

Secondary Innovation Precinct (SIP) Pymble Ladies' College (PLC) - Water Management Plan

Prepared for Pymble Ladies' College

September 2025
Project Number S23158
Version F

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Document Control				
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1. Introduction

BG&E Pty Ltd (BG&E) has been commissioned by Pymble Ladies' College (the College) to prepare this Water Management Plan in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs) and in support of the preparation of an Environmental Impact Statement (EIS) and State Significant Development Application (SSD- 79146716) to the Department of Planning, Housing and Infrastructure (DPHI).

This report has been prepared with reference to architectural plans prepared by 3XN and dated May 2025.

This report will outline the approach BG&E has adopted to evaluate the following:

- Stormwater design, including on-site detention, reuse, water quality measures, and discharge points.
- Compliance with Ku-ring-gai Council's drainage requirements to prevent adverse downstream impacts.

1.1 Purpose of Report

This document has been prepared to support the State Significant Development Application SSD- 79146716 and is subject to the SEARs. This document forms the Stormwater management required to address the following SEARs:

Table 1: SEARs for SSD- 79146716

Item	SEARs Requirement	Relevant Section of Report
13 Water Management	Provide an integrated Water Management Plan for the development that:	
	Is prepared in consultation with the local council and any other relevant drainage or water authority.	Refer to Sections 4&5 for council DCP requirements that have been adopted for the stormwater design.
	Outlines the water-related servicing infrastructure required by the development (informed by the anticipated annual and ultimate increase in servicing demand) and evaluates opportunities to reduce water demand (such as recycled water provision).	Refer to Appendix B for Stormwater Drawings. Refer to Sections 4&5 for all requirements for the site's stormwater quality and quantity management.
	Details the proposed drainage design (stormwater and wastewater) for the site including any on-site treatment, reuse and detention facilities, water quality measures, and nominated discharge points.	Refer to Section 5 for the results of the stormwater quality and quantity management.
	Demonstrates compliance with the local council or other drainage or water authority requirements and avoids adverse downstream impacts.	Refer to Section 5 for the results of the stormwater quality and quantity management.
	Where water and drainage infrastructure works are required that would be handed over to the local council, or other drainage or water authority, provide full hydraulic details and detailed plans and specification of proposed works that have been prepared in consultation with, and comply with the relevant standards of, the local council or other drainage or water authority.	None of this type of work is proposed at this time.



1.2 Referenced Standards and Documentation

The following documents have been used as part of this report:

- Ku-ring-gai Council Development Control Plan 2024 – Part 24 Water Management
- Architectural Drawings by 3xn
- Australian Rainfall and Runoff Guidelines 2019

2. Existing Development

2.1 Existing Scenario

The site is located at 20 Avon Road, Pymble, within the Ku-Ring-Gai Local Government Area (LGA). The site comprises multiple parcels of land and is legally described as:

- Lot 1 Deposited Plan 69541
- Lots 11- 17 Deposited Plan 7131

The site and proposed work areas are identified in Figure 1 below.



Figure 1: Site Aerial Image (Nearmap, February 2025)

2.2 Existing Site Drainage Description

The survey conducted by LTS Lockley on July 07, 2021, indicates the presence of existing drainage pit along the northern end of the existing driveway bitumen, as shown in Figure 2. The proposed site works are proposed to connect to the existing drainage system north of the proposed Secondary Innovation Precinct (SIP) building.

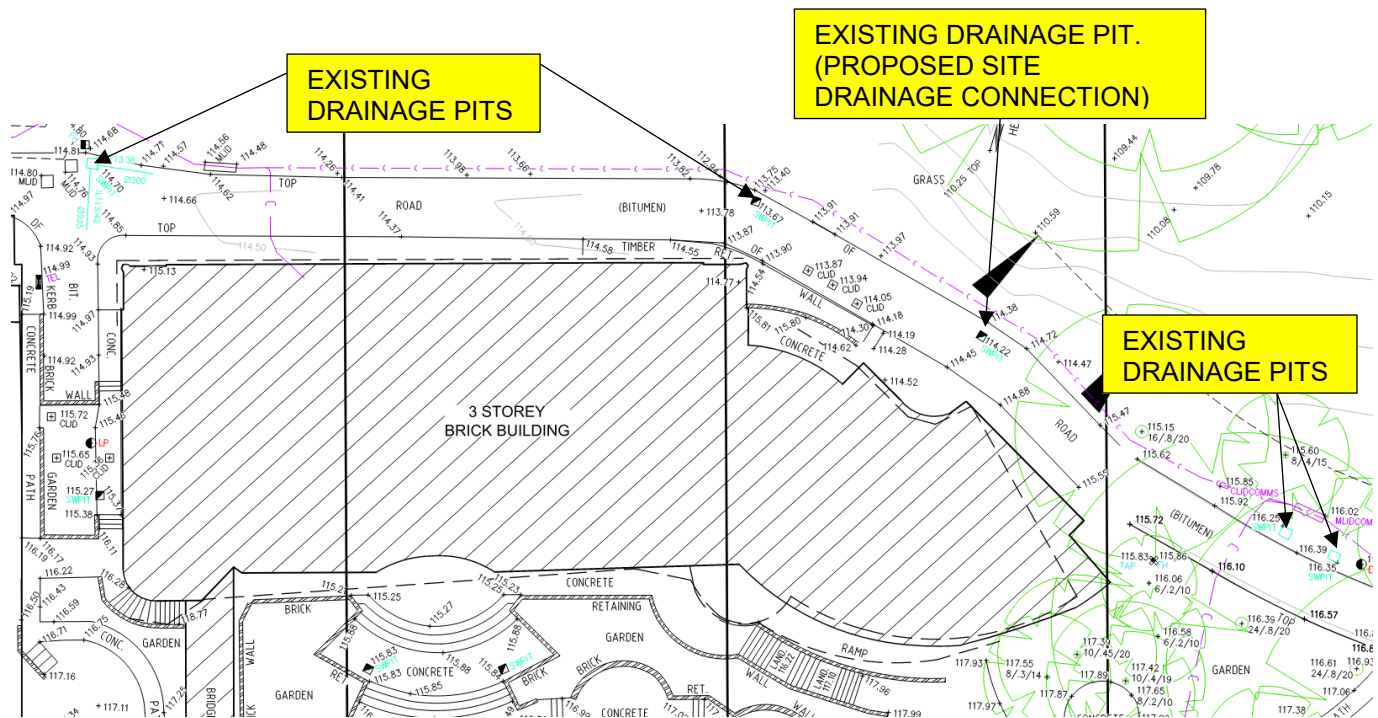


Figure 2: Extract from Survey by LTC Lockley – (03.07.2021)

2.3 Existing Land & Flooding

The intended site is composed of existing buildings with landscape along the eastern end of the site.

Ku-ring-gai council's flood maps indicate that the site is unaffected by flooding. This information was obtained from the Council's online mapping portal, as illustrated in Figure 3. Refer to Appendix C for Flooding Consultant's assessment.

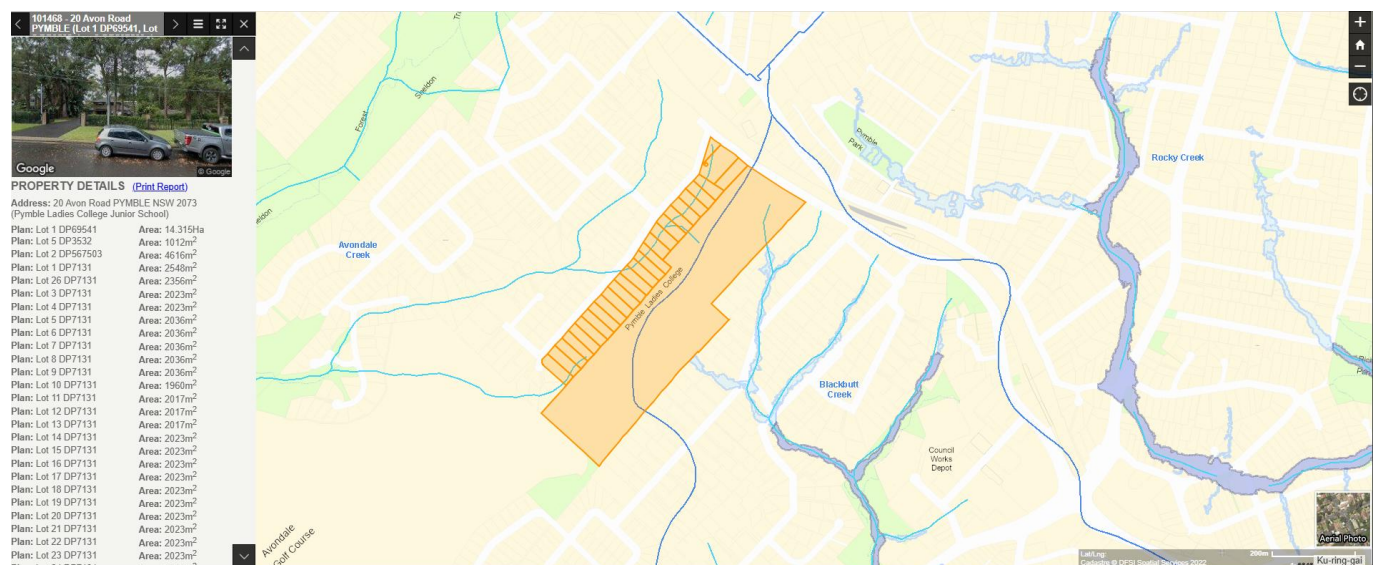


Figure 3: Flood extent - Ku-ring-gai Council's online mapping portal

3. Proposed Development

3.1 Design Proposal

The project comprises demolition of several existing buildings and the construction of the Secondary Innovation Precinct, associated landscaping and Campus Commons at the Pymble Ladies College. The SIP is a five-storey building that will consolidate STEM based learning opportunities within the College.

The SSDA seeks approval for redevelopment of the site, including:

- Demolition of the existing Isabel Harrison, Dorothy Knox, John Vicars and Robert Vicars Buildings.
- Tree removal.
- Excavation of the basement level.
- Construction of the new five storey SIP building of RL 146.98m.
- 1 loading space within the basement (for service vehicles) accessible from the existing rear vehicle service road.
- Minor kerb realignment of the existing access road to the east of the SIP.
- Landscaping on the outdoor terraces and surrounding the building.
- The project also includes the Campus Commons, a significant garden lawn and amphitheatre connecting the SIP precinct to the rest of the campus.

For a detailed project description, refer to the Environment Impact Statement prepared by Urbis.

4. Design Criteria

4.1 Stormwater Policies and Objectives

An integrated stormwater management and water sensitive urban design concept has been prepared for the development. The strategy has been developed to meet the following objectives and comply with:

- Ku-ring-gai Council Development Control Plan (DCP)2024 – Part 24 Water Management

On-Site Detention (OSD) is required for the proposed development, as outlined by Ku-ring-gai Council's DCP (2024) Part 24. The development must comply with Permissible Site Discharge (PSD) and Site Storage Requirements (SSR) as specified in parts 24R.2, 24R.3, and 24R.4. Refer to Section 5 for details.

To meet these requirements, the proposed OSD tank must:

- Limit the total discharge from the site.
- Minimise discharge bypassing the site's OSD tank.
- Implement Water Sensitive Urban Design (WSUD) products to control and enhance the quality of the water discharging from the site.

4.2 Proposed Drainage Design

In accordance with Ku-ring-gai Council's DCP (2024) Part 24R.3, the PSD and SSR rates are determined in accordance with proposed site's location to the relevant catchment. The site is located within the Blackbutt Creek (BB1) Catchment Area and therefore the SSR and PSD rates have been determined based on the figures noted for the BB1 catchment as shown in Figure 4.

WATER
MANAGEMENT

24R.3 PERMITTED SITE DISCHARGE AND
MINIMUM ON-SITE DETENTION
STORAGE VOLUMES

The codes in the table below are found in *Part 25R.1 of this DCP*

Code	Catchment Area	Permitted Site Discharge (l/s/ha)	Equivalent Minimum OSD Storage Volume (m ³ /ha)
AC1	Avondale Creek	102	398
AC2	Avondale Creek	166	241
BB1	Blackbutt Creek	141	302
BB2	Blackbutt Creek	166	241
BC1	Cowan Creek	96	414
BC2	Cowan Creek	166	241
BG1	Blue Gum Creek	147	287
BG2	Blue Gum Creek	166	241

Figure 4: Excerpt from Ku-ring-gai Council's DCP (2024)- Part 24R.3- PSD & SSR

4.3 Water Sensitive Urban Design

The main objectives for stormwater quality are indicated in Part 24C.6 of Ku-ring-gai Council's DCP 2024-Stormwater Quality Control. The technical requirements are presented below:

- Achieve a minimum of 70% retention of the Gross Pollutants (GP) average annual load.
- Achieve a minimum of 85% retention of the Suspended Solids (TSS) average annual load.
- Achieve a minimum of 65% retention of the Total Phosphorus (TP) average annual load.
- Achieve a minimum of 45% retention of the Total Nitrogen (TN) average annual load.

Furthermore, a rainwater tank is proposed for the development as per Council's DCP Part 24C.4 – Mandatory Rainwater Tank Requirements, where rainwater tank needs to meet the 50% reduction in runoff days. The tank will be sized for irrigation purposes only.

Methods to achieve the above treatment targets can include the use of proprietary products, rainwater reuse, raingardens, detention basins or treatment further downstream within the external stormwater network. The proposed development catchments are shown plan in Table 2.

Table 2: Summary of Catchment Plan Areas

Catchment Areas	<i>m</i> ²
Impervious Area OSD 1	3,115
Impervious Area OSD 2	830
Landscape to OSD 1	2,655
Landscape to OSD 2	610
Roof	1,450
Upstream Area	1,085
Total	9,745

5. Analysis Results

5.1 On-Site Detention

The onsite detention tank has been sized based on Section 4.2. As the proposed development is located within the BB1 Catchment, it must comply with the PSD and SSR requirements specified in Council's DCP (2024), Part 24R.3. Therefore, the development is required to match the following requirements:

PSD: 141 L/s/ha

SSR: 302 m³/ha

The proposed development includes the design of two OSD tanks situated within the external area located west of the proposed SIP building. OSD 1 is proposed to discharge into the sump outlet chamber within OSD 2. Refer Table 3 for the proposed volumes for both OSD Tanks 1 & 2, and Figure 5 for the OSD catchments. Refer to Appendix D for the on-site detention calculation sheets.

DRAINS modelling has been used to assess the pits and pipes across the proposed development, as well as to check overland flow during the 100-year ARI event.

Table 3: Ku-ring-gai Council's Requirements Vs Design

OSD n#	Total Area (m ²)	Required Volume (m ³)	Provided Volume (m ³)	Required PSD (L/s)	Designed PSD (L/s)
OSD Tank 1	7,700	232	235	108.57	107.86
OSD Tank 2	1,340	40.46	45.4	18.9	18.5

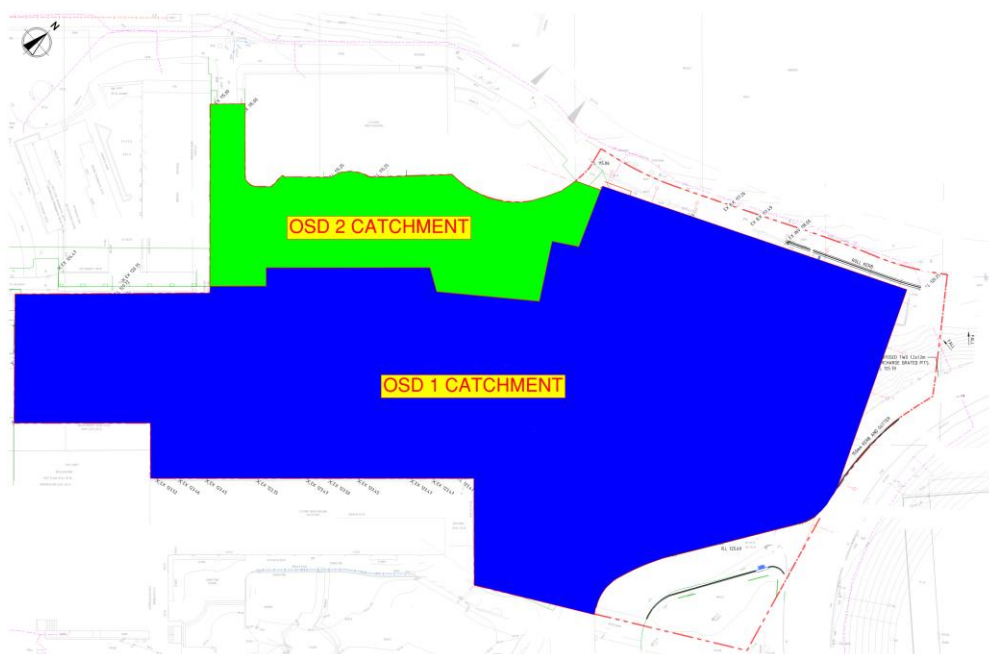


Figure 5: OSD Catchments

5.2 Overland Flow

The proposed SIP building is currently located within the path of overland flows, based on existing site levels and conditions. The upstream catchment affecting the SIP building is proposed to be diverted away from the building and discharged via a level spreader swale behind the road kerb at the north-eastern end of the works boundary. Refer to Figure 6 for details on the upstream catchment and Table 4 for level spreader specifications.

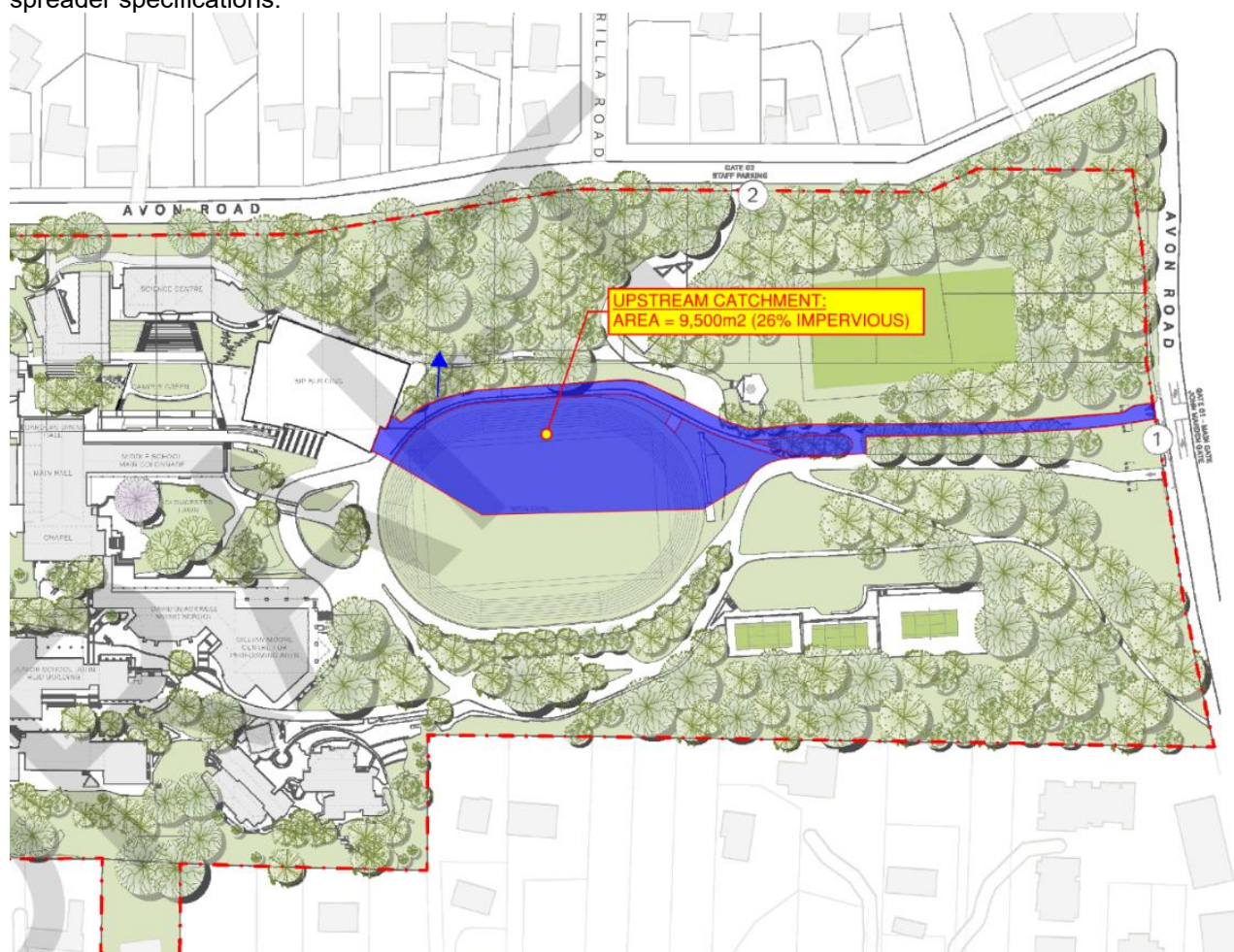


Figure 6: Upstream Catchment - Overland Flow

Table 4: Level Spreader Swale Details

Swale Dimensions	Catchment Area (m ²)	Q ₁₀₀ Flow Rate (L/s)
1.6 m wide x 10 m long x 0.1 m deep level spreader swale designed to accept runoff from the proposed 2 x 1.2 x 1.2m surcharge pits.	9,500 (approx. 26% Impervious)	408

The surcharge pits have been designed in accordance with Australian Standard AS3500.3 – Plumbing and Drainage: Stormwater Drainage. Refer to Figure 7 for calculation details of the surcharge pits and Appendix B for the civil drainage plans.

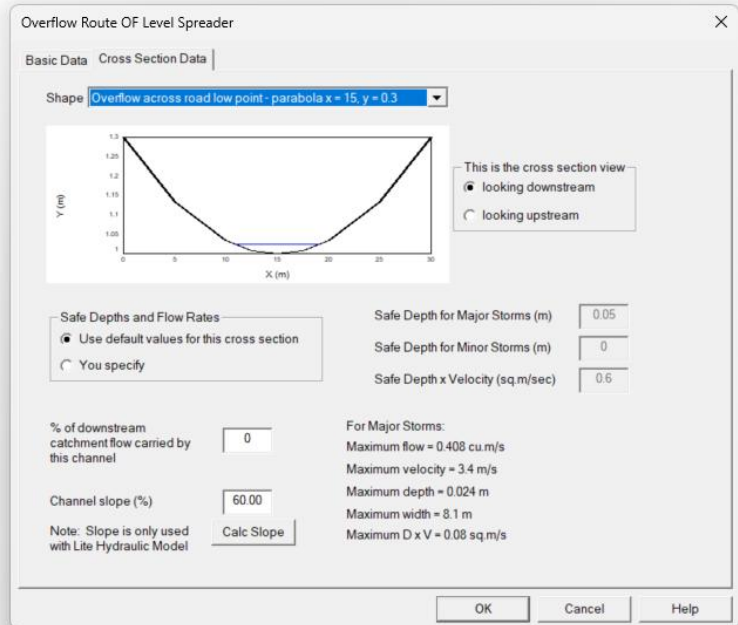
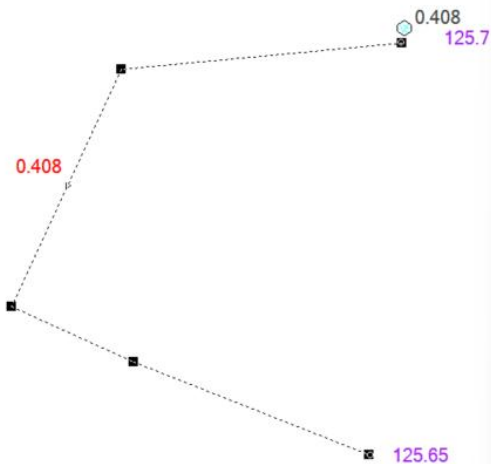


Figure 9: DRAINS modelling - Level Spreader Overland Flow - (1% AEP Results)

5.3 Water Sensitive Urban Design Implementation

The water quality modelling software MUSIC v6.3 was used to analyse the performance of the treatment train. Figure 10 below shows the MUSIC node and link diagram used to describe the proposed treatment train. The model has been built to assess the adequacy of the proposed stormwater treatment measure and ensure that stormwater quality meets the objectives prior to stormwater runoff leaving the site.

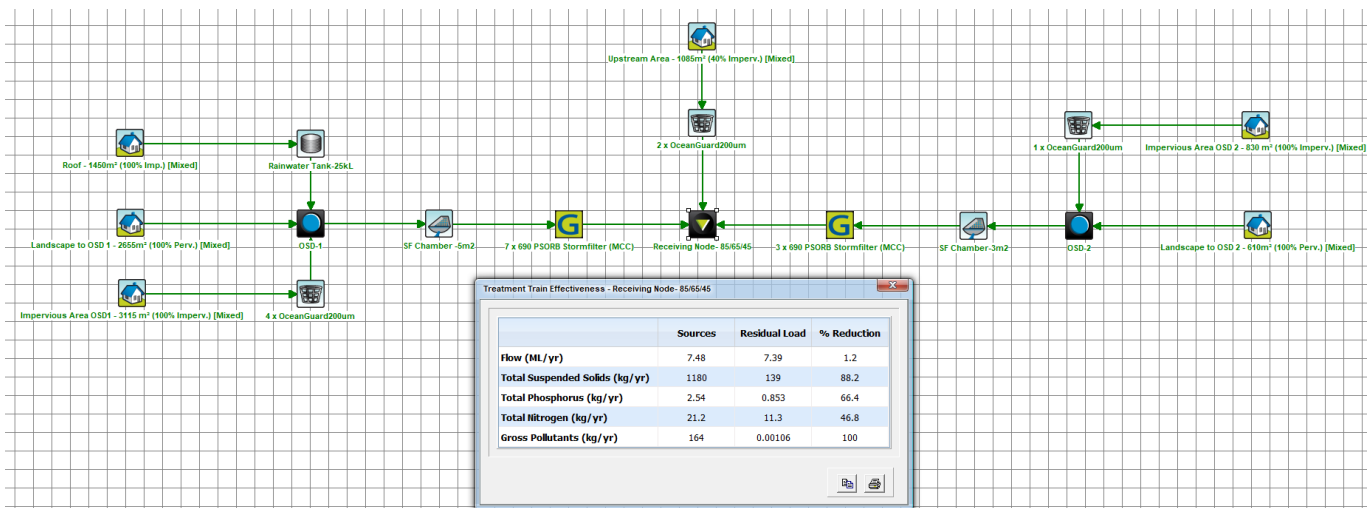


Figure 10: MUSIC Model and Results

The results of the analysis showed the treatment train would achieve the water quality targets set out in Council's Part 24C.6 - Stormwater Quality Control. Table 5 below displays the effectiveness of the treatment train for the primary and secondary treatment. To meet the requirements set out by Council, the following treatment devices were implemented:

- OSD 1: 4 OceanGuard pit inserts and 7 x 690 Psorb (MCC) StormFilters within a 5m² chamber from Ocean Protect or equivalent product.
- One 25kL rainwater tank within the OSD 1 to achieve the minimum 50% reduction in runoff days per Council's requirements. Refer to calculations in Appendix E.
- OSD 2: 1 OceanGuard pit insert and 3 x 690 Psorb (MCC) StormFilters within a 3m² chamber from Ocean Protect or equivalent product.

The water quality model created using MUSIC software provides an indication of the pollutant removal rates expected when a treatment train of water quality measures is applied to the proposed layout of the development.

Table 5: MUSIC Model Results

Pollutant	Prior Treatment (kg/yr.)	Post Treatment (kg/yr.)	Percentage Reduction Achieved (%)	Water Quality Objective (%)
Gross Pollutants (GP)	164	0.00106	100	70
Total Suspended Solids (TSS)	1180	139	88.2	85
Total Phosphorus (TP)	2.54	0.853	66.4	65
Total Nitrogen (TN)	21.2	11.3	46.8	45

6. Conclusion

BG&E Pty Ltd (BG&E) has been commissioned by Pymble Ladies' College (the College) to prepare this Water Management Plan in accordance with the technical requirements of the SEARs and in support of the preparation of an EIS and SSDA (SSD- 79146716) to the Department of Planning, Housing and Infrastructure.

This report outlined the methodology adopted and associated results of:

- Requirement of an on-site detention tank; and
- Water sensitive urban design.

As outlined in this report, the following key items have been identified:

- The proposed site will drain to the existing road kerb inlet pit located at the north-western end of the proposed SIP building.
- The site is not affected by flooding.
- A detention tank is required for this proposed development, as mandated by Council.
- The site includes two OSD tanks for two separate catchments.
- The OSD tanks have been designed with orifice plates to limit the flow from the site. The designed OSD volumes are sufficient when compared to the required volumes.
- Water-sensitive urban design measures are required as part of the site's development. This is achieved using proprietary products, including:
 - A 25 kL rainwater tank.
 - 5 Oceanguard pit inserts.
 - 10 x 690 Psorb (MCC) StormFilters from Ocean Protect, or equivalent products, installed according to the manufacturer's instructions.

These measures will need to be finalised and rationalised during the detailed design phase based on final area calculations.



