Project Documentation
Gebäude-Dokumentation

Abstract | Zusammenfassung

Woodside Building for Technology and Design, Melbourne Australia

Data of building | Gebäudedaten

Year of construction Baujahr	2020	**Space heating** **Heizwärmebedarf**	9 **kWh/(m²a)**
U-value external wall U-Wert Außenwand	0,315 W/(m²K)		
U-value basement U-Wert Kellerdecke	0,212 W/(m²K)	Primary Energy Renewable (PER) Erneuerbare Primärenergie (PER)	74 kWh/(m²a)
U-value roof U-Wert Dach	0,267 W/(m²K)	Generation of renewable Energy Erzeugung erneuerb. Energie	64 kWh/(m²a)
U-value window U-Wert Fenster	1.55 (average) W/(m²K)	Non-renewable Primary Energy (PE) Nicht erneuerbare Primärenergie (PE)	10 kWh/(m²a)
Heat recovery Wärmerückgewinnung	75 %	Pressurization test n_{50} Drucktest n_{50}	0,6 h^{-1}
Special features Besonderheiten	Solar power generation, heat recovery, CO2 heat pump hot water generation, high performance VRV heat recovery heating and cooling and rain water harvesting system.		

Brief Description

Woodside Building for Technology and Design

The Woodside Building for Technology and Design is one of the most efficient and innovative teaching buildings of its type in the world. The Woodside Building for Technology and Design has been created to enable Monash University engineering and IT students and researchers to embrace innovation, design and cutting-edge technology to develop new solutions in sustainable energy.
The building houses many learning spaces, including an interactive tiered space accommodating 360 people. The five-storey building provides a vibrant and collaborative new home for the university's engineering and IT students. Designed as a 'living laboratory', the building features extensive exposed building services, structural elements and unique features such as structural health monitoring systems and thermal piles to help students learn from the
building.
It allows students and researchers to explore new energy possibilities to solve tomorrow's questions for the good of current and future generations, through exposed building services, structural elements and unique features.

Building Envelope Description

Woodside Building for Technology and Design

The building is located in Melbourne which is a Warm Temperate Climate.
The Building Structure consists of the following:

- Slab on grade, uninsulated
- Steel supra-structure
- Reinforced concrete slab elements
- Curtain wall facades
- Sandwich panel roofing

The thermal envelope consists of 5 different curtain wall façade types with coated glazing (gvalue=0,28) and an average Uw installed=1,55 (W/m2K). The opaque façade elements are mostly mounted sandwich panels U=0,315 (W/m2K). Exterior shading devices such as static vertical fins and horizontal lamellas, have been strategically located to reduce heat loads during summer and increase heat gains during winter.

All details have been designed and redesigned in order to reduce as much as feasible the thermal bridging effects. However, due to the happy climate, size and scope of the building, we managed to get away with some instances which would not work in colder climates.
The challenging airtightness tests proved to be a great learning experience for the teams on-site and lead to step-by-step improvements of the building envelope. Final result is n50=0,6 1/h.

Responsible project participants
Verantwortliche Projektbeteiligte

Architect Entwurfsverfasser	Grimshaw Architects http://www.grimshaw.global/
Implementation planning Ausführungsplanung	-
Building systems Haustechnik	Aurecon http://www.aurecongroup.com/projects/property/woodside-building-technology-design
Structural engineering Baustatik	Aurecon http://www.aurecongroup.com/projects/property/woodside-building-technology-design
Building physics Bauphysik	Aurecon http://www.aurecongroup.com/projects/property/woodside-building-technology-design
Passive House project planning Passivhaus-Projektierung	Aurecon http://www.aurecongroup.com/projects/property/woodside-building-technology-design
Construction management Bauleitung	Lendlease https://www.lendlease.com/au/

Certifying body
Zertifizierungsstelle

Passivhaus Institut Darmstadt
www.passiv.de

Certification ID
Zertifizierungs ID

6488	Project-ID (www.passivehouse-database.org) Projekt-ID (www.passivhausprojekte.de)

Author of project documentation
Verfasser der Gebäude-Dokumentation

Aurecon
http://www.aurecongroup.com/projects/property/woodside-building-technology-design

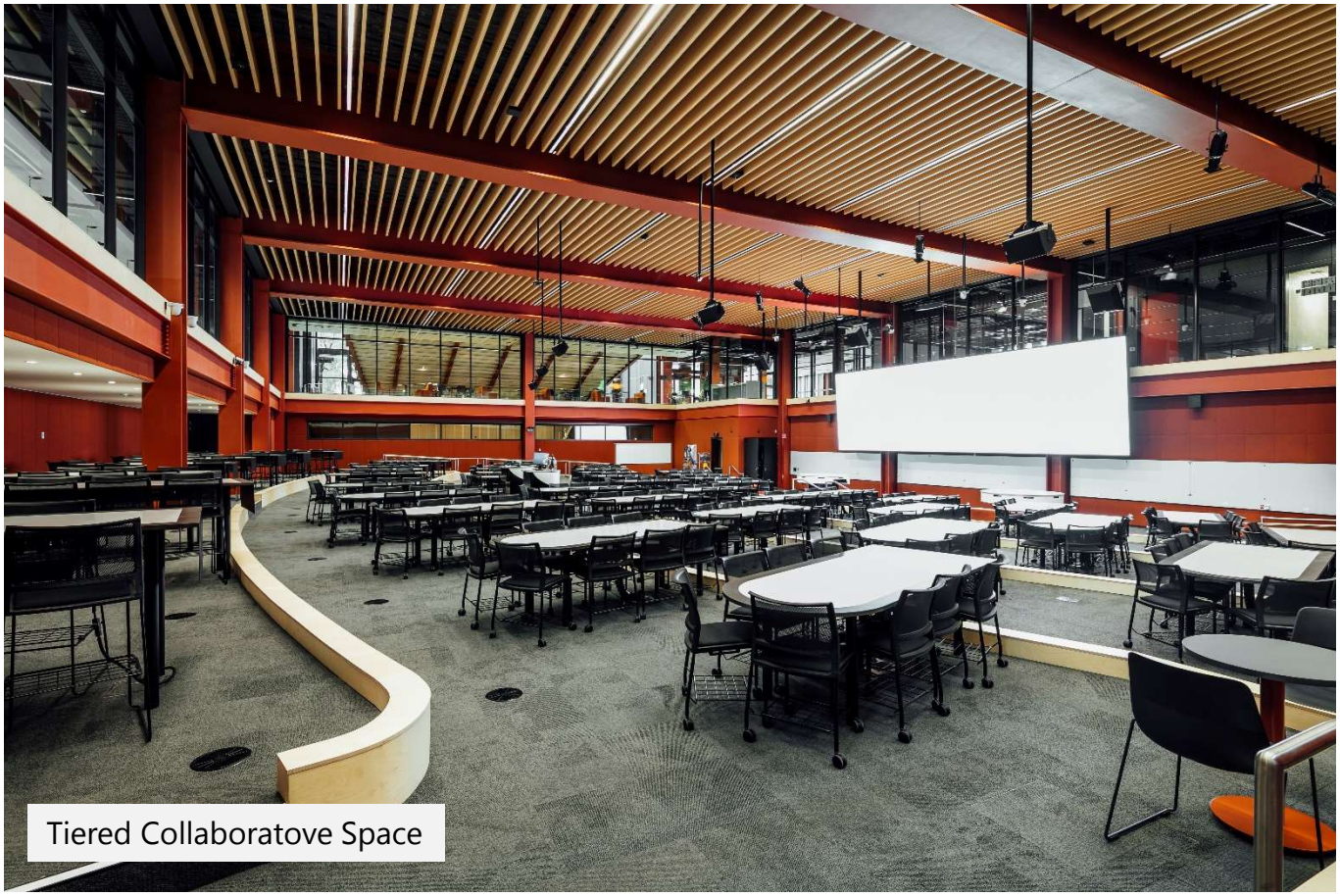
Date Datum	Signature Unterschrift
07.03.2021	

