIN PARTITION WALLS. ALLOW FOR MIN 2m LENGTH AT EACH LOCATION)

WALL HEAD BEAMS___WH1___250PFC (HORIZONTAL ORIENTATION)
WH2___200PFC (HORIZONTAL ORIENTATION)
WH3___200*6 SHS

ROOF BRACING___X___75*75*6 EA AT UNDERSIDE OF PURLINS (FIX TO PURLINS FOR SAG)
Y___139.7*5 CHS

PURLINS___P1___C25019 @ 900 CTS + MIDSPAN BRIDGING
P2___C25019 @ 1200 CTS + MIDSPAN BRIDGING

U.N.O. SURFACE TREATMENT TO BE INORGANIC ZINC SILICATE.

WOOLACOTTS

MULGOA RISE PS

BUILDING C - ROOF PLAN

20-306 **SK 202 [2]**

SCALE 1:100