Appendices

Appendix A - Architectural Plans



DEVELOPMENT FOOTPRINT
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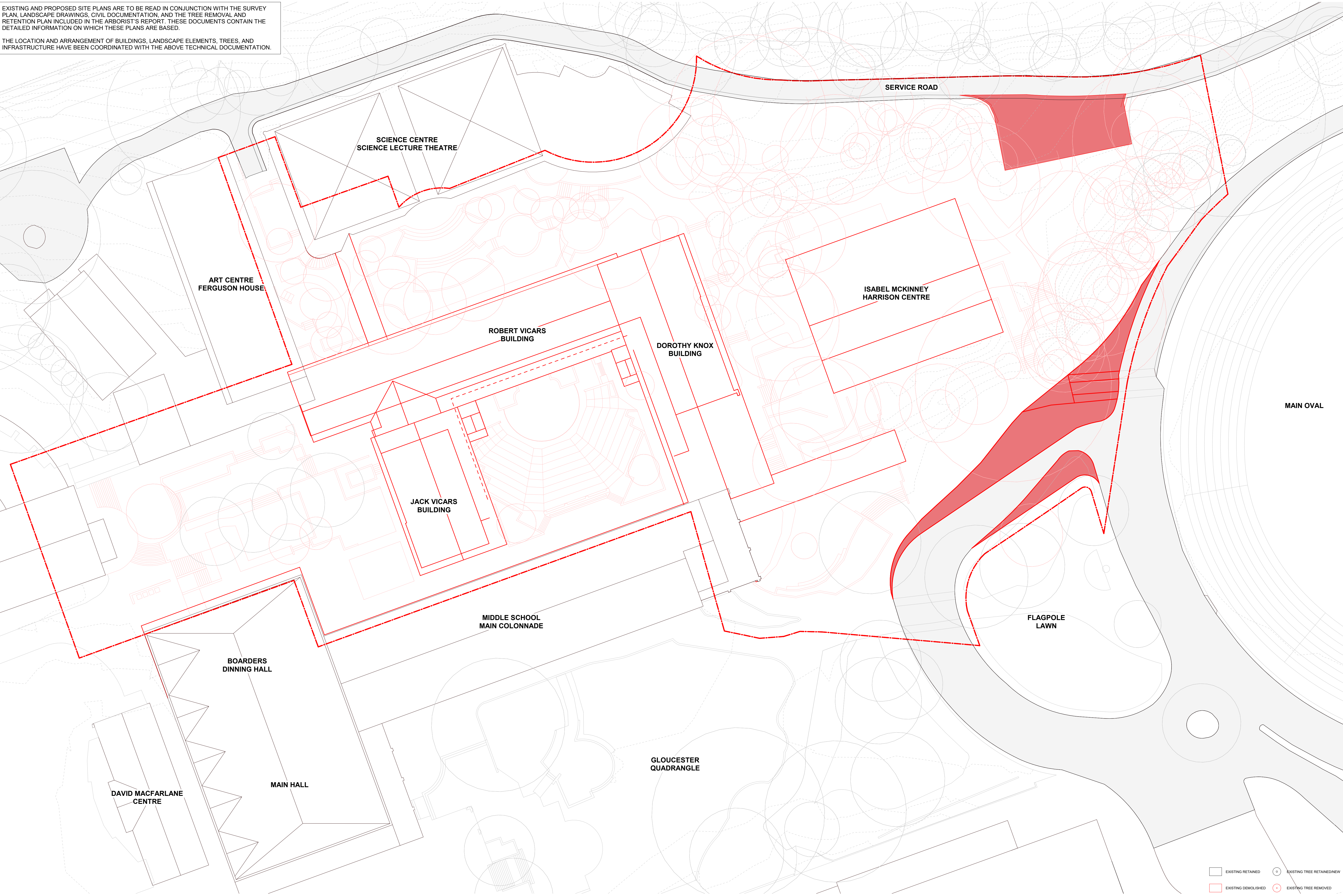
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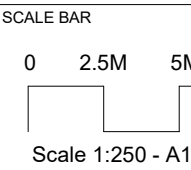
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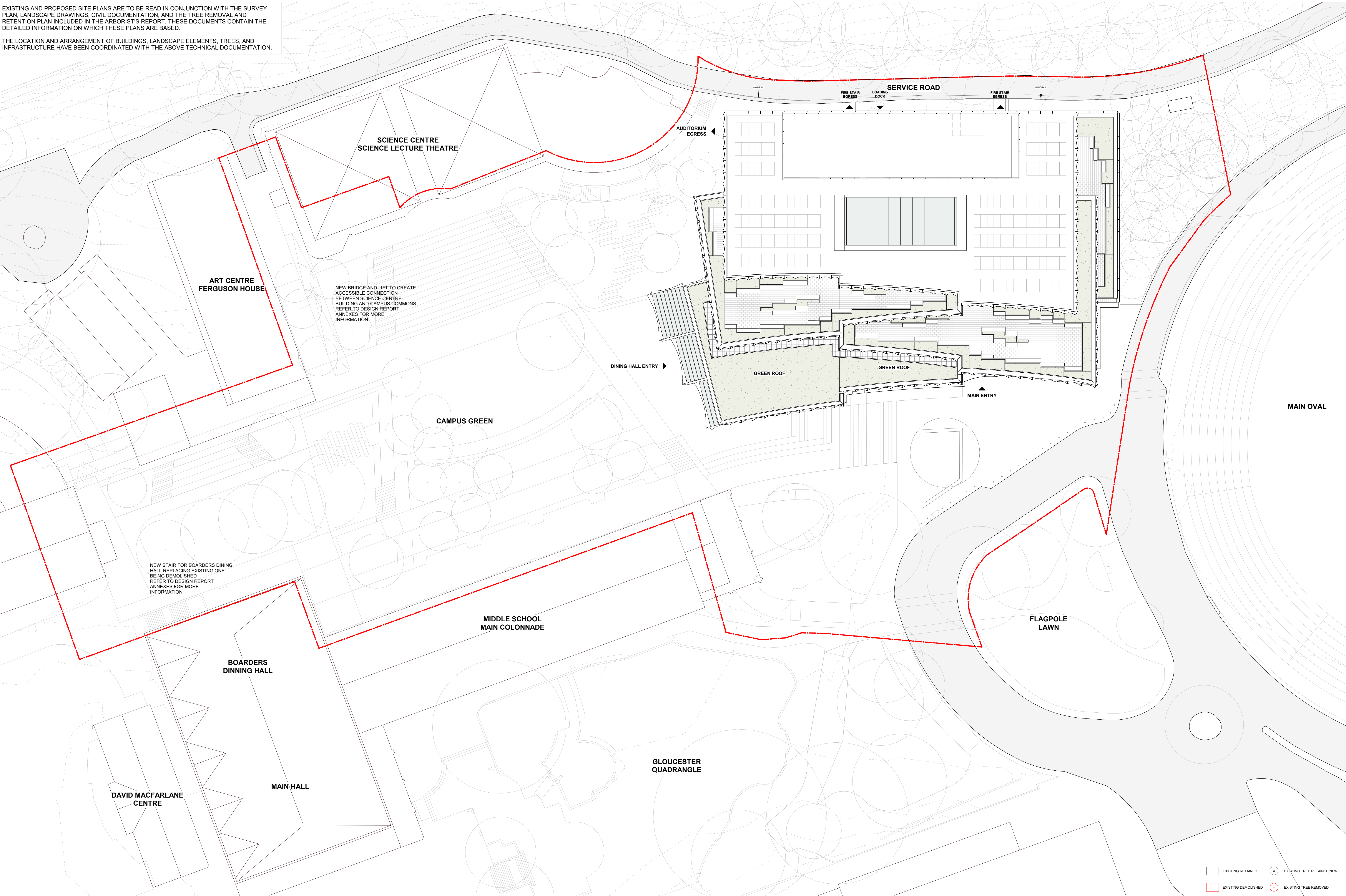
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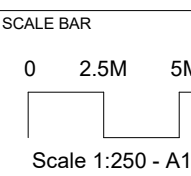
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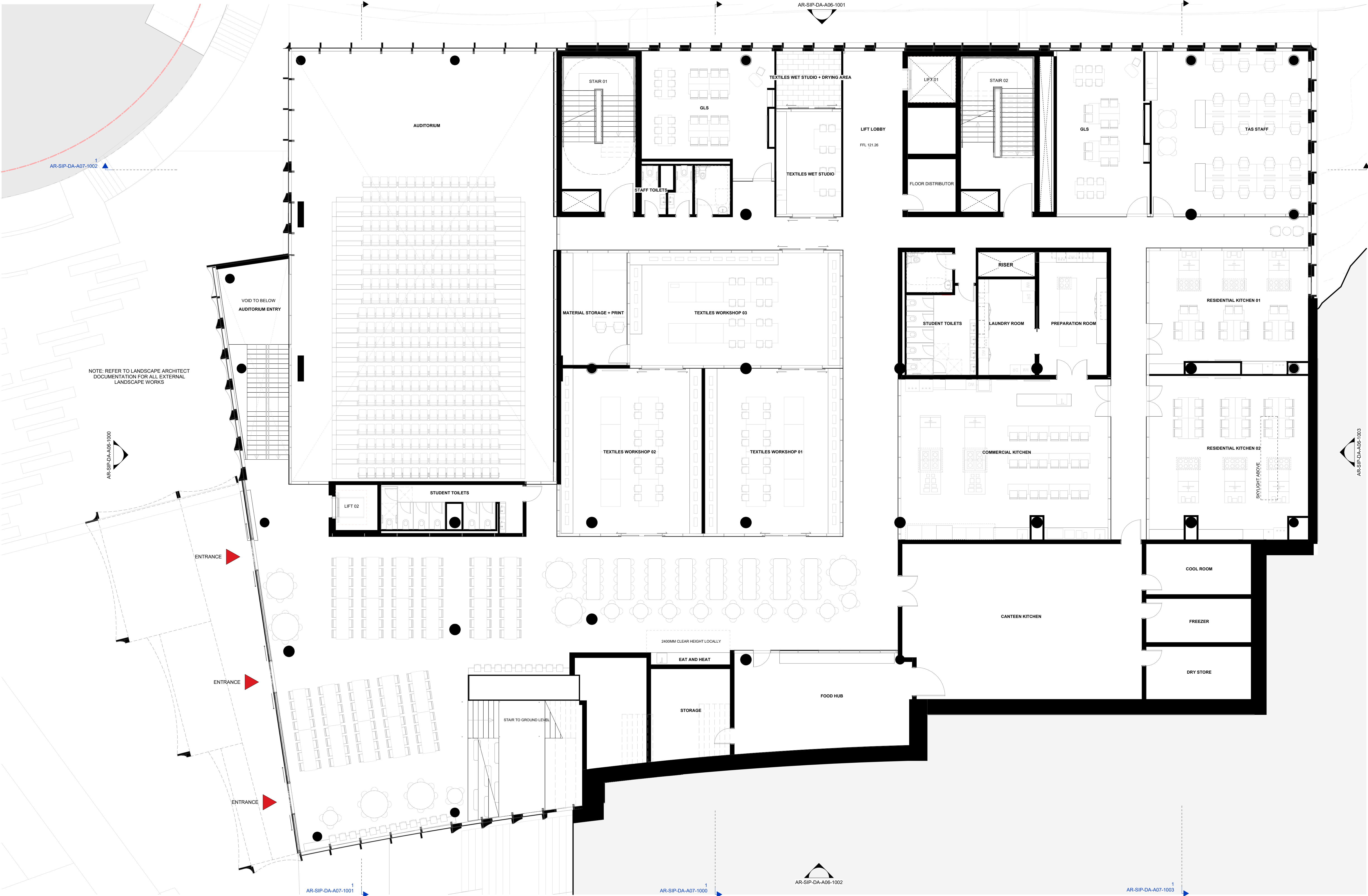
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SITE PLAN - PROPOSED

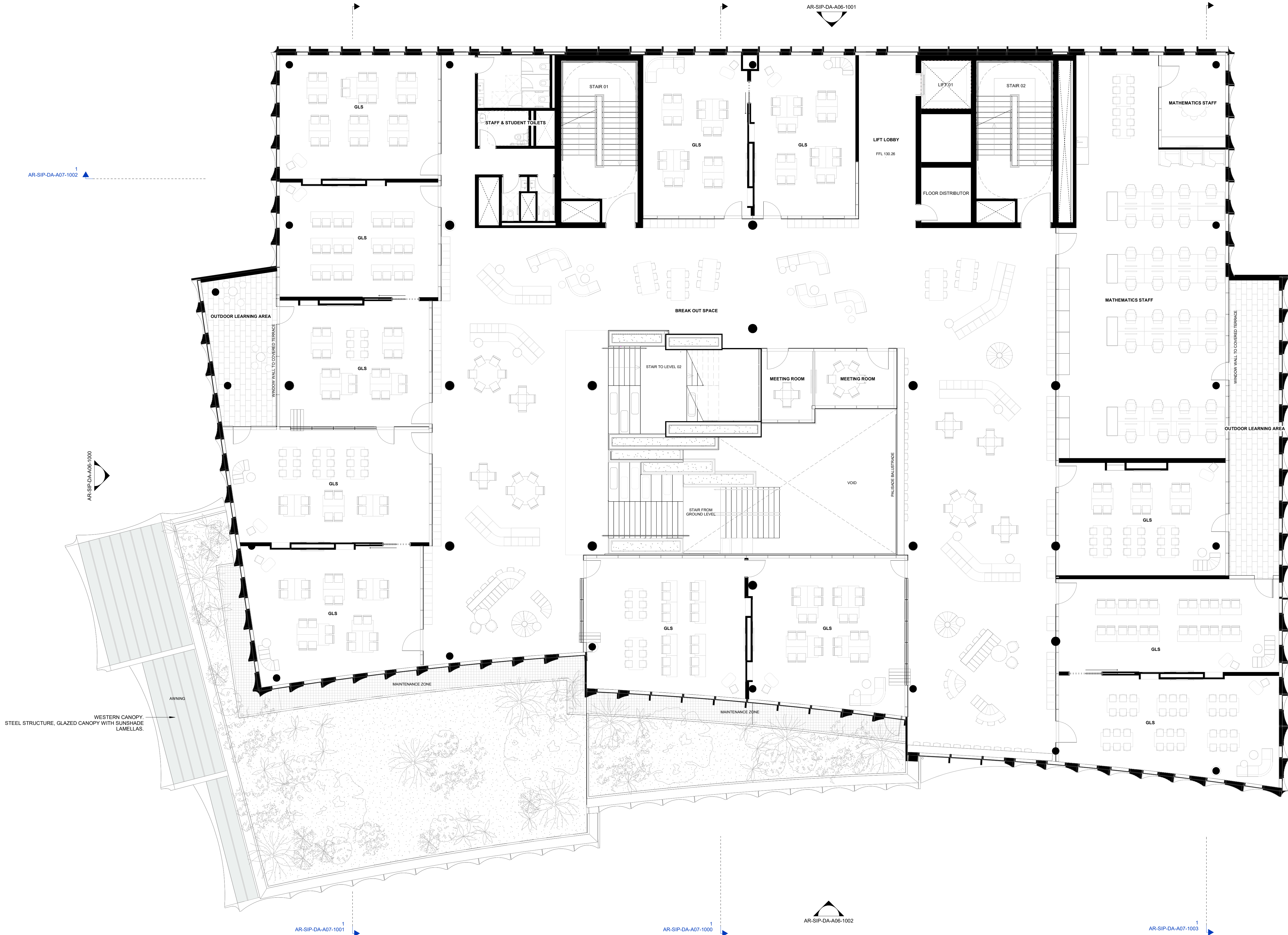
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AR-SIP-DA-A01-1001
ISSUE
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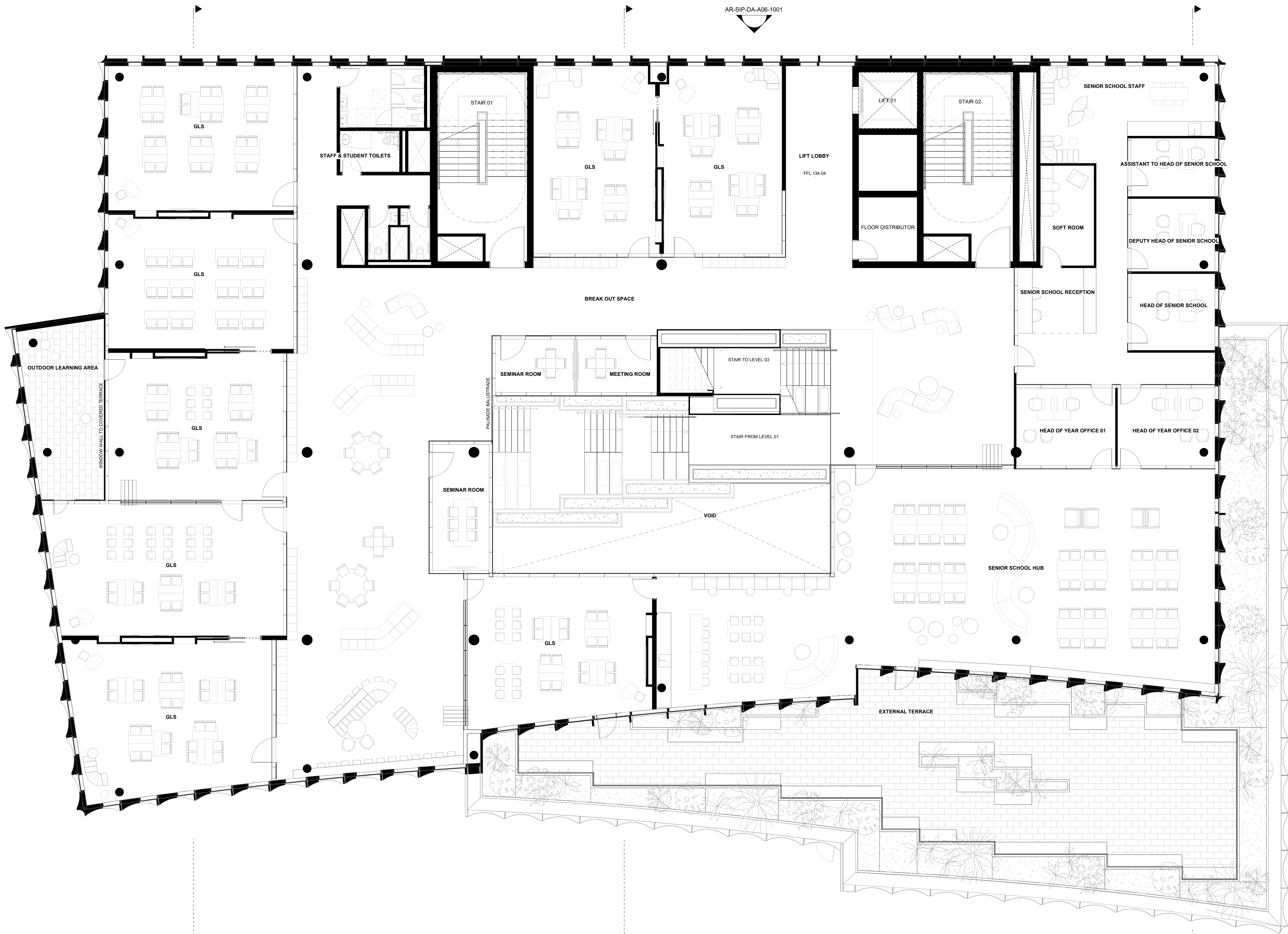
EXISTING RETAINED
EXISTING TREE RETAINED
EXISTING DEMOLISHED
EXISTING TREE REMOVED











3XN

3XN AUSTRALIA PTY LTD
SUITE 1, 178 DICKSON STREET
BURRUM HILLS NSW 2010
AUSTRALIA
ABN 40 610 400 530
TEL 3 9071 3000
WWW.3XN.COM

NEW ARCHITECTS
REGISTRATION BOARD /
NOMINATED ARCHITECTS
KIM HERFORTH NIELSEN - 9513
FRED HOLZ - 12704
DANIEL CRUDDACE - 11438

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REVISION

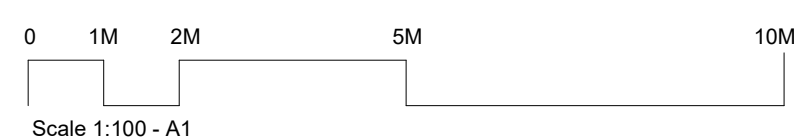
ISSUE	DATE	DESCRIPTION
1	03/02/2025	DRAFT SSD-DA
2	17/02/2025	FOR SSD-DA
3	13/03/2025	FOR SSD-DA
4	26/05/2025	FOR SSD-DA

NOTES

FOR INFORMATION

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DRAWING TO BE PRINTED IN COLOUR

SCALE BAR



CLIENT



PROJECT NAME
PYMBLE LADIES COLLEGE - SECONDARY INNOVATION PRECINCT
PROJECT ADDRESS
20 AVON ROAD, PYMBLE NSW 2073 AUSTRALIA
3XN PROJECT NUMBER
550053

TRUE NORTH (MGA)

SCALE @ A1
1 : 100
STATUS
SSD-DA

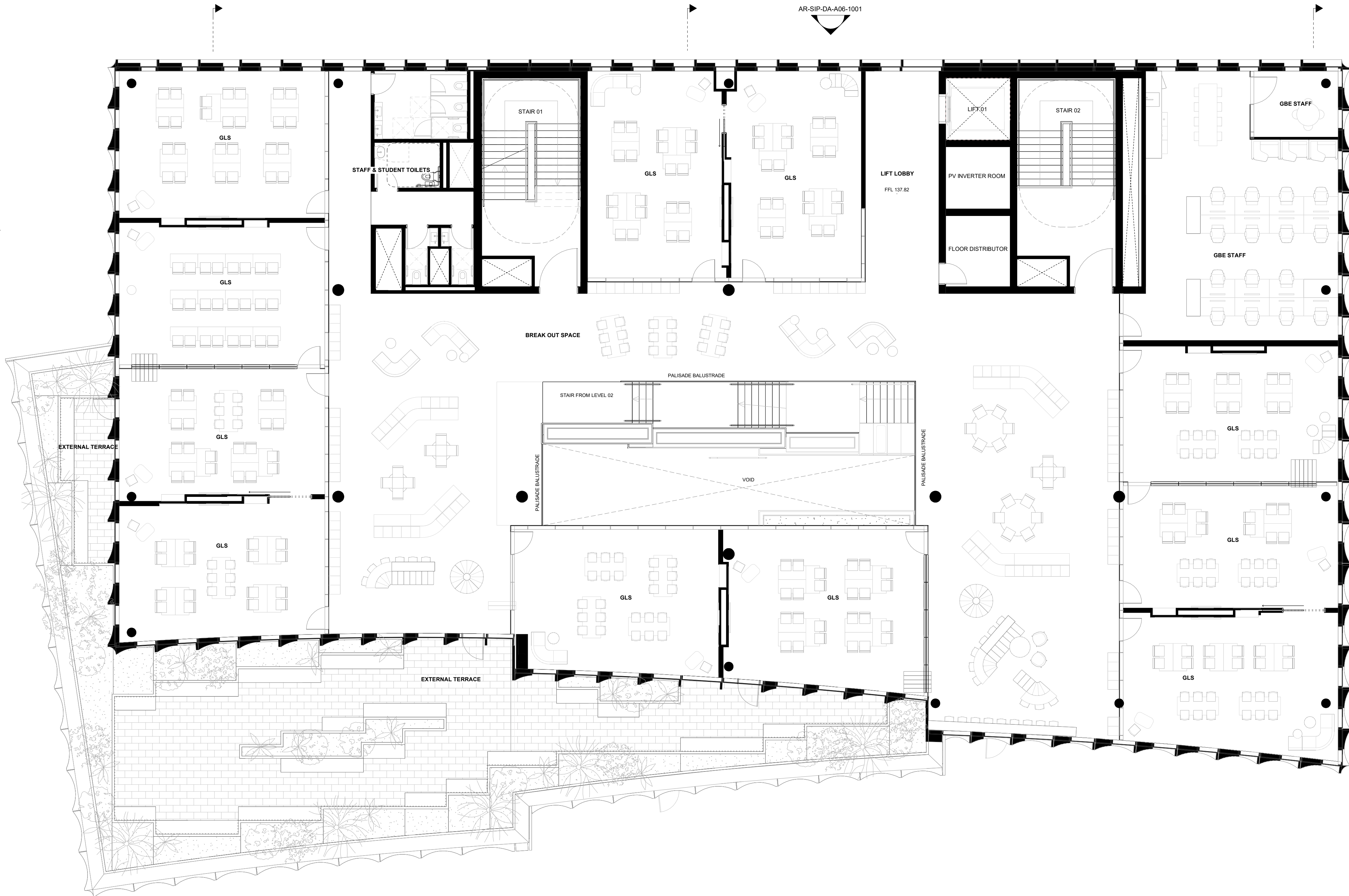
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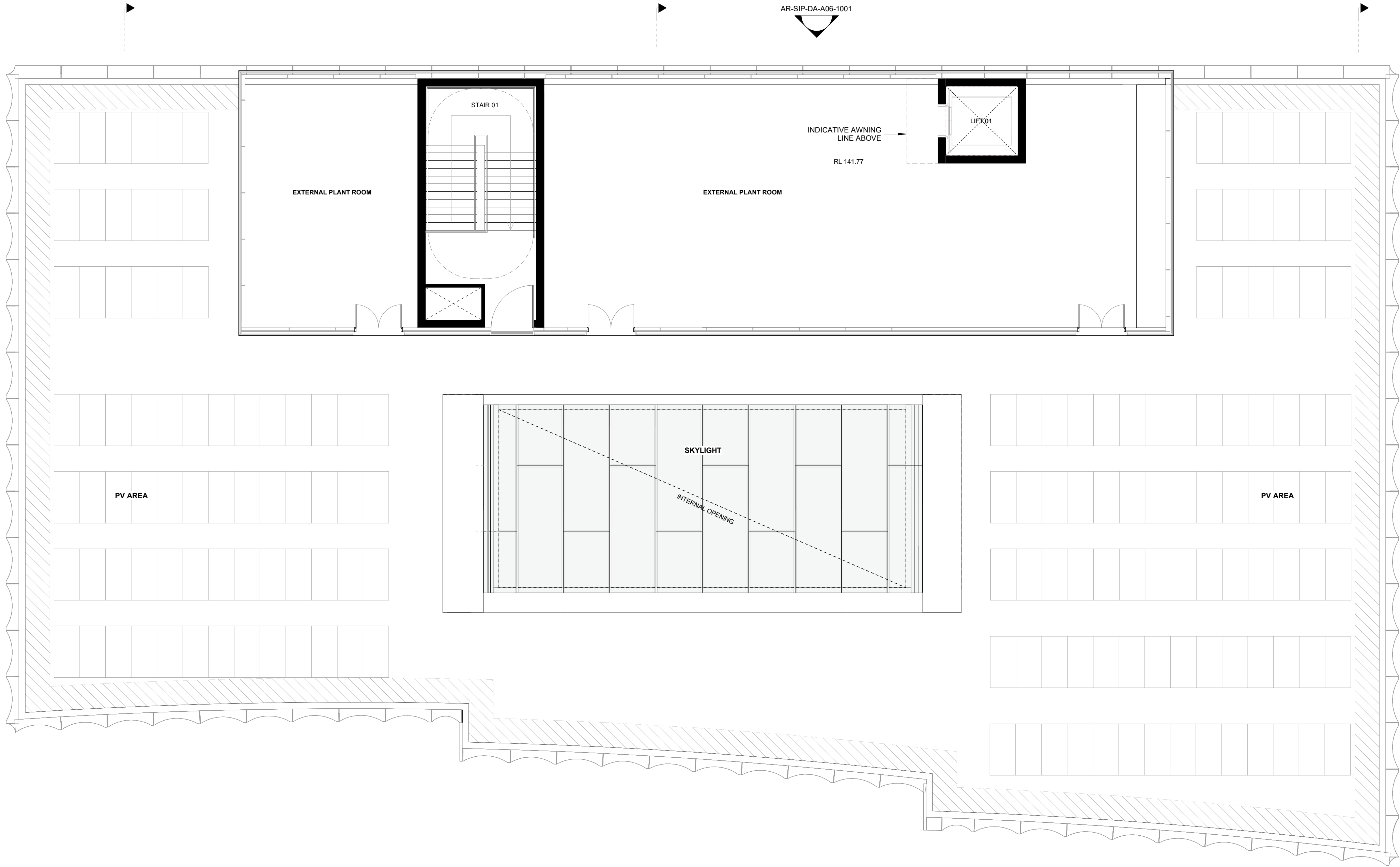
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GA PLAN - LEVEL 02

DRAWING NUMBER
AR-SIP-DA-A02-1002

ISSUE
4





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REVISION

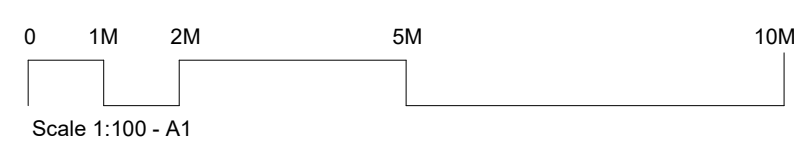
ISSUE	DATE	DESCRIPTION
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2	17/02/2025	FOR SSD-DA
3	13/03/2025	FOR SSD-DA
4	26/05/2025	FOR SSD-DA

NOTES

FOR INFORMATION

DRAWING NOT TO BE USED FOR CONSTRUCTION
DRAWING TO BE PRINTED IN COLOUR

SCALE BAR



CLIENT



PROJECT NAME
PYMBLE LADIES COLLEGE - SECONDARY INNOVATION PRECINCT
PROJECT ADDRESS
20 AVON ROAD, PYMBLE NSW 2073 AUSTRALIA
3XN PROJECT NUMBER
550053

TRUE NORTH (MGA)
PROJECT NORTH
SCALE @ A1
1 : 100
STATUS
SSD-DA

DRAWING

GA PLAN - PLANT LEVEL
DRAWING NUMBER
AR-SIP-DA-A02-1004
ISSUE
4

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REVISION

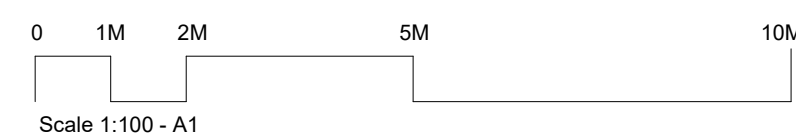
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3	13/03/2025	FOR SSD-DA
4	26/05/2025	FOR SSD-DA

NOTES

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DRAWING TO BE PRINTED IN COLOUR

SCALE BAR



CLIENT



PROJECT NAME
PYMBLE LADIES COLLEGE - SECONDARY INNOVATION PRECINCT
PROJECT ADDRESS
20 AVON ROAD, PYMBLE NSW 2073 AUSTRALIA
3XN PROJECT NUMBER
550053

TRUE NORTH (MGA)
PROJECT NORTH
SCALE @ A1
1 : 100
STATUS
SSD-DA

DRAWING

GA PLAN - ROOF LEVEL
DRAWING NUMBER
AR-SIP-DA-A02-1005
ISSUE
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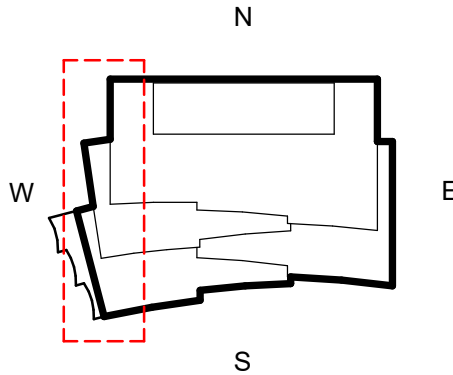


Ground Lines

--- Existing Topography

— Proposed Topography

- Materials**
- ① Brick Slip Cladding System. Open jointed rainscreen
 - ② Vertical and Horizontal Aluminium Shroud - Colour: Bronze, light brown colour / Satin Finish
 - ③ Glazing
 - ④ Glazed Spandrel Panel Shadowbox
 - ⑤ Steel/Aluminium Palisade Balustrade - Colour: Dark Grey
 - ⑥ Aluminium Spandrel Panel - Colour: Bronze, dark brown colour / Satin Finish
 - ⑦ Solid Aluminium Fascia Panels - Colour: Bronze, light brown colour / Satin Finish
 - ⑧ Solid Aluminium Louvres Panels - Colour: Bronze, dark brown colour / Satin Finish
 - ⑨ Solid Aluminium Louvres Panels - Colour: Dark Grey
 - ⑩ Solid Insulated Aluminium Panels - Colour: Bronze, light brown colour / Satin Finish



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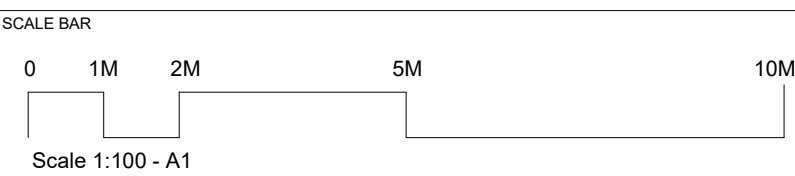
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4	26/05/2025	FOR SSD-DA

NOTES

FOR INFORMATION

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DRAWING TO BE PRINTED IN COLOUR



CLIENT



PROJECT NAME
PYMBLE LADIES COLLEGE - SECONDARY INNOVATION PRECINCT

PROJECT ADDRESS
20 AVON ROAD, PYMBLE NSW 2073 AUSTRALIA

3XN PROJECT NUMBER
550053

TRUE NORTH (MGA)
PROJECT NORTH

SCALE @ A1
1 : 100

STATUS
SSD-DA

DRAWING
ELEVATION - WEST

DRAWING NUMBER
AR-SIP-DA-A06-1000

ISSUE
4

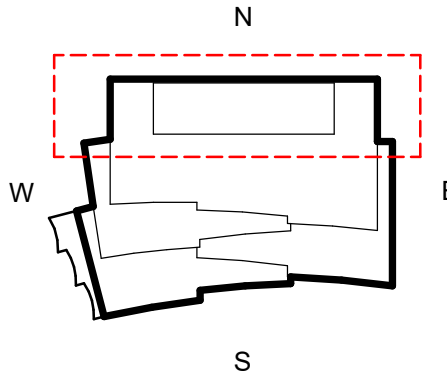


Ground Lines

- Existing Topography
- Proposed Topography

Materials

- Brick Slip Cladding System. Open jointed rainscreen
- Vertical and Horizontal Aluminium Shroud - Colour: Bronze, light brown colour / Satin Finish
- Glazing
- Glazed Spandrel Panel Shadowbox
- Steel/Aluminium Palisade Balustrade - Colour: Dark Grey
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REVISION

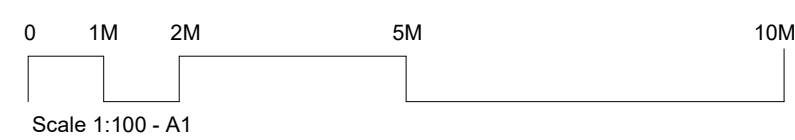
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3	13/03/2025	FOR SSD-DA
4	26/05/2025	FOR SSD-DA

NOTES

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SCALE BAR



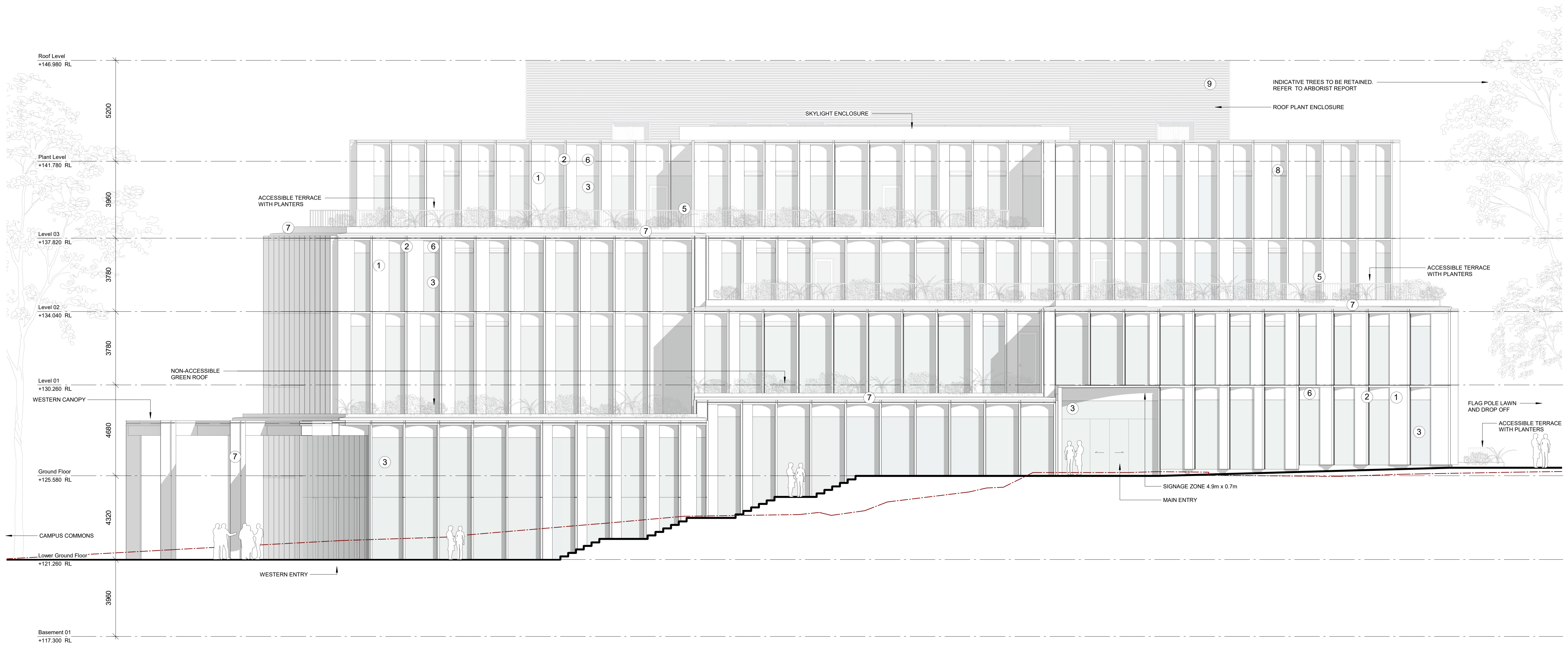
CLIENT



PROJECT NAME
PYMBLE LADIES' COLLEGE - SECONDARY INNOVATION PRECINCT
PROJECT ADDRESS
20 AVON ROAD, PYMBLE NSW 2073 AUSTRALIA
3XN PROJECT NUMBER
550053