1. Ansichtsfotos

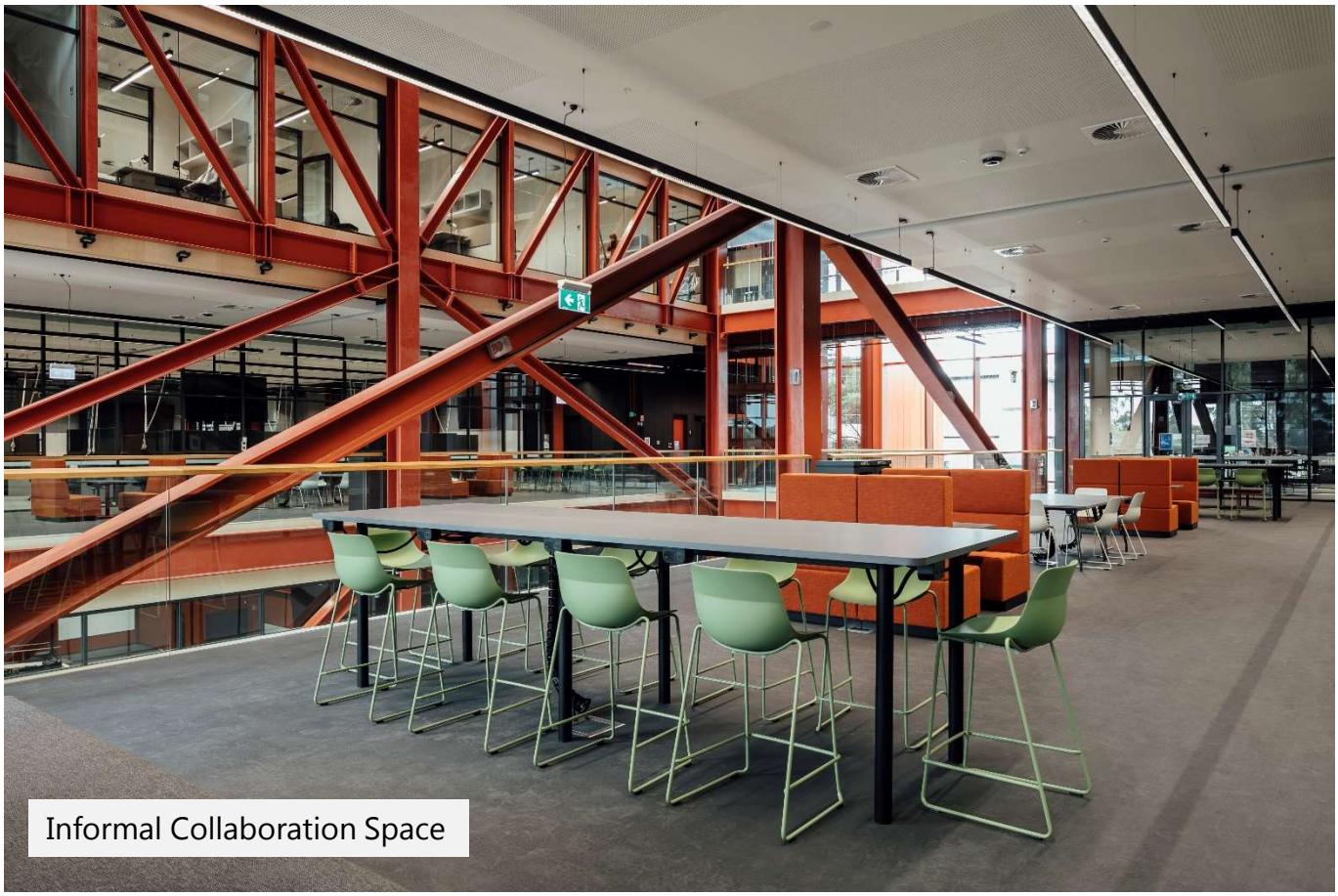
East

South

2. Interior photo examples

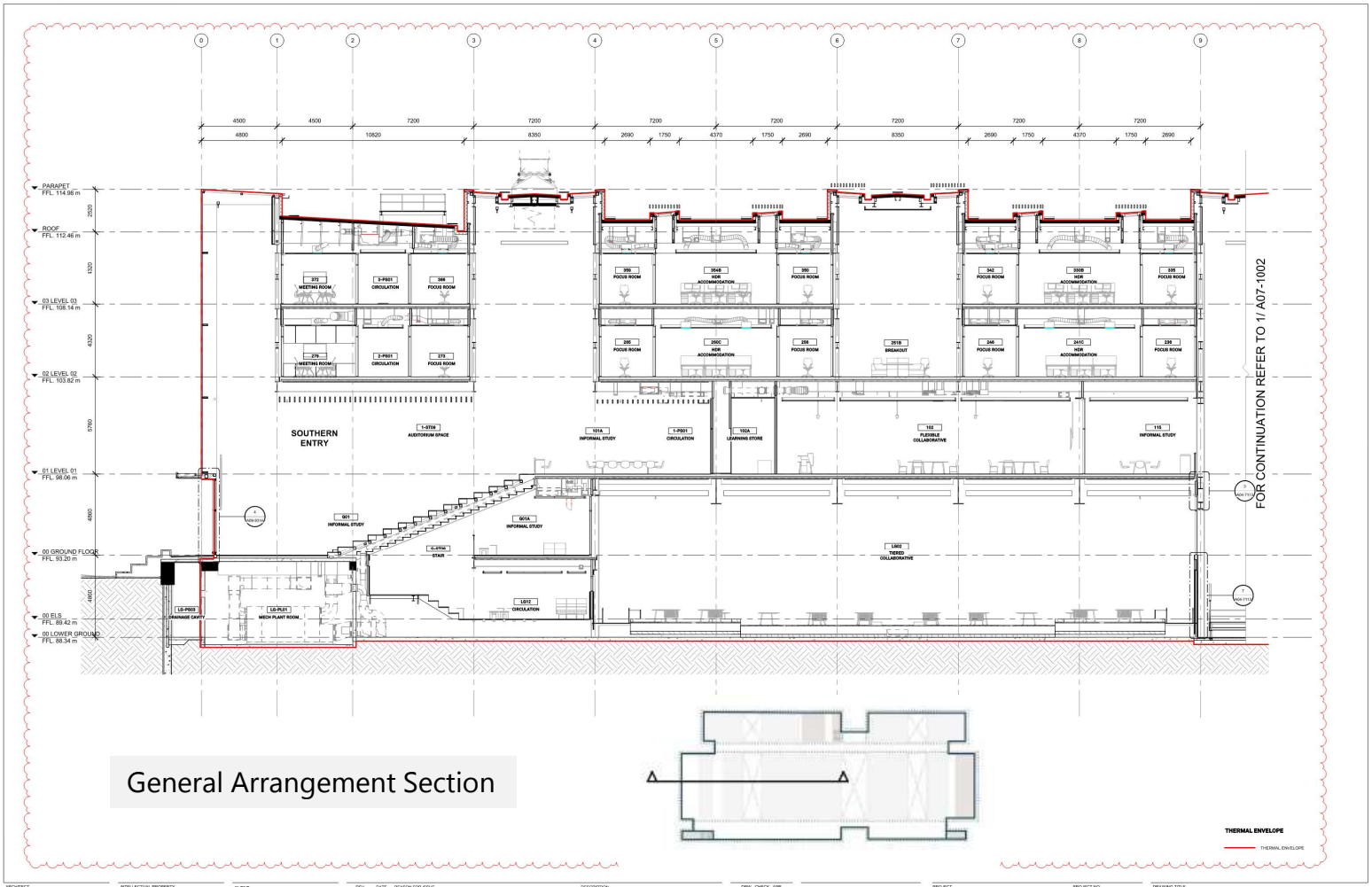


Tiered Collaboratove Space



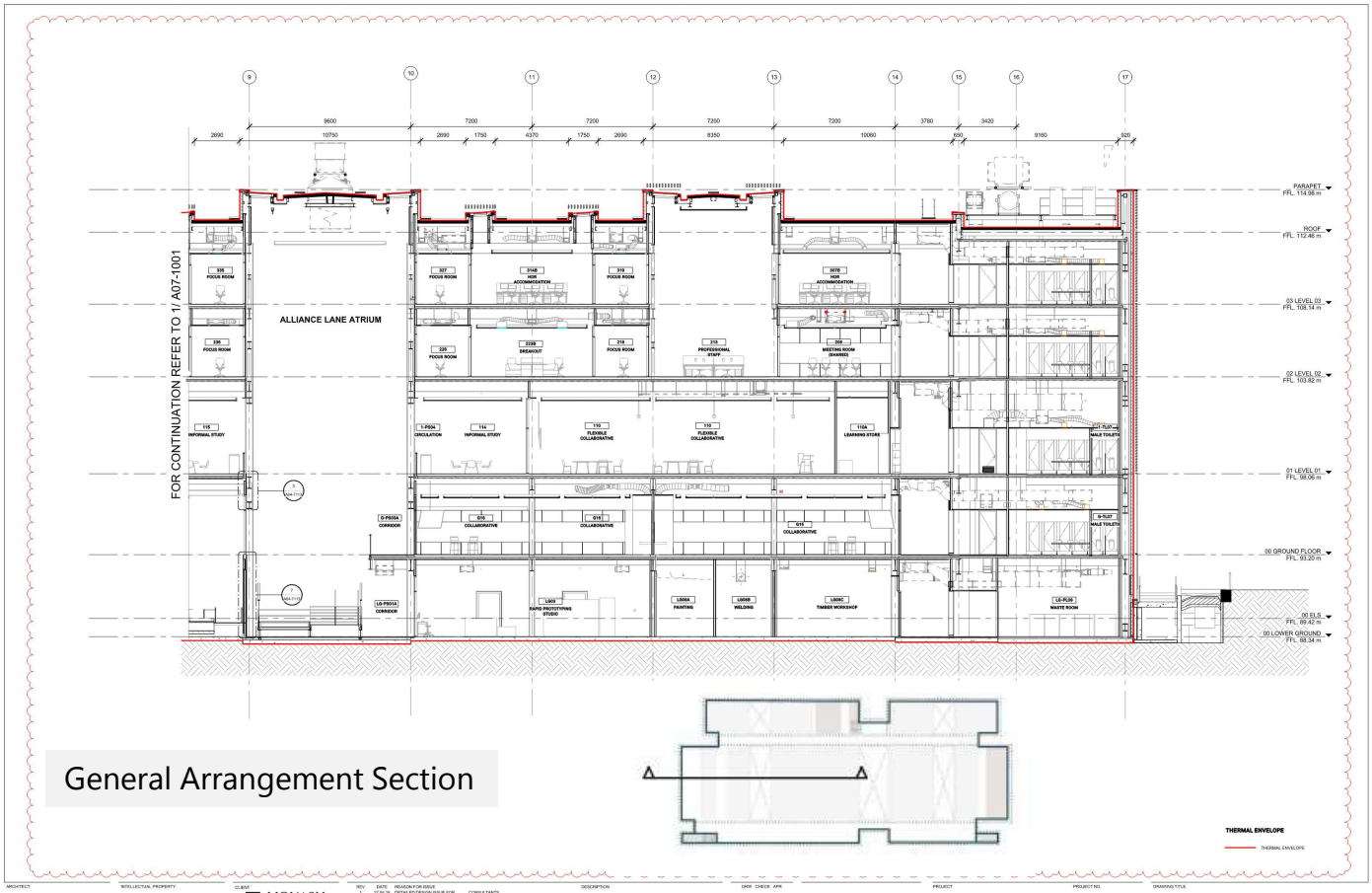
Informal Collaboration Space

3. Building Sections



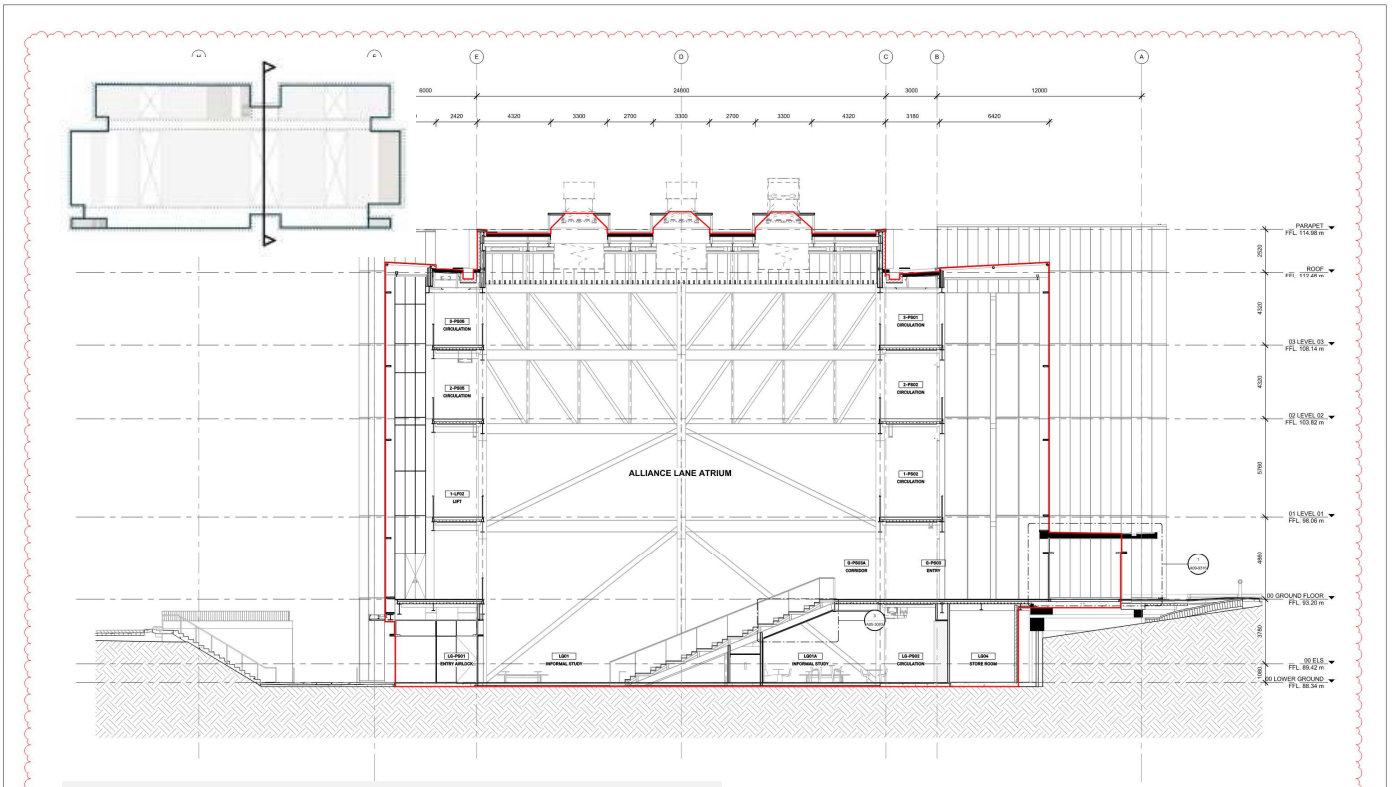
General Arrangement Section

3. Building Sections continued



General Arrangement Section

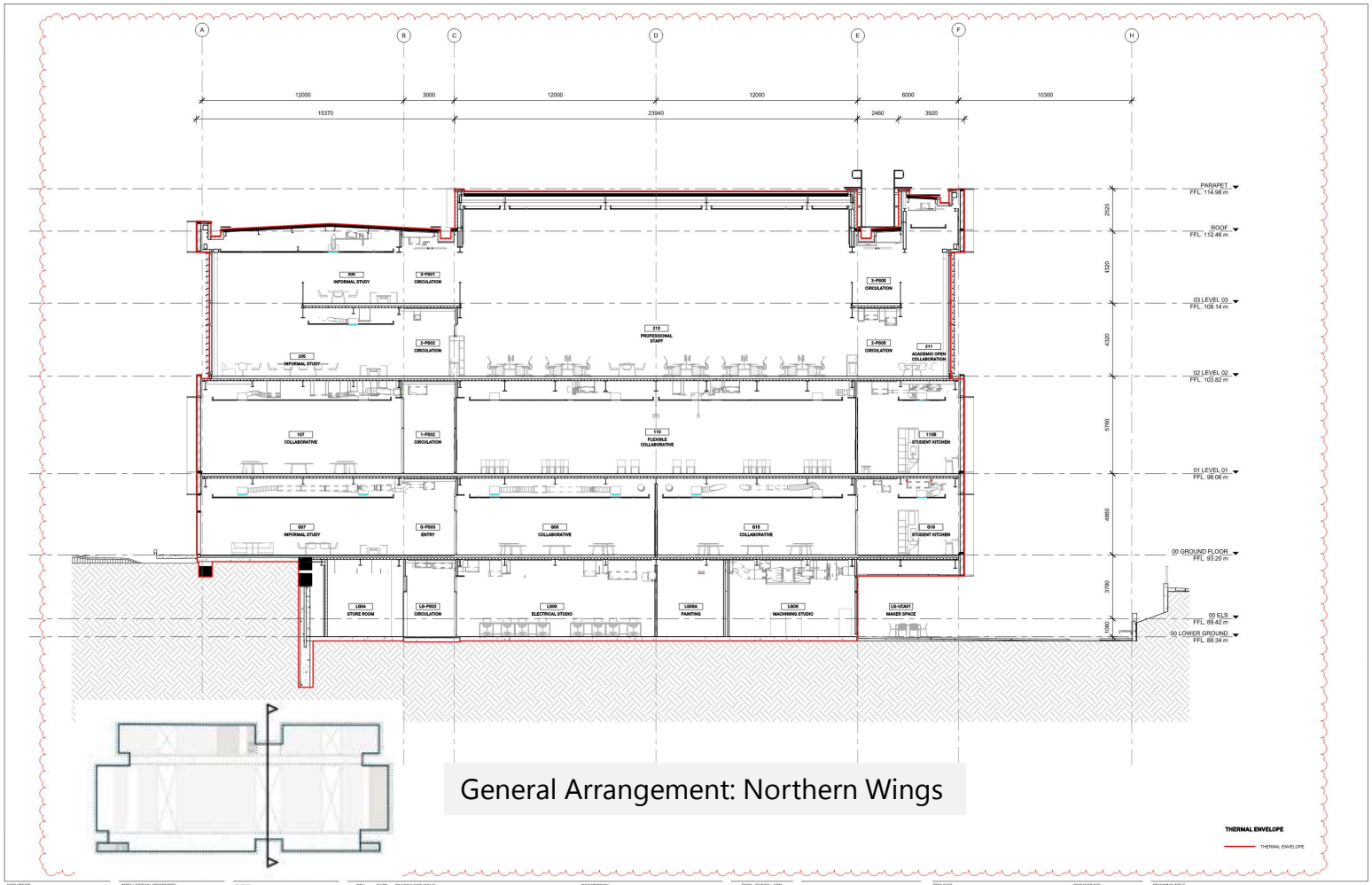
ARCHITECT GRIMSHAW 21 Bouverie Street, Melbourne, VIC 3053 +61 (03) 9321 2800 grimshaw.global	CLIENT MONASH University	DRW RH CHECK MJ APR	PROJECT MONASH TEd BUILDING / PROJECT NO. 16103 / DRAWING TITLE GA SECTION - LONGITUDAL SHEET 02
INTELLECTUAL PROPERTY © Copyright Grimshaw architects.	CONSULTANTS aurecon		ISSUE FOR INFORMATION / SCALE 1 : 100 @A1 / DRAWING NO. A07-1002 / REV A / NORTH



General Arrangement: Alliance Lane Section

ARCHITECT GRIMSHAW 21 Bouverie Street, Melbourne, VIC 3053 +61 (03) 9321 2800 grimshaw.global	CLIENT MONASH University	DRW RH CHECK MJ APR	PROJECT MONASH TEd BUILDING / PROJECT NO. 16103 / DRAWING TITLE GA SECTION - ALLIANCE LANE
INTELLECTUAL PROPERTY © Copyright Grimshaw architects.	CONSULTANTS aurecon		ISSUE FOR INFORMATION / SCALE 1 : 100 @A1 / DRAWING NO. A07-1003 / REV A / NORTH

3. Building Sections continued



General Arrangement: Northern Wings

ARCHITECT
GRIMSHAW
21 Bouverie Street, Melbourne, VIC 3053
+61 (03) 9321 2600
grimshaw.global

CLIENT
MONASH University

CONSULTANTS
aurecon

REV	DATE	REASON FOR ISSUE	DESCRIPTION
1	27.04.18	DETAILED DESIGN ISSUE FOR INFORMATION	CONSULTANTS
2	08.06.18	FOR TENDER	CONSULTANTS
A	XX.XX.XX	DO NOT DELETE	CHANGE TRACKER

DRW CHECK APR
Author Checker

PROJECT
MONASH TEd BUILDING

PROJECT NO.
16103

DRAWING TITLE
GA SECTION - NORTHERN WINGS

ISSUE
FOR INFORMATION

SCALE
1 : 100 @A1

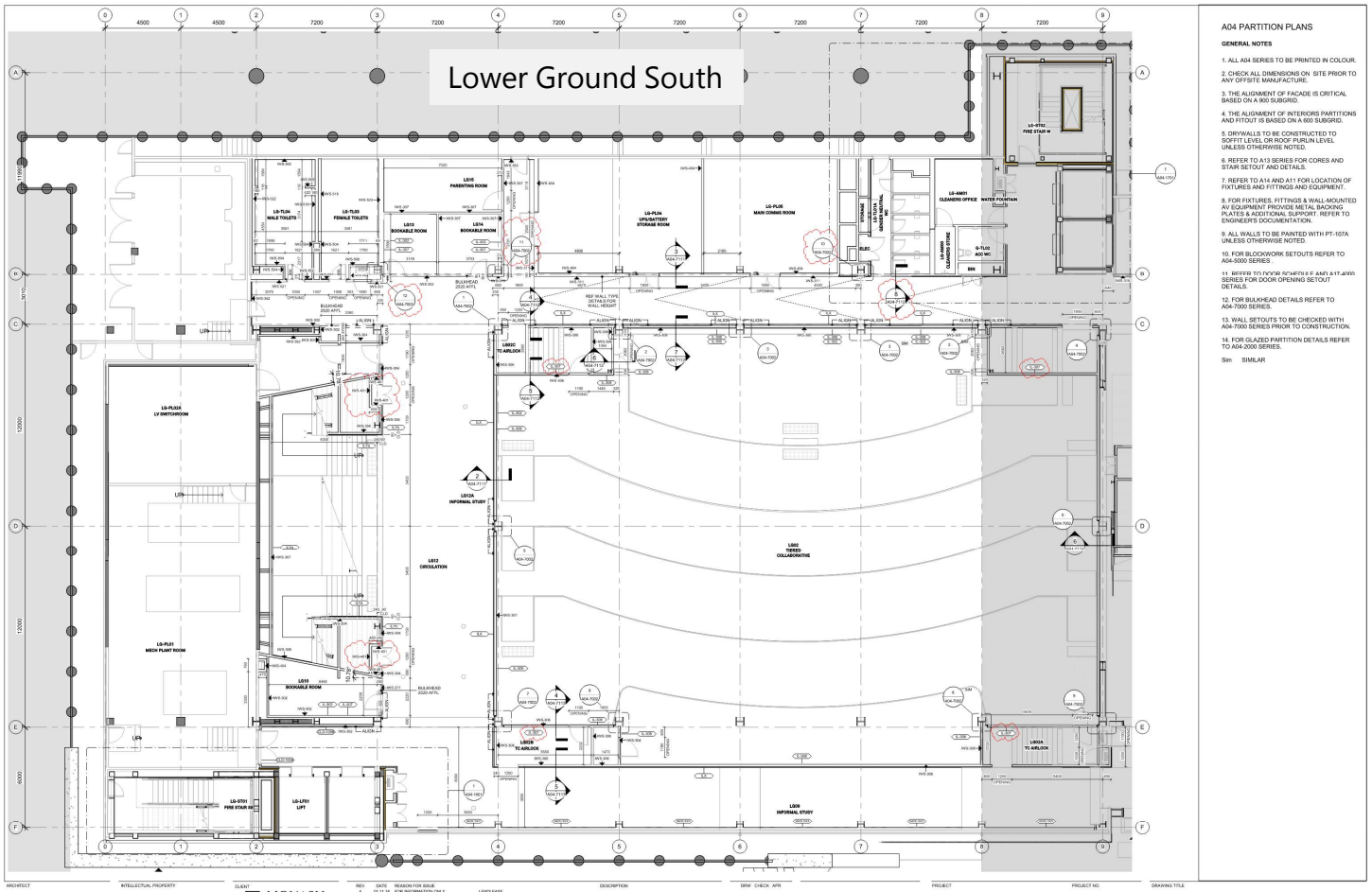
DRAWING NO.
A07-1004

REV
A

NORTH

4. Building Elevations

5. Floor Layout



ARCHITECT
GRIMSHAW
21 Bouverie Street, Melbourne, VIC 3053
+61 (03) 9321 2600
grimshaw.global

INTELLECTUAL PROPERTY
© Copyright Grimshaw architects.
Unless otherwise agreed in writing, all rights to use this document are subject to payment in full of all Grimshaw charges; this document may only be used for the purposes for which it was supplied by Grimshaw, retained and delivered, as notified in writing by Grimshaw; and this document may not be otherwise used, sold, loaned, modified, reverse engineered, or copied in whole or in part without prior written permission. Any unauthorised use of this document is at the user's sole risk and without limiting Grimshaw's rights the user releases and indemnifies Grimshaw from and against all loss or arising.

CLIENT
MONASH University

CONSULTANTS
aurecon

REV	DATE	REASON FOR ISSUE	DESCRIPTION
A	01.11.19	FOR INFORMATION ONLY	LONDLEASE
5	22.02.19	FOR INFORMATION	DRAFT ISSUE
6	01.03.19	FOR TENDER	
7	12.04.19	FOR COORDINATION	DETAILS REVD FOR ACOUSTIC ENG. APPROVAL
8	16.04.19	FOR COORDINATION	TAGS RELATED CORES DELETED: SOUTH EAST TOILETS REVD; COLLABORATIVE ROOMS REVD;
A	13.05.19	FOR AFC	WALL FINISHES REVD; WALLS REVD
B	22.05.19	FOR AFC	WALL FINISHES CODES REVD AND TAGS ADDED
C	31.05.19	FOR AFC	WALL SETOUTS ADDED
D	12.06.19	FOR AFC	WALL TYPES REVD; DOORS TO STORE ROOM DELETED
E	21.06.19	FOR AFC	DETAILS ADDED; WALL TYPES REVD; ACOUSTIC LINING TO AIRLOCKS ADDED

DRW CHECK APR
TR CC AC

PROJECT
MONASH TEd BUILDING

PROJECT NO.
16103

ISSUE
FOR INFORMATION

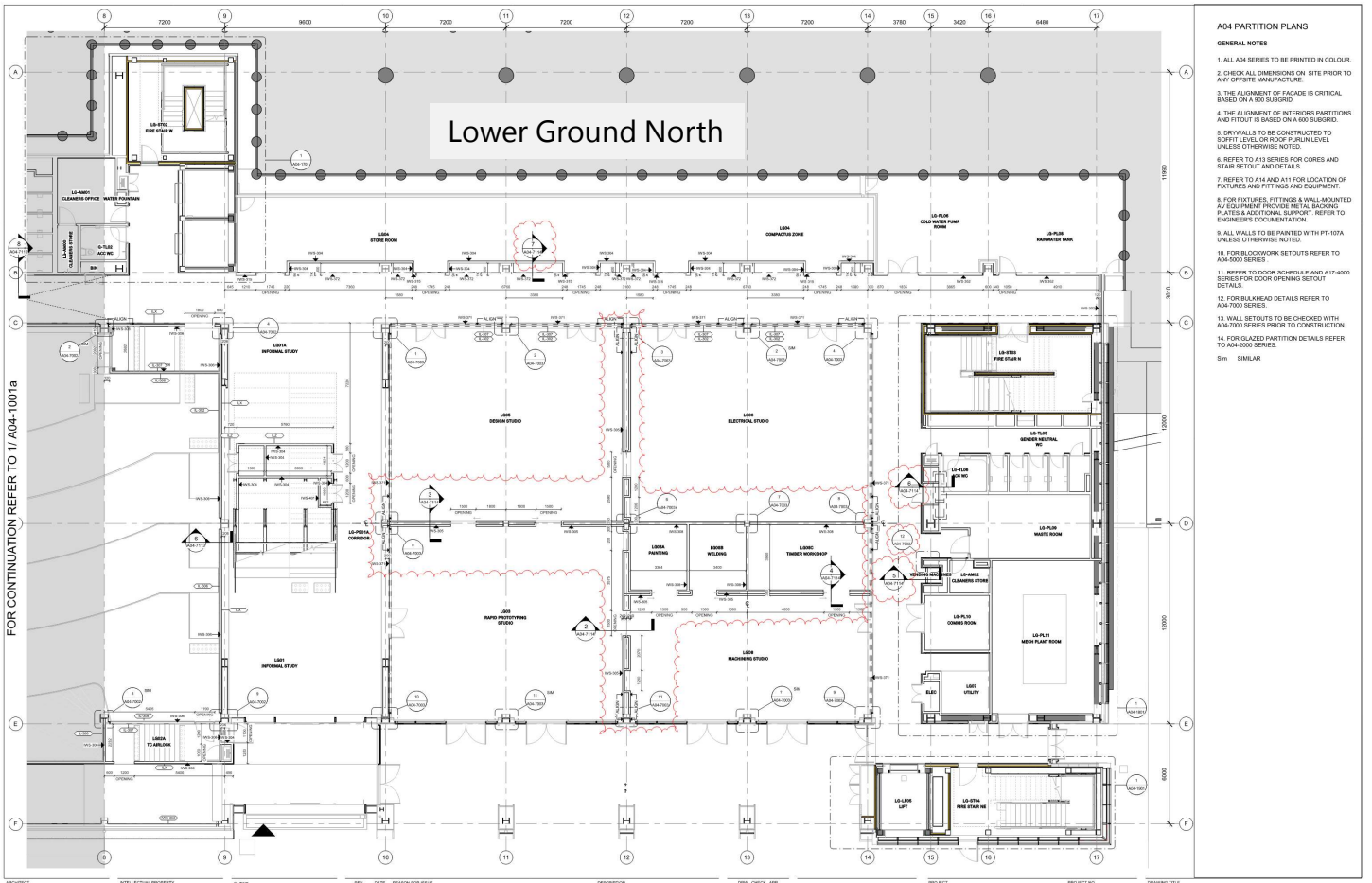
SCALE
1 : 100 @A1

DRAWING NO.
A04-1001a

REV
E

NORTH

DRAWING TITLE
PARTITIONS - LOWER GROUND PLAN SHEET 01



ARCHITECT
GRIMSHAW
21 Bouverie Street, Melbourne, VIC 3053
+61 (03) 9321 2600
grimshaw.global

INTELLECTUAL PROPERTY
© Copyright Grimshaw architects.
Unless otherwise agreed in writing, all rights to use this document are subject to payment in full of all Grimshaw charges; this document may only be used for the purposes for which it was supplied by Grimshaw, retained and delivered, as notified in writing by Grimshaw; and this document may not be otherwise used, sold, loaned, modified, reverse engineered, or copied in whole or in part without prior written permission. Any unauthorised use of this document is at the user's sole risk and without limiting Grimshaw's rights the user releases and indemnifies Grimshaw from and against all loss or arising.

CLIENT
MONASH University

CONSULTANTS
aurecon

REV	DATE	REASON FOR ISSUE	DESCRIPTION
A	01.11.19	FOR INFORMATION ONLY	LONDLEASE
5	22.02.19	FOR INFORMATION	DRAFT ISSUE
6	01.03.19	FOR TENDER	
7	12.04.19	FOR COORDINATION	DETAILS REVD FOR ACOUSTIC ENG. APPROVAL
8	16.04.19	FOR COORDINATION	TAGS RELATED CORES DELETED: SOUTH EAST TOILETS REVD; COLLABORATIVE ROOMS REVD;
A	13.05.19	FOR AFC	WALL FINISHES REVD; WALLS REVD
B	22.05.19	FOR AFC	WALL FINISHES CODES REVD AND TAGS ADDED
C	31.05.19	FOR AFC	WALL SETOUTS ADDED
D	12.06.19	FOR AFC	WALL TYPES REVD; DOORS TO STORE ROOM DELETED
E	21.06.19	FOR AFC	DETAILS ADDED; WALL TYPES REVD; ACOUSTIC LINING TO AIRLOCKS ADDED

DRW CHECK APR
TR CC AC

PROJECT
MONASH TEd BUILDING

PROJECT NO.
16103

ISSUE
FOR INFORMATION

SCALE
1 : 100 @A1

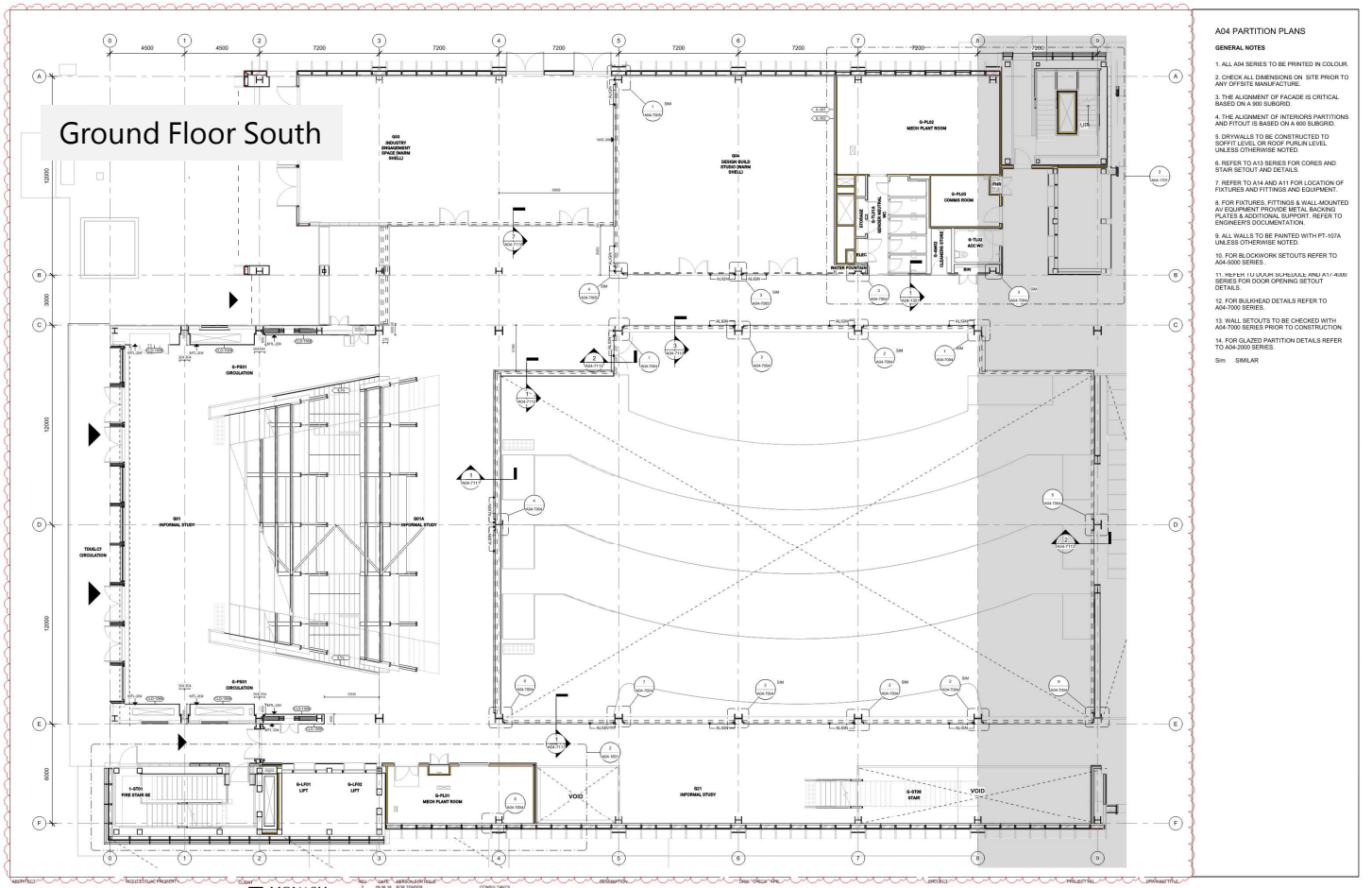
DRAWING NO.
A04-1001b

REV
E

NORTH

DRAWING TITLE
PARTITIONS - LOWER GROUND PLAN SHEET 02

5. Floor Layout continued



ARCHITECT
GRIMSHAW
21 Bouverie Street, Melbourne, VIC 3053
+61 (0)3 9321 2600
grimshaw.global

INTELLECTUAL PROPERTY

CLIENT
MONASH University

CONSULTANTS
aurecon

REV	DATE	ARCH/OWNER ISSUE	CONSULTANTS	DESCRIPTION
2	08.06.18	FOR TENDER	CONSULTANTS	
3	27.06.18	FOR TENDER	CONSULTANTS	
4	01.11.19	FOR INFORMATION ONLY	LENDLEASE	
5	22.02.19	FOR INFORMATION	DRAFT ISSUE	
6	01.03.19	FOR TENDER		
7	12.04.19	FOR COORDINATION	DETAILS REVD FOR ACOUSTIC ENG. APROVAL	
8	10.04.19	FOR COORDINATION	TAGS RELATED CORES DELETED; SOUTH EAST TOILETS REVD; COLLABORATIVE ROOMS REVD;	
A	13.05.19	FOR AFC	WALL FINISHES REVD; WALLS REVD	
B	22.05.19	FOR AFC	WALL FINISHES CORES REVD; TAGS ADDED; AV CUPBOARD REVD	
C	06.06.19	FOR AFC	WALL SETOUTS ADDED	

TR CC AC

PROJECT
MONASH TEd BUILDING

PROJECT NO.
16103

DRAWING TITLE
PARTITIONS - GROUND FLOOR PLAN SHEET 01

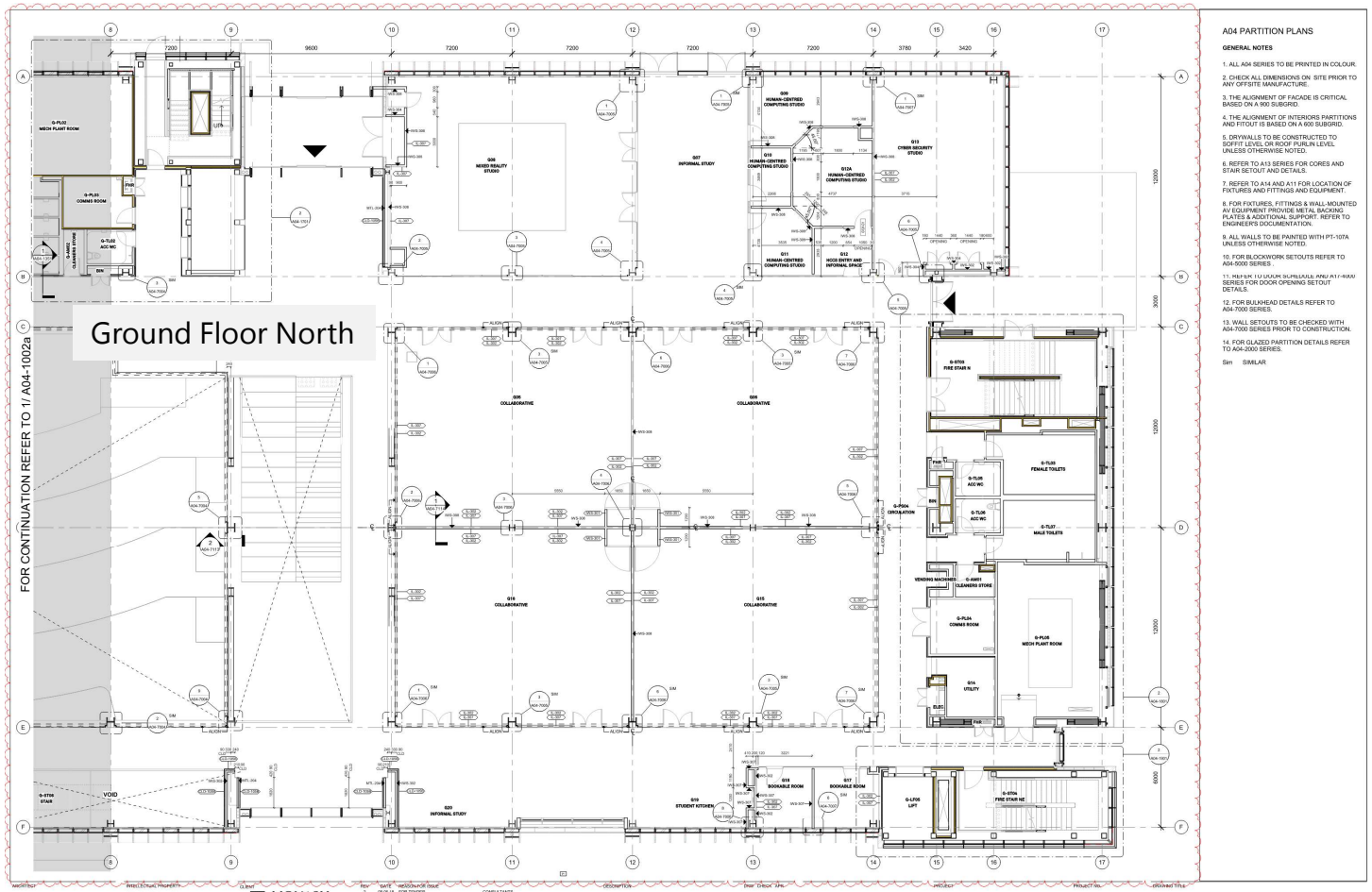
ISSUE
FOR INFORMATION

SCALE
1 : 100 @A1

DRAWING NO.
A04-1002a

REV
C

NORTH



ARCHITECT
GRIMSHAW
21 Bouverie Street, Melbourne, VIC 3053
+61 (0)3 9321 2600
grimshaw.global

INTELLECTUAL PROPERTY

CLIENT
MONASH University

CONSULTANTS
aurecon

REV	DATE	ARCH/OWNER ISSUE	CONSULTANTS	DESCRIPTION
2	08.06.18	FOR TENDER	CONSULTANTS	
3	27.06.18	FOR TENDER	CONSULTANTS	
4	01.11.19	FOR INFORMATION ONLY	LENDLEASE	
5	22.02.19	FOR INFORMATION	DRAFT ISSUE	
6	01.03.19	FOR TENDER		
7	12.04.19	FOR COORDINATION	DETAILS REVD FOR ACOUSTIC ENG. APROVAL	
8	10.04.19	FOR COORDINATION	TAGS RELATED CORES DELETED; SOUTH EAST TOILETS REVD; COLLABORATIVE ROOMS REVD;	
A	13.05.19	FOR AFC	WALL FINISHES REVD; WALLS REVD	
B	22.05.19	FOR AFC	WALL FINISHES CORES REVD; TAGS ADDED; AV CUPBOARD REVD	
C	06.06.19	FOR AFC	WALL SETOUTS ADDED	