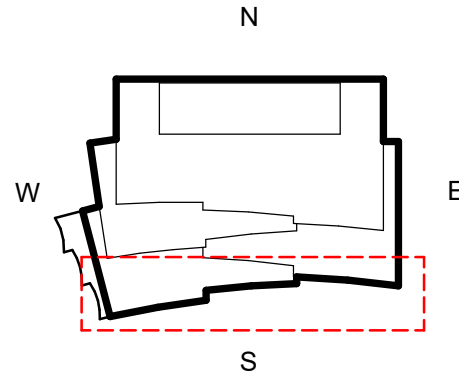
TRUE NORTH (MGA)
PROJECT NORTH
SCALE @ A1
1 : 100
STATUS
SSD-DA

DRAWING
ELEVATION - NORTH
DRAWING NUMBER
AR-SIP-DA-A06-1001
ISSUE
4



Ground Lines
--- Existing Topography
— Proposed Topography

- Materials**
- ① Brick Slip Cladding System. Open jointed rainscreen
 - ② Vertical and Horizontal Aluminium Shroud - Colour: Bronze, light brown colour / Satin Finish
 - ③ Glazing
 - ④ Glazed Spandrel Panel Shadowbox
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NEW ARCHITECTS
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NOMINATED ARCHITECTS
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FRED HOLZ - 12784
DANIEL CRUDDACE - 11438

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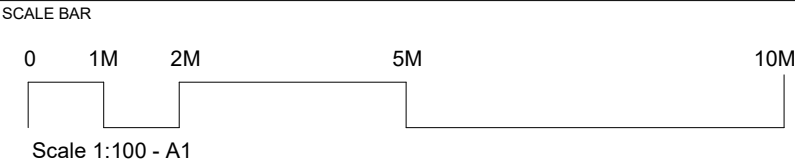
SHOP-DRAWING DETAILING MATERIAL / EQUIPMENT
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2	17/02/2025	FOR SSD-DA
3	13/03/2025	FOR SSD-DA
4	26/05/2025	FOR SSD-DA

NOTES

FOR INFORMATION

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DRAWING TO BE PRINTED IN COLOUR



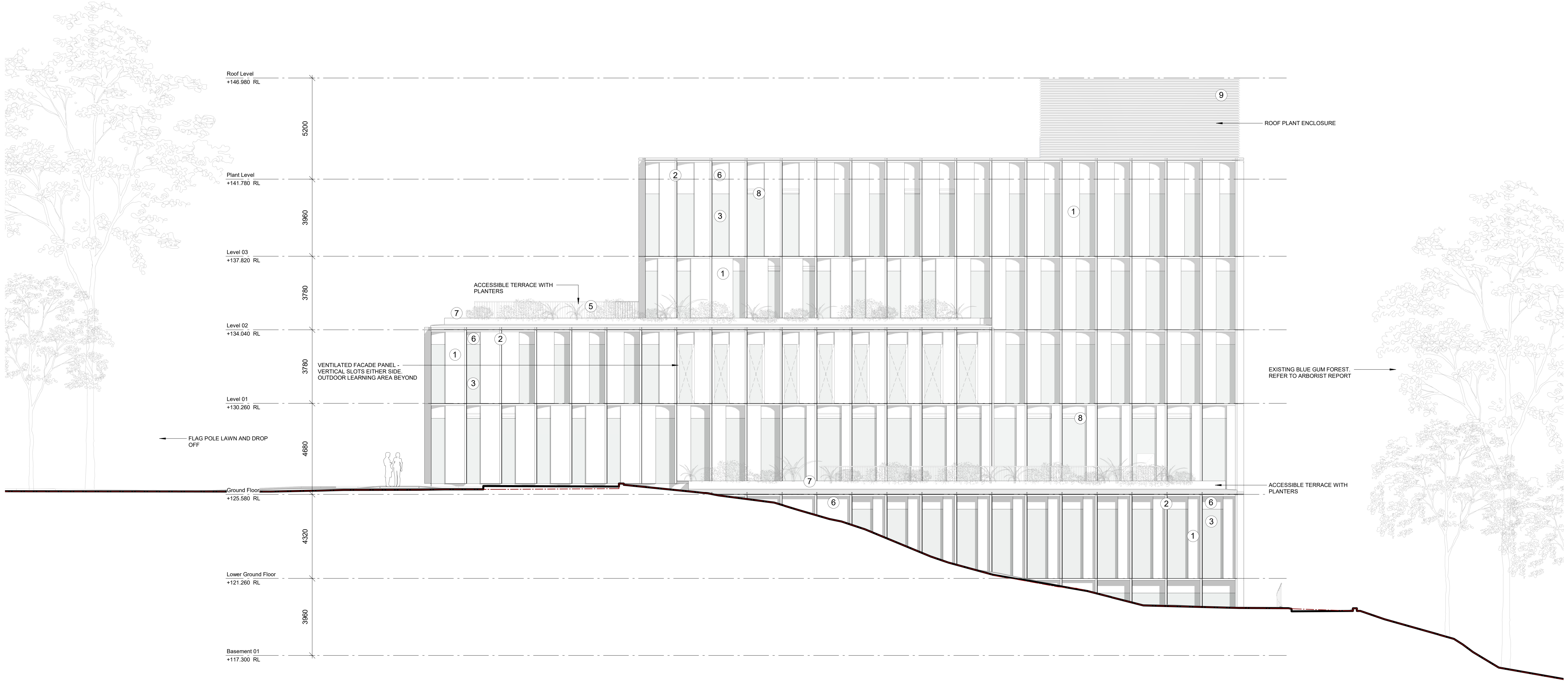
CLIENT



PROJECT NAME
PYMBLE LADIES COLLEGE - SECONDARY INNOVATION PRECINCT
PROJECT ADDRESS
20 AVON ROAD, PYMBLE NSW 2073 AUSTRALIA
3XN PROJECT NUMBER
550053

TRUE NORTH (MGA)
PROJECT NORTH
SCALE @ A1
1 : 100
STATUS
SSD-DA

DRAWING
ELEVATION - SOUTH
DRAWING NUMBER
AR-SIP-DA-A06-1002
ISSUE
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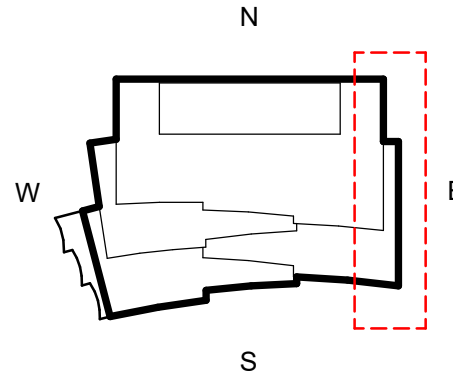


Ground Lines

--- Existing Topography

— Proposed Topography

- Materials**
- ① Brick Slip Cladding System. Open jointed rainscreen
 - ② Vertical and Horizontal Aluminium Shroud - Colour: Bronze, light brown colour / Satin Finish
 - ③ Glazing
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SUITE 1, 178 DICKSON STREET
BURRILL HILLS NSW 2010
AUSTRALIA

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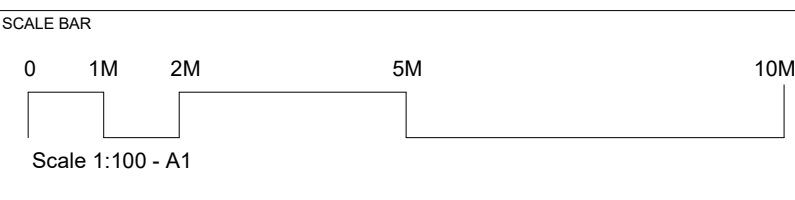
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DRAWING TO BE PRINTED IN COLOUR



CLIENT



PROJECT NAME
PYMBLE LADIES COLLEGE - SECONDARY INNOVATION PRECINCT

PROJECT ADDRESS
20 AVON ROAD, PYMBLE NSW 2073 AUSTRALIA

3XN PROJECT NUMBER
550053

TRUE NORTH (MGA)

SCALE @ A1
1 : 100

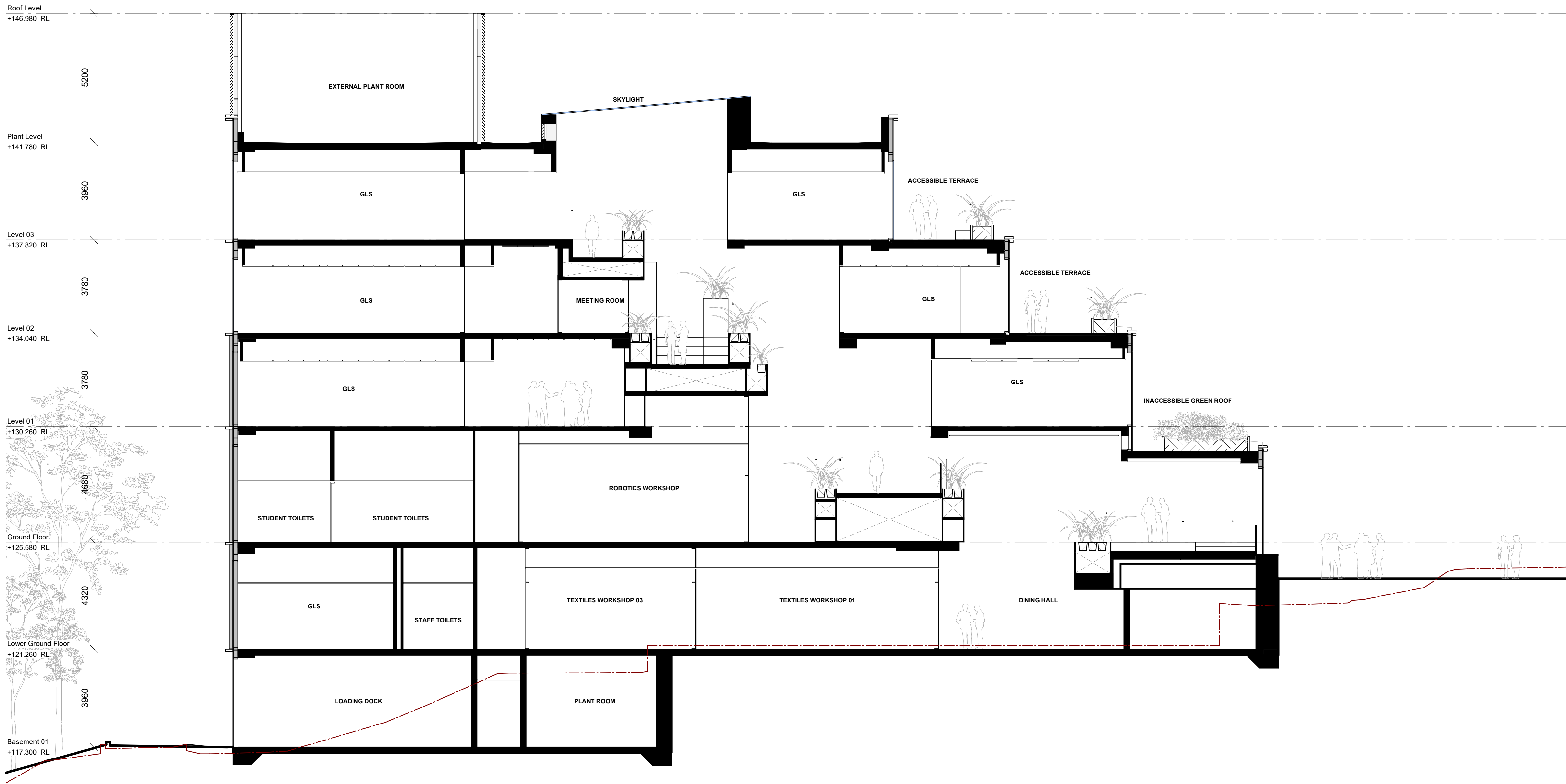
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SSD-DA

PROJECT NORTH

DRAWING
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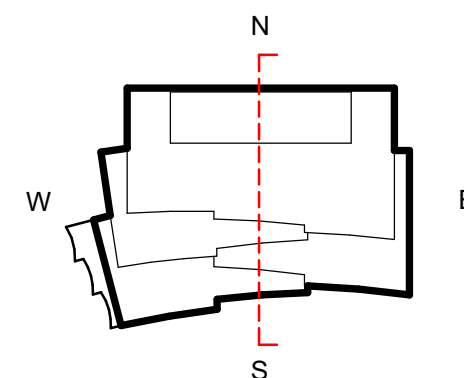
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AR-SIP-DA-A06-1003

ISSUE
4



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NORTH / SOUTH SECTION 01 - ATRIUM

Ground Lines
- - - Existing Topography
— Proposed Topography



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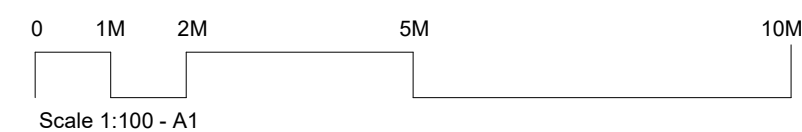
ISSUE	DATE	DESCRIPTION
1	03/02/2025	DRAFT SSD-DA
2	17/02/2025	FOR SSD-DA
3	28/05/2025	FOR SSD-DA

NOTES

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SCALE BAR



CLIENT

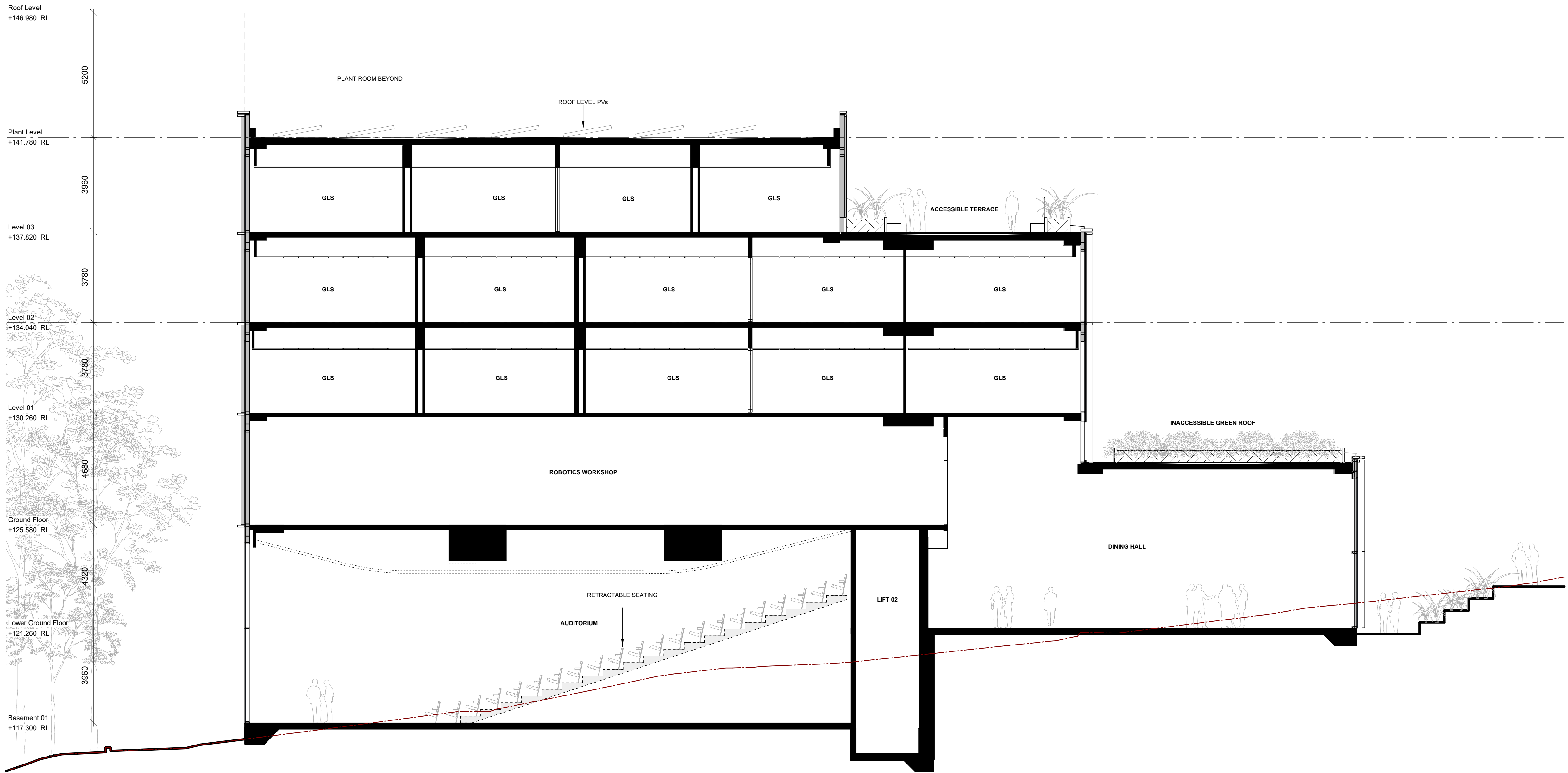


PROJECT NAME
PYMBLE LADIES COLLEGE - SECONDARY INNOVATION PRECINCT
PROJECT ADDRESS
20 AVON ROAD, PYMBLE NSW 2073 AUSTRALIA
3XN PROJECT NUMBER
550053

TRUE NORTH (MGA)
PROJECT NORTH
SCALE @ A1
1 : 100
STATUS
SSD-DA

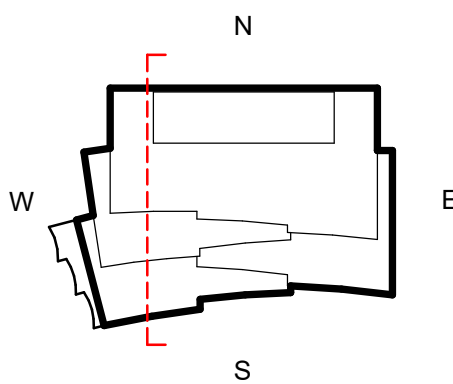
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SECTION - NORTH / SOUTH 01 - ATRIUM
DRAWING NUMBER
AR-SIP-DA-A07-1000
ISSUE
3



1 : 100
NORTH / SOUTH SECTION 02 - AUDITORIUM

Ground Lines
--- Existing Topography
— Proposed Topography



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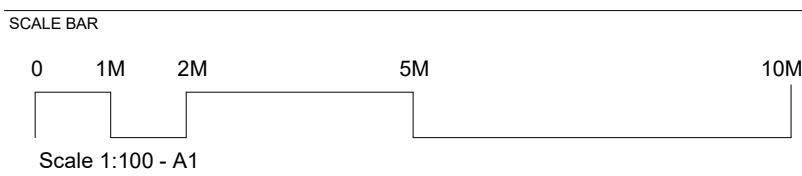
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ISSUE	DATE	DESCRIPTION
1	03/02/2025	DRAFT SSD-DA
2	17/02/2025	FOR SSD-DA
3	13/03/2025	FOR SSD-DA
4	26/05/2025	FOR SSD-DA

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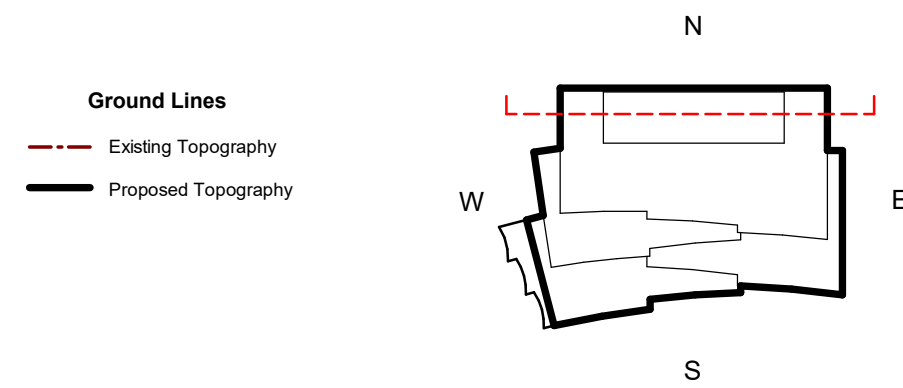
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PYMBLE LADIES COLLEGE - SECONDARY INNOVATION PRECINCT
PROJECT ADDRESS
20 AVON ROAD, PYMBLE NSW 2073 AUSTRALIA
3XN PROJECT NUMBER
550053

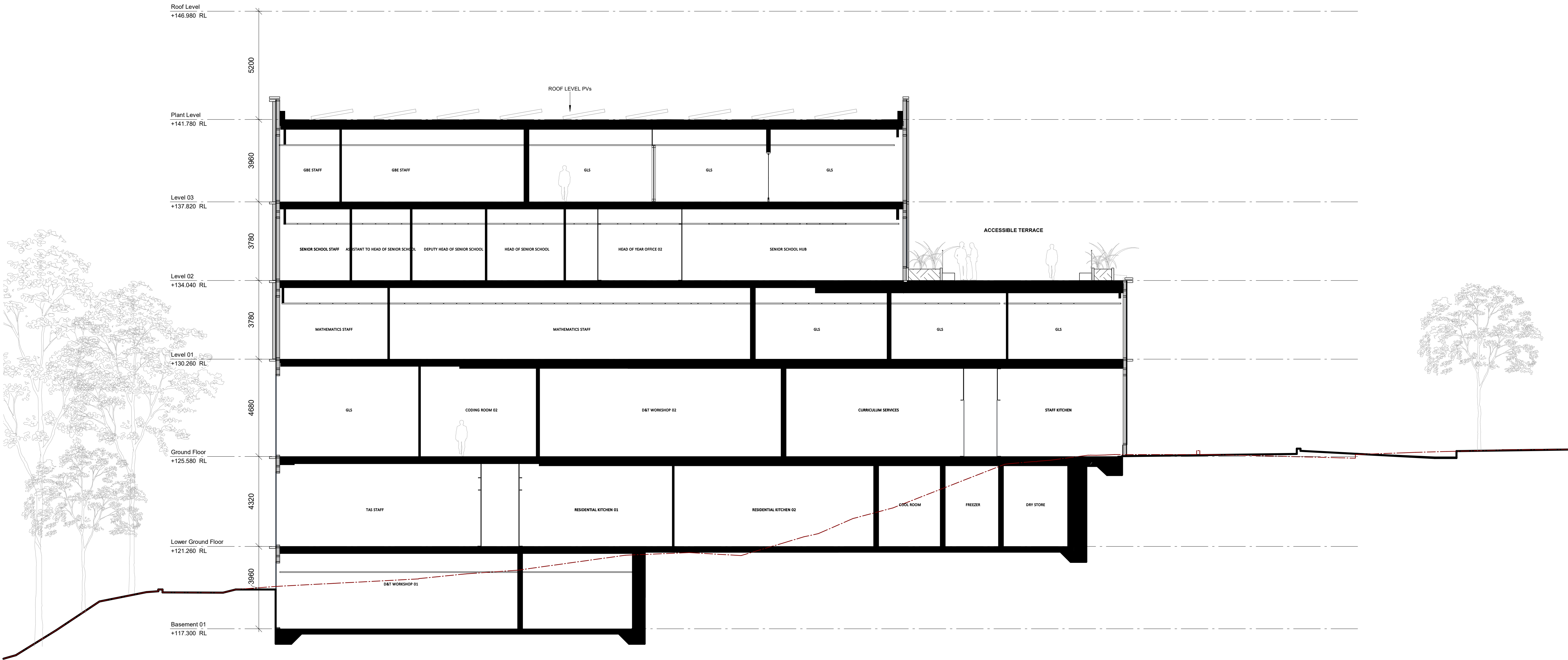
TRUE NORTH (MGA)
PROJECT NORTH
SCALE @ A1
1 : 100
STATUS
SSD-DA

DRAWING
SECTION - NORTH / SOUTH 02 -
AUDITORIUM
DRAWING NUMBER
AR-SIP-DA-A07-1001
ISSUE
4

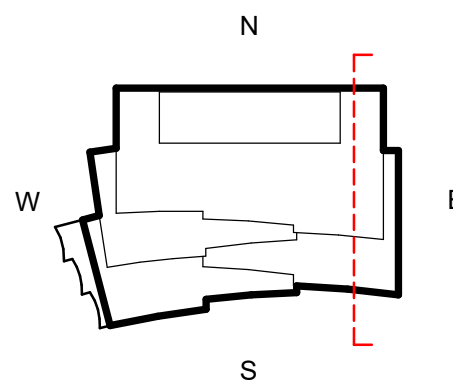


1 : 100
EAST / WEST SECTION 01 - BUILDING CORES





Ground Lines
- - - Existing Topography
— Proposed Topography



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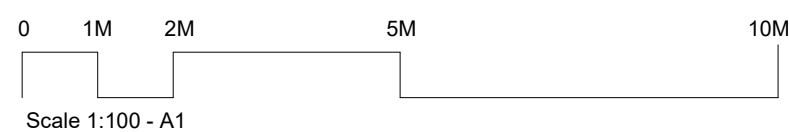
REVISION	ISSUE	DATE	DESCRIPTION
1		26/05/2025	FOR SSD-DA

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SCALE BAR



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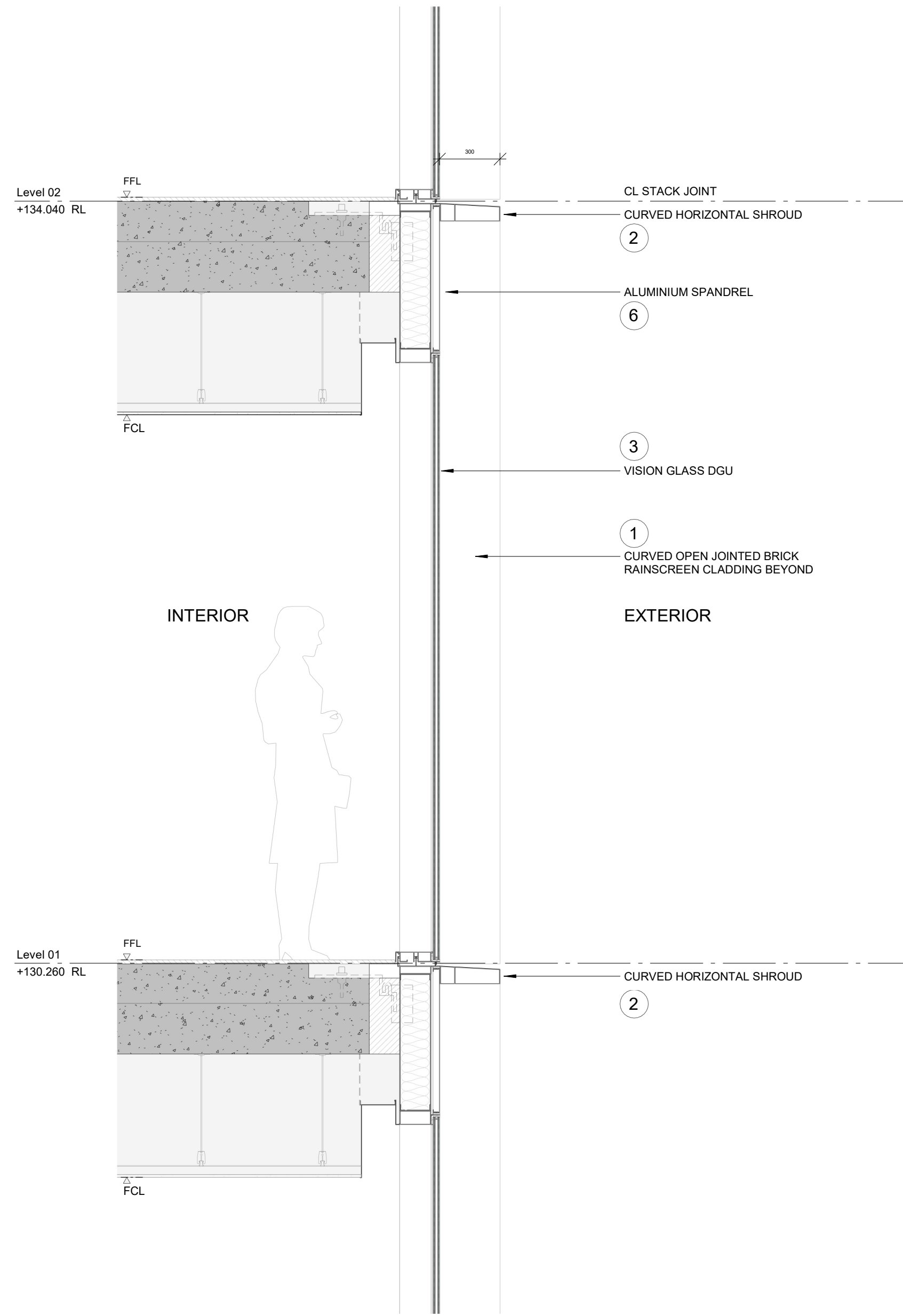
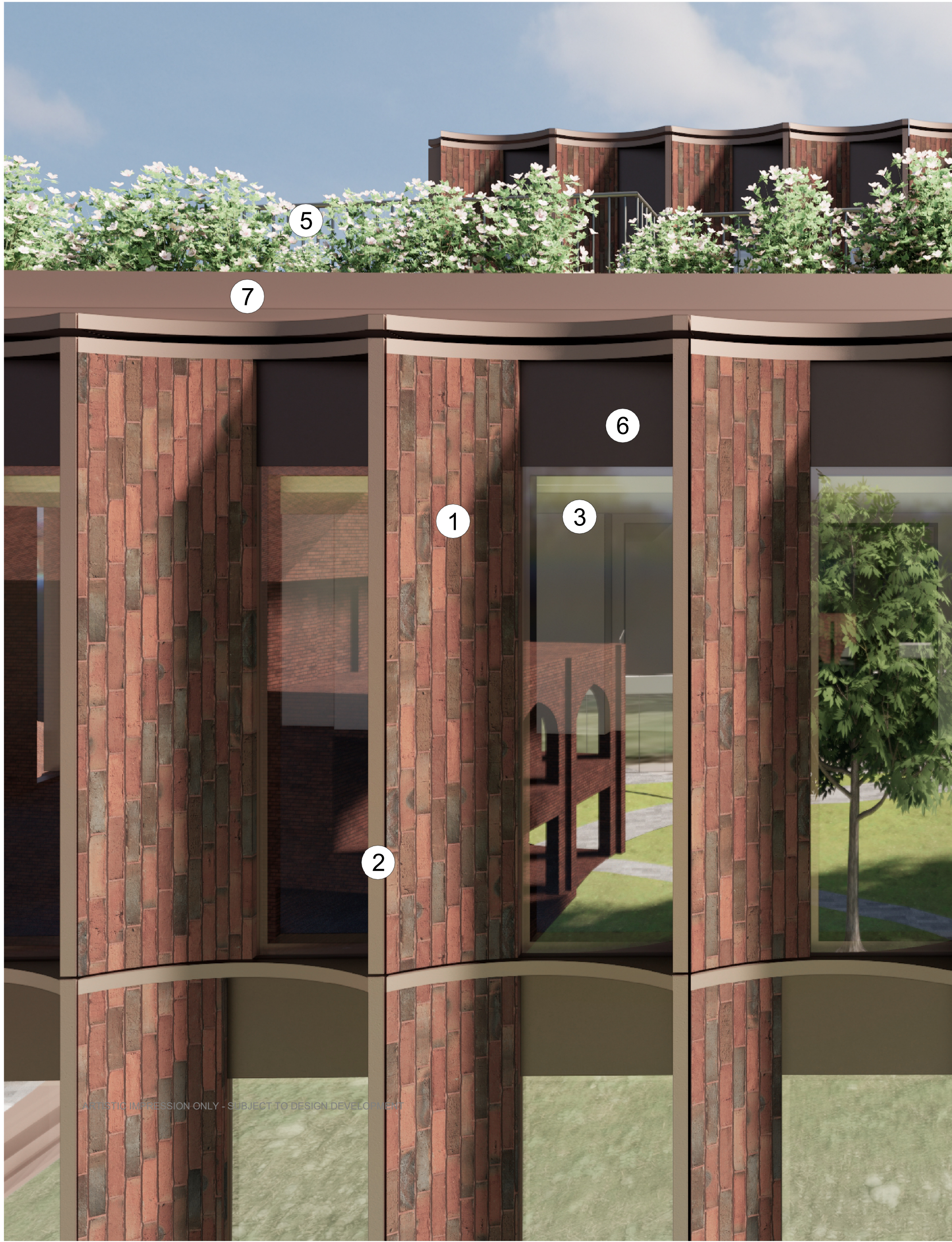


PROJECT NAME
PYMBLE LADIES COLLEGE - SECONDARY INNOVATION PRECINCT
PROJECT ADDRESS
20 AVON ROAD, PYMBLE NSW 2073 AUSTRALIA
3XN PROJECT NUMBER
550053

TRUE NORTH (MGA)
PROJECT NORTH
SCALE @ A1
1 : 100
STATUS
SSD-DA

DRAWING
SECTION - NORTH / SOUTH 03 - STAFF
ROOMS

DRAWING NUMBER
AR-SIP-DA-A07-1003
ISSUE
1



1:20
FACADE SECTION - TYPICAL DETAIL

Ground Lines

- Existing Topography
- Proposed Topography

Materials

- Brick Slap Cladding System - Open jointed rainscreen
- Vertical and Horizontal Aluminium Shroud - Colour: Bronze, light brown colour / Satin Finish
- Glazing
- Glazed Spandrel Panel Shadowbox
- Steel/Aluminium Pallisade Balustrade - Colour: Dark Grey
- Aluminium Spandrel Panel - Colour: Bronze, dark brown colour / Satin Finish
- Solid Aluminium Fascia Panels - Colour: Bronze, light brown colour / Satin Finish
- Solid Aluminium Louvers Panels - Colour: Bronze, dark brown colour / Satin Finish
- Solid Aluminium Louvers Panels - Colour: Dark Grey
- Solid Insulated Aluminium Panels - Colour: Bronze, light brown colour / Satin Finish

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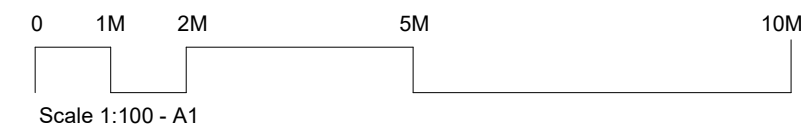
REVISION		
ISSUE	DATE	DESCRIPTION
1	17/02/2025	FOR SSD-DA
2	26/05/2025	FOR SSD-DA