TR CC AC

PROJECT
MONASH TEd BUILDING

PROJECT NO.
16103

DRAWING TITLE
PARTITIONS - GROUND FLOOR PLAN SHEET 02

ISSUE
FOR INFORMATION

SCALE
1 : 100 @A1

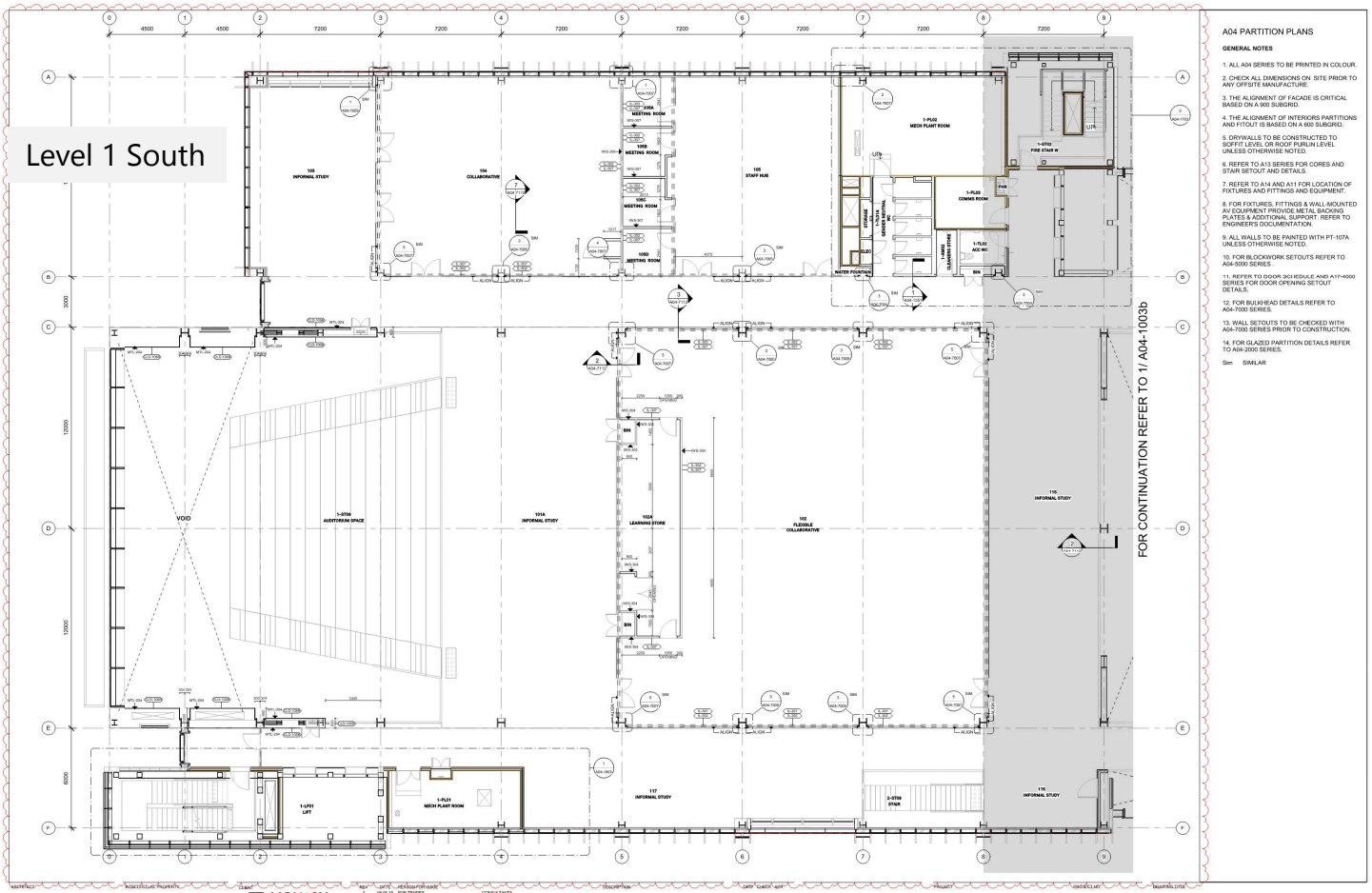
DRAWING NO.
A04-1002b

REV
C

NORTH

5. Floor Layout continued

Level 1 South



A04 PARTITION PLANS

GENERAL NOTES

1. ALL A04 SERIES TO BE PRINTED IN COLOUR.
2. CHECK ALL DIMENSIONS ON SITE PRIOR TO ANY OFFSITE MANUFACTURE.
3. THE ALIGNMENT OF FACADE IS CRITICAL BASED ON A 900 SUBGRID.
4. THE ALIGNMENT OF INTERIORS PARTITIONS AND FITOUT IS BASED ON A 600 SUBGRID.
5. DRYWALLS TO BE CONSTRUCTED TO SOFFIT LEVEL OR ROOF PURLIN LEVEL UNLESS OTHERWISE NOTED.
6. REFER TO A13 SERIES FOR CORES AND STAIR SETOUT AND DETAILS.
7. REFER TO A14 AND A11 FOR LOCATION OF FIXTURES AND FITTINGS AND EQUIPMENT.
8. FOR FIXTURES, FITTINGS & WALL-MOUNTED AV EQUIPMENT PROVIDE METAL BACKING PLATES & ADDITIONAL SUPPORT. REFER TO ENGINEER'S DOCUMENTATION.
9. ALL WALLS TO BE PAINTED WITH PT-107A UNLESS OTHERWISE NOTED.
10. FOR BLOCKWORK SETOUTS REFER TO A04-5000 SERIES .
11. REFER TO DOOR SCHEDULE AND A17-4000 SERIES FOR DOOR OPENING SETOUT DETAILS.
12. FOR BULKHEAD DETAILS REFER TO A04-7000 SERIES.
13. WALL SETOUTS TO BE CHECKED WITH A04-7000 SERIES PRIOR TO CONSTRUCTION.
14. FOR GLAZED PARTITION DETAILS REFER TO A04-2000 SERIES.

Sim SIMILAR

ARCHITECT
GRIMSHAW
21 Bouverie Street, Melbourne, VIC 3053
+61 (03) 9321 2600
grimshaw.global

INTELLECTUAL PROPERTY

CLIENT
MONASH University

CONSULTANTS
aurecon

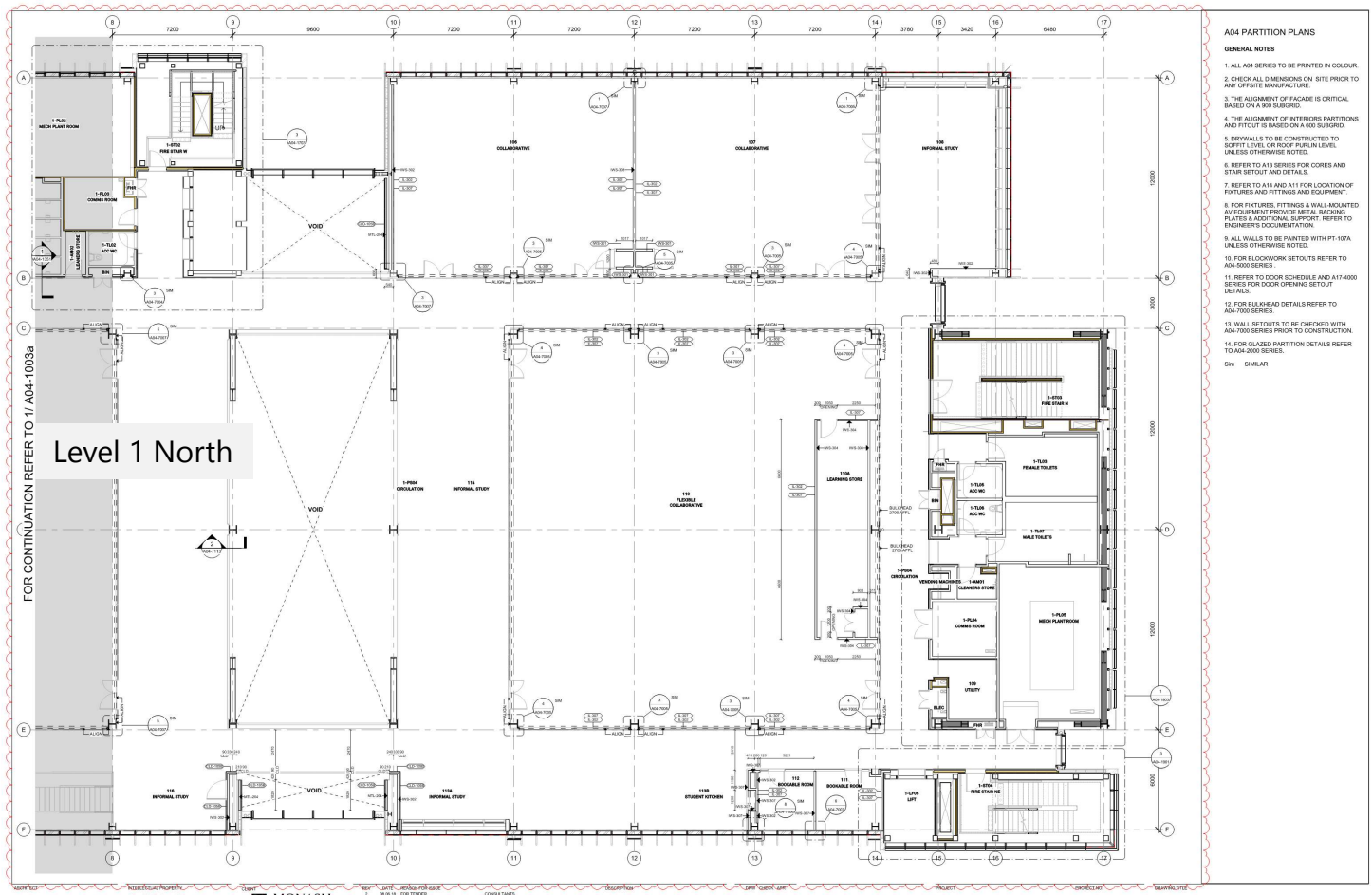
REV	DATE	REVISION FOR ISSUE	DESCRIPTION
2	06.06.18	FOR TENDER	CONSULTANTS
3	27.06.18	FOR TENDER	CONSULTANTS
4	05.11.18	FOR INFORMATION ONLY	LENDLEASE
5	22.02.19	FOR INFORMATION	DRAFT ISSUE
6	01.03.19	FOR TENDER	
7	12.04.19	FOR COORDINATION	DETAILS REVD FOR ACOUSTIC ENG. APPROVAL
8	10.04.19	FOR COORDINATION	TAGS RELATED CORES DELETED, SOUTH EAST TOILETS REVD; COLLABORATIVE ROOMS REVD;
A	22.05.19	FOR AFC	WALL FINISHES CODES REVD; TAGS ADDED; AV CUPBOARD REVD;
B	11.06.19	FOR AFC	WALL SETOUTS ADDED

TR CC AC

PROJECT: MONASH TEd BUILDING
PROJECT NO.: 16103
DRAWING TITLE: PARTITIONS - LEVEL 01 PLAN SHEET 01

ISSUE: FOR INFORMATION
SCALE: 1 : 100 @A1
DRAWING NO.: A04-1003a
REV: B
NORTH

Level 1 North



A04 PARTITION PLANS

GENERAL NOTES

1. ALL A04 SERIES TO BE PRINTED IN COLOUR.
2. CHECK ALL DIMENSIONS ON SITE PRIOR TO ANY OFFSITE MANUFACTURE.
3. THE ALIGNMENT OF FACADE IS CRITICAL BASED ON A 900 SUBGRID.
4. THE ALIGNMENT OF INTERIORS PARTITIONS AND FITOUT IS BASED ON A 600 SUBGRID.
5. DRYWALLS TO BE CONSTRUCTED TO SOFFIT LEVEL OR ROOF PURLIN LEVEL UNLESS OTHERWISE NOTED.
6. REFER TO A13 SERIES FOR CORES AND STAIR SETOUT AND DETAILS.
7. REFER TO A14 AND A11 FOR LOCATION OF FIXTURES AND FITTINGS AND EQUIPMENT.
8. FOR FIXTURES, FITTINGS & WALL-MOUNTED AV EQUIPMENT PROVIDE METAL BACKING PLATES & ADDITIONAL SUPPORT. REFER TO ENGINEER'S DOCUMENTATION.
9. ALL WALLS TO BE PAINTED WITH PT-107A UNLESS OTHERWISE NOTED.
10. FOR BLOCKWORK SETOUTS REFER TO A04-5000 SERIES .
11. REFER TO DOOR SCHEDULE AND A17-4000 SERIES FOR DOOR OPENING SETOUT DETAILS.
12. FOR BULKHEAD DETAILS REFER TO A04-7000 SERIES.
13. WALL SETOUTS TO BE CHECKED WITH A04-7000 SERIES PRIOR TO CONSTRUCTION.
14. FOR GLAZED PARTITION DETAILS REFER TO A04-2000 SERIES.

Sim SIMILAR

ARCHITECT
GRIMSHAW
21 Bouverie Street, Melbourne, VIC 3053
+61 (03) 9321 2600
grimshaw.global

INTELLECTUAL PROPERTY
© Copyright Grimshaw architects.
Unless otherwise agreed in writing, all rights to use this document are subject to payment in full of all Grimshaw charges, this document may only be used for the express purpose and project for which it has been created and delivered, as notified in writing by Grimshaw; and this document may not be otherwise used, or copied. Any unauthorised use of this document is at the user's sole risk and without limiting Grimshaw's rights the user releases and indemnifies Grimshaw from and against all loss so arising.

CLIENT
MONASH University

CONSULTANTS
aurecon

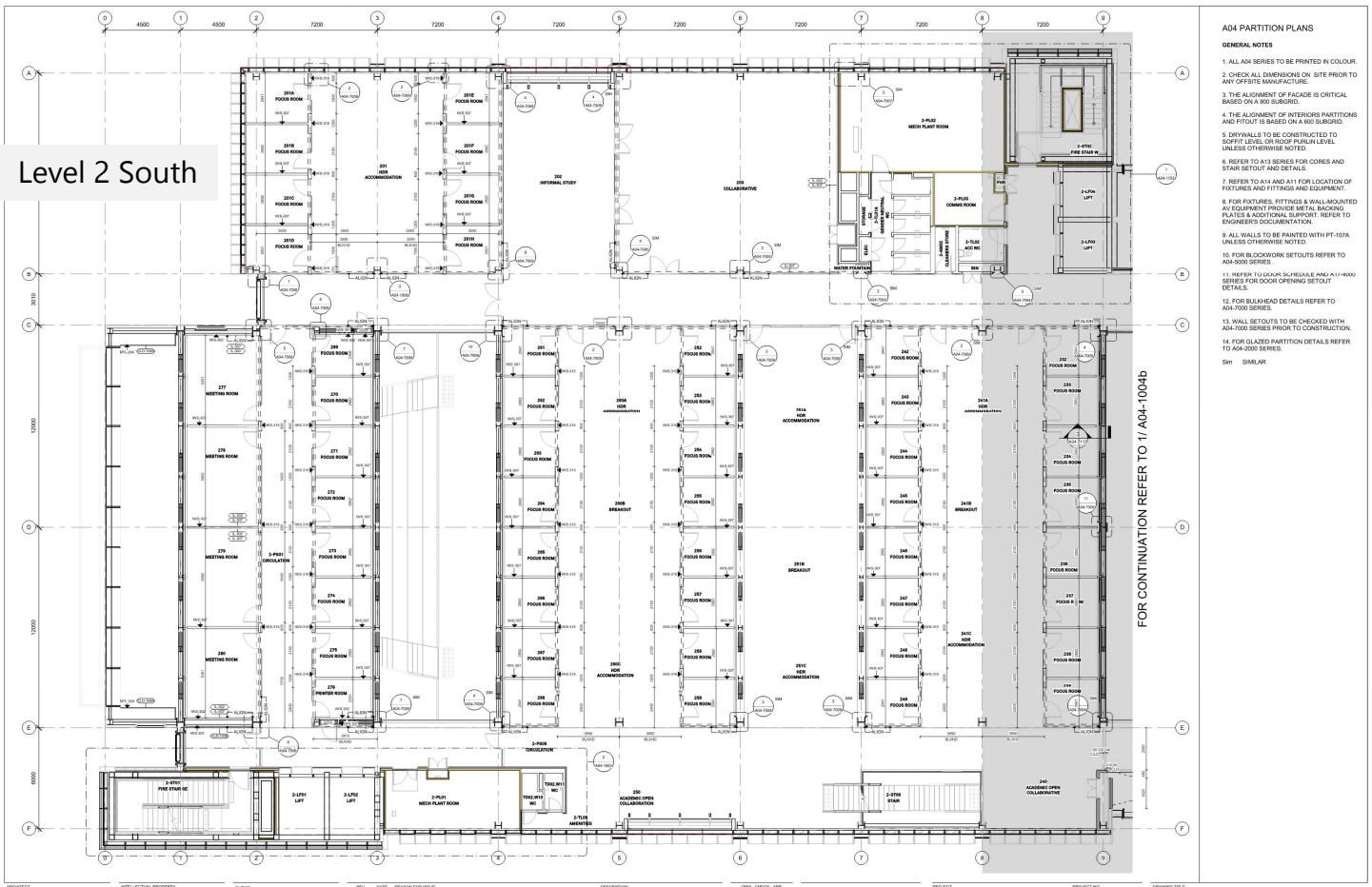
REV	DATE	REVISION FOR ISSUE	DESCRIPTION
2	06.06.18	FOR TENDER	CONSULTANTS
3	27.06.18	FOR TENDER	CONSULTANTS
4	05.11.18	FOR INFORMATION ONLY	LENDLEASE
5	22.02.19	FOR INFORMATION	DRAFT ISSUE
6	01.03.19	FOR TENDER	
7	12.04.19	FOR COORDINATION	DETAILS REVD FOR ACOUSTIC ENG. APPROVAL
8	10.04.19	FOR COORDINATION	TAGS RELATED CORES DELETED; SOUTH EAST TOILETS REVD; COLLABORATIVE ROOMS REVD;
A	22.05.19	FOR AFC	WALL FINISHES CODES REVD; TAGS ADDED; AV CUPBOARD REVD;
B	11.06.19	FOR AFC	WALL SETOUTS ADDED

TR CC AC

PROJECT: MONASH TEd BUILDING
PROJECT NO.: 16103
DRAWING TITLE: PARTITIONS - LEVEL 01 PLAN SHEET 02

ISSUE: FOR INFORMATION
SCALE: 1 : 100 @A1
DRAWING NO.: A04-1003b
REV: B
NORTH

5. Floor Layout continued



A04 PARTITION PLANS

GENERAL NOTES

1. ALL A04 SERIES TO BE PRINTED IN COLOUR.
2. CHECK ALL DIMENSIONS ON SITE PRIOR TO ANY OFFSITE MANUFACTURE.
3. THE ALIGNMENT OF FACADE IS CRITICAL BASED ON A 900 SUBGRID.
4. THE ALIGNMENT OF INTERIORS PARTITIONS AND FITOUT IS BASED ON A 600 SUBGRID.
5. DRYWALLS TO BE CONSTRUCTED TO SOFFIT LEVEL OR ROOF PURLIN LEVEL UNLESS OTHERWISE NOTED.
6. REFER TO A13 SERIES FOR CORES AND STAIR SETOUT AND DETAILS.
7. REFER TO A14 AND A11 FOR LOCATION OF FIXTURES AND FITTINGS AND EQUIPMENT.
8. FOR FIXTURES, FITTINGS & WALL-MOUNTED AV EQUIPMENT PROVIDE METAL BACKING PLATES & ADDITIONAL SUPPORT. REFER TO ENGINEER'S DOCUMENTATION.
9. ALL WALLS TO BE PAINTED WITH PT-107A UNLESS OTHERWISE NOTED.
10. FOR BLOCKWORK SETOUTS REFER TO A04-5020 SERIES.
11. REFER TO DOOR SCHEDULE AND A17-4000 SERIES FOR DOOR OPENING SETOUT DETAILS.
12. FOR BULKHEAD DETAILS REFER TO A04-7000 SERIES.
13. WALL SETOUTS TO BE CHECKED WITH A04-7000 SERIES PRIOR TO CONSTRUCTION.
14. FOR GLAZED PARTITION DETAILS REFER TO A04-2000 SERIES.

Sim SIMILAR

ARCHITECT
GRIMSHAW
21 Bouverie Street, Melbourne, VIC 3053
+61 (03) 9321 2600
grimshaw.global

INTELLECTUAL PROPERTY
© Copyright Grimshaw architects.
Unless otherwise agreed in writing, all rights to use this document are subject to payment in full of all Grimshaw charges. This document may only be used for the express purpose and project for which it has been created and delivered, as notified in writing by Grimshaw, and this document may not be otherwise used, or copied. Any unauthorised use of this document will be at the user's sole risk and without limiting Grimshaw's rights the user releases and indemnifies Grimshaw from and against all loss or arising

CLIENT
MONASH University

CONSULTANTS
aurecon

REV	DATE	REASON FOR ISSUE	DESCRIPTION
2	30.06.19	FOR TENDER	CONSULTANTS
3	27.06.19	FOR TENDER	CONSULTANTS
4	01.11.19	FOR INFORMATION ONLY	LEND/LEASE
5	22.02.19	FOR INFORMATION	DRAFT ISSUE
6	01.03.19	FOR TENDER	
7	12.04.19	FOR COORDINATION	DETAILS REVD FOR ACOUSTIC END. APPROVAL
8	16.04.19	FOR COORDINATION	TAGS RELATED CORES DELETED. SOUTH EAST TOILETS REVD. COLLABORATIVE ROOMS REVD.
A	22.05.19	FOR AFC	WALL FINISHES CODES REVD AND TAGS ADDED
B	21.06.19	FOR AFC	WALL SETOUTS ADDED

DRW CHECK APR
TR CC AC

PROJECT
MONASH TEd BUILDING

PROJECT NO.
16103

DRAWING TITLE
PARTITIONS - LEVEL 02 PLAN SHEET 01

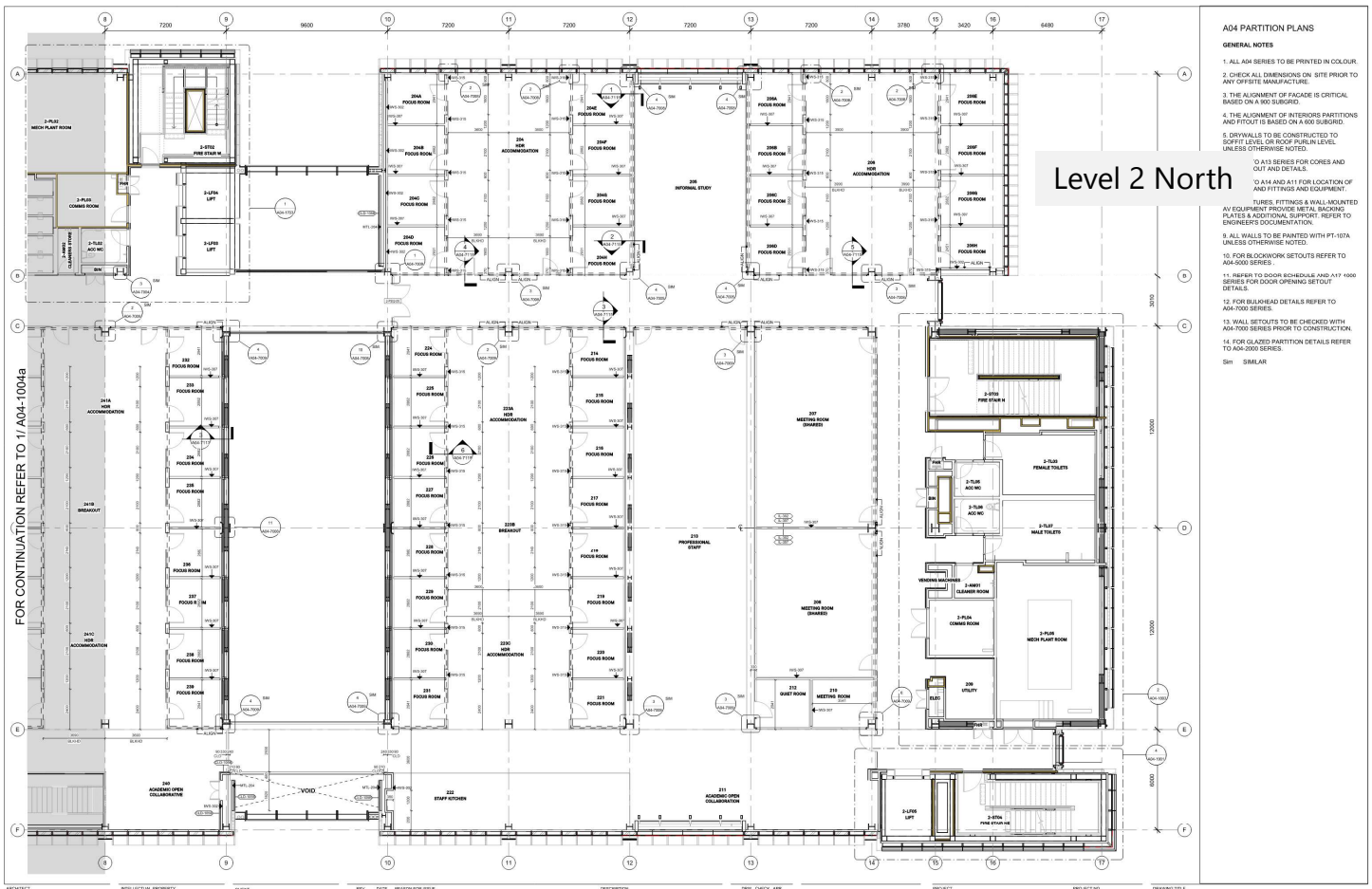
ISSUE
FOR INFORMATION

SCALE
1 : 100 @A1

DRAWING NO.
A04-1004a

REV
B

NORTH



A04 PARTITION PLANS

GENERAL NOTES

1. ALL A04 SERIES TO BE PRINTED IN COLOUR.
2. CHECK ALL DIMENSIONS ON SITE PRIOR TO ANY OFFSITE MANUFACTURE.
3. THE ALIGNMENT OF FACADE IS CRITICAL BASED ON A 900 SUBGRID.
4. THE ALIGNMENT OF INTERIORS PARTITIONS AND FITOUT IS BASED ON A 600 SUBGRID.
5. DRYWALLS TO BE CONSTRUCTED TO SOFFIT LEVEL OR ROOF PURLIN LEVEL UNLESS OTHERWISE NOTED.
6. REFER TO A13 SERIES FOR CORES AND STAIR SETOUT AND DETAILS.
7. REFER TO A14 AND A11 FOR LOCATION OF FIXTURES AND FITTINGS AND EQUIPMENT.
8. FOR FIXTURES, FITTINGS & WALL-MOUNTED AV EQUIPMENT PROVIDE METAL BACKING PLATES & ADDITIONAL SUPPORT. REFER TO ENGINEER'S DOCUMENTATION.
9. ALL WALLS TO BE PAINTED WITH PT-107A UNLESS OTHERWISE NOTED.
10. FOR BLOCKWORK SETOUTS REFER TO A04-5020 SERIES.
11. REFER TO DOOR SCHEDULE AND A17-4000 SERIES FOR DOOR OPENING SETOUT DETAILS.
12. FOR BULKHEAD DETAILS REFER TO A04-7000 SERIES.
13. WALL SETOUTS TO BE CHECKED WITH A04-7000 SERIES PRIOR TO CONSTRUCTION.
14. FOR GLAZED PARTITION DETAILS REFER TO A04-2000 SERIES.

Sim SIMILAR

ARCHITECT
GRIMSHAW
21 Bouverie Street, Melbourne, VIC 3053
+61 (03) 9321 2600
grimshaw.global

INTELLECTUAL PROPERTY
© Copyright Grimshaw architects.
Unless otherwise agreed in writing, all rights to use this document are subject to payment in full of all Grimshaw charges. This document may only be used for the express purpose and project for which it has been created and delivered, as notified in writing by Grimshaw, and this document may not be otherwise used, or copied. Any unauthorised use of this document will be at the user's sole risk and without limiting Grimshaw's rights the user releases and indemnifies Grimshaw from and against all loss or arising

CLIENT
MONASH University

CONSULTANTS
aurecon

REV	DATE	REASON FOR ISSUE	DESCRIPTION
2	30.06.19	FOR TENDER	CONSULTANTS
3	27.06.19	FOR TENDER	CONSULTANTS
4	01.11.19	FOR INFORMATION ONLY	LEND/LEASE
5	22.02.19	FOR INFORMATION	DRAFT ISSUE
6	01.03.19	FOR TENDER	
7	12.04.19	FOR COORDINATION	DETAILS REVD FOR ACOUSTIC END. APPROVAL
8	16.04.19	FOR COORDINATION	TAGS RELATED CORES DELETED. SOUTH EAST TOILETS REVD. COLLABORATIVE ROOMS REVD.
A	22.05.19	FOR AFC	WALL FINISHES CODES REVD AND TAGS ADDED
B	21.06.19	FOR AFC	WALL SETOUTS ADDED