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SCALE BAR



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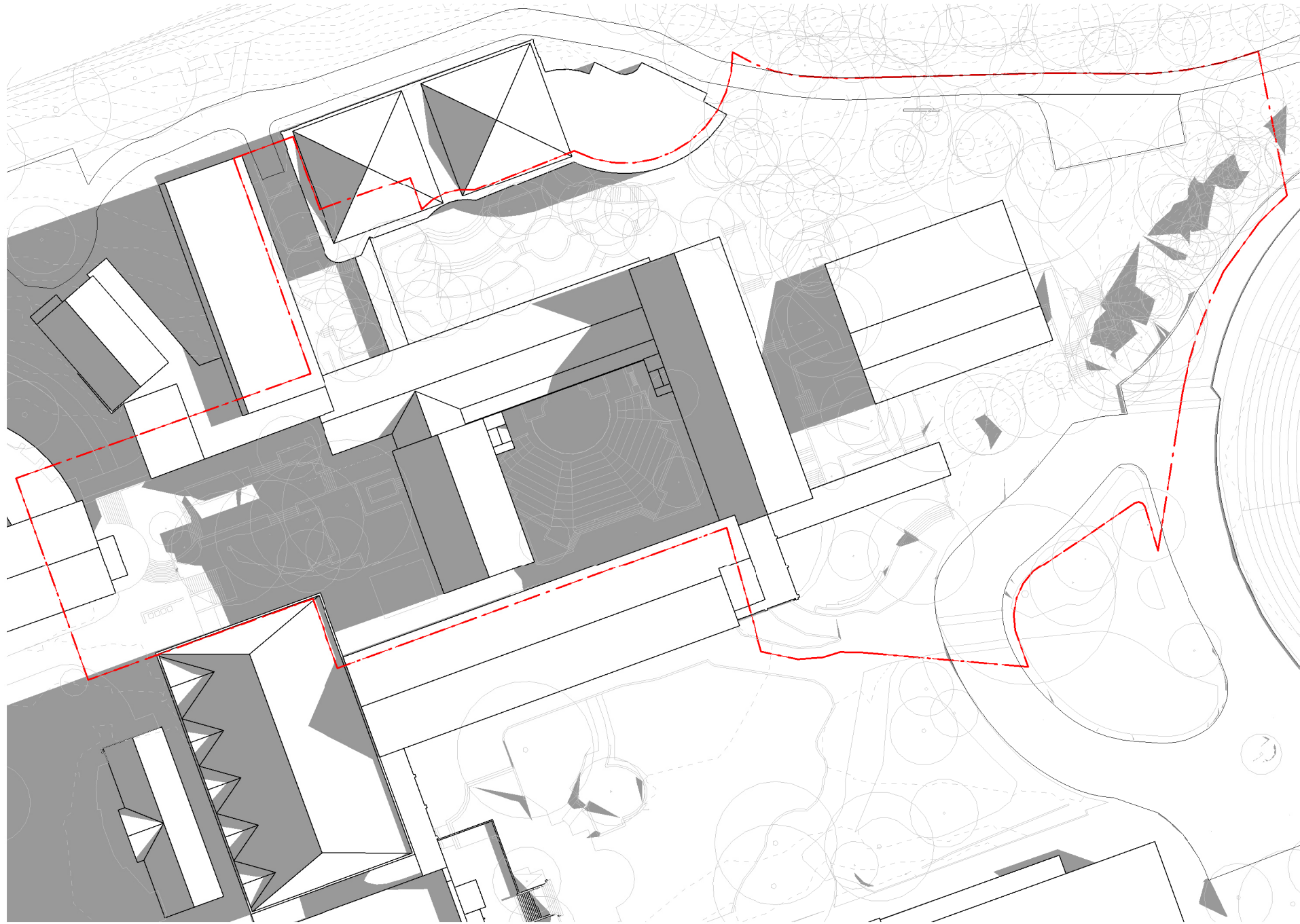


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PYMBLE LADIES COLLEGE - SECONDARY INNOVATION PRECINCT
PROJECT ADDRESS
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3XN PROJECT NUMBER
550053

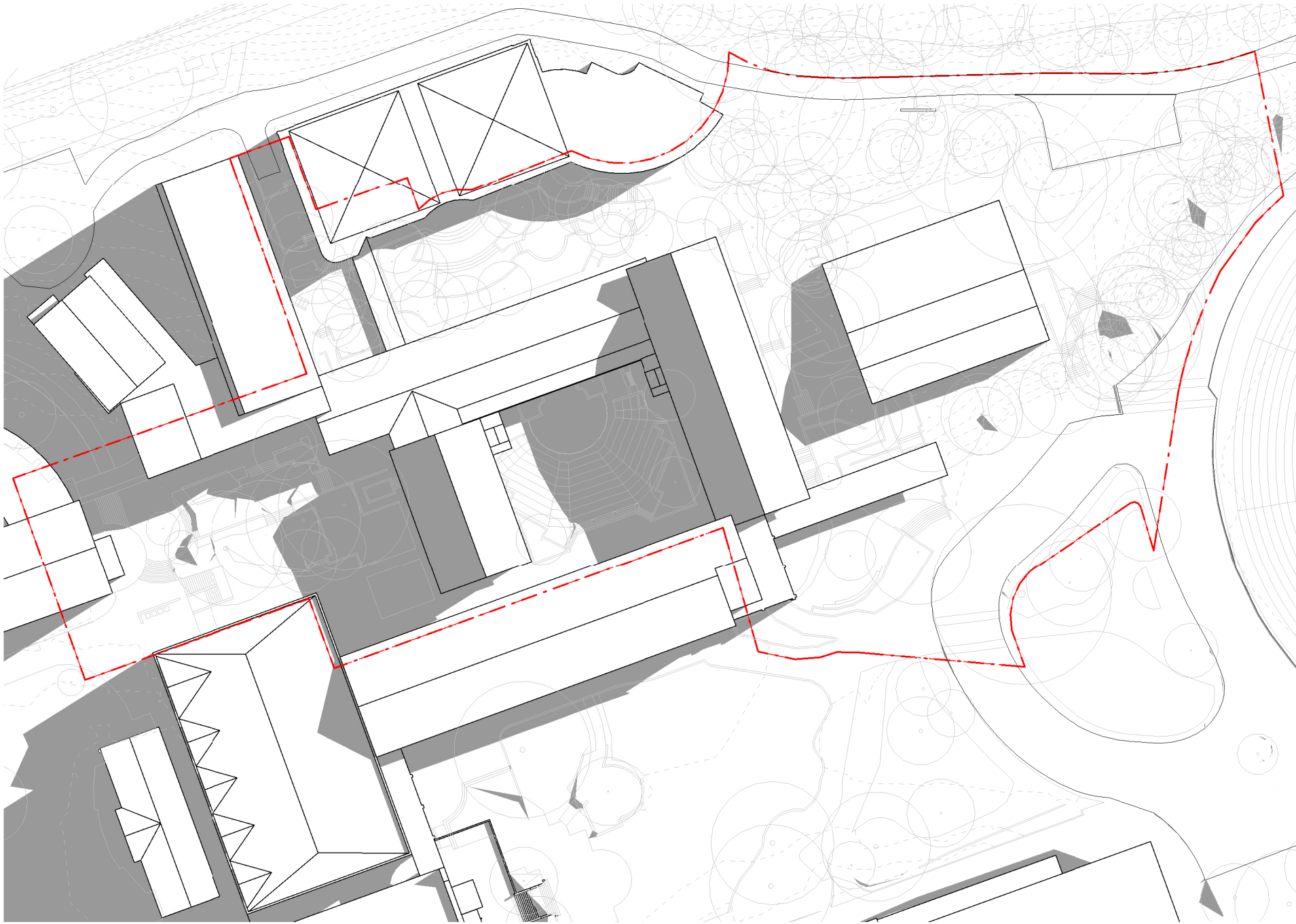
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PROJECT NORTH
SCALE @ A1
As indicated
STATUS
SSD-DA

DRAWING
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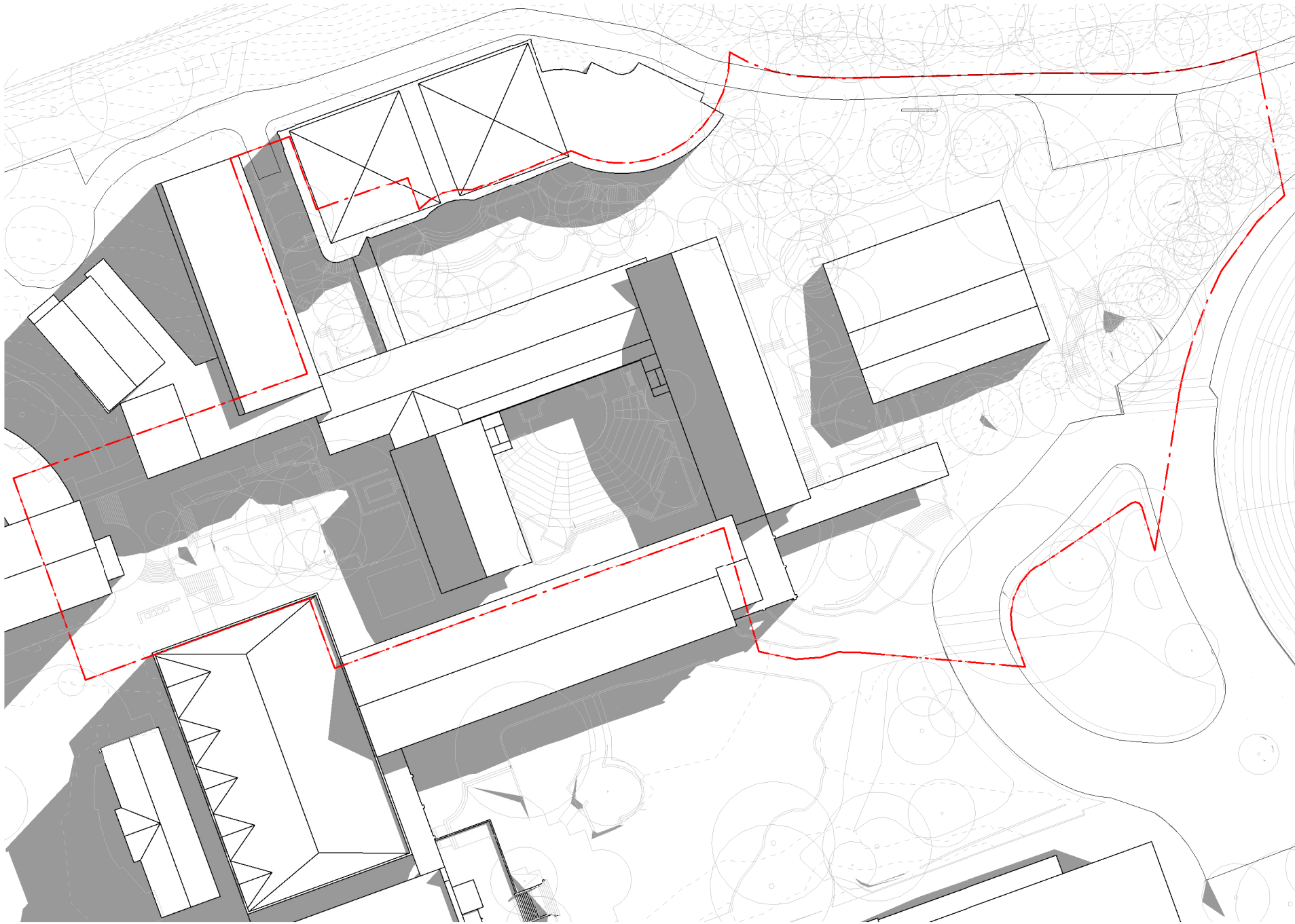
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ISSUE
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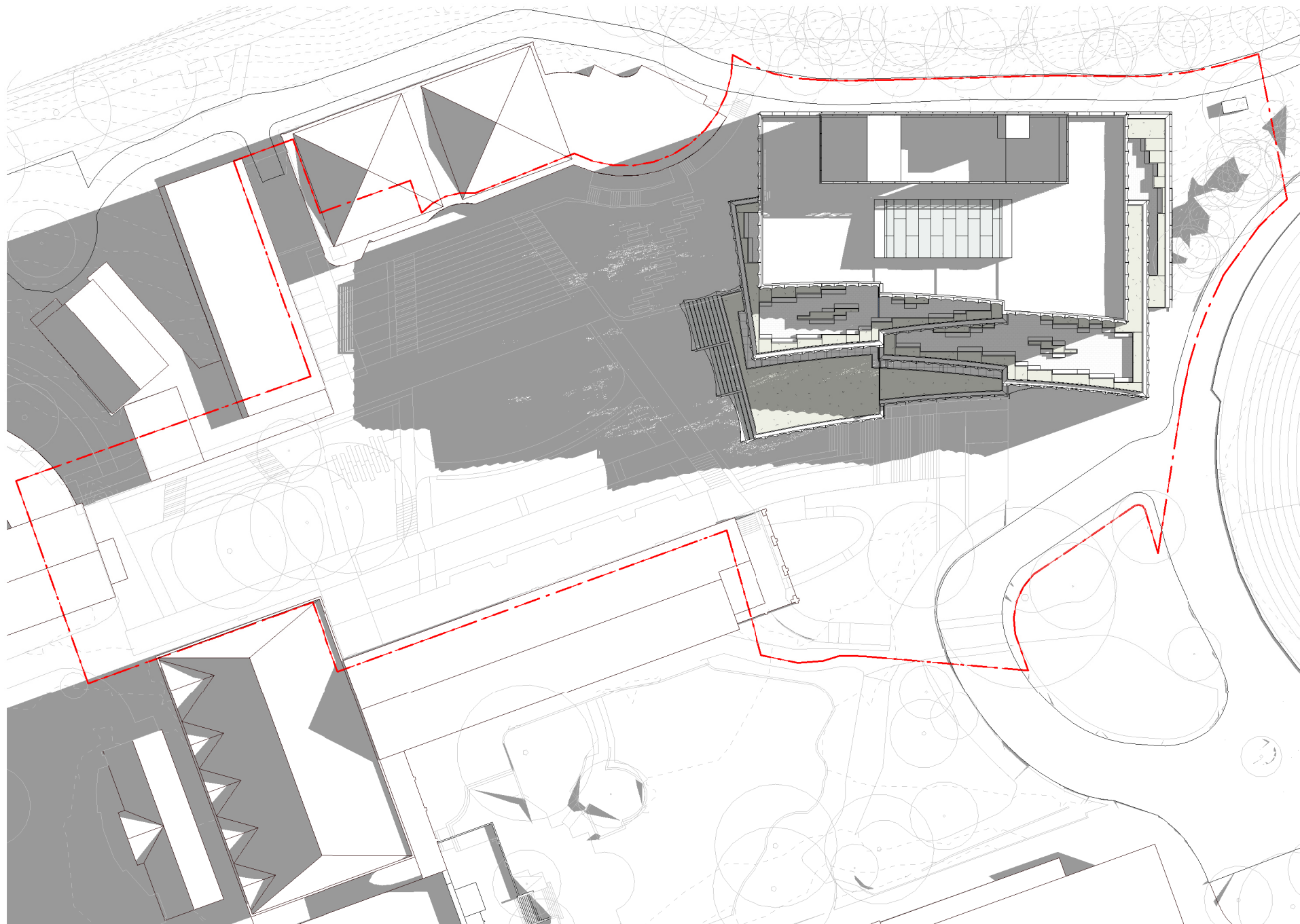
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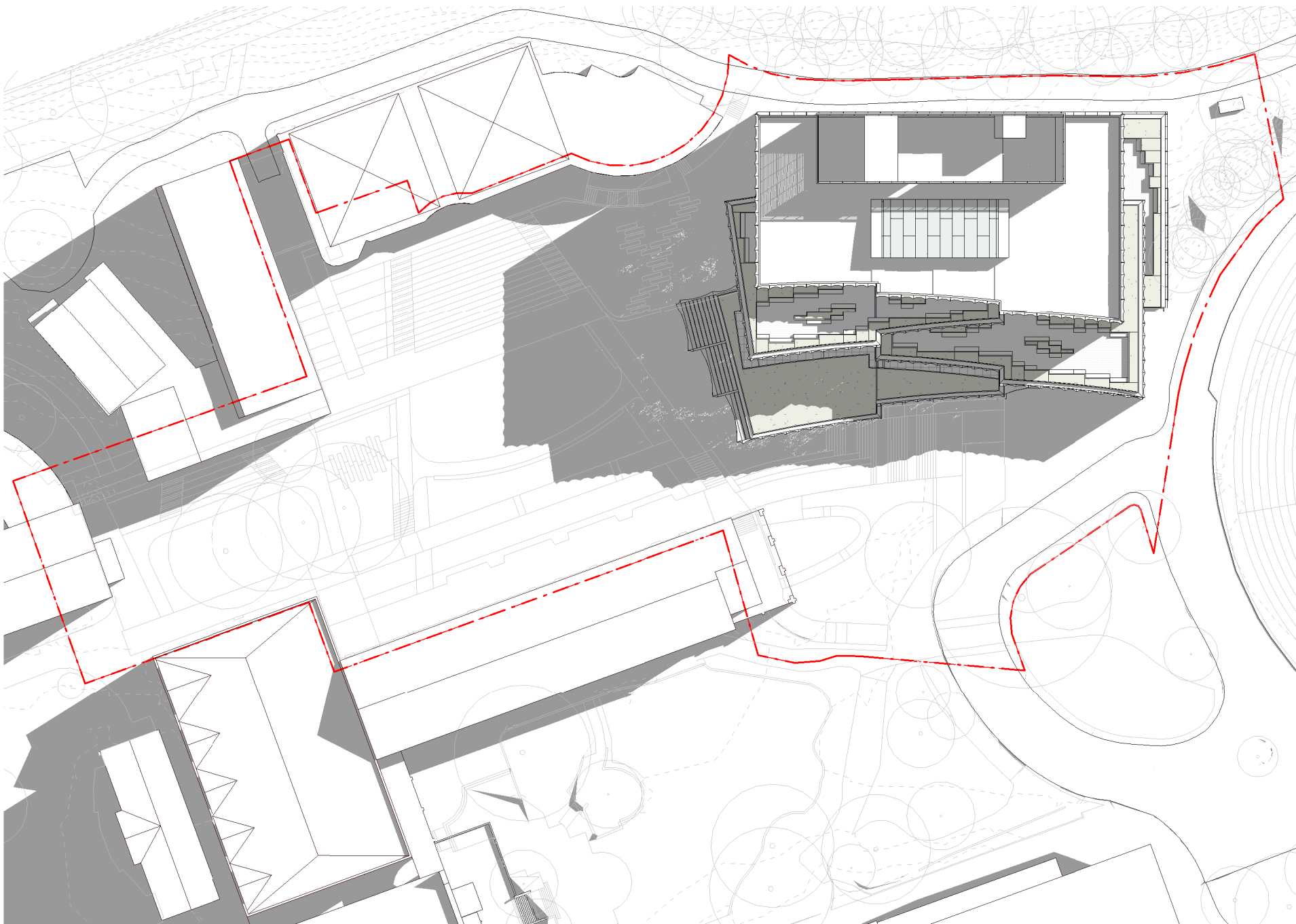
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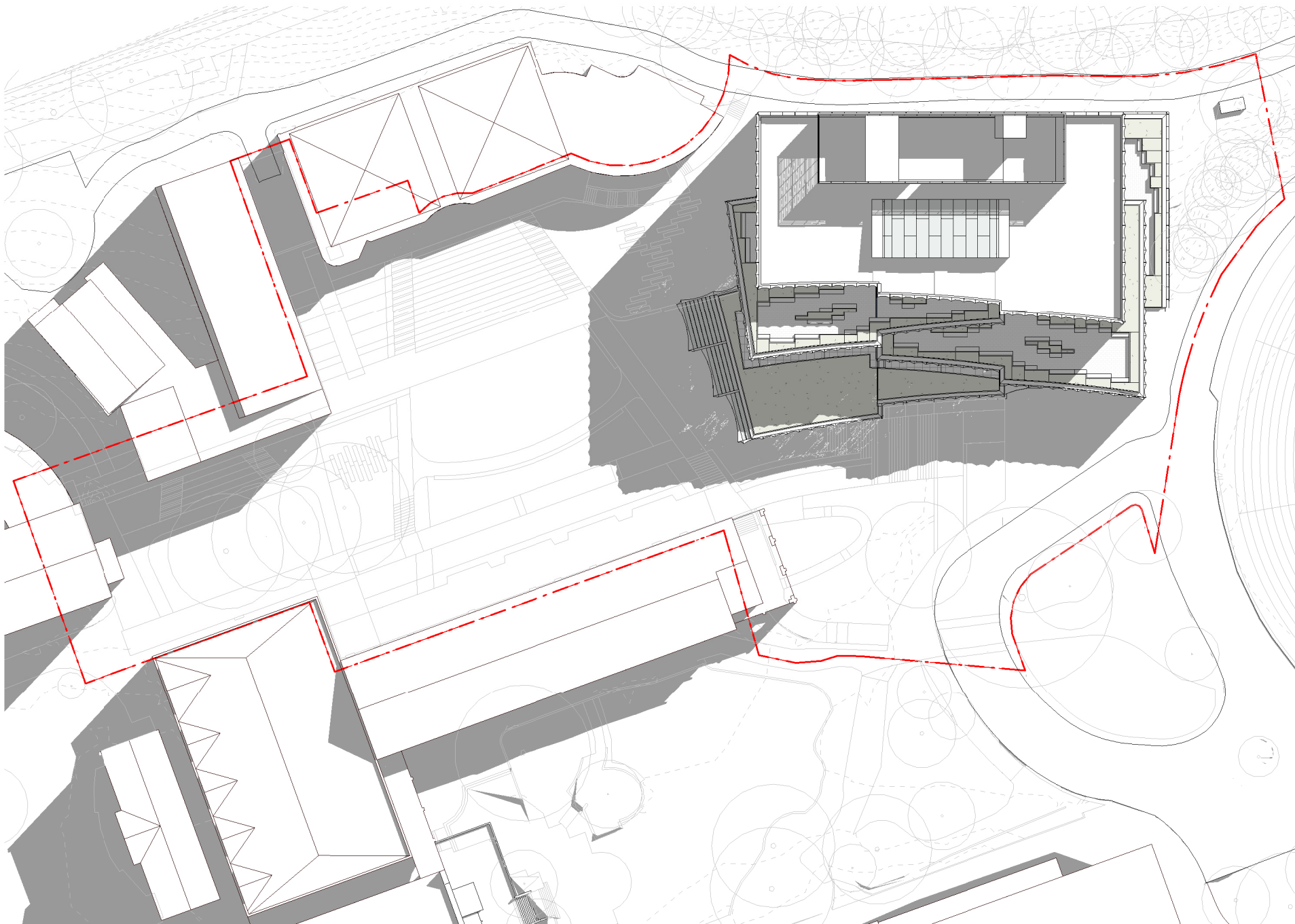
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SHADOW DIAGRAM: EXISTING - WINTER SOLITICE - 11:00AM



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SHADOW DIAGRAM: PROPOSED - WINTER SOLITICE - 9:00AM



5 | 1 : 750
SHADOW DIAGRAM: PROPOSED - WINTER SOLITICE - 10:00AM



6 | 1 : 750
SHADOW DIAGRAM: PROPOSED - WINTER SOLITICE - 11:00AM

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ISSUE	DATE	DESCRIPTION
1	03/02/2025	DRAFT SSD-DA
2	17/02/2025	FOR SSD-DA

NOTES

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DRAWING KEY

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PROJECT NAME

PLC - Secondary Innovation Precinct
PROJECT ADDRESS
20 Avon Road, Pymble NSW 2073, Australia
3XN PROJECT NUMBER
550053

TRUE NORTH (MGA)



SCALE @ A1

1 : 750

STATUS
SSD-DA

PROJECT NORTH



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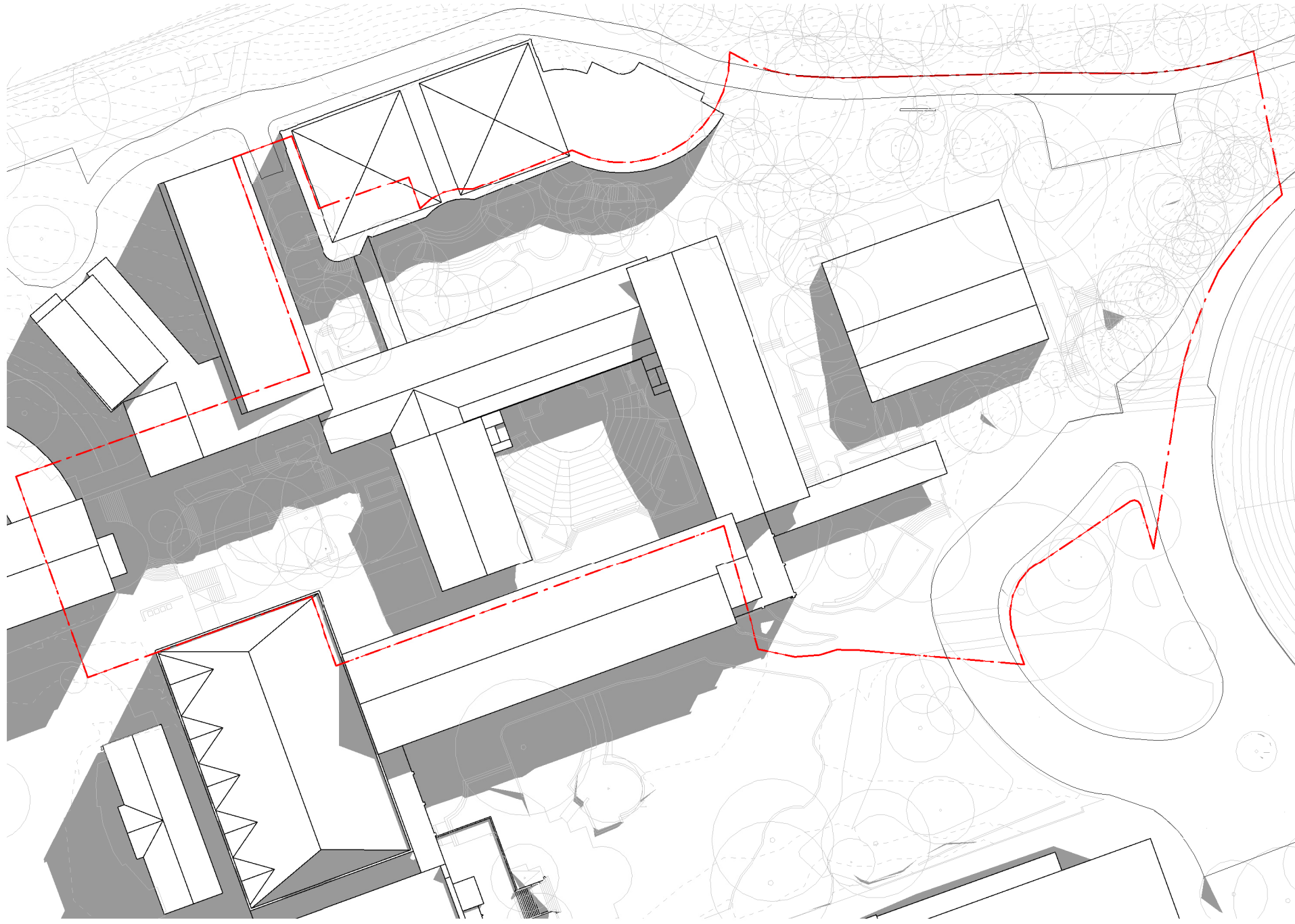
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9am - 11am

DRAWING NUMBER

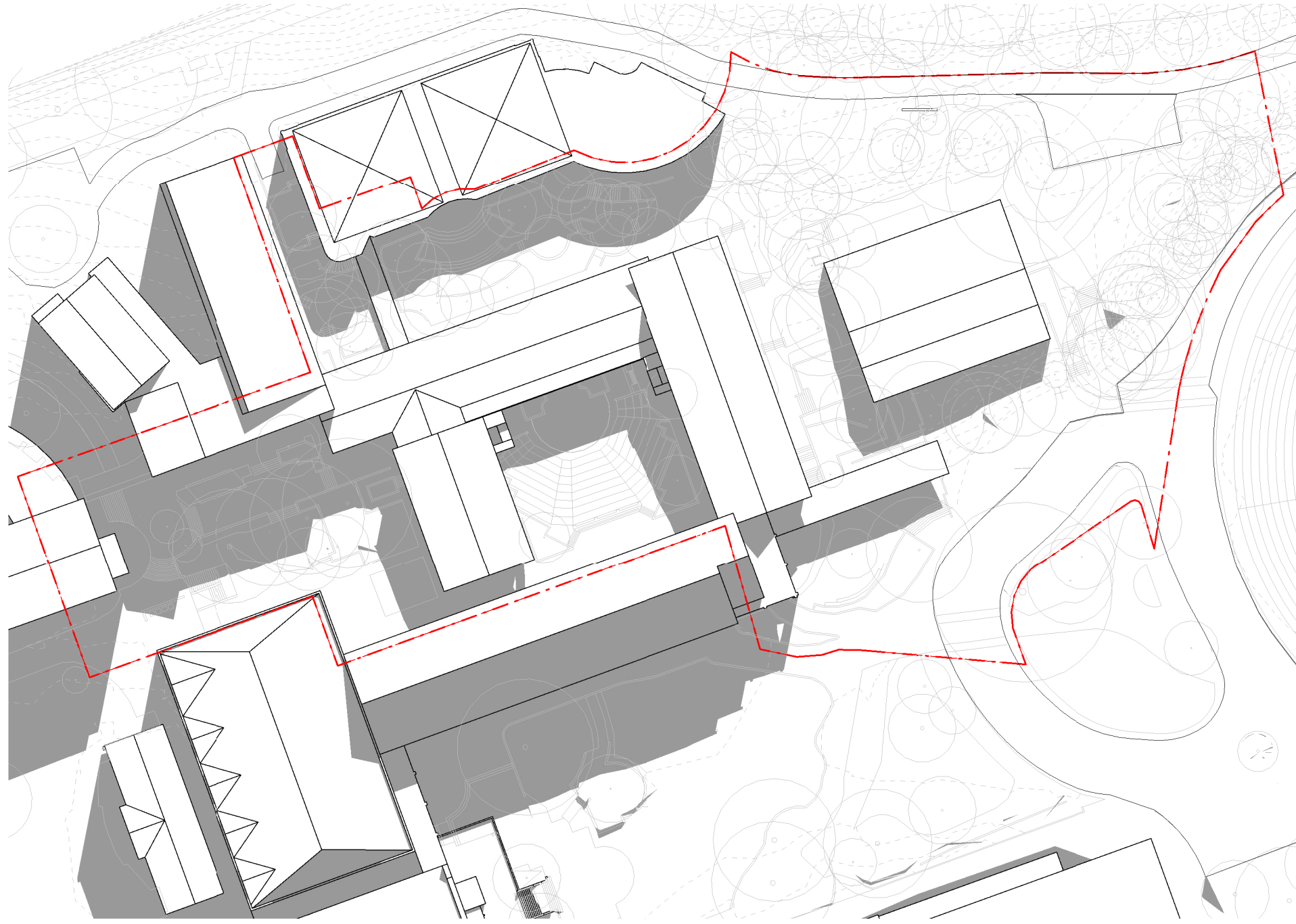
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ISSUE