DRW CHECK APR
TR CC AC

PROJECT
MONASH TEd BUILDING

PROJECT NO.
16103

DRAWING TITLE
PARTITIONS - LEVEL 02 PLAN SHEET 02

ISSUE
FOR INFORMATION

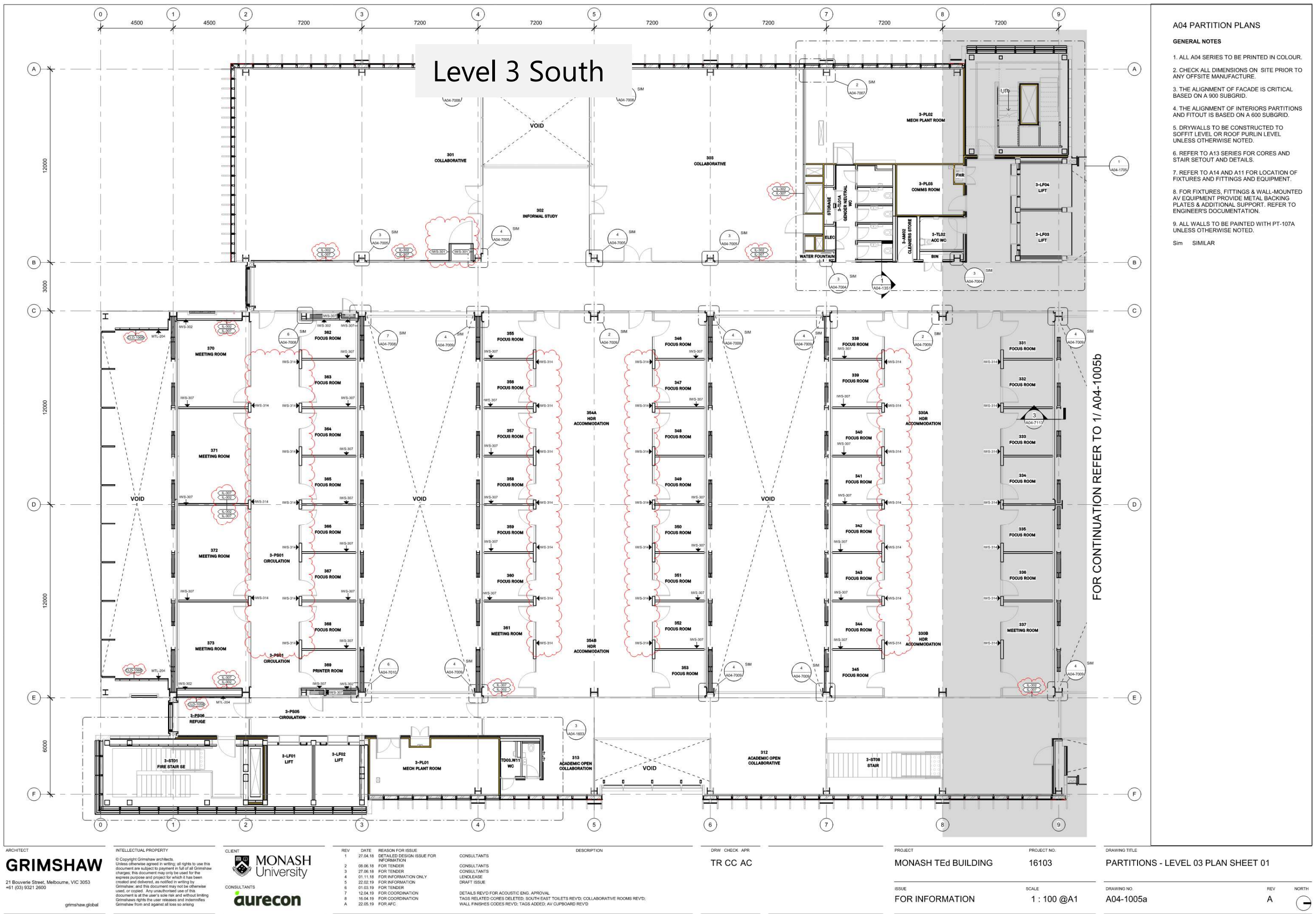
SCALE
1 : 100 @A1

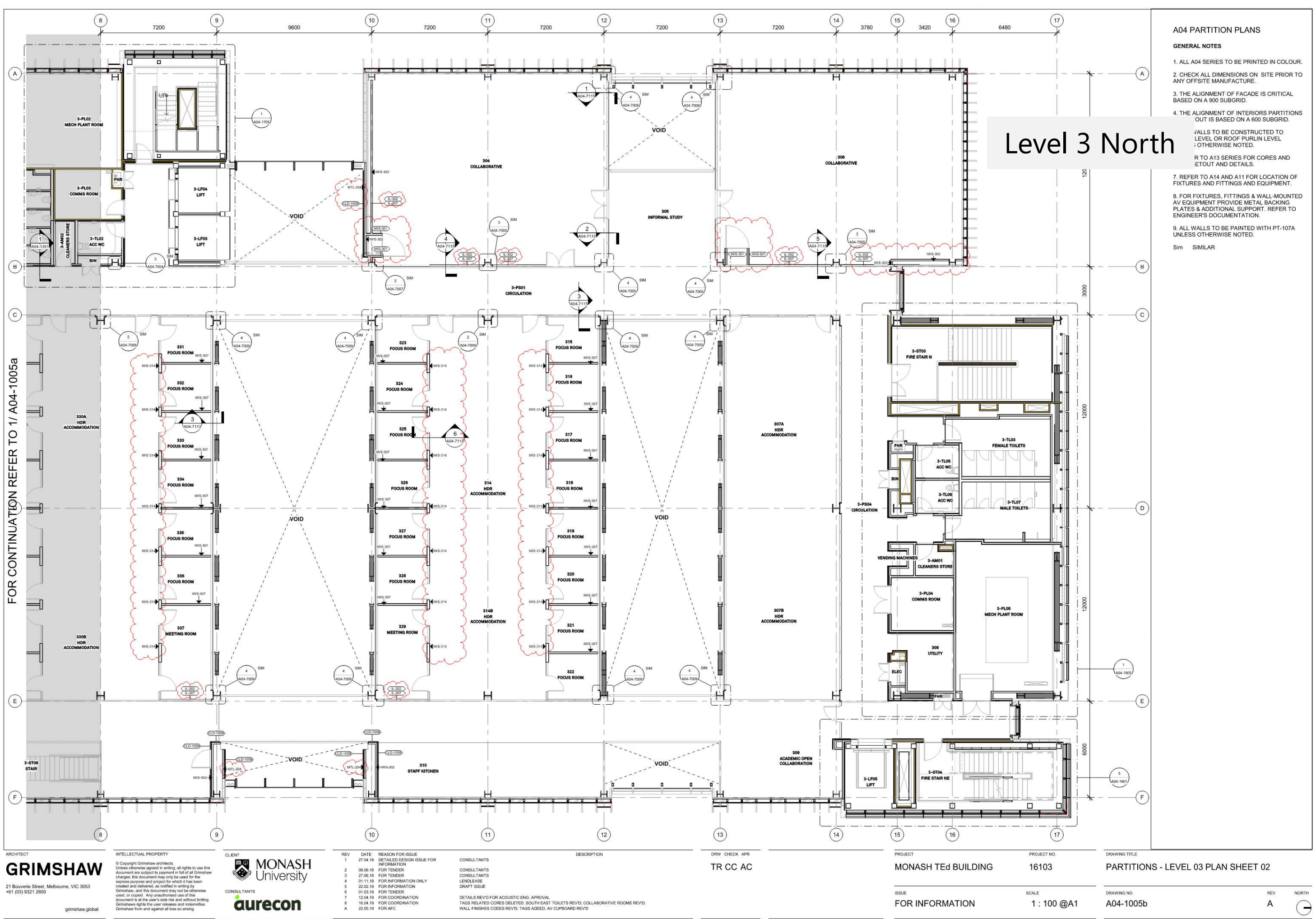
DRAWING NO.
A04-1004b

REV
B

NORTH

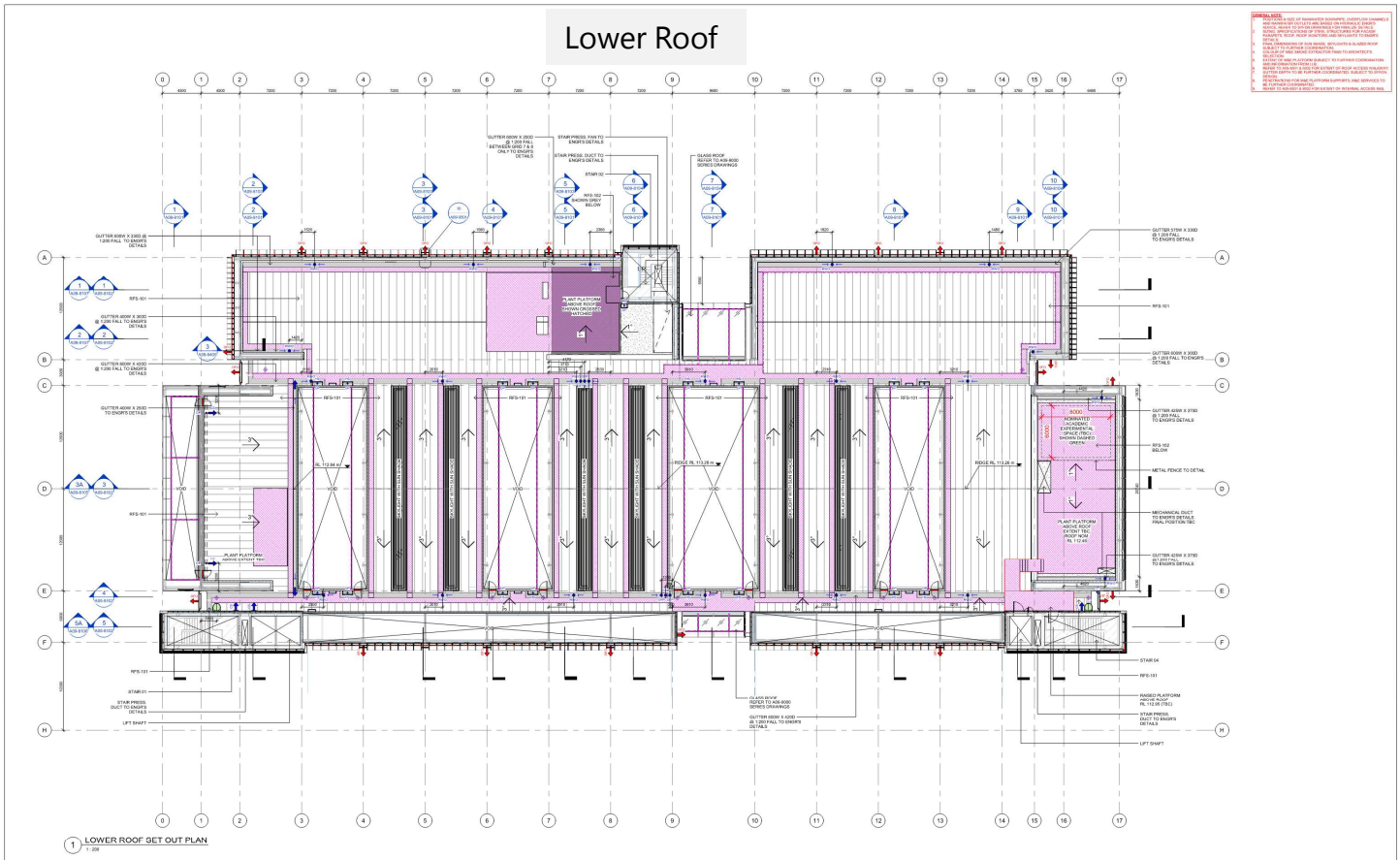
5. Floor Layout continued





5. Roof Layout

Lower Roof



1 LOWER ROOF SET OUT PLAN
1 : 200

ARCHITECT
GRIMSHAW
21 Bouverie Street, Melbourne, VIC 3053
+61 (03) 9321 2600
grimshaw.global

INTELLECTUAL PROPERTY
© Copyright Grimshaw architects
Unless otherwise agreed in writing, all rights to use this document are subject to payment in full of all Grimshaw charges. This document may only be used for the purposes for which it was supplied by Grimshaw, and this document may not be otherwise used, or copied. Any unauthorised use of this document is at the user's sole risk and without limiting Grimshaw's rights the user releases and indemnifies Grimshaw from and against all loss so arising

CLIENT
MONASH University
CONSULTANTS
aurecon

REV	DATE	REASON FOR ISSUE	
1	13.12.18	FOR INFORMATION	LENDLEASE
2	11.01.19	FOR INFORMATION	LENDLEASE
3	01.02.19	ROOF PACKAGE DRAFT ONLY	LENDLEASE
4	05.02.19	ROOF PACKAGE DRAFT ONLY	LENDLEASE
5	06.03.19	FOR ROOF ACCESS COORDINATION	LENDLEASE
6	22.03.19	ROOF - FOR INFORMATION	LENDLEASE
7	20.03.19	ROOF - FOR INFORMATION	LENDLEASE
A	17.05.19	ROOF PLANS FOR AFC - 1ST ISSUE	LENDLEASE
B	07.06.19	FOR AFC - GUTTER & OVERFLOW DETAILS	LENDLEASE

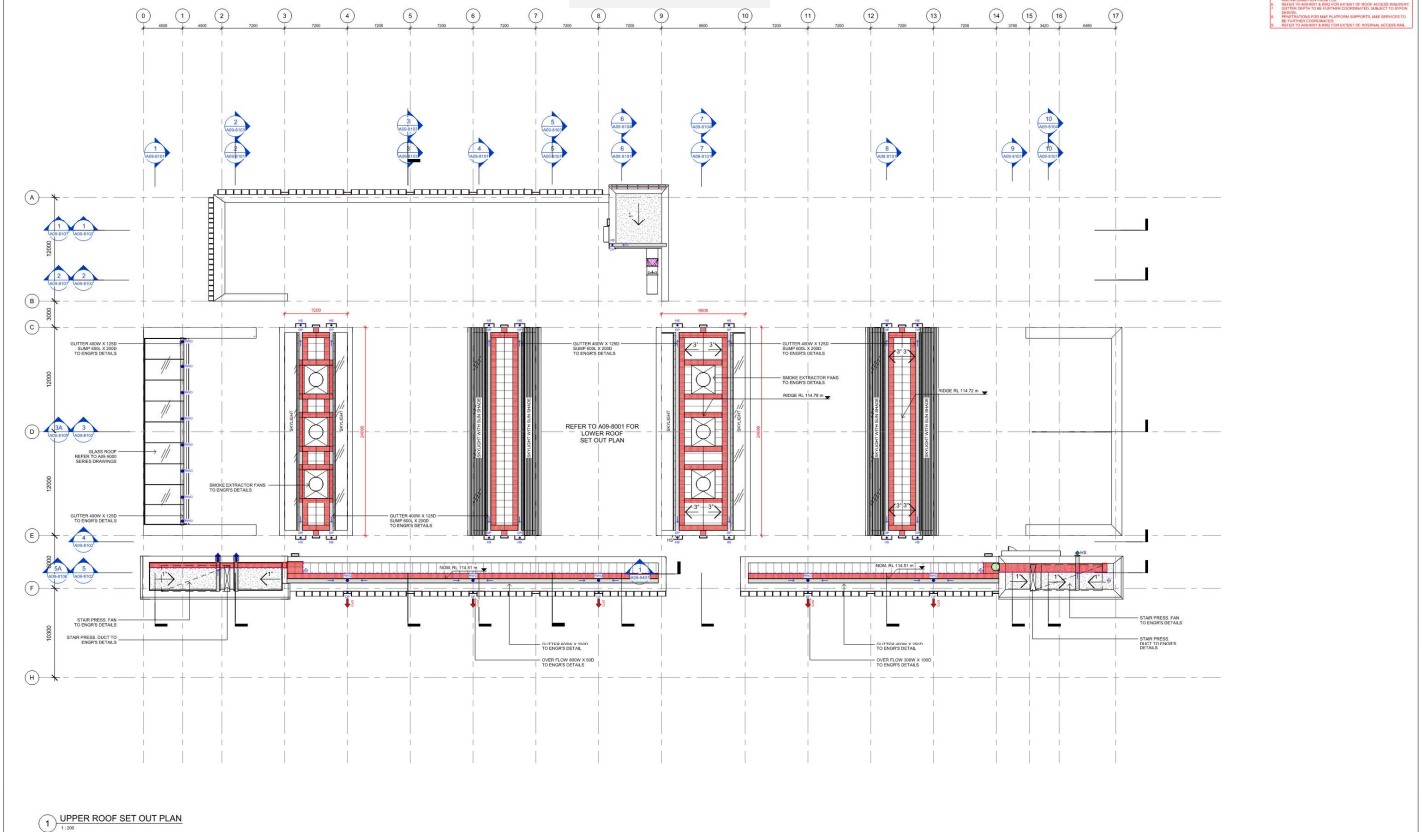
DESCRIPTION

DRW CHECK APR
SL BC BC

KEY PLAN

PROJECT
MONASH TEd BUILDING
PROJECT NO.
16103
DRAWING TITLE
LOWER ROOF SETOUT PLAN
ISSUE
FOR CONSTRUCTION
SCALE
As indicated @A1
DRAWING NO.
A09-8001
REV
B
NORTH

Upper Roof



1 UPPER ROOF SET OUT PLAN
1 : 200

ARCHITECT
GRIMSHAW
21 Bouverie Street, Melbourne, VIC 3053
+61 (03) 9321 2600
grimshaw.global

INTELLECTUAL PROPERTY
© Copyright Grimshaw architects
Unless otherwise agreed in writing, all rights to use this document are subject to payment in full of all Grimshaw charges. This document may only be used for the purposes for which it was supplied by Grimshaw, and this document may not be otherwise used, or copied. Any unauthorised use of this document is at the user's sole risk and without limiting Grimshaw's rights the user releases and indemnifies Grimshaw from and against all loss so arising

CLIENT
MONASH University
CONSULTANTS
aurecon

REV	DATE	REASON FOR ISSUE	
1	13.12.18	FOR INFORMATION	LENDLEASE
2	11.01.19	FOR INFORMATION	LENDLEASE
3	01.02.19	ROOF PACKAGE DRAFT ONLY	LENDLEASE
4	05.02.19	ROOF PACKAGE DRAFT ONLY	LENDLEASE
5	06.03.19	FOR ROOF ACCESS COORDINATION	LENDLEASE
6	22.03.19	ROOF - FOR INFORMATION	LENDLEASE
7	20.03.19	ROOF - FOR INFORMATION	LENDLEASE
A	17.05.19	ROOF PLANS FOR AFC - 1ST ISSUE	LENDLEASE

DESCRIPTION

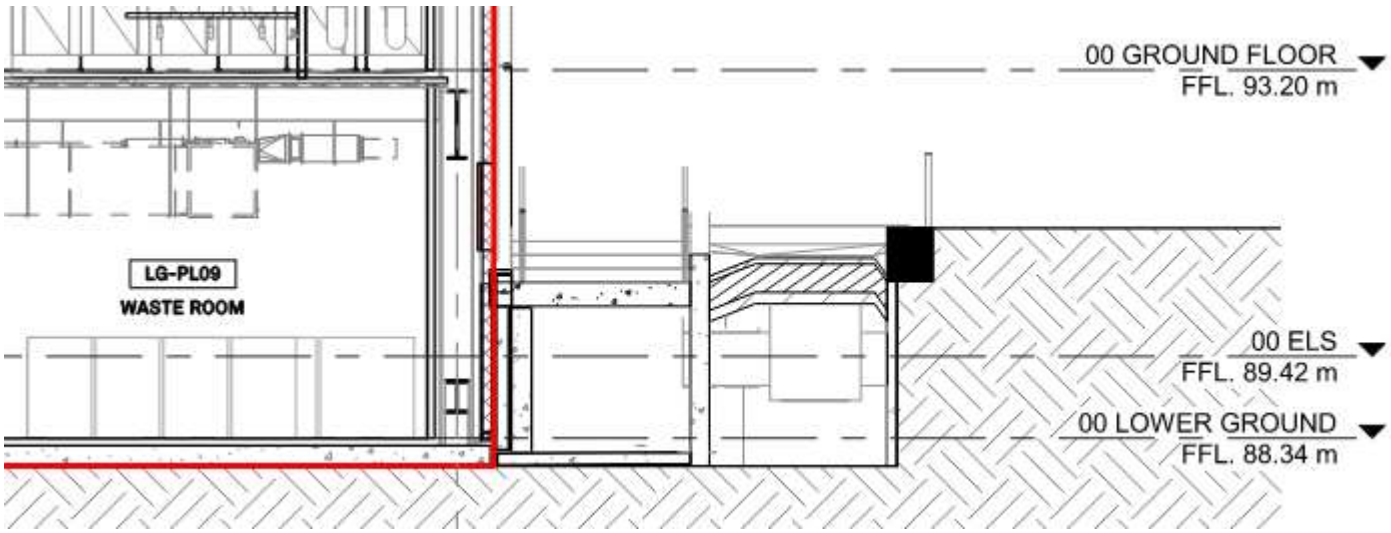
DRW CHECK APR
SL BC BC

KEY PLAN

PROJECT
MONASH TEd BUILDING
PROJECT NO.
16103
DRAWING TITLE
UPPER ROOF SETOUT PLAN
ISSUE
FOR CONSTRUCTION
SCALE
As indicated @A1
DRAWING NO.
A09-8002
REV
A
NORTH

6. Construction of Ground Floor Slab

Concrete slab on grade, uninsulated



Bauteil Nr.						Interior insulation?
49ud	Ground in contact with Slab UG					

Heat transmission resistance [m²K/W]

Orientation of building element: 0.13 — interior R_{si}: 0.13

Adjacent to: 2-Ground — exterior R_{se}: 0.00

Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Ground in contact with Slab UG	1.500					250

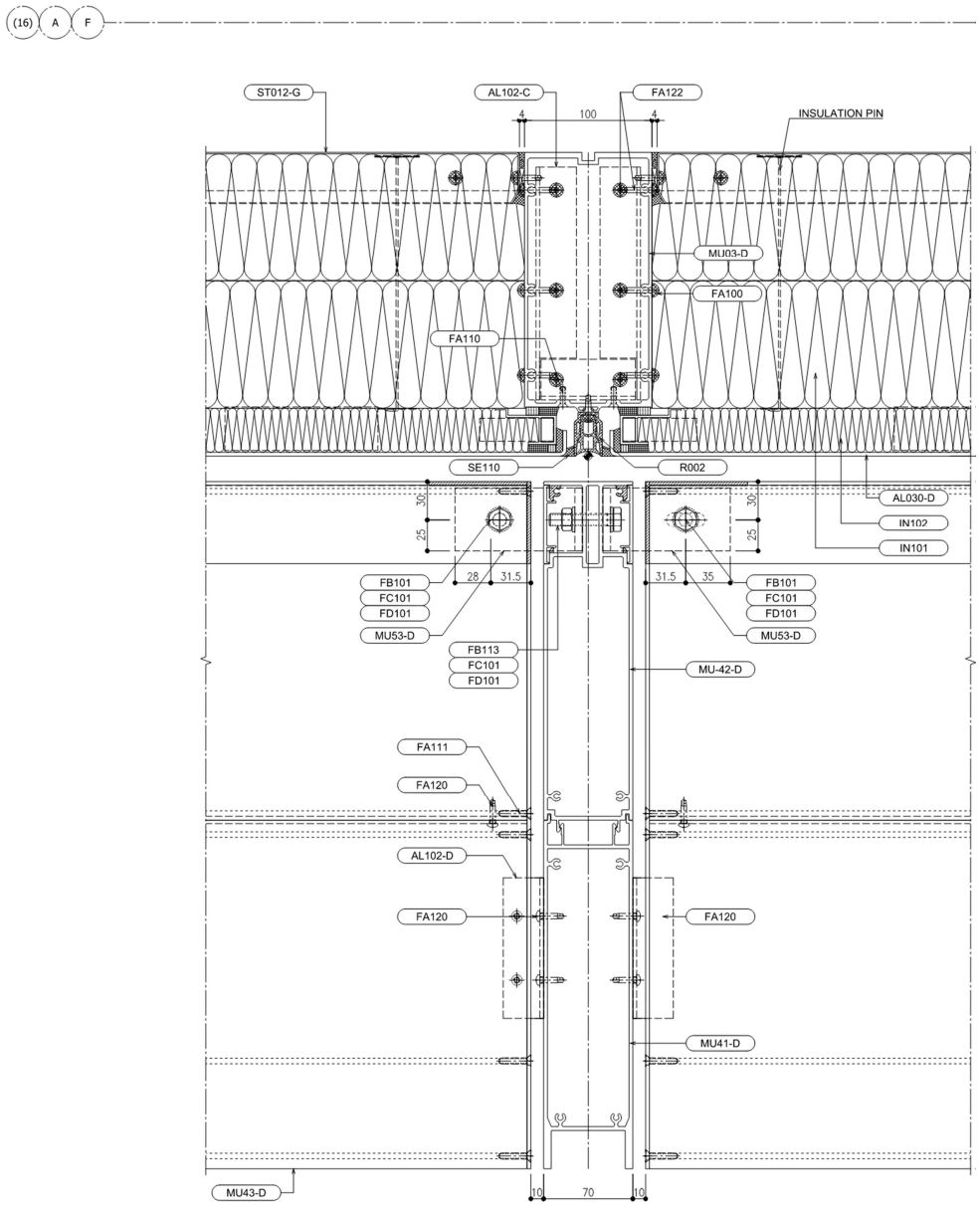
Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
100%			25.0 cm

U-value supplement: W/(m²K)

U-value: 3.371 W/(m²K)