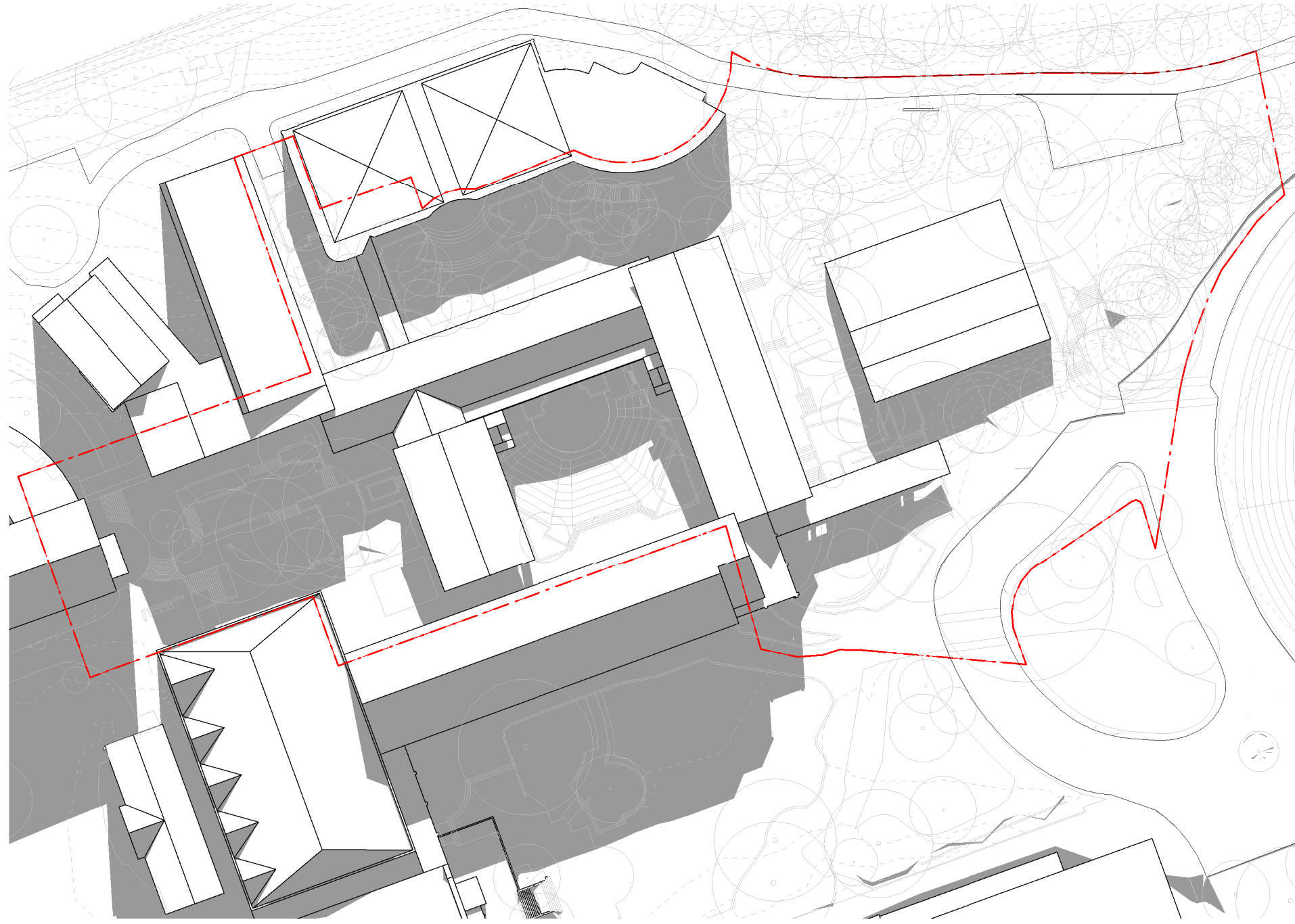
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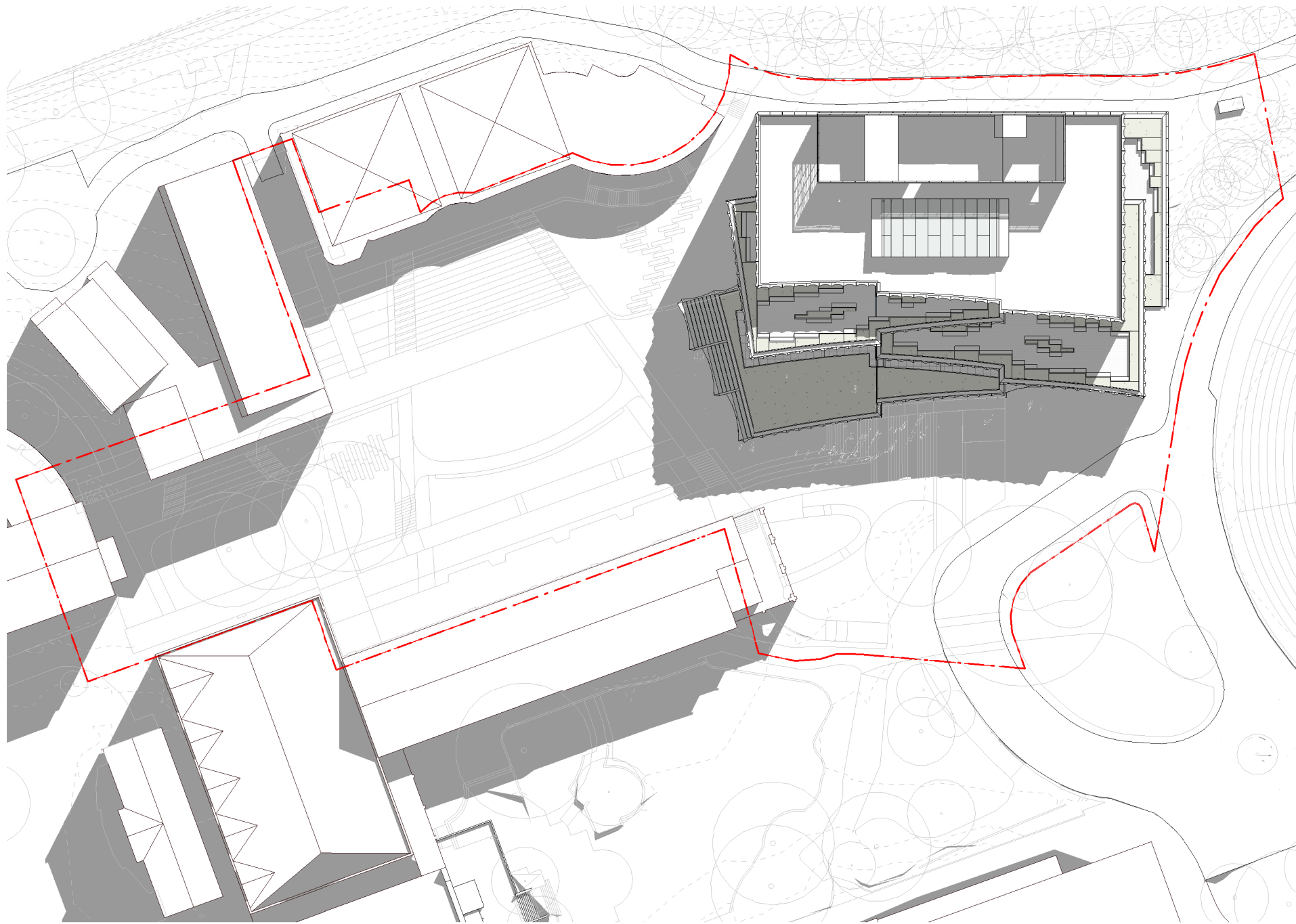
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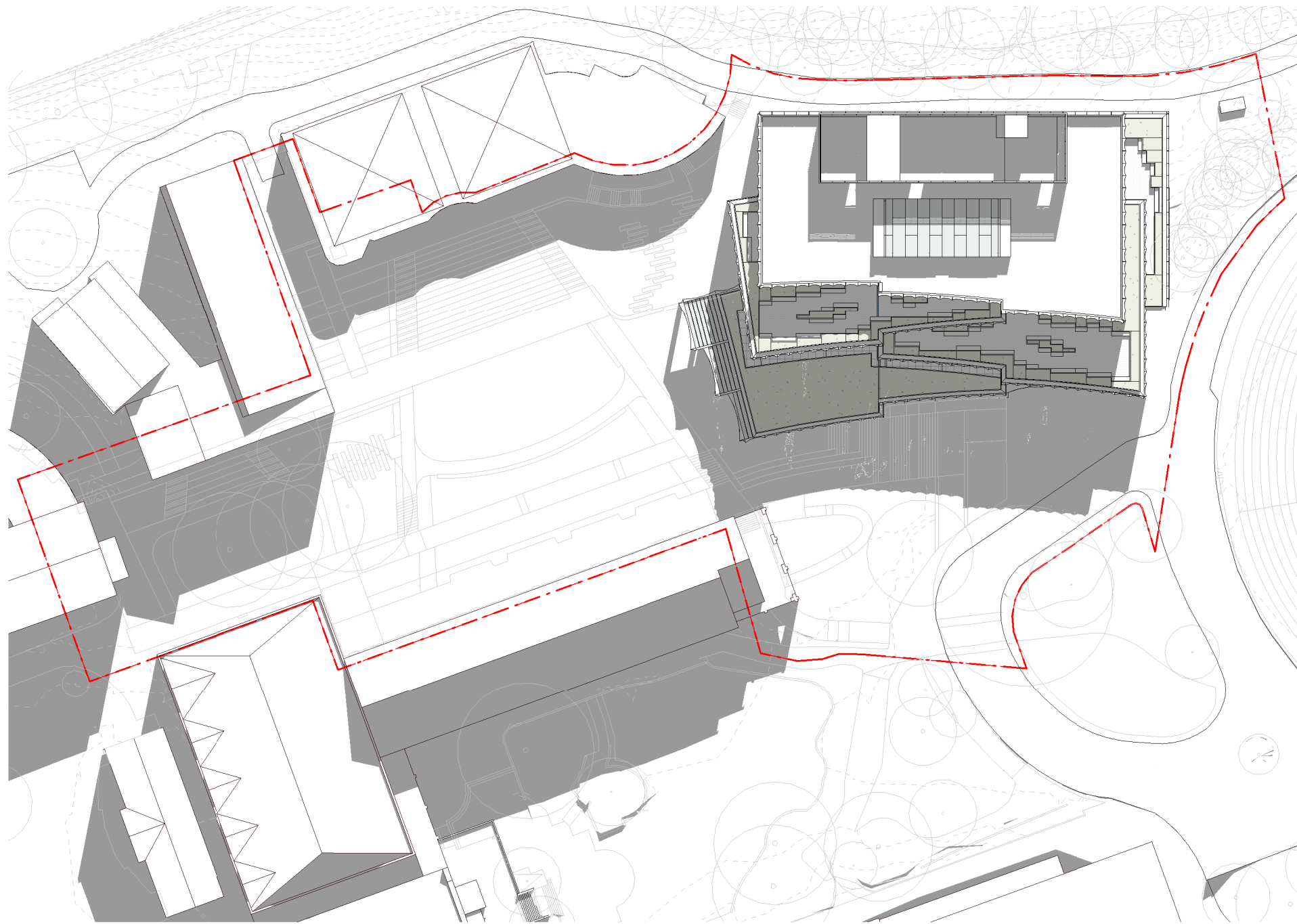
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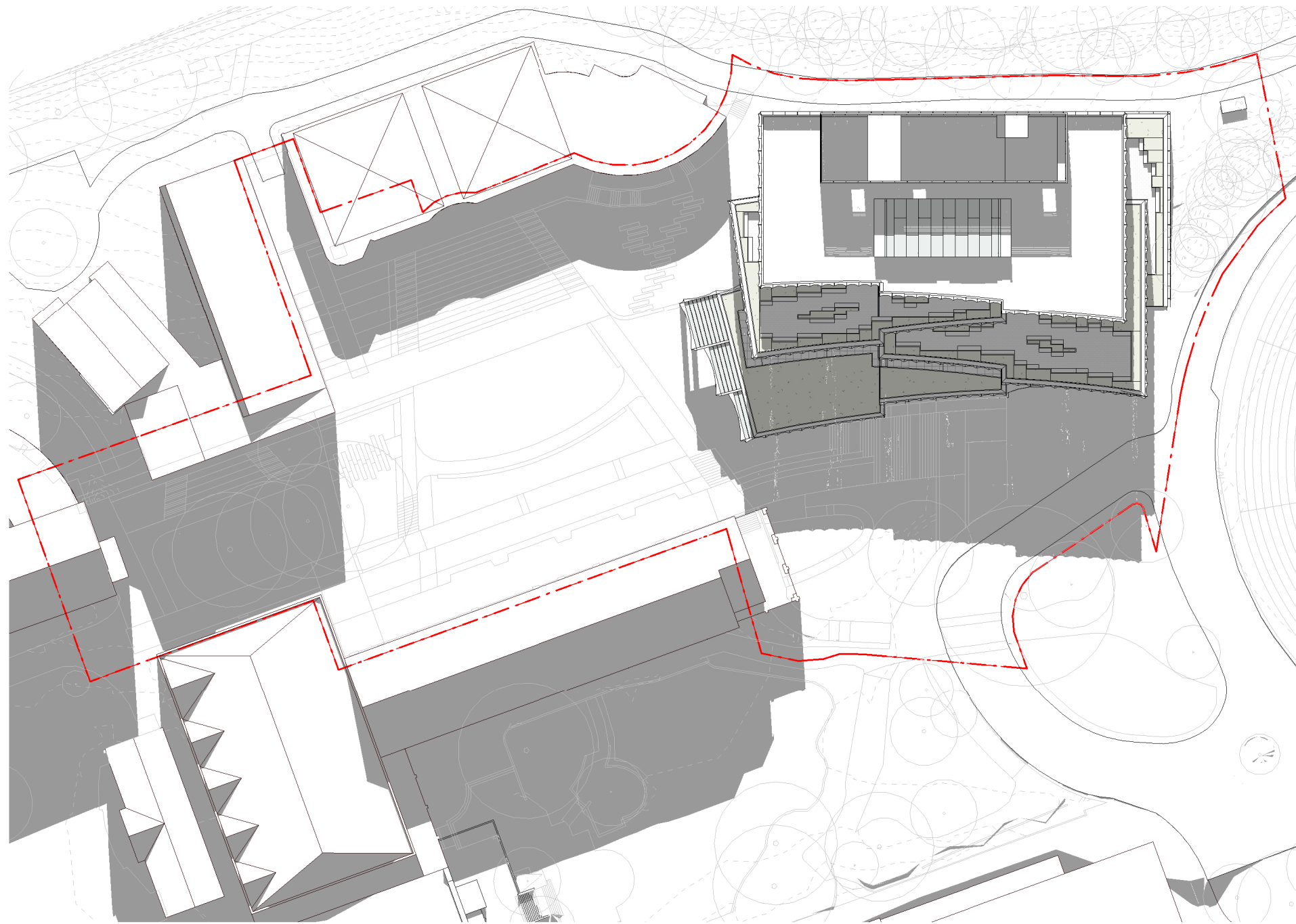
3 | 1 : 750
SHADOW DIAGRAM: EXISTING - WINTER SOLITICE - 2:00PM



4 | 1 : 750
SHADOW DIAGRAM: PROPOSED - WINTER SOLITICE - 12:00PM



5 | 1 : 750
SHADOW DIAGRAM: PROPOSED - WINTER SOLITICE - 1:00PM



6 | 1 : 750
SHADOW DIAGRAM: PROPOSED - WINTER SOLITICE - 2:00PM

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REVISION
ISSUE DATE DESCRIPTION
1 03/02/2025 DRAFT SSD-DA
2 17/02/2025 FOR SSD-DA

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DRAWING TO BE PRINTED IN COLOUR

DRAWING KEY

CLIENT

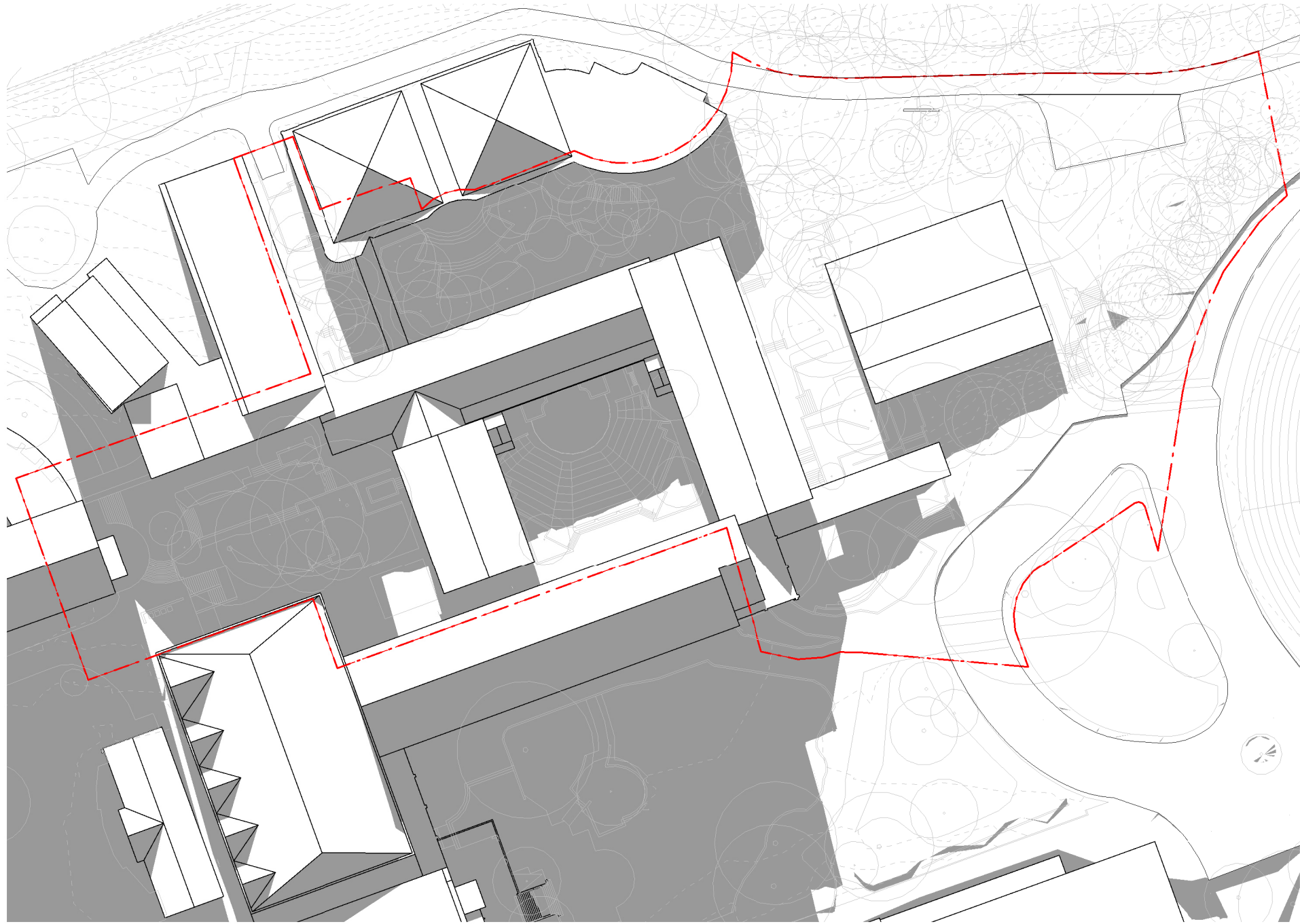


PROJECT NAME
PLC - Secondary Innovation Precinct
PROJECT ADDRESS
20 Avon Road, Pymble NSW 2073, Australia
3XN PROJECT NUMBER
550053

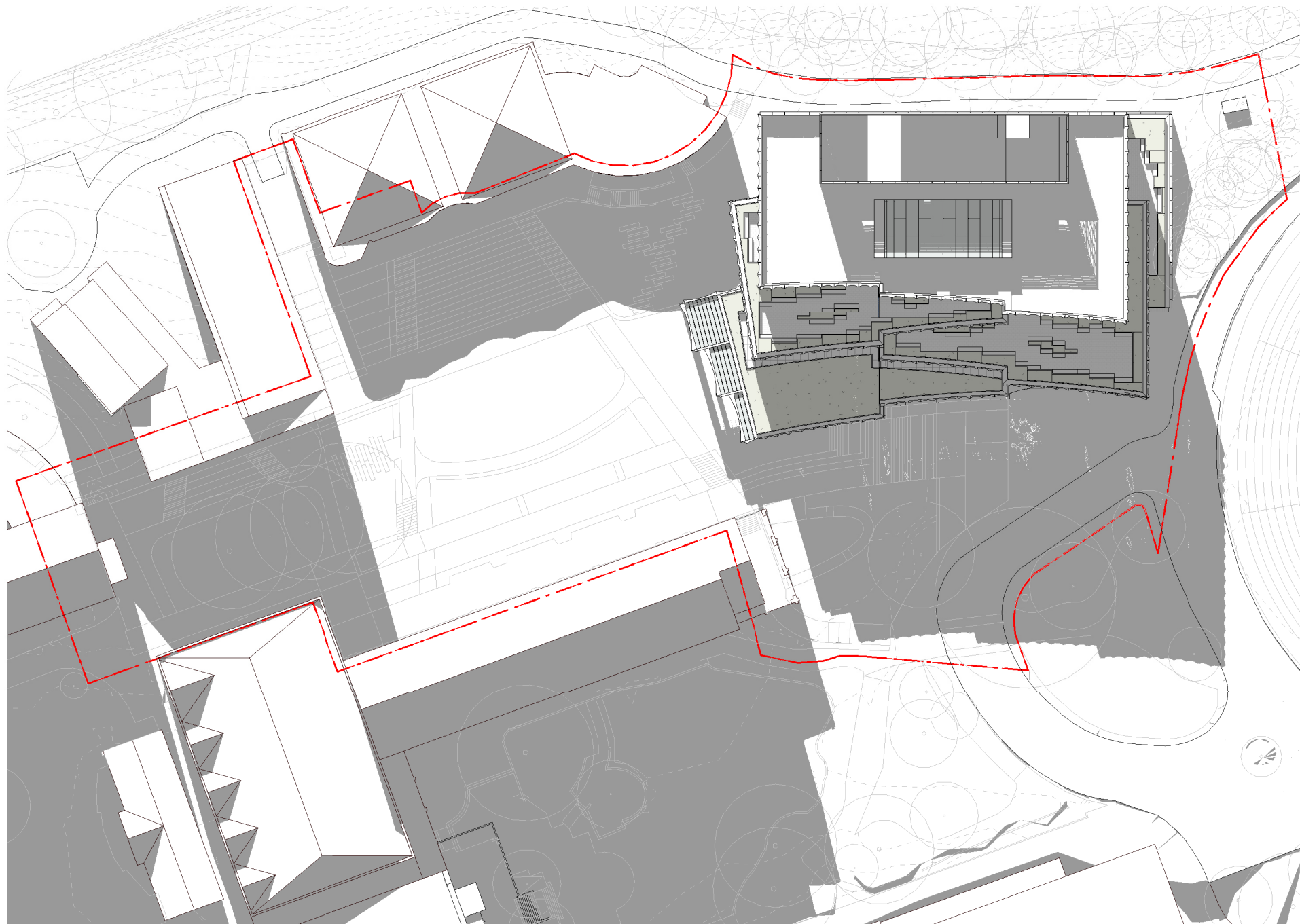
TRUE NORTH (MGA)
SCALE @ A1
1 : 750
STATUS
SSD-DA

PROJECT NORTH
DRAWING
SHADOW DIAGRAMS - WINTER SOLSTICE
12pm - 2pm

DRAWING NUMBER
AR-SIP-DA-A19-4001
ISSUE
2



1 | 1 : 750
SHADOW DIAGRAM: EXISTING - WINTER SOLITICE - 3:00PM



2 | 1 : 750
SHADOW DIAGRAM: PROPOSED - WINTER SOLITICE - 3:00PM

3XN

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SUITE 1, 178 DICKSONHIRE ST
BURRY HILLS NSW 2010
AUSTRALIA
ABN 40 610 400 530
TEL 3 9071 3000
WWW.3XN.COM

NEW ARCHITECTS
REGISTRATION BOARD /
NOMINATED ARCHITECTS
KIM HERFORTH NIELSEN - 9513
FRED HOLZ - 12704
DANIEL CRUDDACE - 11438

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REVISION		
ISSUE	DATE	DESCRIPTION
1	03/02/2025	DRAFT SSD-DA
2	17/02/2025	FOR SSD-DA

NOTES

FOR INFORMATION

DRAWING NOT TO BE USED FOR CONSTRUCTION

DRAWING TO BE PRINTED IN COLOUR

DRAWING KEY

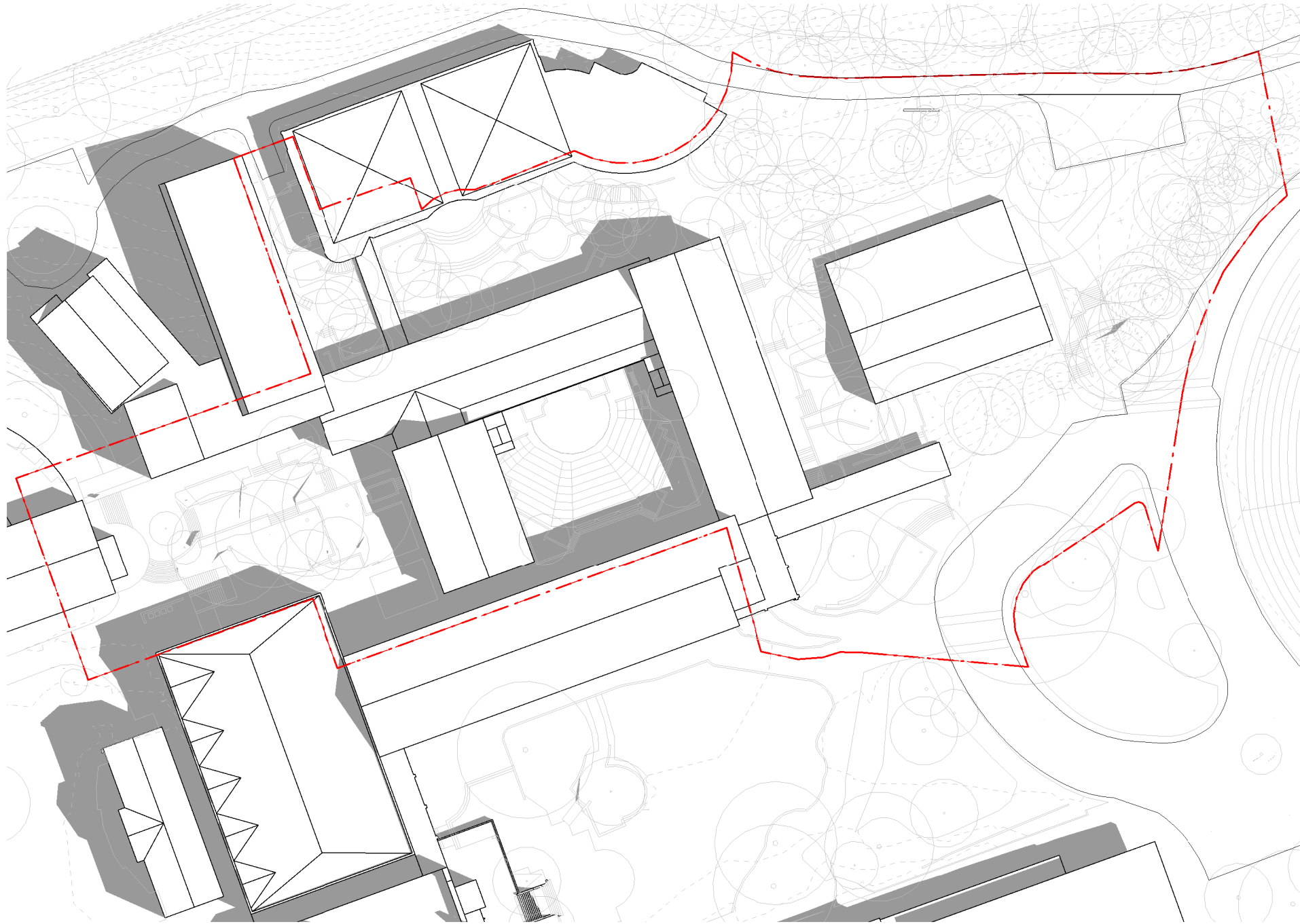
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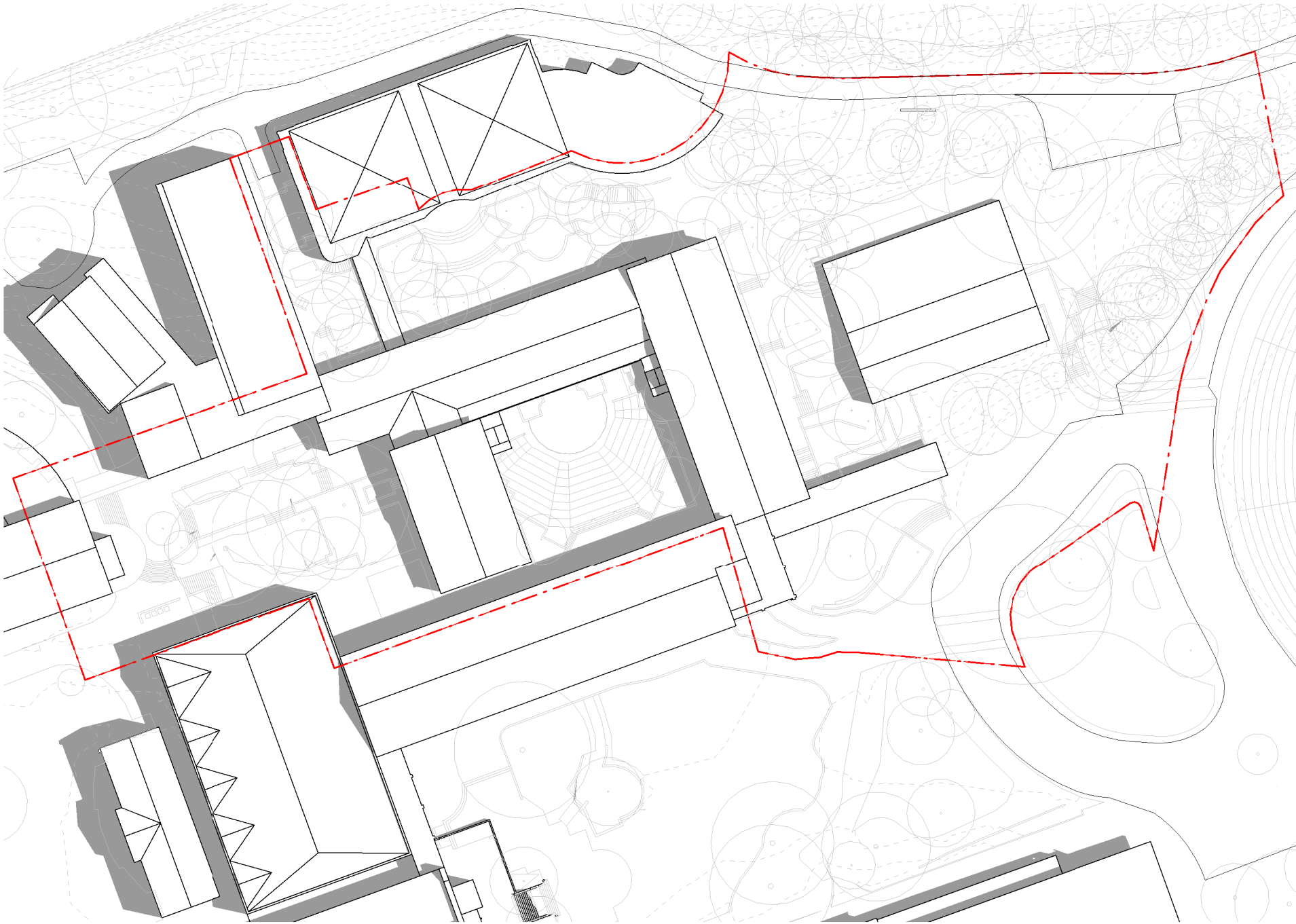
PROJECT NAME
PLC - Secondary Innovation Precinct
PROJECT ADDRESS
20 Avon Road, Pymble NSW 2073, Australia
3XN PROJECT NUMBER
550053

TRUE NORTH (MGA)
PROJECT NORTH
SCALE @ A1
1 : 750
STATUS
SSD-DA

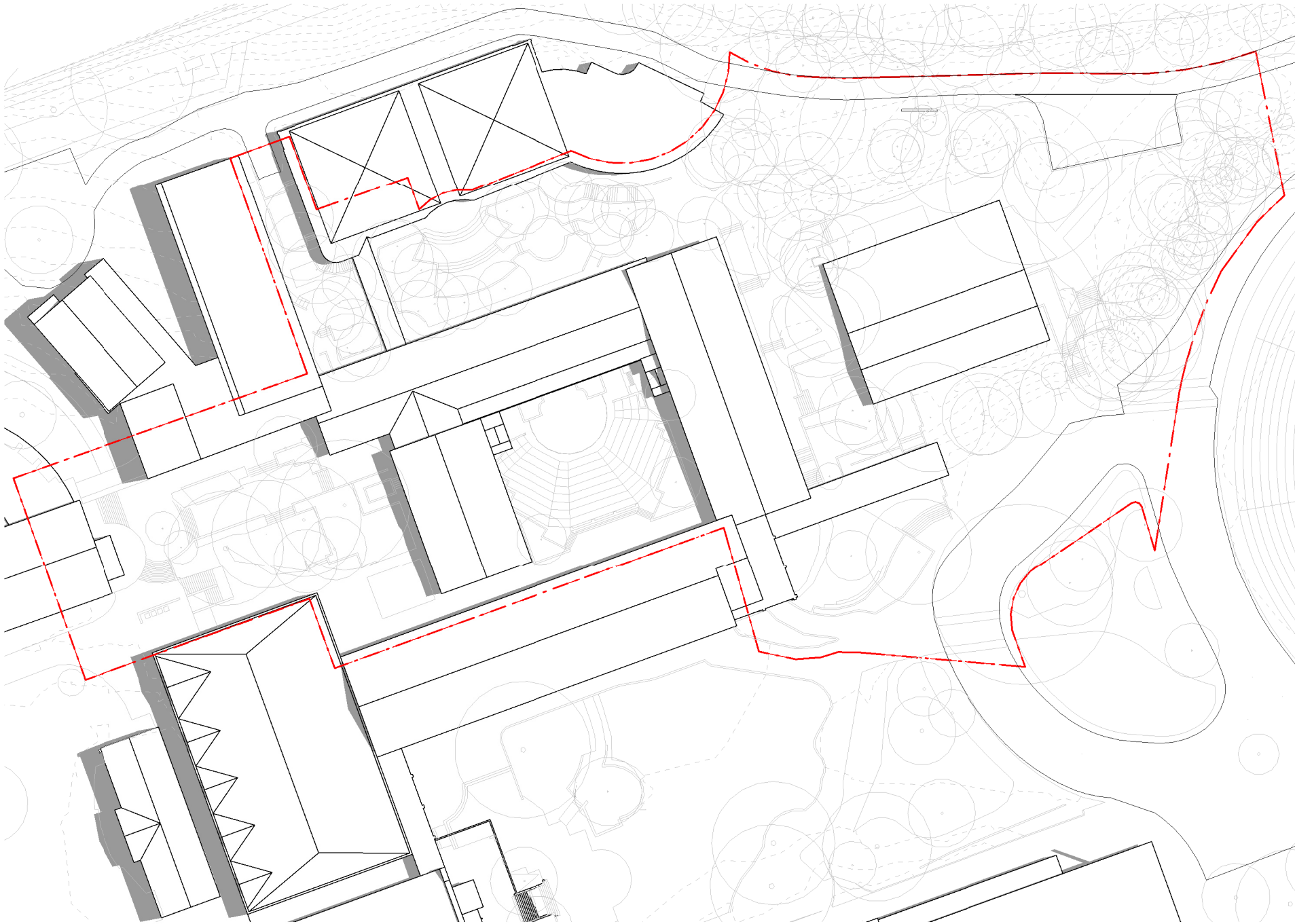
DRAWING
SHADOW DIAGRAMS - WINTER SOLSTICE
3pm
DRAWING NUMBER
AR-SIP-DA-A19-4002
ISSUE
2



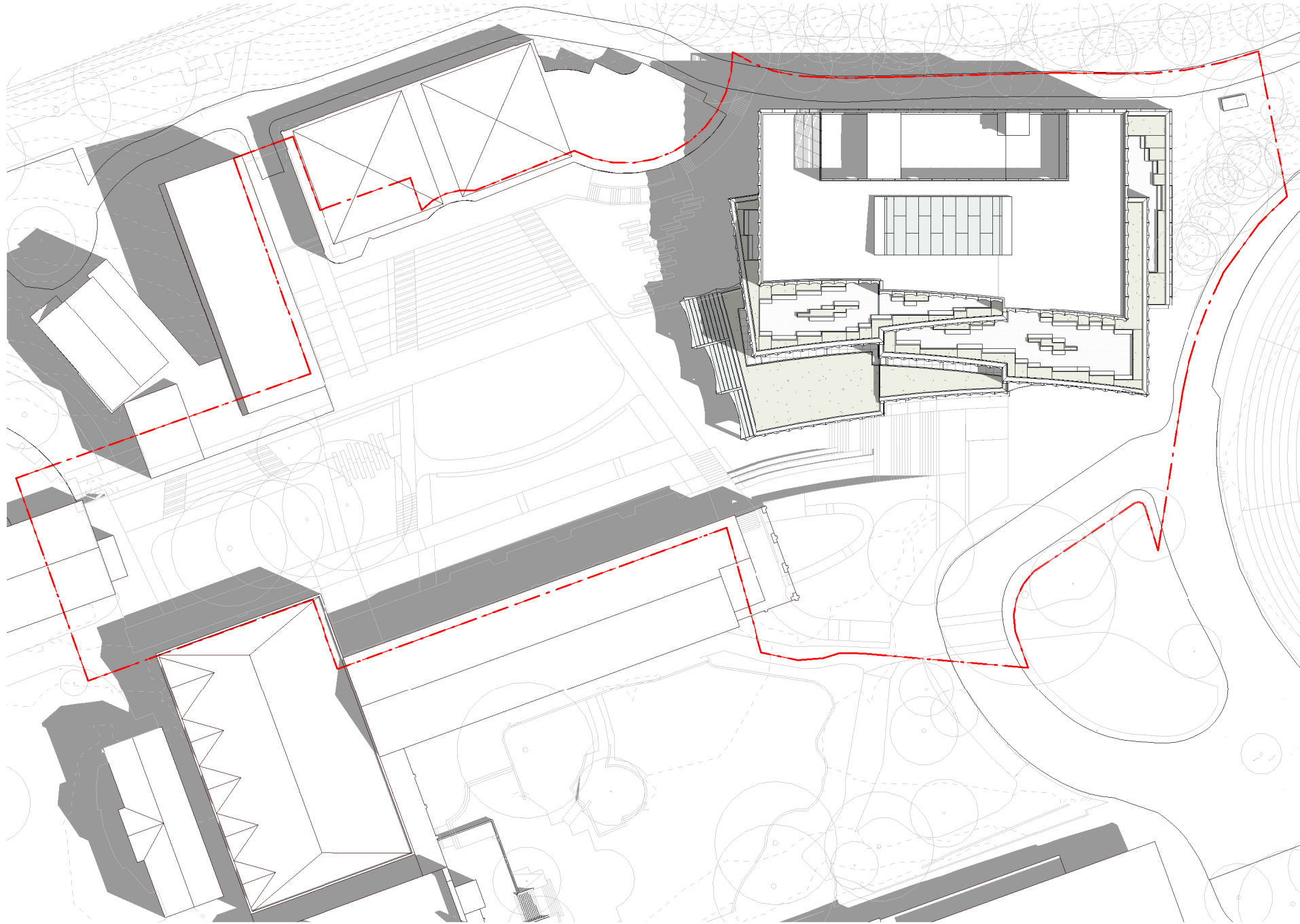
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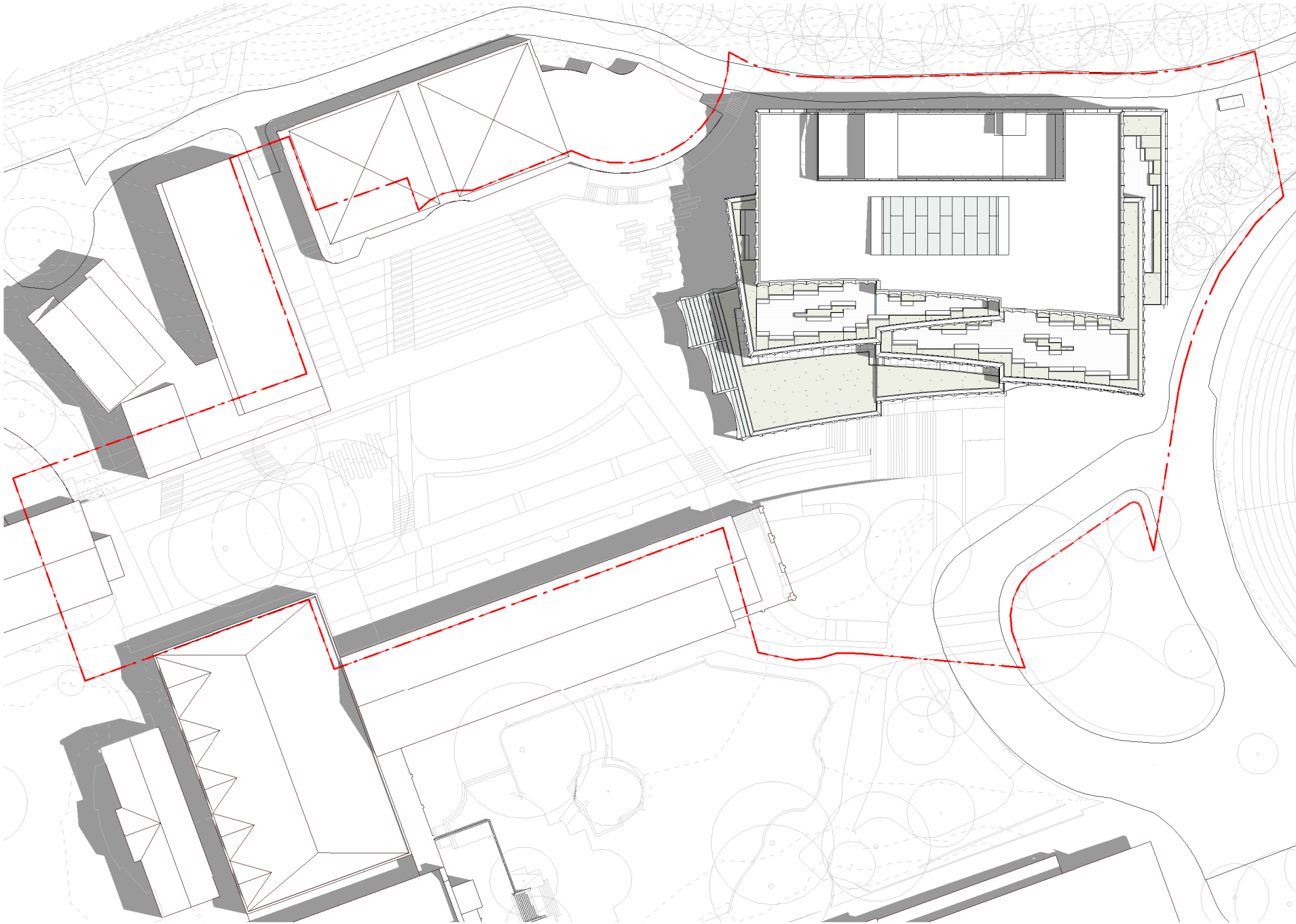
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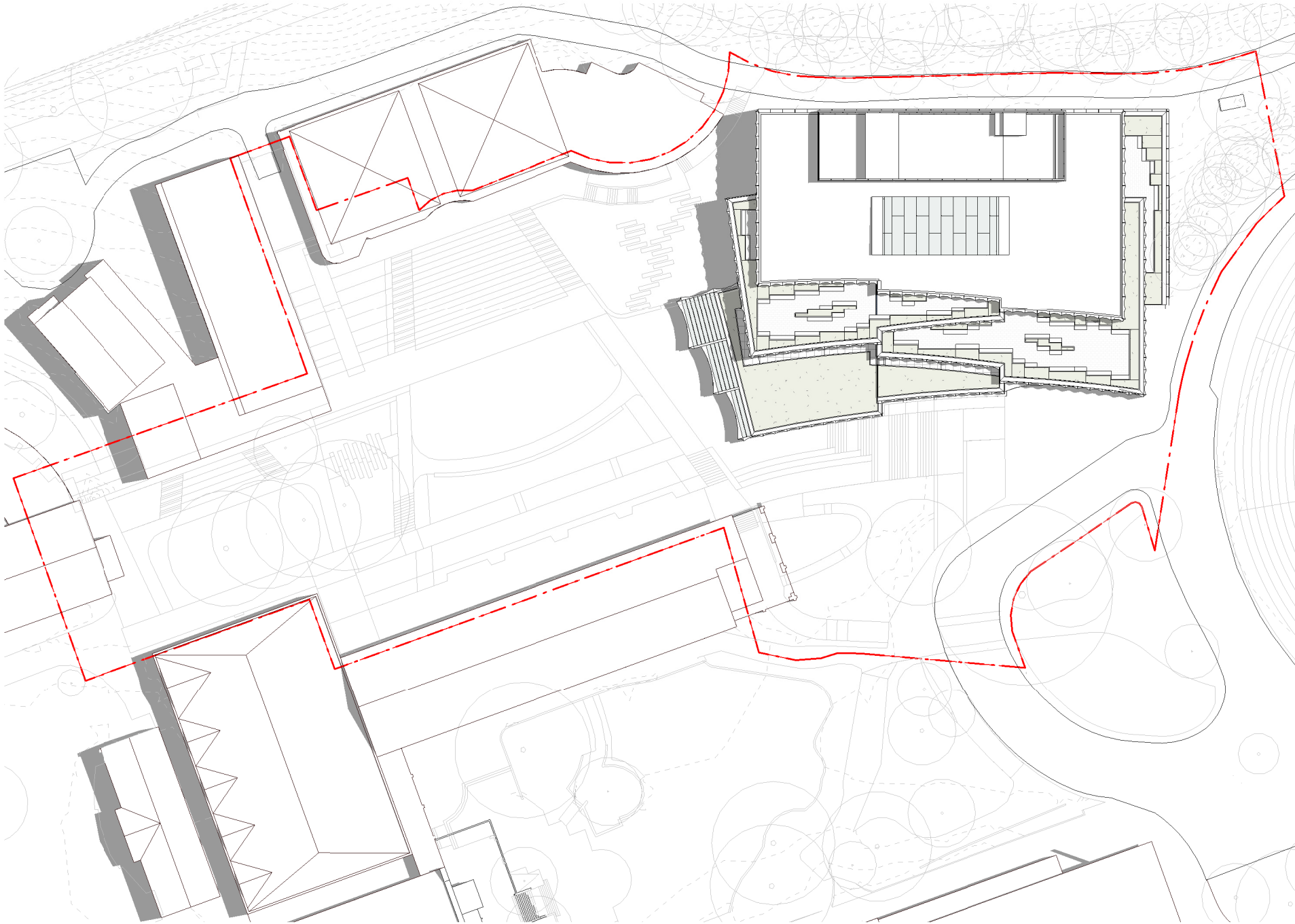
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SHADOW DIAGRAM: EXISTING - SUMMER SOLITICE - 11:00AM



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SHADOW DIAGRAM: PROPOSED - SUMMER SOLITICE - 9:00AM



5 | 1 : 750
SHADOW DIAGRAM: PROPOSED - SUMMER SOLITICE - 10:00AM



6 | 1 : 750
SHADOW DIAGRAM: PROPOSED - SUMMER SOLITICE - 11:00AM

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SUITE 1, 178 DICKSON STREET
BURRILL HILLS NSW 2010
AUSTRALIA

NEW ARCHITECTS
REGISTRATION BOARD /
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ABN 40 610 404 530
+61 3 9071 3000
WWW.3XN.COM

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REVISION

ISSUE DATE

DESCRIPTION

1 03/02/2025

2 17/02/2025

DRAFT SSD-DA

FOR SSD-DA

NOTES

FOR INFORMATION

DRAWING NOT TO BE USED FOR CONSTRUCTION

DRAWING TO BE PRINTED IN COLOUR

DRAWING KEY

CLIENT



PROJECT NAME
PLC - Secondary Innovation Precinct
PROJECT ADDRESS
20 Avon Road, Pymble NSW 2073, Australia
3XN PROJECT NUMBER
550053

TRUE NORTH (MGA)

SCALE @ A1

1 : 750

STATUS

SSD-DA

PROJECT NORTH

DRAWING

SHADOW DIAGRAMS - SUMMER SOLSTICE

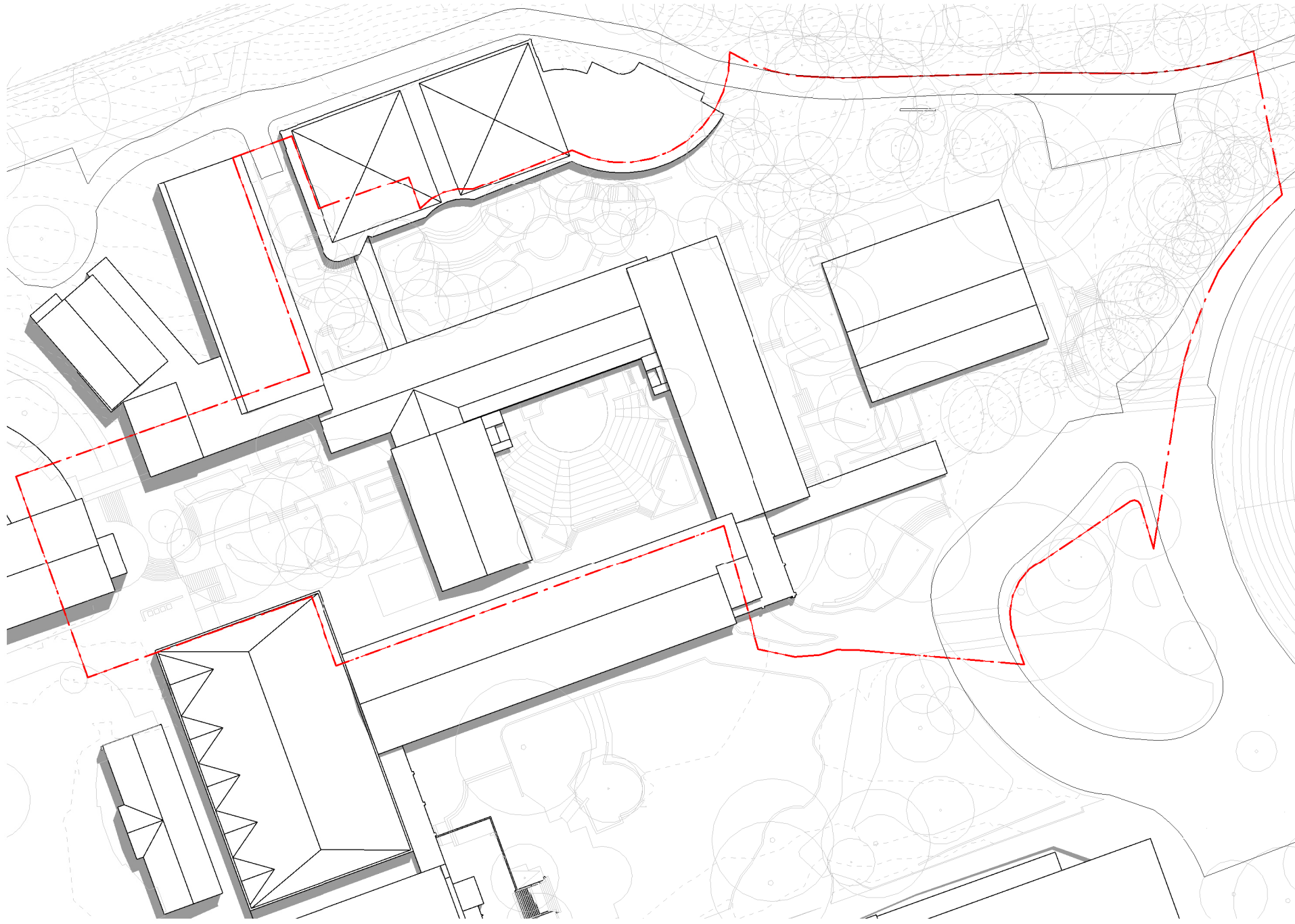
9am - 11am

DRAWING NUMBER

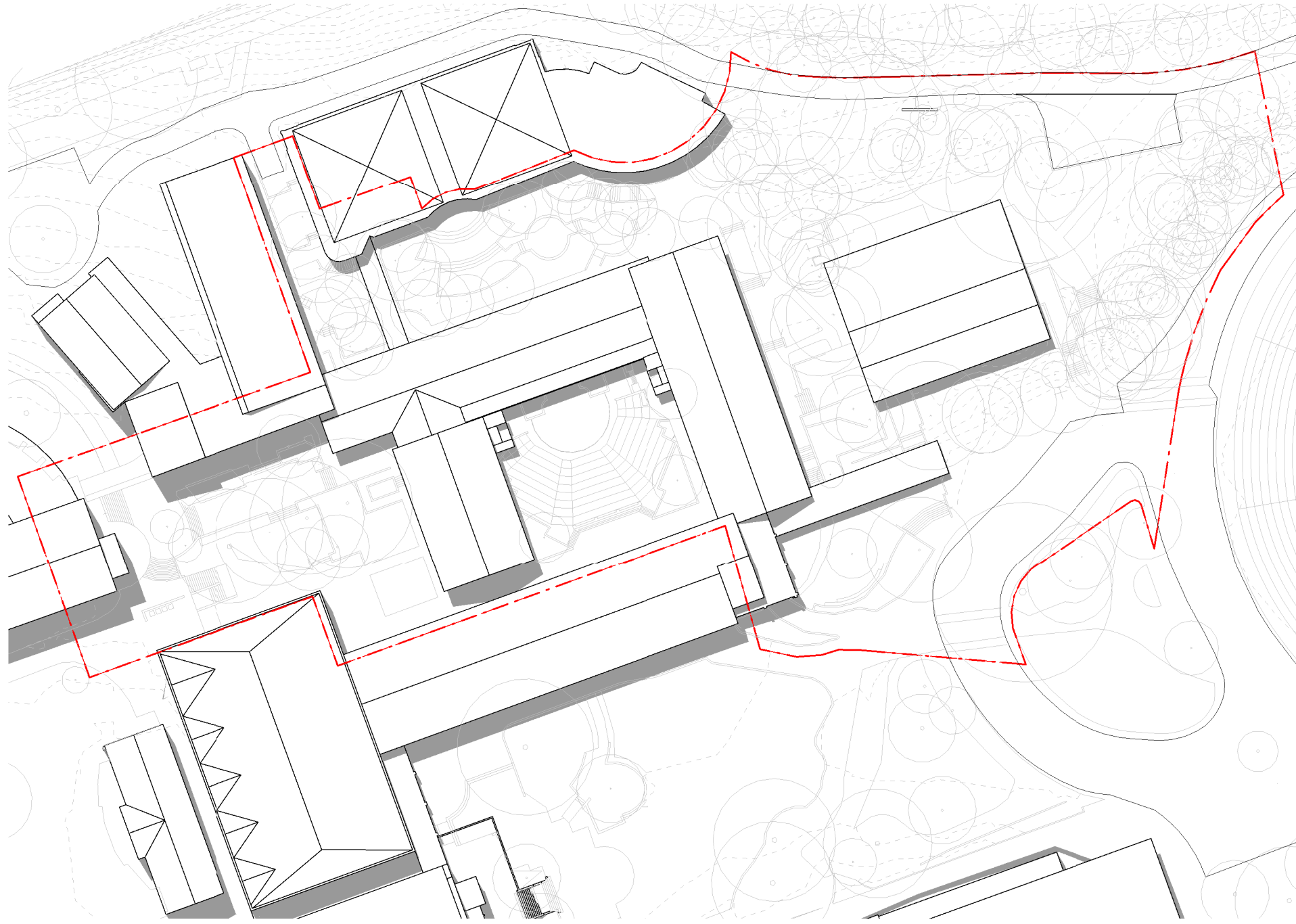
AR-SIP-DA-A19-4003

ISSUE

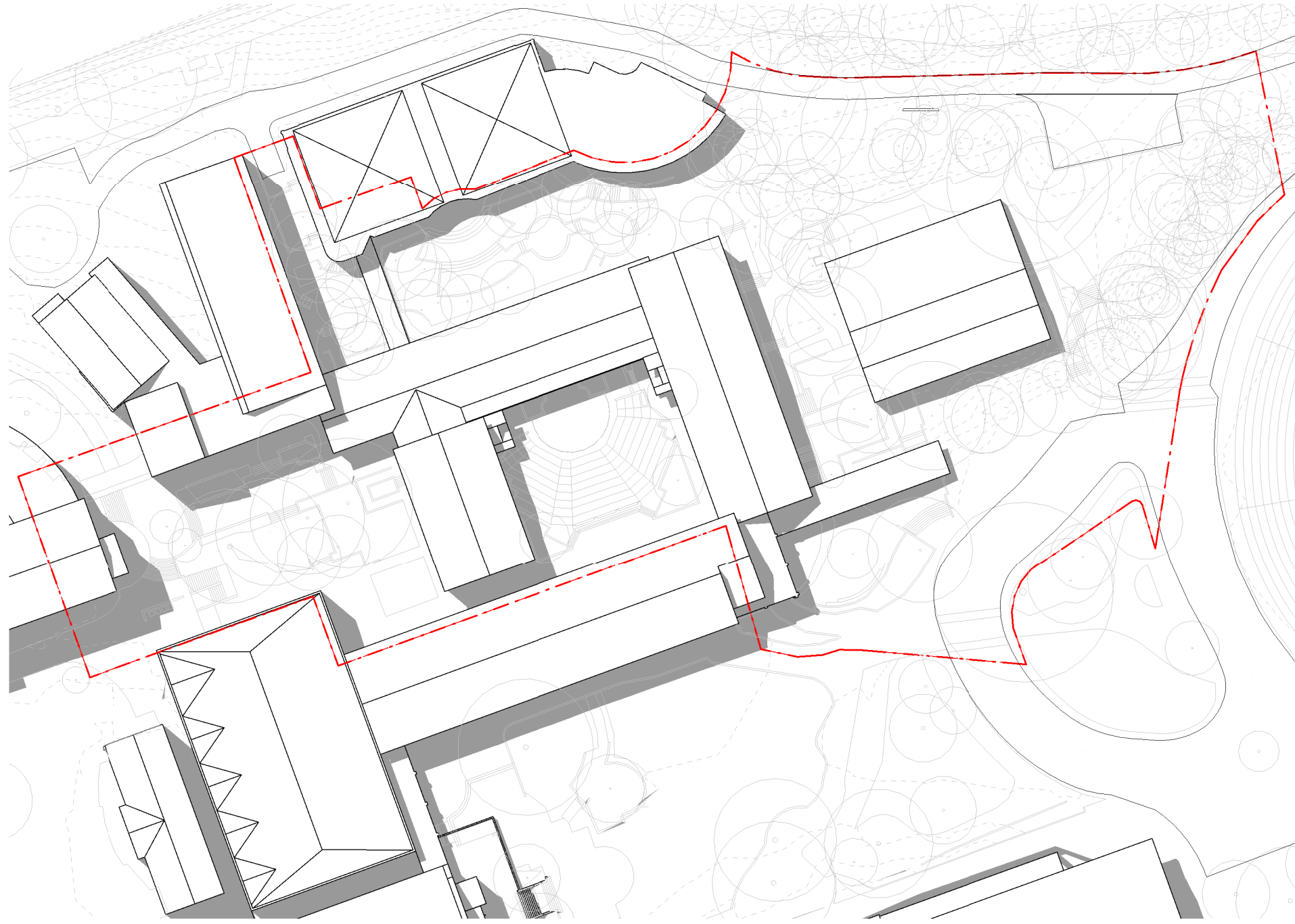
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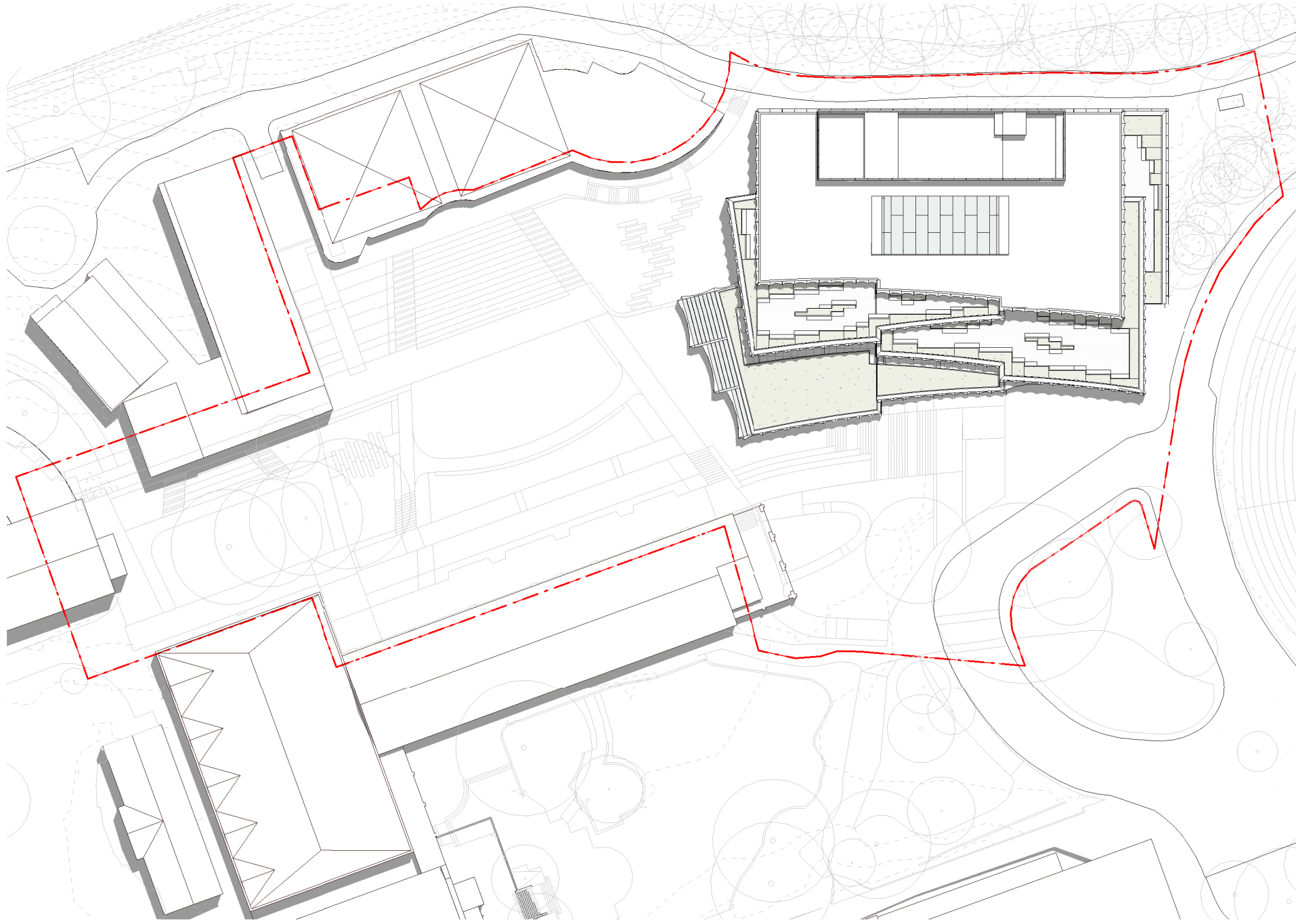
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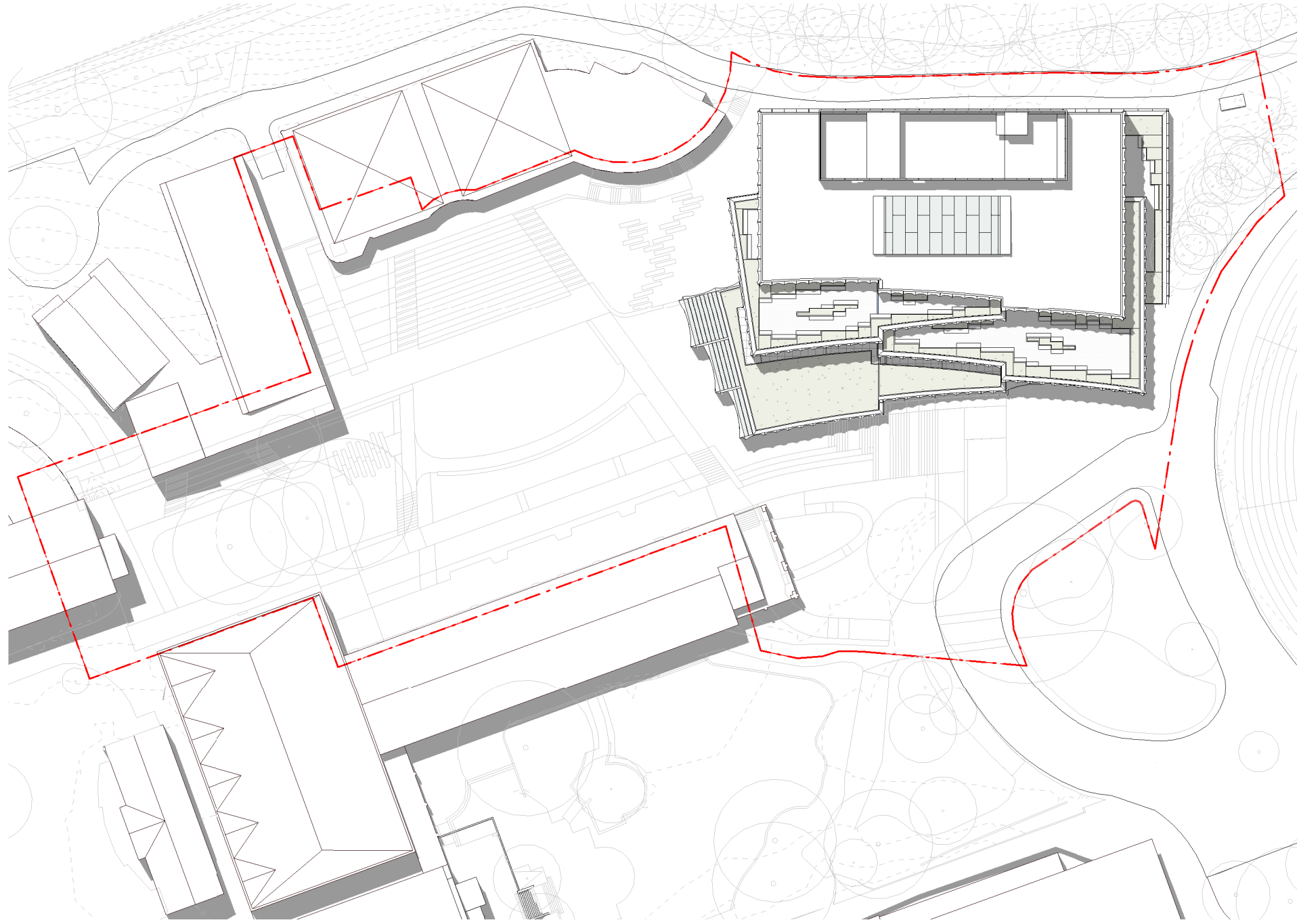
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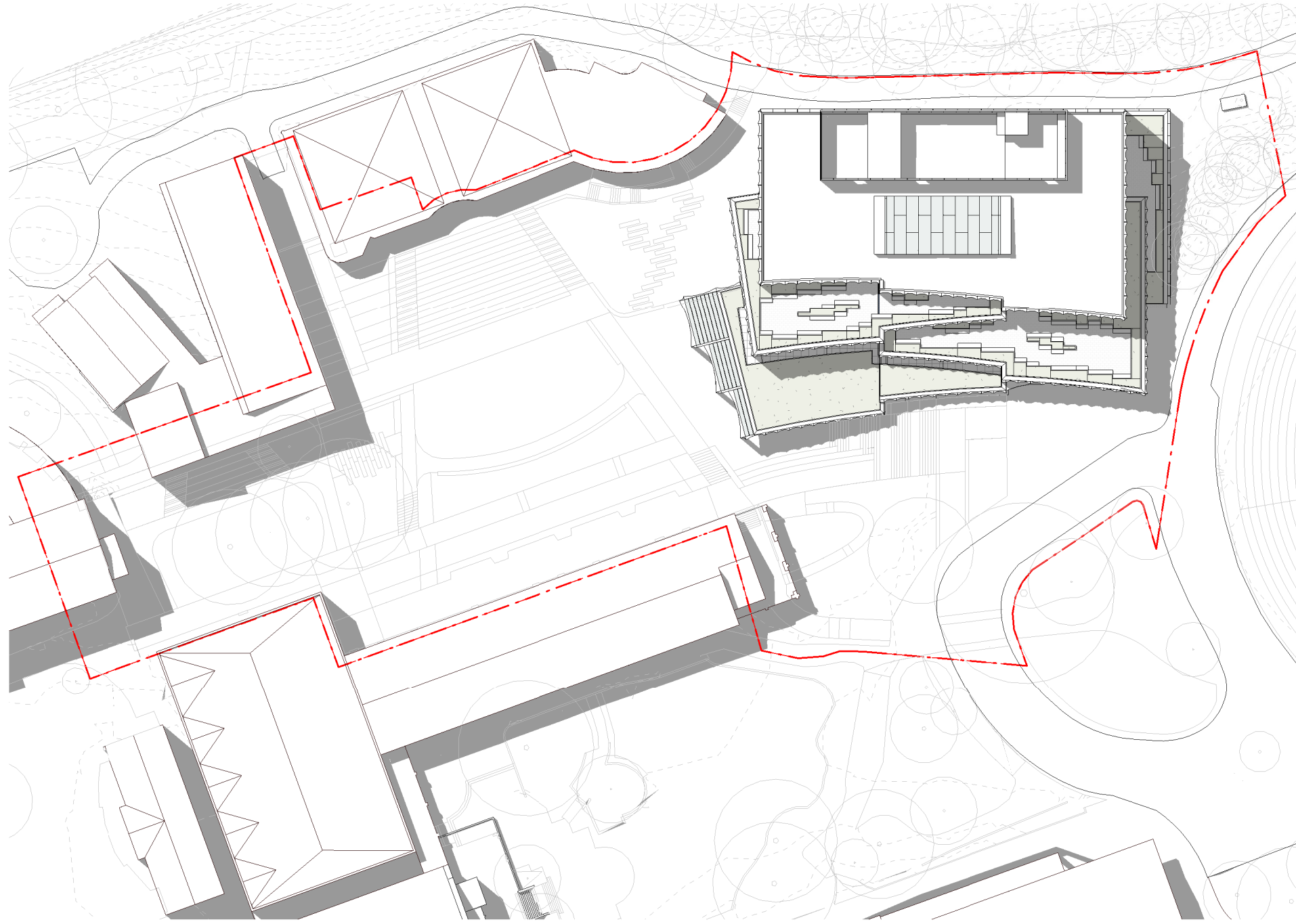
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SHADOW DIAGRAM: EXISTING - SUMMER SOLITICE - 2:00PM