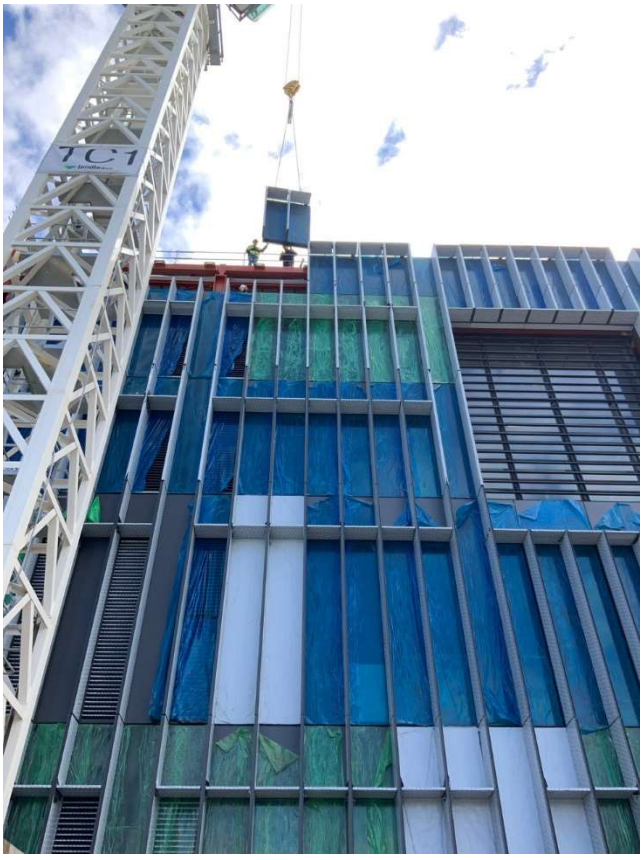
7. Construction of Exterior Walls

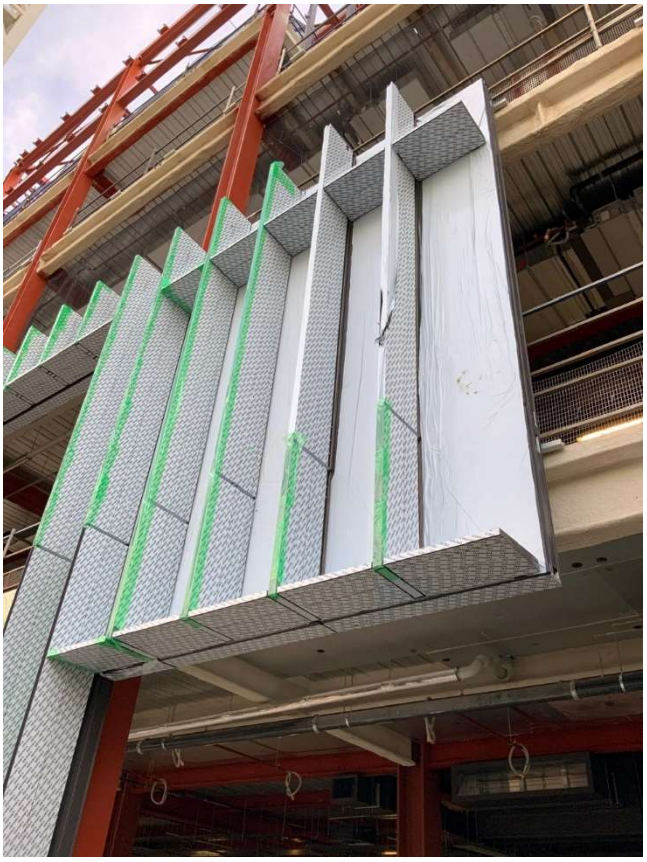
The façade elements are mostly mounted sandwich panels. The sandwich panel consists of 3 layers of rock wool insulation (2x50mm and 65mm). The external face of the sandwich panel is made of 3mm thick formed aluminium sheet with a powder coated finish. The internal face of the sandwich panel is 1.2mm thick galvanised steel. The building envelope consists of 5 different curtain wall types.



1 SD-4006 TYPICAL-HORIZONTAL SECTION
EWS-101 Scale: 1:2

7. Construction of Exterior Walls





Assembly no.						Interior insulation?
02ud	EWS-101 (Ceiling Cavity)					

Heat transmission resistance [m²K/W]

Orientation of building element	0.13	interior R_{si}:	0.13
Adjacent to	0.04	exterior R_{se}:	0.04

Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Unitised Curtain wall	0.120					100
Askin panel	0.035					67

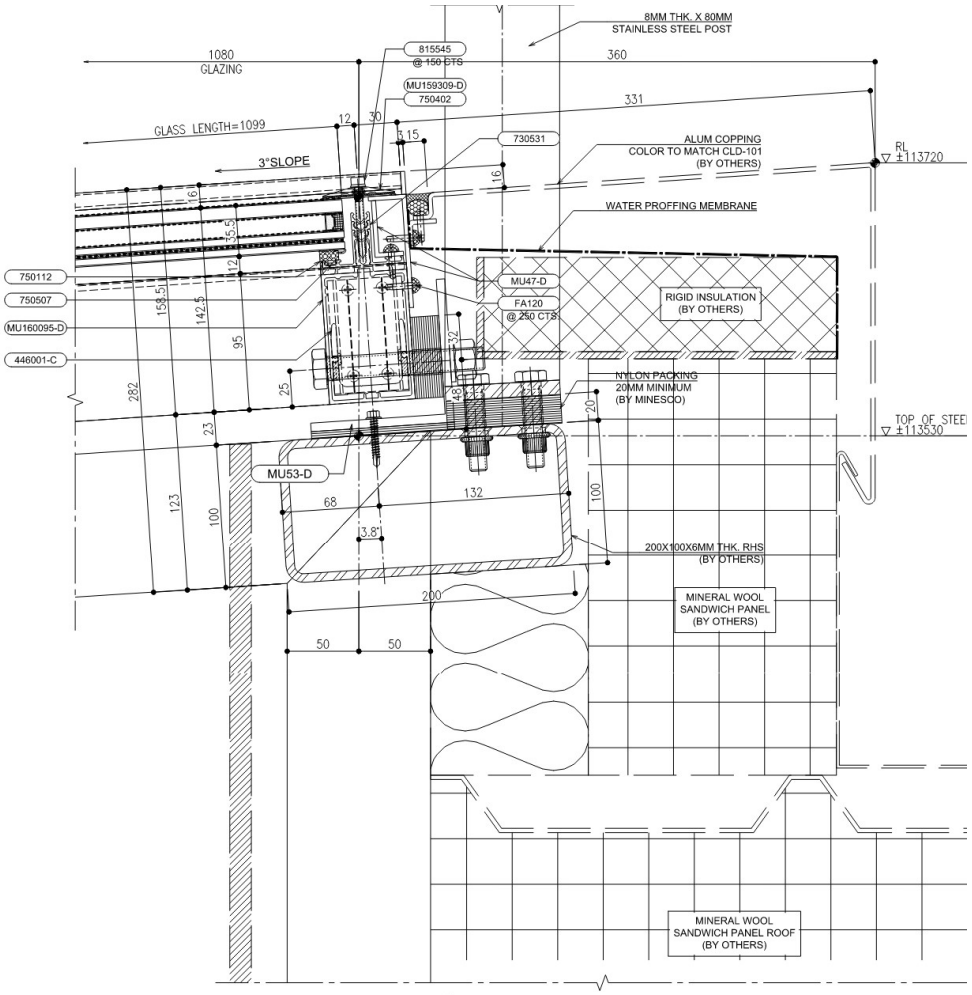
Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
100%			16.7 cm

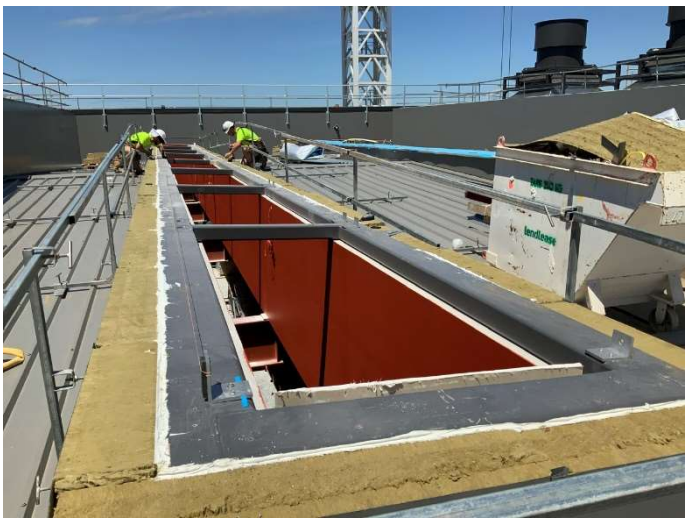
U-value supplement: W/(m²K)

U-value: 0.343 W/(m²K)

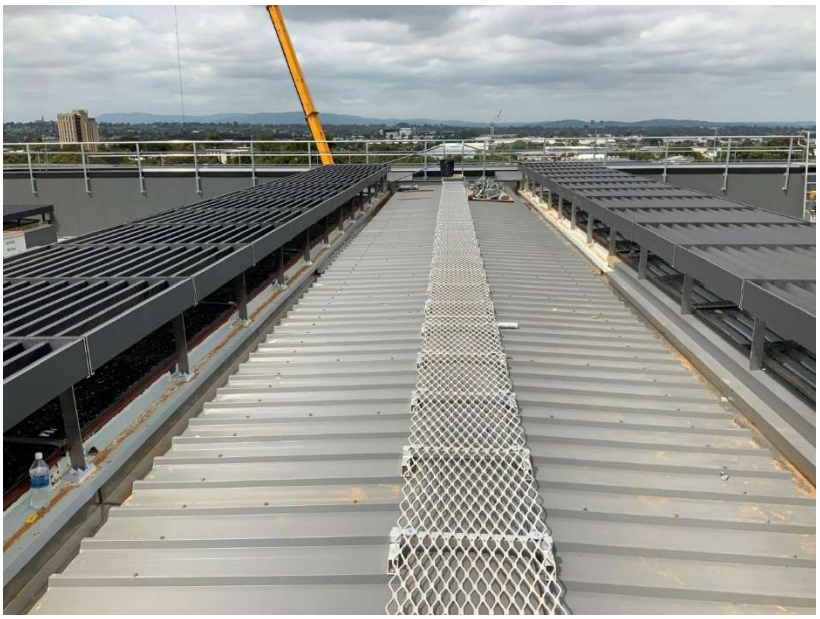
8. Construction of Roof

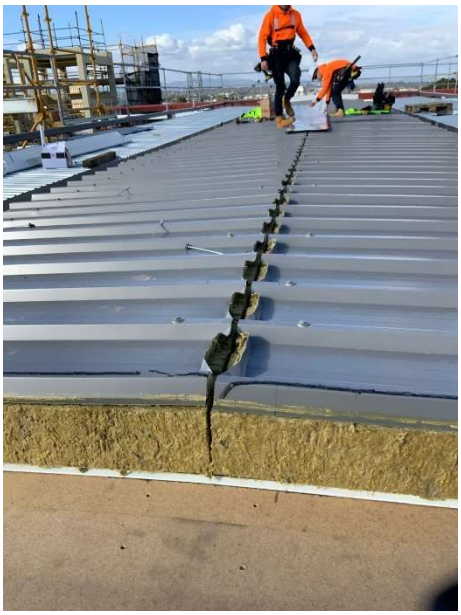
The roof consists of 150mm of Volcore panel. The external skin material is 0.5mm thick high performance steel with pre-painted polyester finish coat of 25 microns. The internal skin material is 0.6mm thick pre-painted off-white steel with a polyester finish coat of 25 microns and antibacterial protection.





8. Construction of Roof





Assembly no.						Interior insulation?
16ud	Roof A					

Heat transmission resistance [m²K/W]

Orientation of building element: 0.13 — interior R_{si}: 0.13

Adjacent to: 0.04 — exterior R_{se}: 0.04

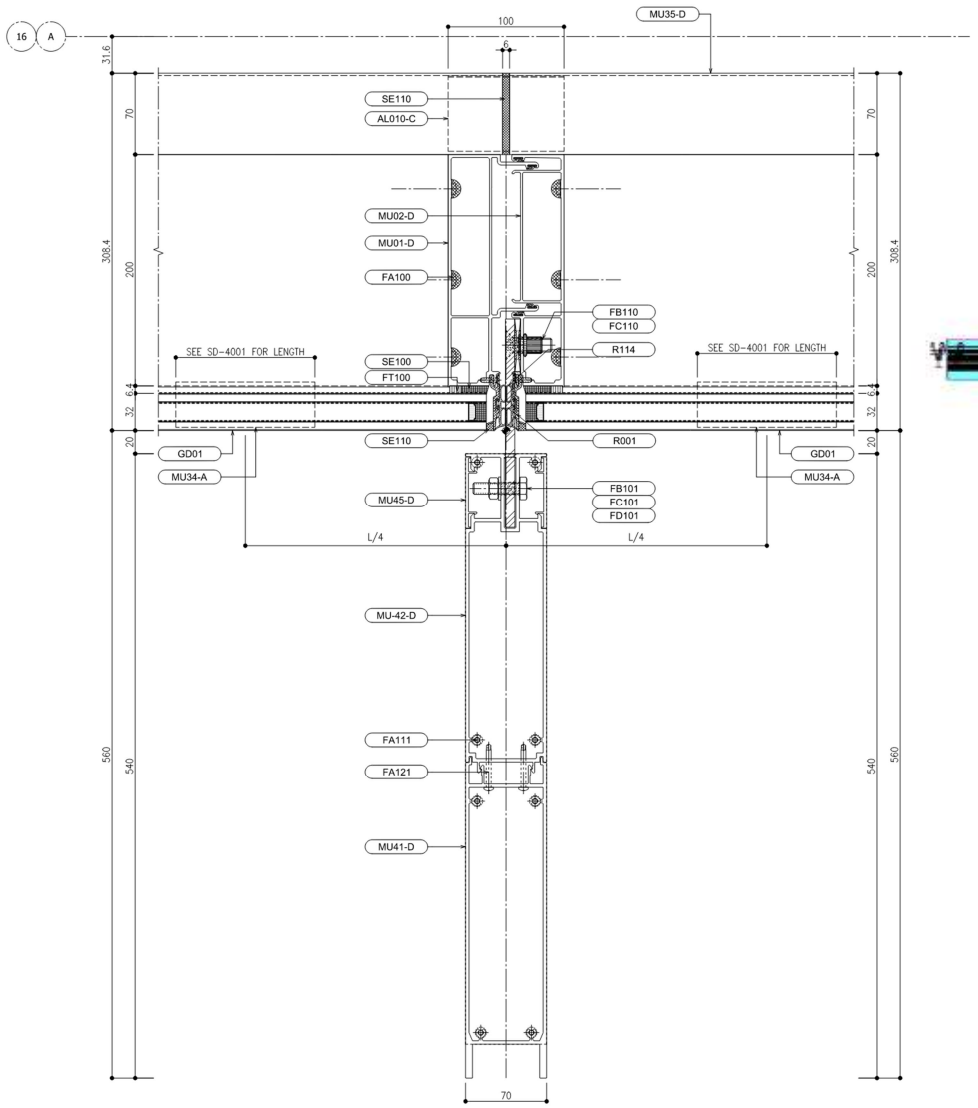
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Askin Volcore Panel at 150mm	0.039					150

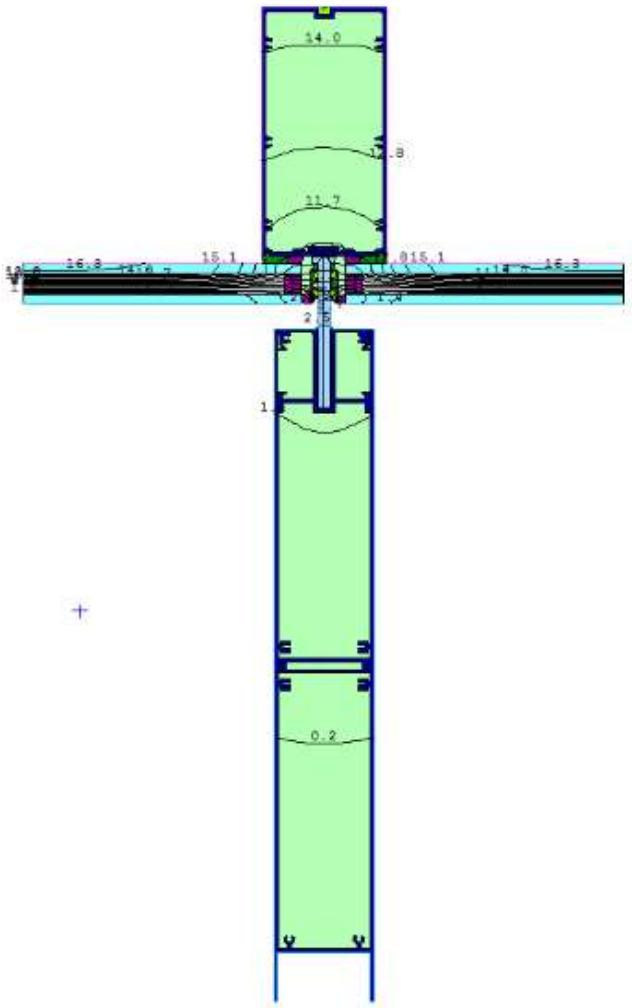
Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
100%			15.0 cm

U-value supplement: W/(m²K)

U-value: 0.249 W/(m²K)