4 | 1 : 750
SHADOW DIAGRAM: PROPOSED - SUMMER SOLITICE - 12:00PM



5 | 1 : 750
SHADOW DIAGRAM: PROPOSED - SUMMER SOLITICE - 1:00PM



6 | 1 : 750
SHADOW DIAGRAM: PROPOSED - SUMMER SOLITICE - 2:00PM

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1	03/02/2025	DRAFT SSD-DA	
2	17/02/2025	FOR SSD-DA	

NOTES

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DRAWING TO BE PRINTED IN COLOUR

DRAWING KEY

CLIENT



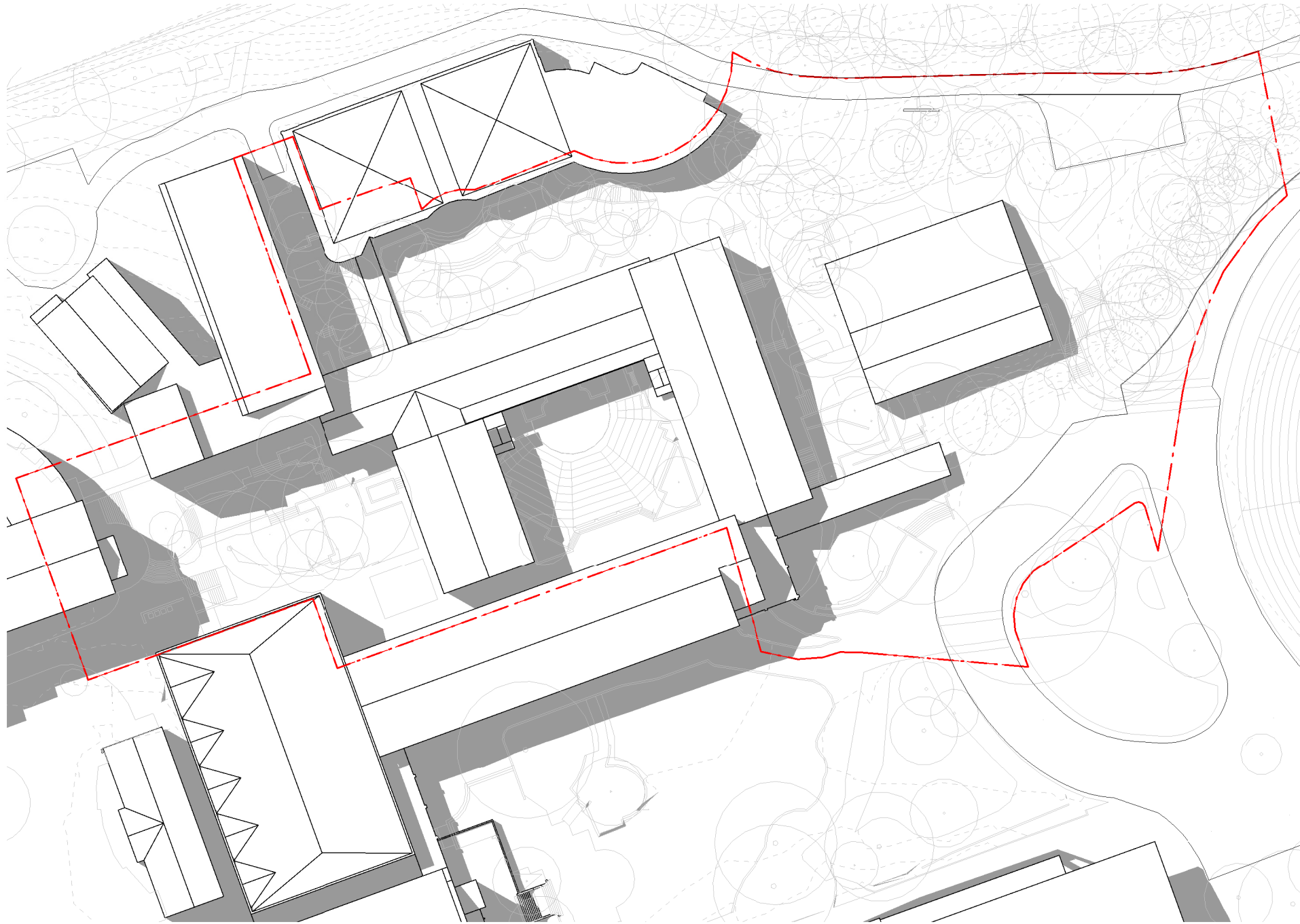
PROJECT NAME
PLC - Secondary Innovation Precinct
PROJECT ADDRESS
20 Avon Road, Pymble NSW 2073, Australia
3XN PROJECT NUMBER
550053

TRUE NORTH (MSA)
SCALE @ A1
1 : 750
STATUS
SSD-DA

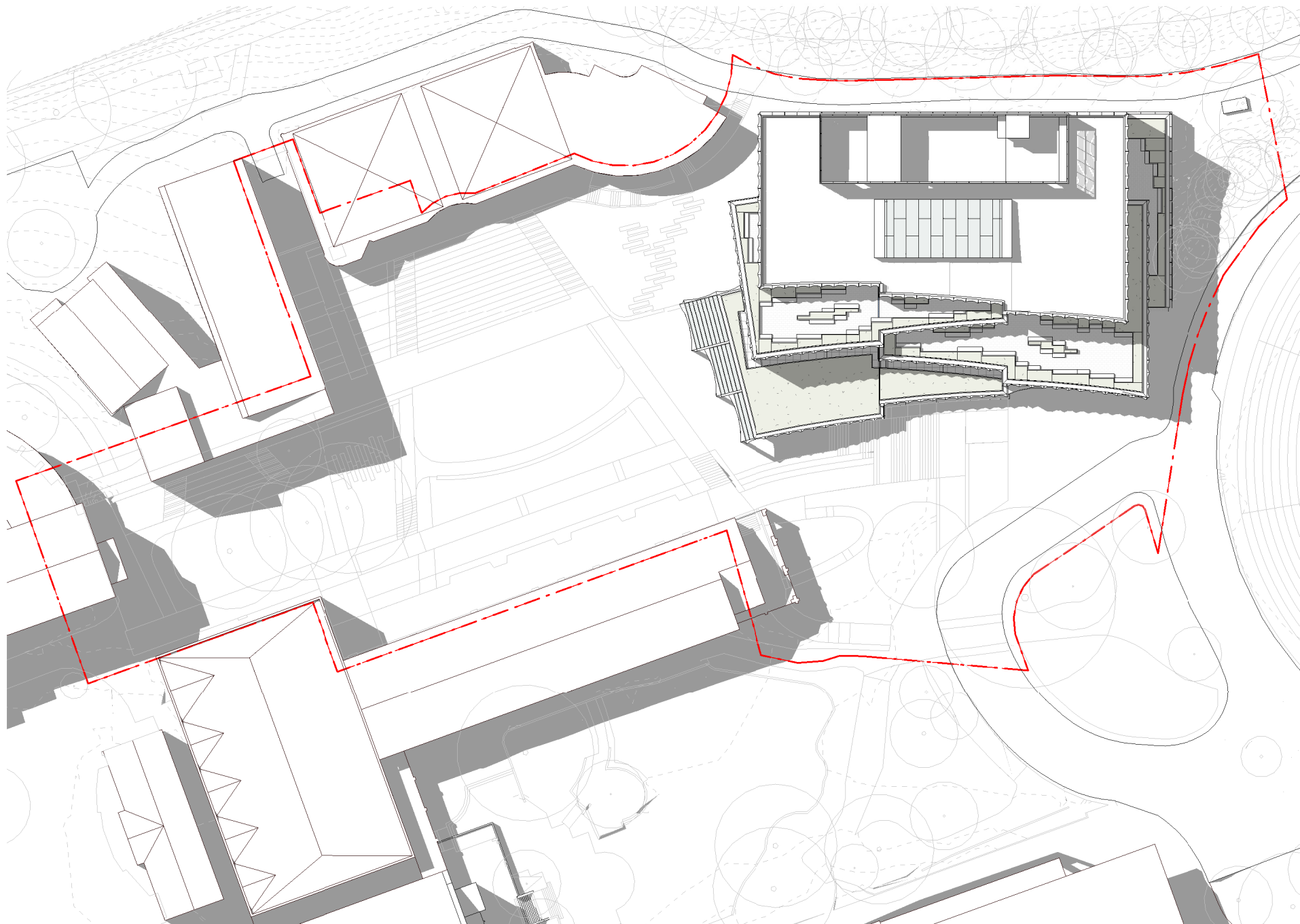
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DRAWING
SHADOW DIAGRAMS - SUMMER SOLSTICE
12pm - 2pm

DRAWING NUMBER
AR-SIP-DA-A19-4004
ISSUE
2



1 | 1 : 750
SHADOW DIAGRAM: EXISTING - SUMMER SOLITICE - 3:00PM



2 | 1 : 750
SHADOW DIAGRAM: PROPOSED - SUMMER SOLITICE - 3:00PM

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ISSUE DATE DESCRIPTION
1 03/02/2025 DRAFT SSD-DA
2 17/02/2025 FOR SSD-DA

NOTES

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DRAWING KEY

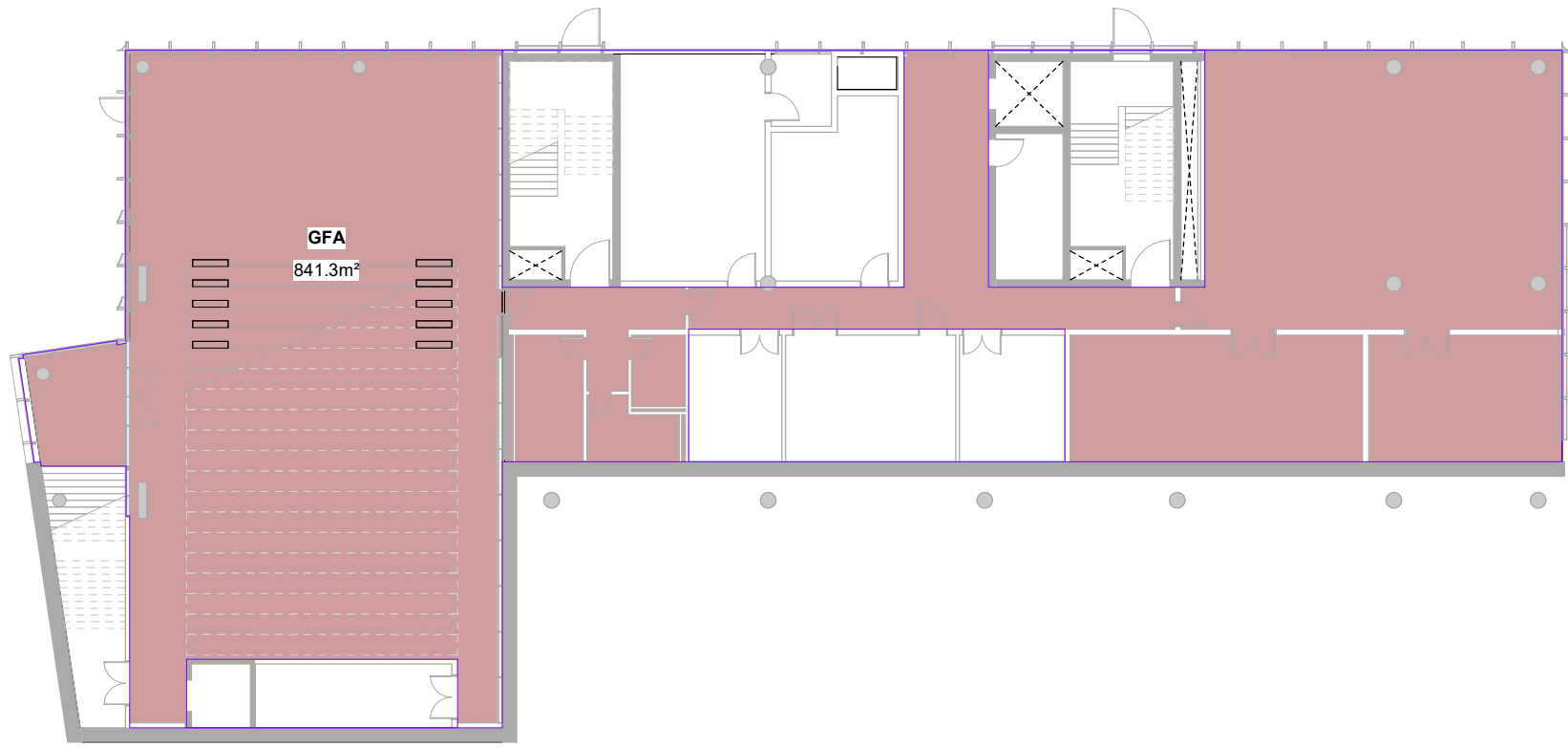
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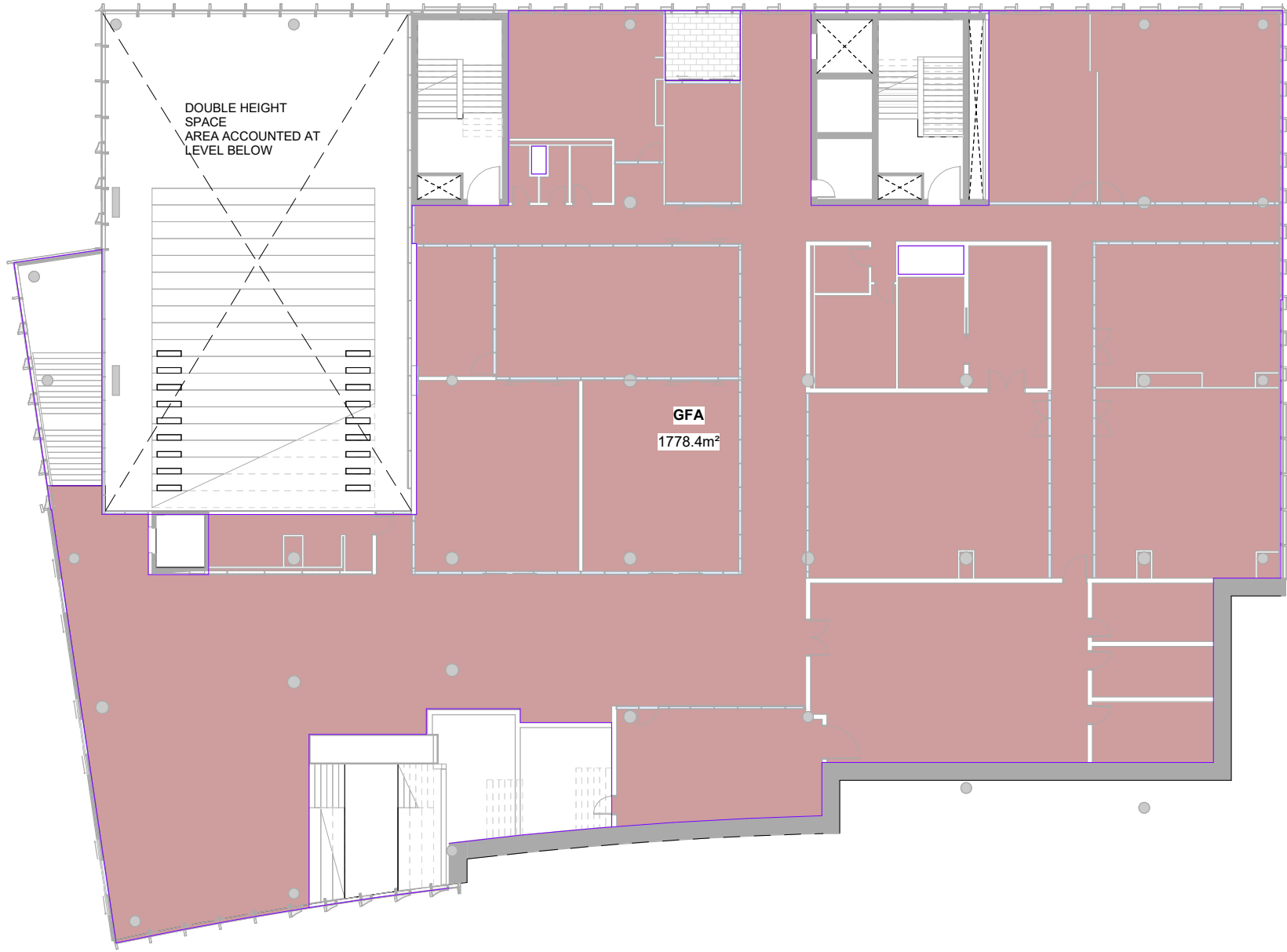
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3XN PROJECT NUMBER
550053

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PROJECT NORTH
SCALE @ A1
1 : 750
STATUS
SSD-DA

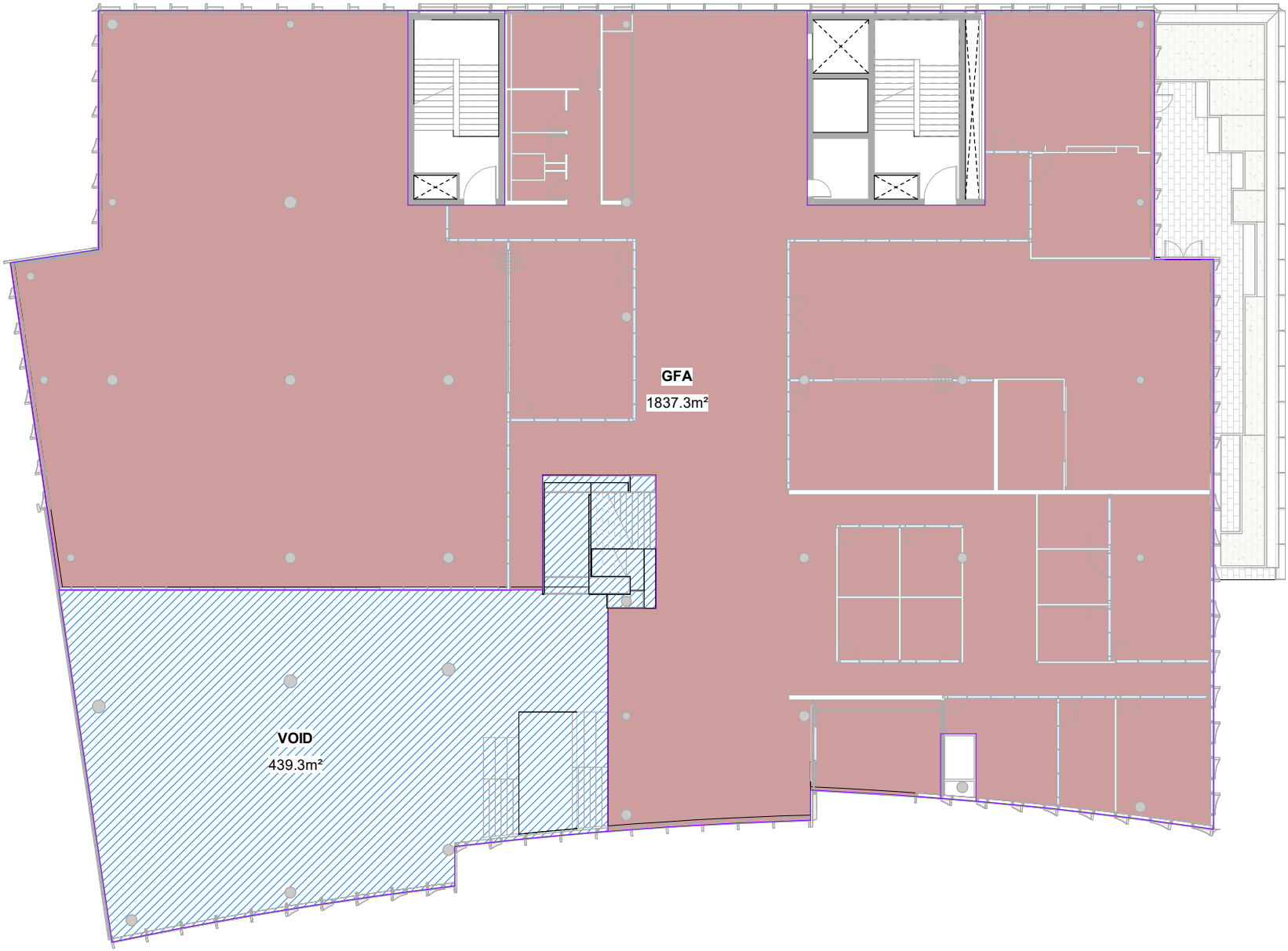
DRAWING
SHADOW DIAGRAMS - SUMMER SOLSTICE
3pm
DRAWING NUMBER
AR-SIP-DA-A19-4005
ISSUE
2



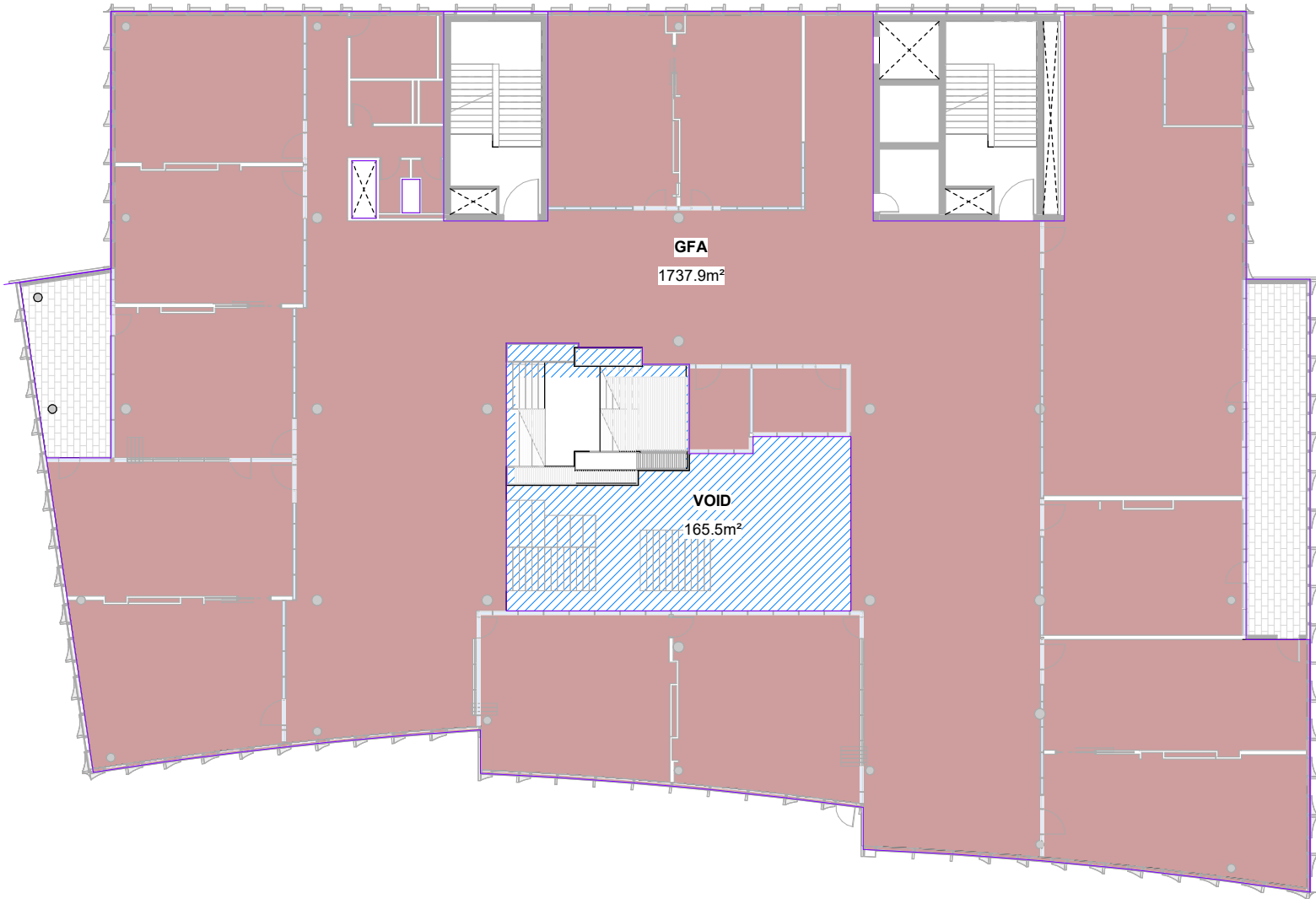
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GFA Area Plan Basement 01



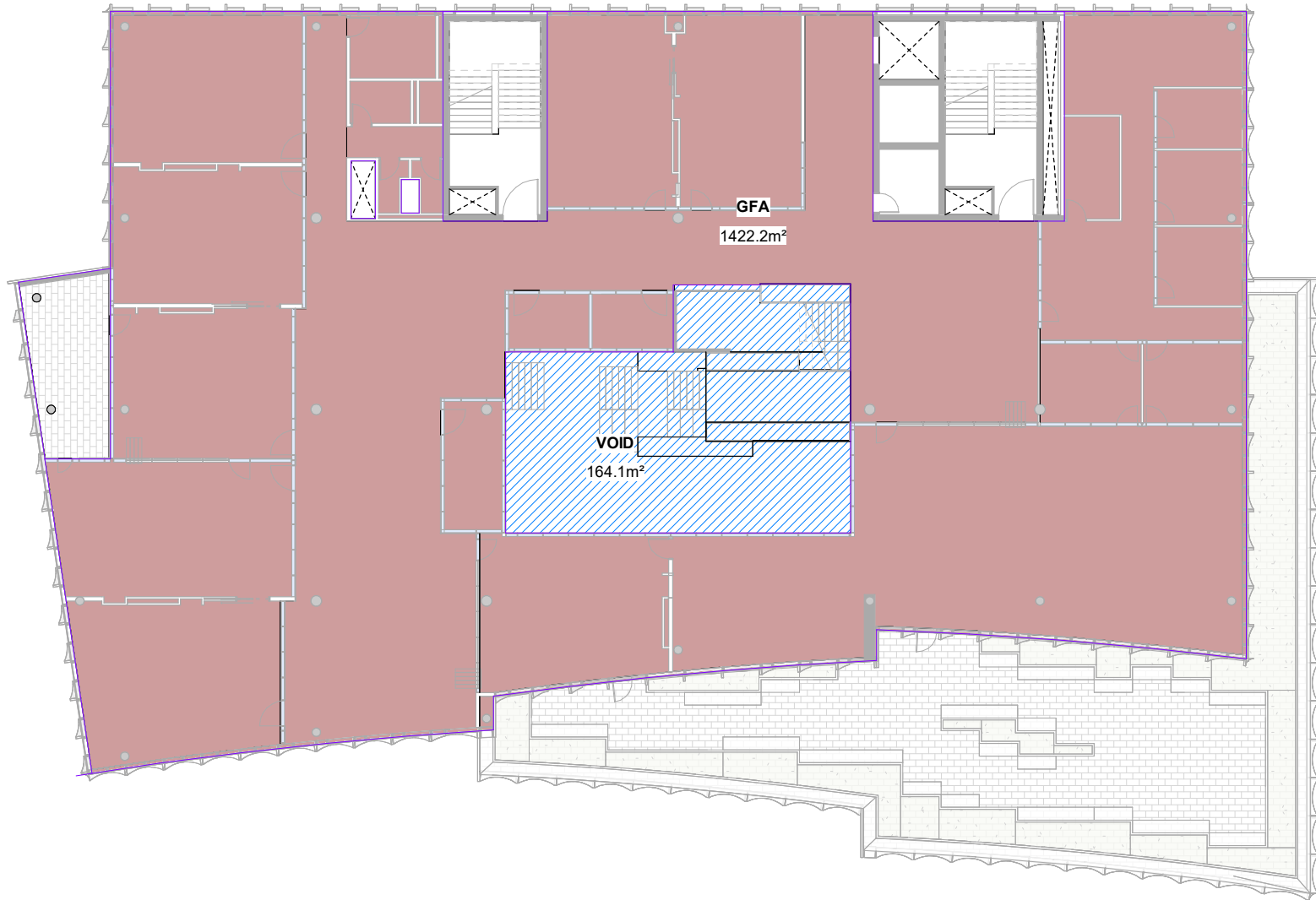
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GFA Area Plan Lower Ground Floor



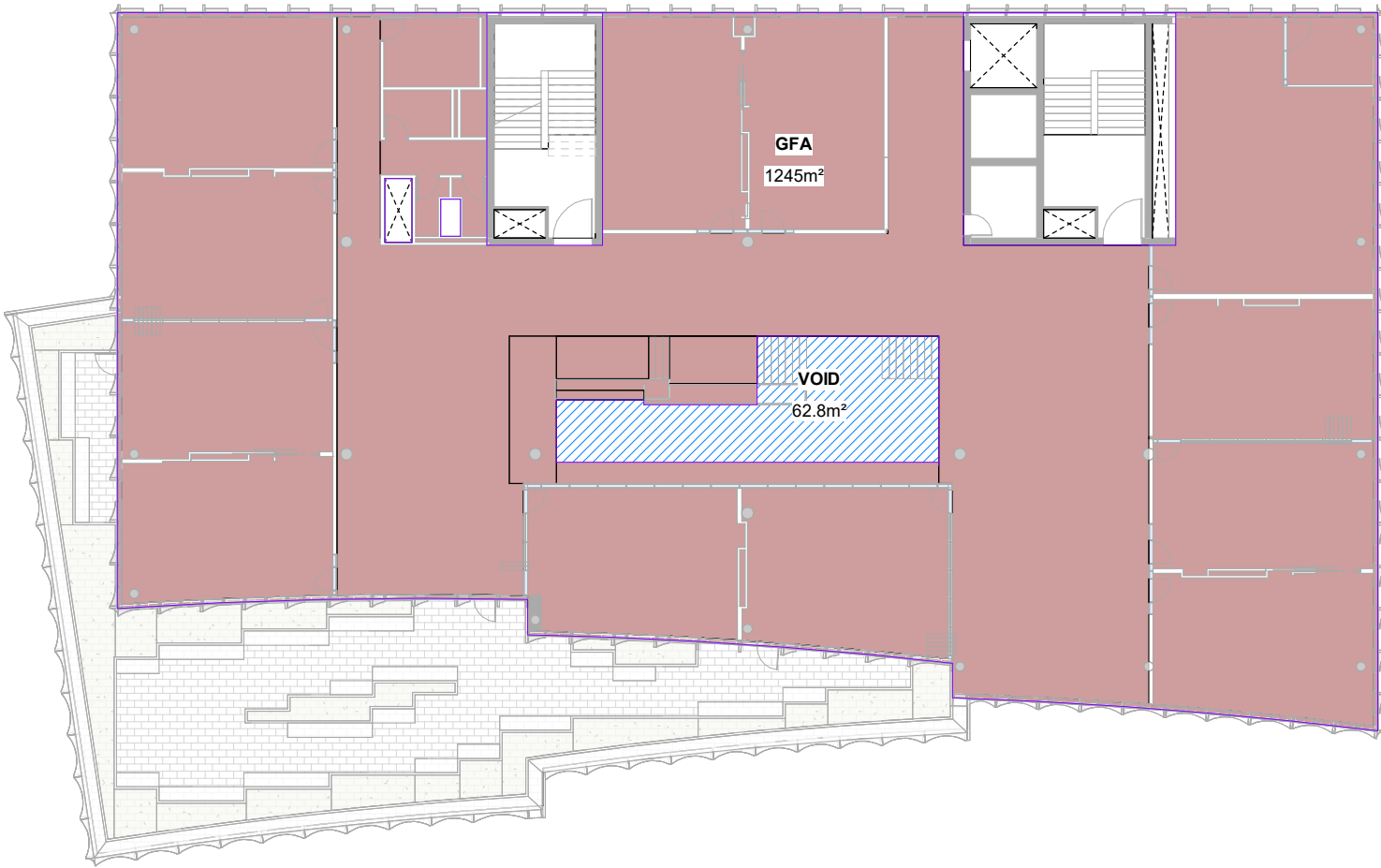
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GFA Area Plan Ground Floor