9. Windows and Installation of Windows



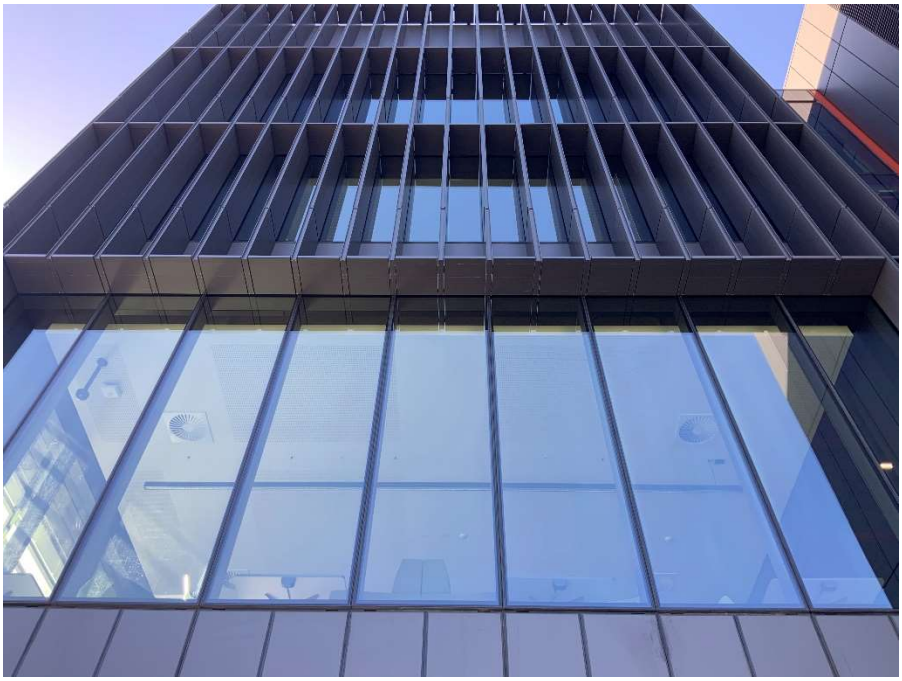


1 SD-4014 TYPICAL-HORIZONTAL SECTION
EWS-101 Scale: 1:2

Beschreibung der Fenster (rahmen)-Konstruktion, Hersteller	**In-house construction**
Fabrikat Fenster (rahmen; Produktname)	Aluminium window frame with polyurethane double sided tape, structural sealant, weather sealant and uPVC adapters. The glass is 32mm thick and consists of 8mm glass, 16mm Argon and 8mm glass with tripple low E treatment on the external face.
Rahmen-U-Wert Uf	Varies: 2,1-3,1 W/(m²K)
Bauart der Verglasung	Filled with Argon; 8 | 16 | 8 |
Glas-U-Wert Ug	1,05 W/(m²K)

9. Windows and Installation of Windows continued

Façade System	U-value range (W/m²K)
EWS 101	2.1-3.1
EWS 201, 202, 203	1.2-2.13
EWS 302	2.26

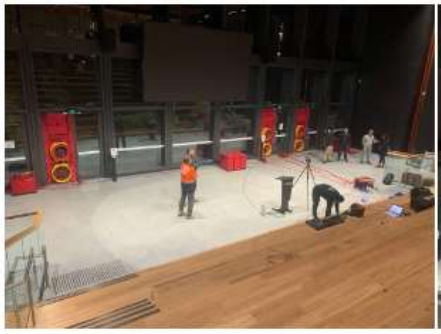


10. Airtight Building Envelope

The building was pressure tested on three separate occasions and on the first two occaisions the points of air leakage were identified and rectified. The air tightness test was undertaken by Efficiency Matrix.

Messung	50 Pa-Drucktest-luftwechsel n_{50} h^{-1}
Woodside Building for Technology and Design	0,6

Construction Type:
Cast concrete construction, including sandwich panel roof construction. The facade is predominantly block work and sandwich panel curtain wall construction.



Building Preparation Appendix

The building was prepared by Efficiency Matrix in accordance with common practices according to ATTMA TS2:2010 and AS/NZS ISO 9972:2015. Preparations are listed below. The definition of closing an opening is "to set an opening in close position using the closing device present on the opening without additionally increasing the air tightness of the opening...If there is no way to close the opening (i.e. without closing device), it remains open." The definition of sealing an opening is "to make an opening hermetic by any appropriate means (adhesive, inflatable balloon, stopper, etc.)," for example with adhesive plastic film or tape (AS/NZS ISO 9972:2015).

Check if applicable	Pre-Test Building Preparations	Preparation
	Exhaust fans with back draft dampers	No preparation
	Supply fans with back draft dampers	No preparation
	Combustion air intake damper for boilers	Closed
	Outside air intake damper for Air Handling Unit inside test zone	Closed
	Outside air intake for 24/7 operation Air Handling Unit inside test zone without damper	Sealed
	Outside air intake for Air Handling Unit inside test zone without damper	No preparation
	Exhaust, Air Handling Units, Make-up Air Units, Energy Recovery Units, Supply fans, Furnaces, Fan Coil Units, Boilers, Gas Hot Water Heaters, All equipment requiring combustion air (including kitchen equipment, HVAC, etc.)	Off
	Fan inlet grilles with motorized damper	Closed
	Fan inlet grills without motorized damper	No preparation
X	Ventilators designed for continuous use	Sealed
	Supply and exhaust ventilator dampers	Held closed
X	Ventilation to other zones	Sealed
X	Windows	Closed and Latched
X	Exterior doors	Closed and Latched
X	Openings leading to outside the test zone	Closed
	All HVAC ducts going from inside the test zone to outside the test zone and back into the test zone	Sealed
	All electrical conduits going from inside the test zone to outside the test zone and back into the test zone	Sealed
X	Openings within the test zone (including doors)	Open
X	Floor drains and plumbing traps	Filled
	Elevator pressure relief openings	Closed
X	Elevator Doors	Closed
	Elevator Door Frame spacing between the elevator door and frame if the elevator connects an area outside the air barrier	Open
	Elevator Door Frame spacing between the elevator door and frame if the elevator connects an area within the air barrier	Open
	Rooms with Exterior, non-ducted louvers (interior doors)	Closed
	Loading Dock Doors (interior doors)	Closed

10. Airtight Building Envelope

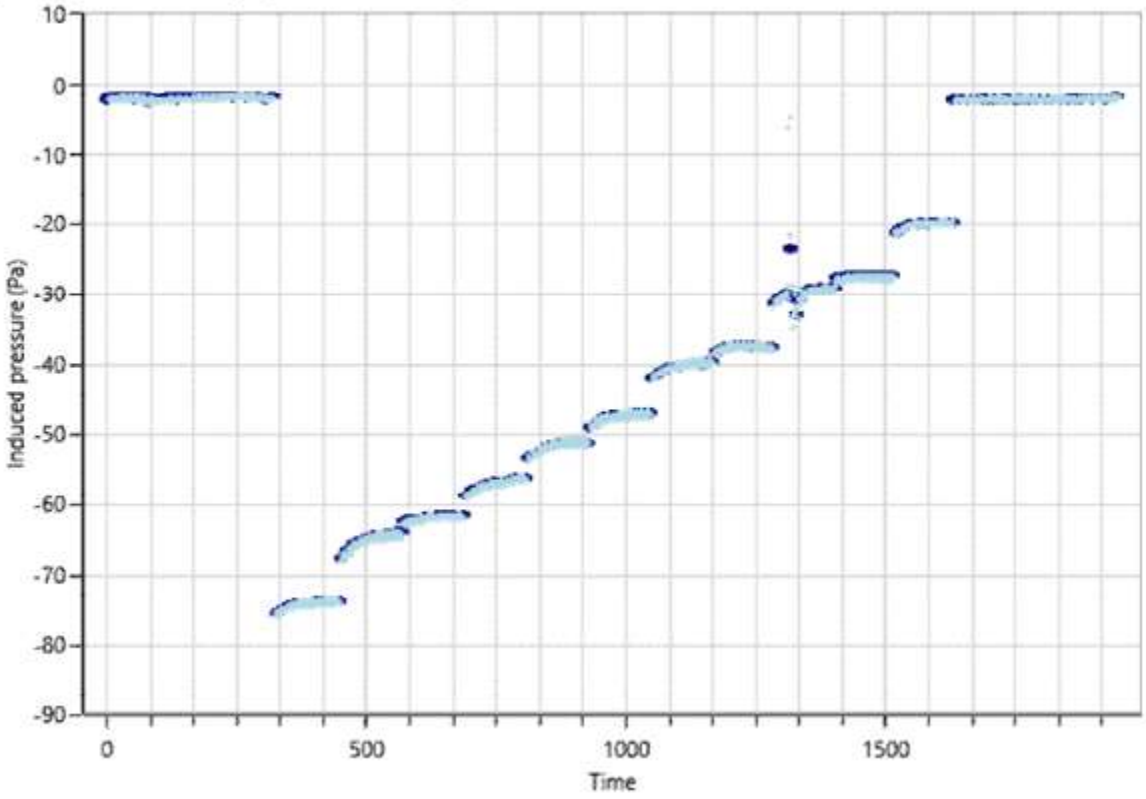
Depressurize Data Set

Test Dataset Date and Time: 2020-05-15-18:49:03

Environmental Conditions		
Wind speed:	2.2	from the SSW
Operator Location:	Inside the building	
Initial Bias Pressure:	-2.30 Pa	
Final Bias Pressure:	-2.42 Pa	
Initial Temperature:	indoors: 20	outdoors: 11.
Final Temperature:	indoors: 20	outdoors: 11.
Barometric Pressure	101.9 kPa	from Direct measurement

Test Analysis			
Correlation, r:	99.940	95% confidence limits	
Slope, n:	0.534	0.52368	0.54341
Intercept, C_{env} [$m^3/h/Pa^n$]:	6152.5	5926	6387
	Results	Uncertainty	
Air flow at 50 Pa, Q_{50} m^3/h	50510	+/-0.4%	
Air changes, n_{50}:	0.63	+/-3.0%	
Equivalent leakage area at 50 Pa [cm^2]	21710	+/-0.4%	
Permeability at 50 Pa, AP_{50} [$m^3/h/m^2$]	2.5201	+/-3.0%	

Building Gauge Pressure (Depressurize Set)



10. Airtight Building Envelope

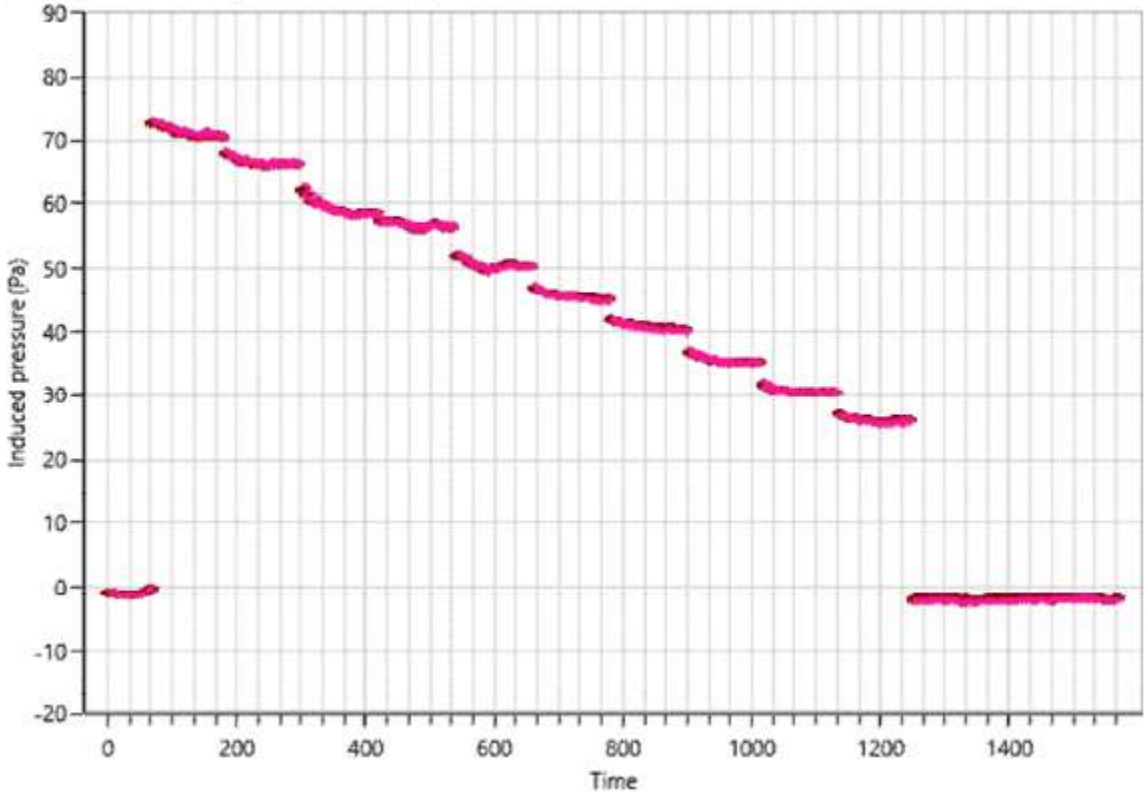
Pressurize Data Set

Test Dataset Date and Time: 2020-05-15-20:30:43
Test was carried out under Method A (method A, B or C).

Environmental Conditions		
Wind speed:	2.2	from the SSW
Operator Location:	Inside the building	
Initial Bias Pressure:	-1.20 Pa	
Final Bias Pressure:	-2.30 Pa	
Initial Temperature:	indoors: 15	outdoors: 8.
Final Temperature:	indoors: 15	outdoors: 8.
Barometric Pressure	101.9 kPa	from Direct measurement

Test Analysis			
Correlation, r:	99.905	95% confidence limits	
Slope, n:	0.591	0.57644	0.60614
Intercept, C_{env} [$m^3/h/m^2$]:	5117.5	4834	5418
	Results	Uncertainty	
Air flow at 50 Pa, Q_{50} m^3/h	52230	+/-0.5%	
Air changes, n_{50}:	0.65	+/-3.0%	
Equivalent leakage area at 50 Pa [cm^2]	17390	+/-0.5%	
Permeability at 50 Pa, AP_{50} [$m^3/h/m^2$]	2.6059	+/-3.0%	

Building Gauge Pressure (Pressurize Set)



10. Airtight Building Envelope

As the building facade is constructed with pre-baricated sandwich panels and glazing the junction where the panels connect with each other and with the steel structure would most likey be the locations where air leakage may take place. Therefore the builder (Lendlease) undertook extensive off-site testing by building prototypes of all the different junction types. Regular site inspections and tests during construction were carried. The builder gained valuable insight from both on and off-site testing.

On-site air leakage testing

Side view of test mock-up

Inside pressure measuring point

Test fan attaching point

Roofing and box gutter sample of the mock-up

Off-site air leakage testing of prototypes

11. Construction Cost

Building construction cost is confidential.

Minimal cost implications compared to business as usual educational buildings in Australia. Additional approximate cost of 2.5% more where the areas of additional spend are:

- Substructure: additional insulation
- Building Envelope (facade and roof): improved U-value, reduced number of thermal bridges, addition of vertical and horizontal sunshades to reduce solar heat gains.
- Air Tightness: Additional paint to blockwork, additional caulking, prototype tests, remedial works, independent air tightness testing agent.
- Apertures/Doors: Related to thermal and or air tightness
- Services: Related to heat recovery and efficiency requirements
- Additional supervision: Daily Quality Assurance (inspections, subcontractor management, identification and close-out of issues.

The cost premium is likely to reduce as more Passive House projects are briefed and delivered in Australia.

12. PHPP-Ergebnisse

Passive House Verification

Building:	Woodside Building for Technology and Design
Street:	Wellington Rd, Clayton
Postcode/City:	3800 Melbourne
Province/Country:	Victoria AU-Australia
Building type:	Educational
Climate data set:	ud---01-PHI Updated Weather File
Climate zone:	5: Warm Altitude of location: 94 m
Home owner / Client:	Monash University
Street:	Wellington Rd, Clayton
Postcode/City:	3800 Melbourne
Province/Country:	Victoria AU-Australia

Architecture:	Grimshaw Architects
Street:	Level 2, 333 George Street
Postcode/City:	2000 Sydney
Province/Country:	New South Wales AU-Australia
Energy consultancy:	Aurecon
Street:	850 Collins Street
Postcode/City:	3008 Melbourne
Province/Country:	Victoria AU-Australia

Mechanical engineer:	Aurecon
Street:	850 Collins St, Docklands
Postcode/City:	3008 Melbourne
Province/Country:	Victoria
Certification:	Passive House Institute
Street:	Rheinstrasse 44-46
Postcode/City:	64283 Darmstadt
Province/Country:	Hessen DE-Germany

Year of construction:	2020	Interior temperature winter [°C]:	20,0
No. of dwelling units:	1	Internal heat gains (IHG) heating case [W/m²]:	11,1
No. of occupants:	2719,0	Specific capacity [Wh/K per m² TFA]:	132
		Interior temp. summer [°C]:	25,0
		IHG cooling case [W/m²]:	11,1
		Mechanical cooling:	x

Specific building characteristics with reference to the treated floor area

					Criteria	Alternative criteria	Fulfilled?[2]
	Treated floor area	m²	15860,0				
Space heating	Heating demand	kWh/(m²a)	9	≤	15	-	yes
	Heating load	W/m²	13	≤	-	10	
Space cooling	Cooling & dehum. demand	kWh/(m²a)	14,32	≤	15	18	yes
	Cooling load	W/m²	30	≤	-	19	
	Frequency of overheating (> 25 °C)	%	-	≤	-		-
	Frequency of excessively high humidity (> 12 g/kg)	%	0	≤	10		yes
Airtightness	Pressurization test result n_{50}	1/h	0,6	≤	0,6		yes
Non-renewable Primary Energy (PE)	PE demand	kWh/(m²a)	169	≤	-		-
Primary Energy Renewable (PER)	PER demand	kWh/(m²a)	74	≤	60	74	yes
	Generation of renewable energy (in relation to projected building footprint area)	kWh/(m²a)	64	≥	-	45	

[2] Empty field: Data missing; '-': No requirement

I confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

Passive House Classic? yes

Task:	First name:	Surname:	Signature:
2-Certifier	Dragos	Arnautu	

Certificate ID	Issued on:	City
27722-27880_PHI_PH_20200818_DA	18.08.20	Darmstadt