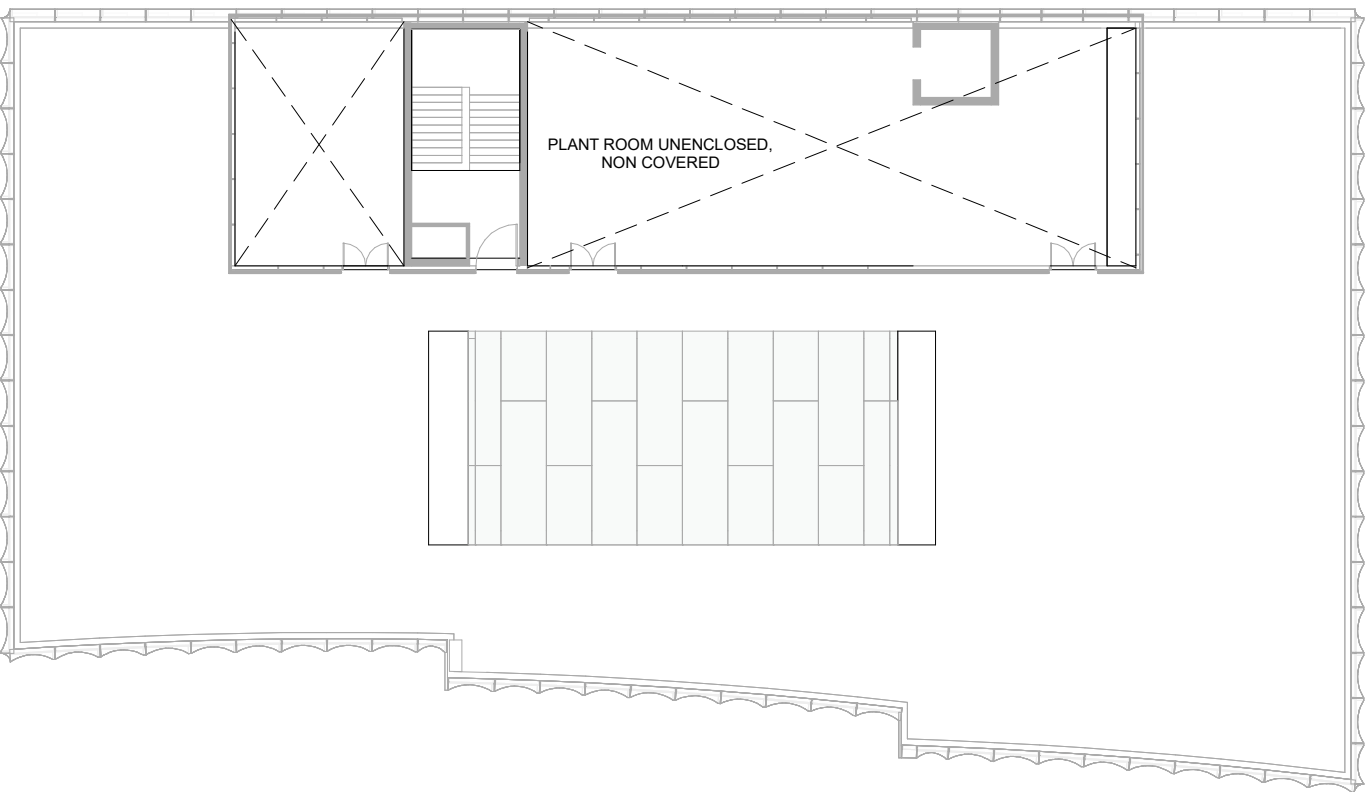
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GFA Area Plan Level 01



5 | 1 : 300
GFA Area Plan Level 02



6 | 1 : 300
GFA Area Plan Level 03



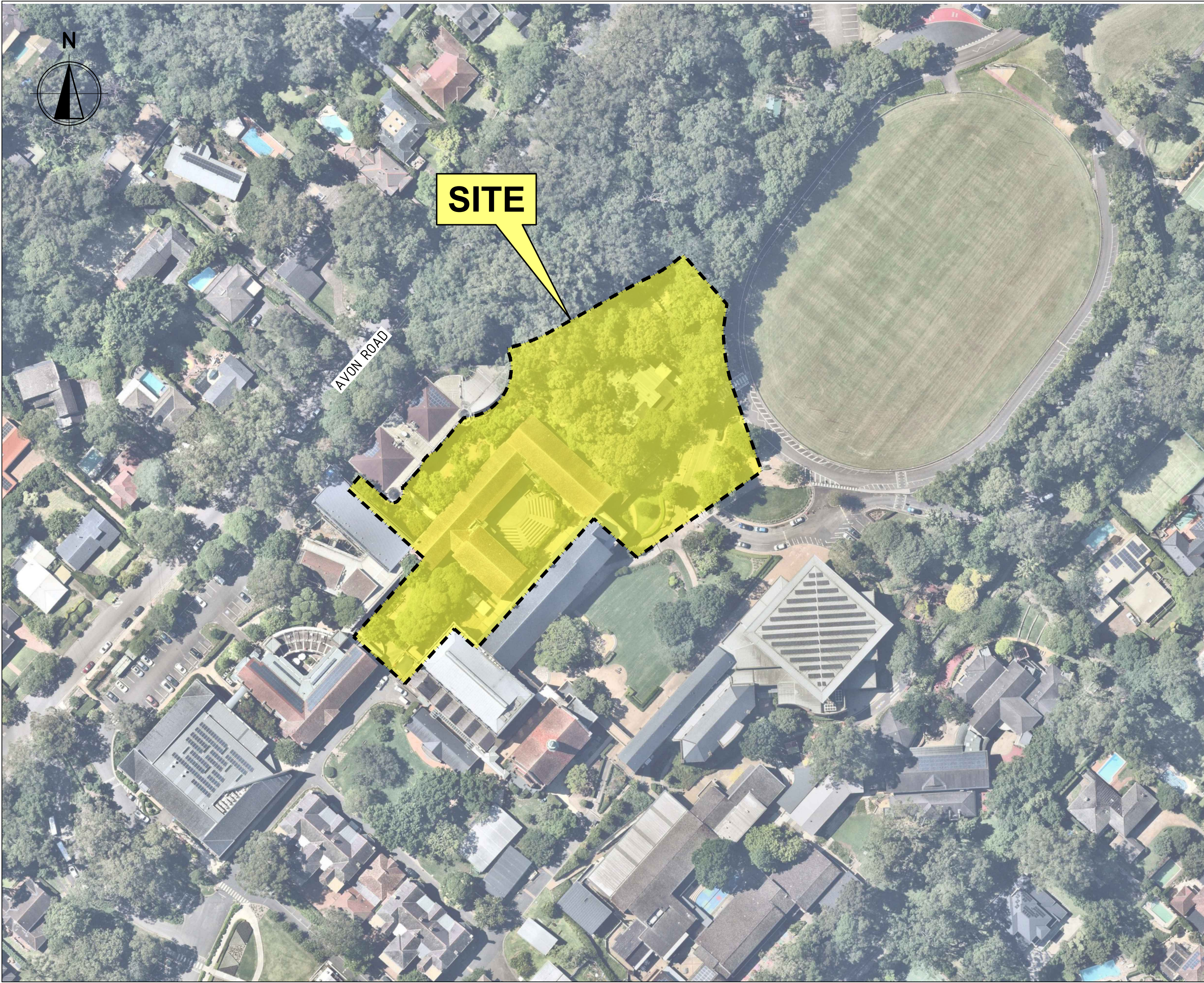
7 | 1 : 300
GFA Area Plan Plant Level

AREA SCHEDULE - GFA	
Name	Area (m2)
Basement 01	
GFA	841.3
Lower Ground Floor	
GFA	1778.4
Ground Floor	
GFA	1837.3
Level 01	
GFA	1737.9
Level 02	
GFA	1422.2
Level 03	
GFA	1245
Grand Total	8862.1

Appendix B - Civil Plans

PYMBLE LADIES COLLEGE, 20 AVON RD PYMBLE, NSW, 2073

LGA: KU-RING-GAI COUNCIL
ISSUED FOR DEVELOPMENT APPROVAL

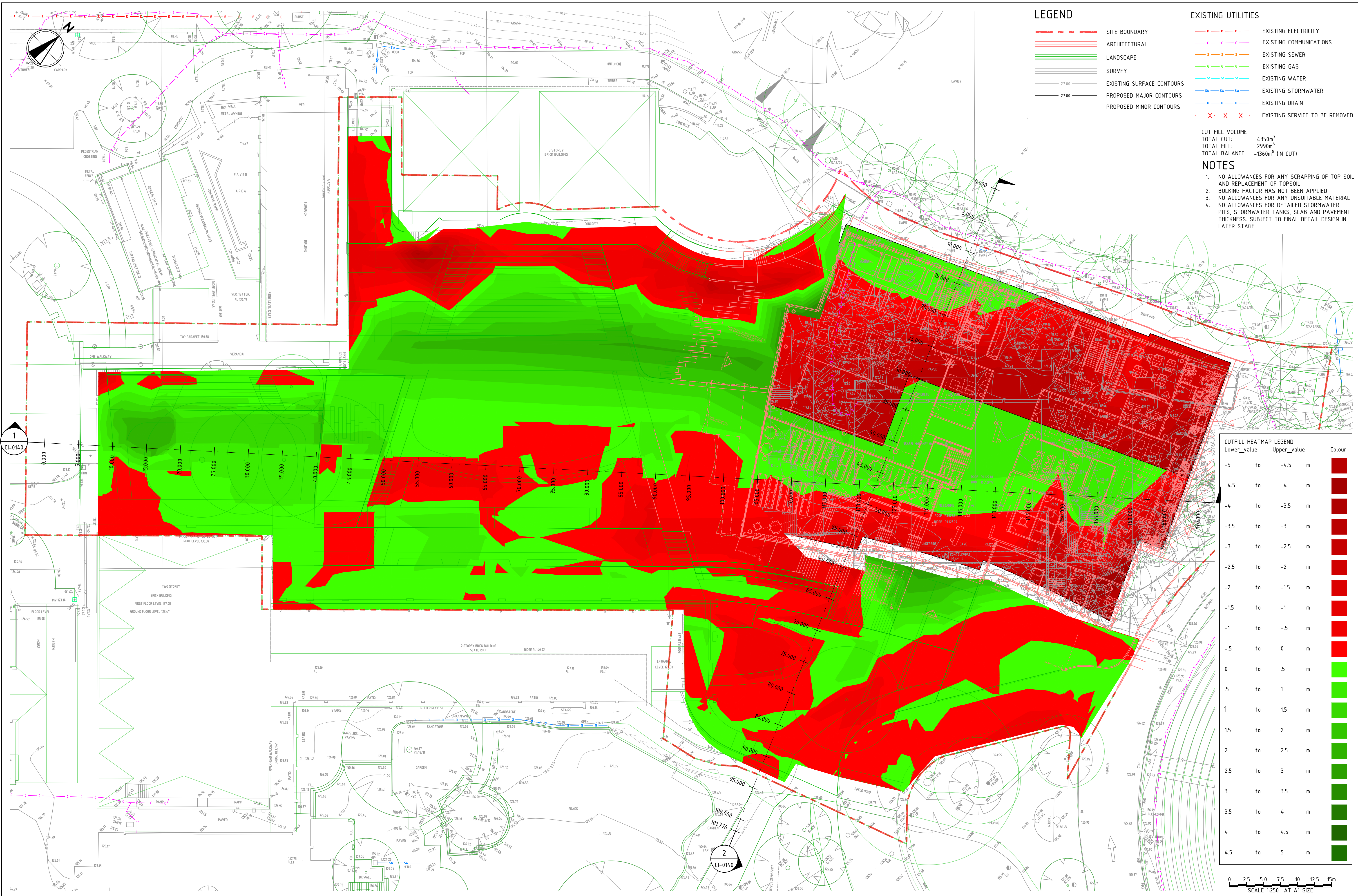


LOCALITY PLAN
SCALE 1:1000

DRAWING INDEX	
DRAWING No.	DESCRIPTION
CI-0000	COVER SHEET, LOCALITY PLAN AND DRAWING INDEX
CI-0100	BULK EARTHWORKS PLAN
CI-0140	EARTHWORKS SECTIONS
CI-0200	SITEWORKS, ROADWORKS AND DRAINAGE PLAN GROUND FLOOR
CI-0300	DRAINAGE CATCHMENT PLAN
CI-0340	DRAINAGE DETAILS PLAN
CI-0350	OSD PLAN
CI-0355	OSD SECTIONS AND DETAILS
CI-0700	EROSION AND SEDIMENT CONTROL PLAN



										CLIENT												PROJECT		STATUS ISSUED FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION				TITLE COVER SHEET, LOCALITY PLAN AND DRAWING INDEX							
																						Sydney Office — 12, 8 Windmill St Sydney NSW 2000 P / +61 2 9770 3300 E / info@bgeeng.com bgeeng.com—				PYMBLE LADIES COLLEGE 20 AVON ROAD, PYMBLE, NSW, 2073									



LEGEND

- SITE BOUNDARY
- ARCHITECTURAL
- LANDSCAPE
- SURVEY
- EXISTING SURFACE CONTOURS
- PROPOSED MAJOR CONTOURS
- PROPOSED MINOR CONTOURS

EXISTING UTILITIES

- EXISTING ELECTRICITY
- EXISTING COMMUNICATIONS
- EXISTING SEWER
- EXISTING GAS
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING DRAIN
- EXISTING SERVICE TO BE REMOVED

CUT FILL VOLUME
TOTAL CUT: -4350m³
TOTAL FILL: 2990m³
TOTAL BALANCE: -1360m³ (IN CUT)

NOTES

- NO ALLOWANCES FOR ANY SCRAPPING OF TOP SOIL AND REPLACEMENT OF TOPSOIL
- BULKING FACTOR HAS NOT BEEN APPLIED
- NO ALLOWANCES FOR ANY UNSUITABLE MATERIAL
- NO ALLOWANCES FOR DETAILED STORMWATER PITS, STORMWATER TANKS, SLAB AND PAVEMENT THICKNESS. SUBJECT TO FINAL DETAIL DESIGN IN LATER STAGE

CUTFILL HEATMAP LEGEND		Lower_value	Upper_value	Colour
-5	to	-4.5	m	
-4.5	to	-4	m	
-4	to	-3.5	m	
-3.5	to	-3	m	
-3	to	-2.5	m	
-2.5	to	-2	m	
-2	to	-1.5	m	
-1.5	to	-1	m	
-1	to	-0.5	m	
-0.5	to	0	m	
0	to	0.5	m	
0.5	to	1	m	
1	to	1.5	m	
1.5	to	2	m	
2	to	2.5	m	
2.5	to	3	m	
3	to	3.5	m	
3.5	to	4	m	
4	to	4.5	m	
4.5	to	5	m	

0 2.5 5.0 7.5 10 12.5 15m
SCALE 1:250 AT A1 SIZE

REV	DATE	DESCRIPTION	REVISED	REV	DATE	DESCRIPTION	REVISED
O	30.05.2025	ISSUED FOR SSDA APPROVAL	PF				
C	15.05.2025	ISSUED FOR SSDA APPROVAL	PF				
B	04.03.2025	ISSUED FOR SSDA APPROVAL	PF				
A	25.02.2025	ISSUED FOR INFORMATION	PF				

REV	DATE	DESCRIPTION	REVISED

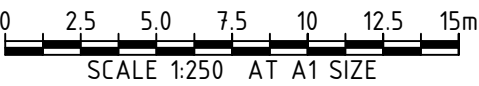
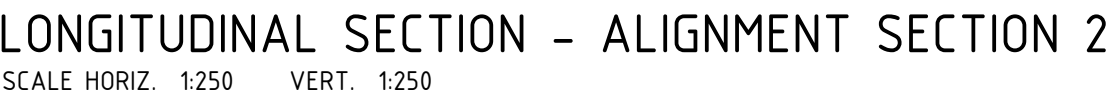
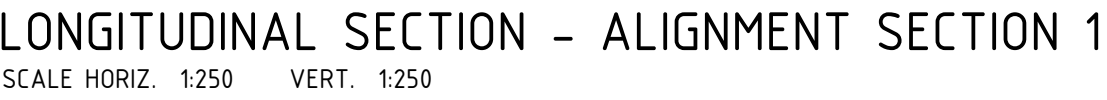
REV	DATE	DESCRIPTION	REVISED

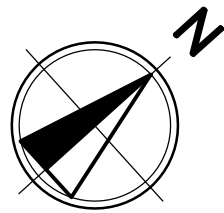
Sydney Office – 12, 8 Windmill St Sydney NSW 2000 P / +61 2 9770 3300 E / info@bgeeng.com bgeeng.com	
--	--

PROJECT PYMBLE LADIES COLLEGE 20 AVON ROAD, PYMBLE, NSW, 2073

STATUS			
ISSUED FOR APPROVAL			
NOT TO BE USED FOR CONSTRUCTION			
DRAWN	DESIGNED	CHECKED	APPROVED
JC	SM	PF	
DATUM	GRID	SCALE	
AHD	GDA2020 MGA-56	1:250	AT A1 SIZE

TITLE		
BULK EARTHWORKS PLAN		
PROJECT No.	DRAWING No.	REV.
S23158	CI-0100	D

[illegible]



WATER QUALITY FOR DEVELOPMENT

TREATMENT DEVICES:
- WATER QUALITY CHAMBER WITH 10 OCEAN PROTECT
\$90 PSORB (MCC) STORMFILTER CARTRIDGES
- ALL SURFACE PITS TO BE INSTALLED WITH OCEAN
GUARD BY OCEAN PROTECTS

TREATMENT STANDARDS				
POLLUTANT	PRE	POST	REDUCTION ACHIEVED (%)	COUNCIL REQUIREMENTS (%)
GROSS POLLUTANTS	164	0.00106	100	70
TOTAL SUSPENDED SOLIDS	1180	139	88.2	85
TOTAL PHOSPHORUS	2.54	0.853	66.4	65
TOTAL NITROGEN	21.2	11.3	46.8	45

STORMWATER DRAINAGE REQUIREMENTS HAVE BEEN CALCULATED IN ACCORDANCE WITH KU-RING-GAI COUNCIL'S DEVELOPMENT CONTROL PLAN PART 24C.6 - STORMWATER QUALITY CONTROL - TABLE 24C.6-1

LEGEND

- SITE BOUNDARY
- ARCHITECTURAL
- LANDSCAPE
- ROOF = 1,450m²
- IMPERVIOUS AREA OSD 1 = 3,115m²
- IMPERVIOUS AREA OSD 2 = 830m²
- LANDSCAPE TO OSD 1 = 2,655m²
- LANDSCAPE TO OSD 2 = 610m²
- UPSTREAM AREA = 1,085m²
- TOTAL = 9,745m²



REVISIONS				REVISIONS			
REV	DATE	DESCRIPTION	RVD	REV	DATE	DESCRIPTION	RVD
D	30.05.2025	ISSUED FOR SSDA APPROVAL	PF				
C	14.03.2025	ISSUED FOR SSDA APPROVAL	PF				
B	04.03.2025	ISSUED FOR SSDA APPROVAL	PF				
A	25.02.2025	ISSUED FOR INFORMATION	PF				

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PROJECT	

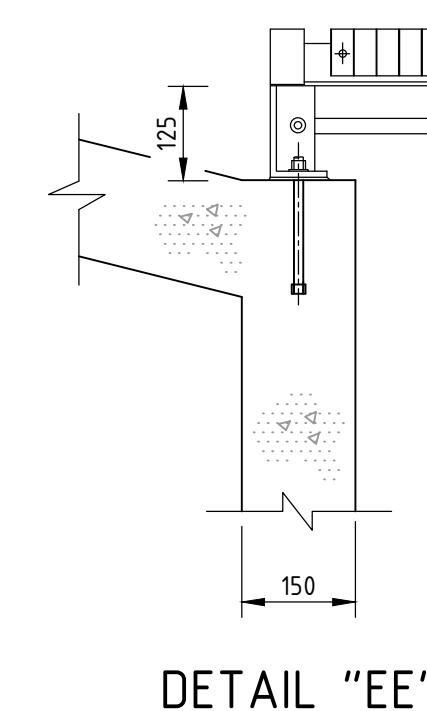
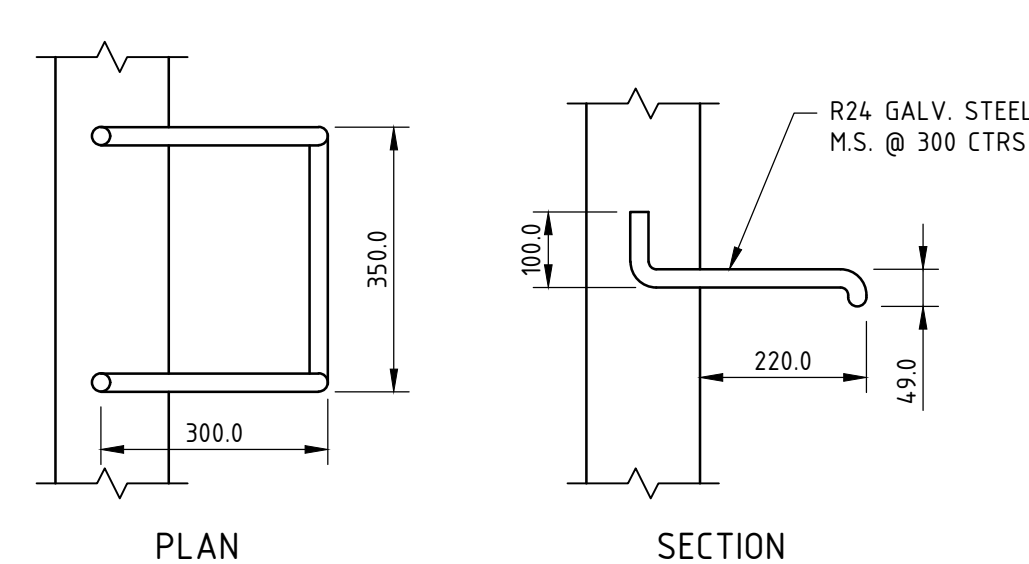
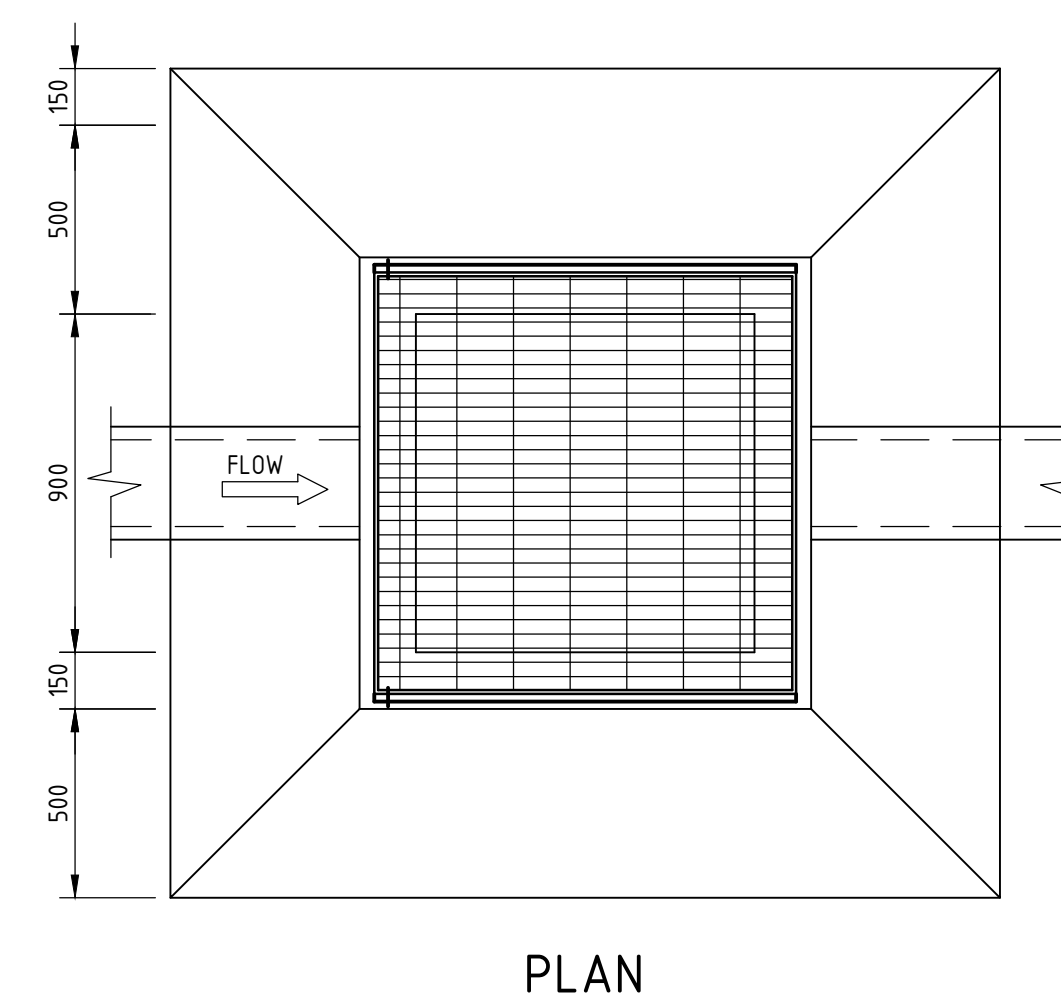
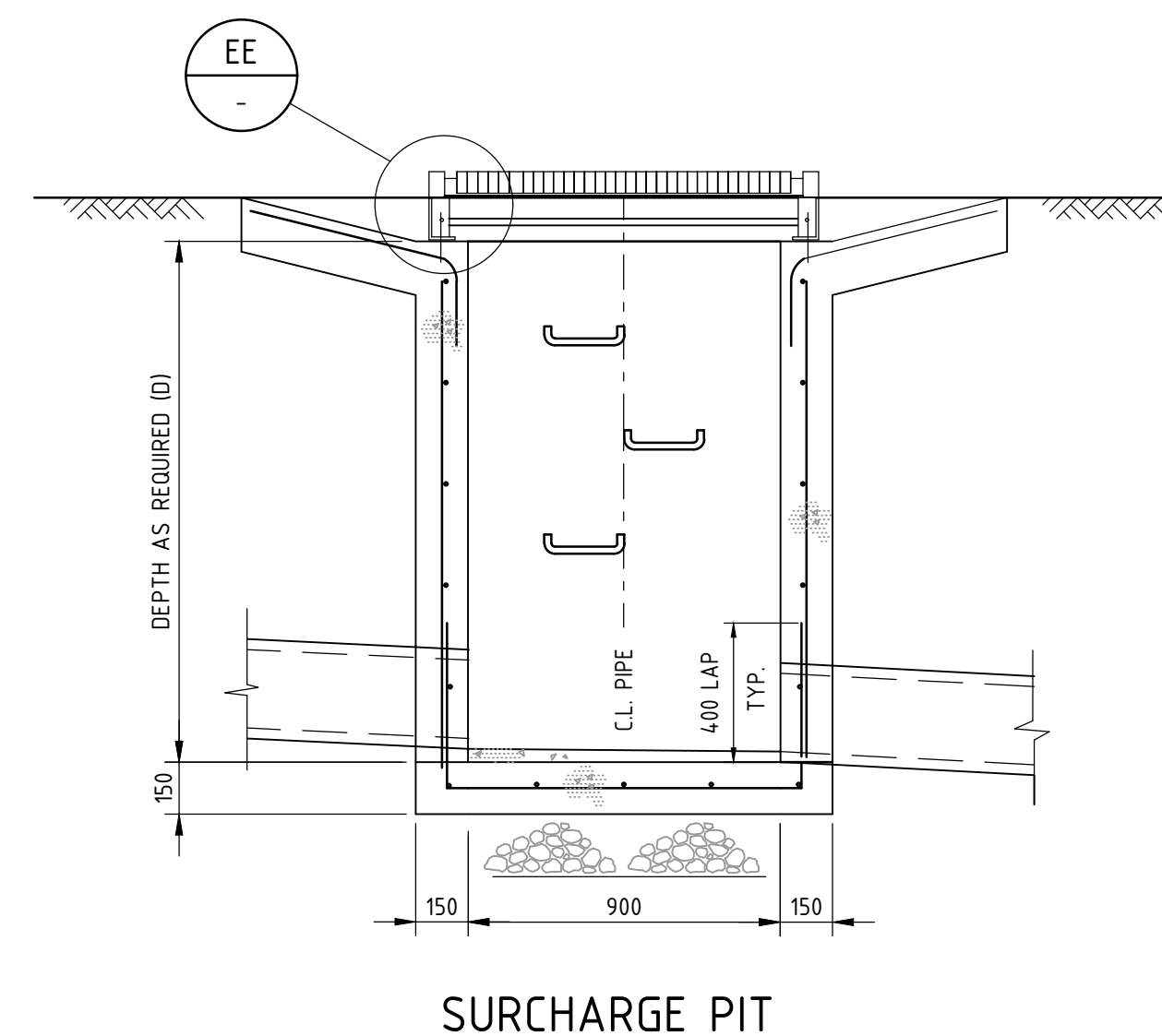
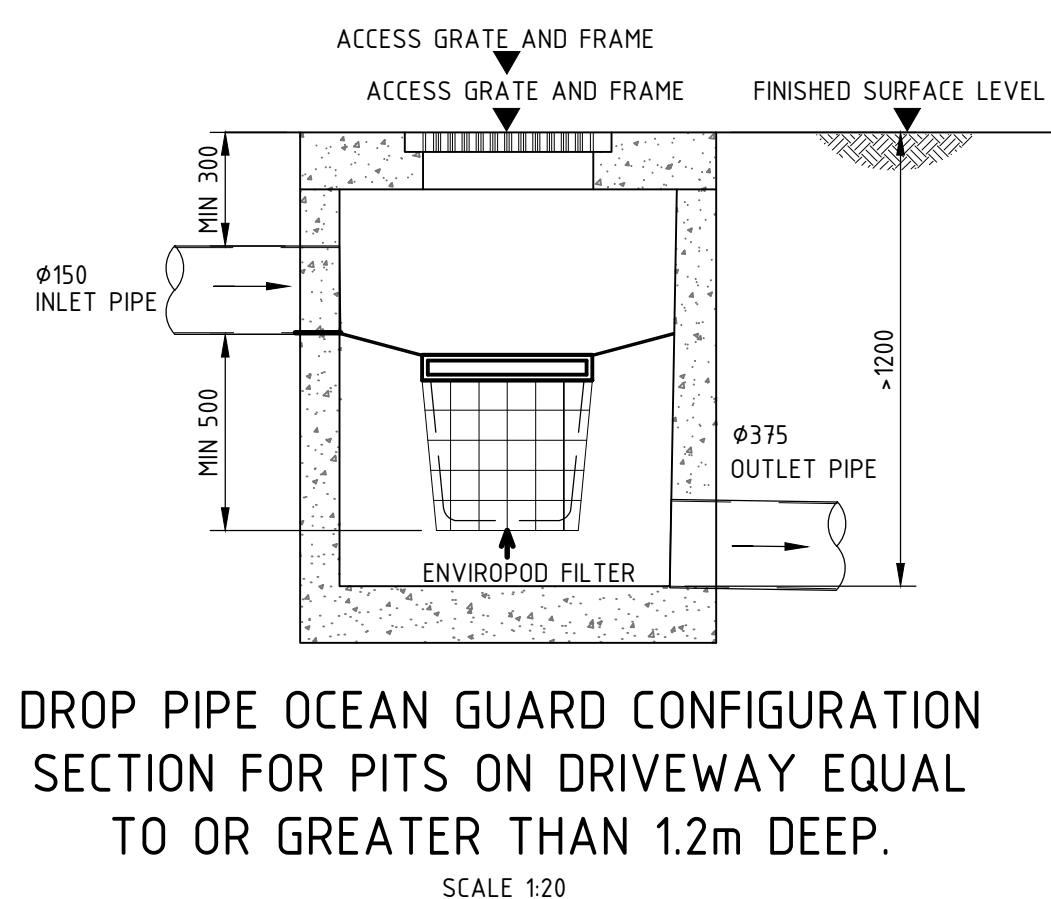
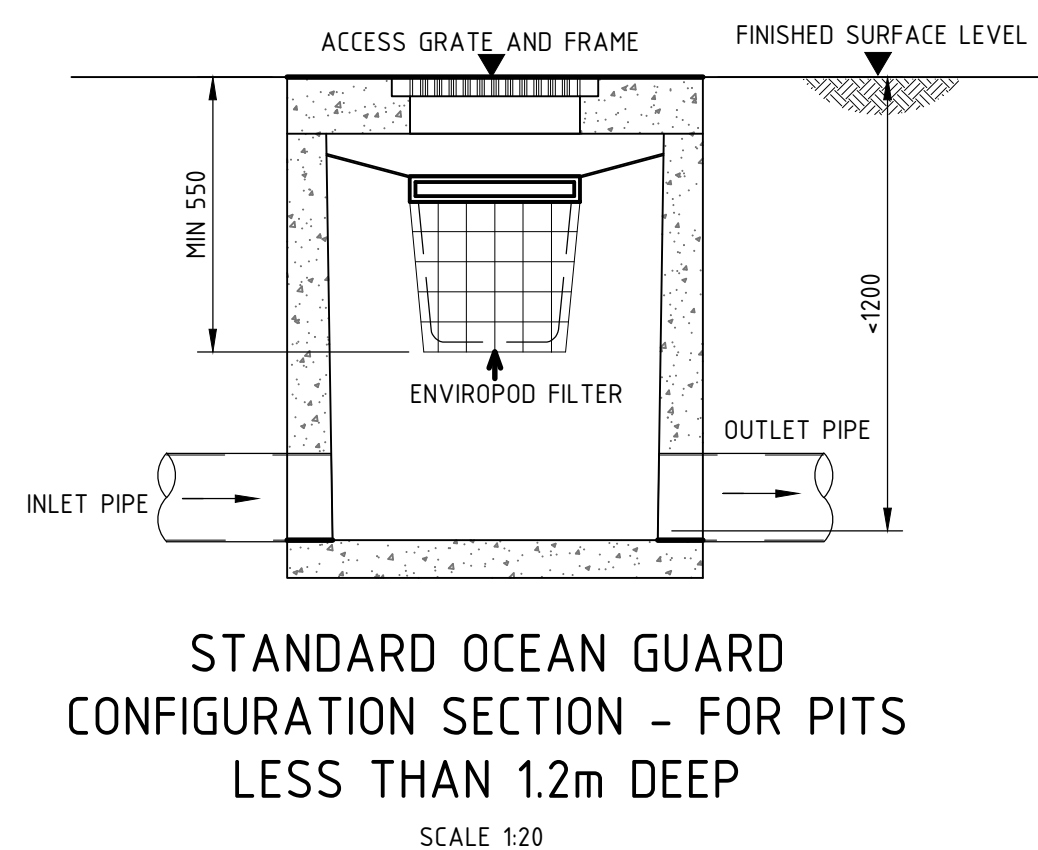
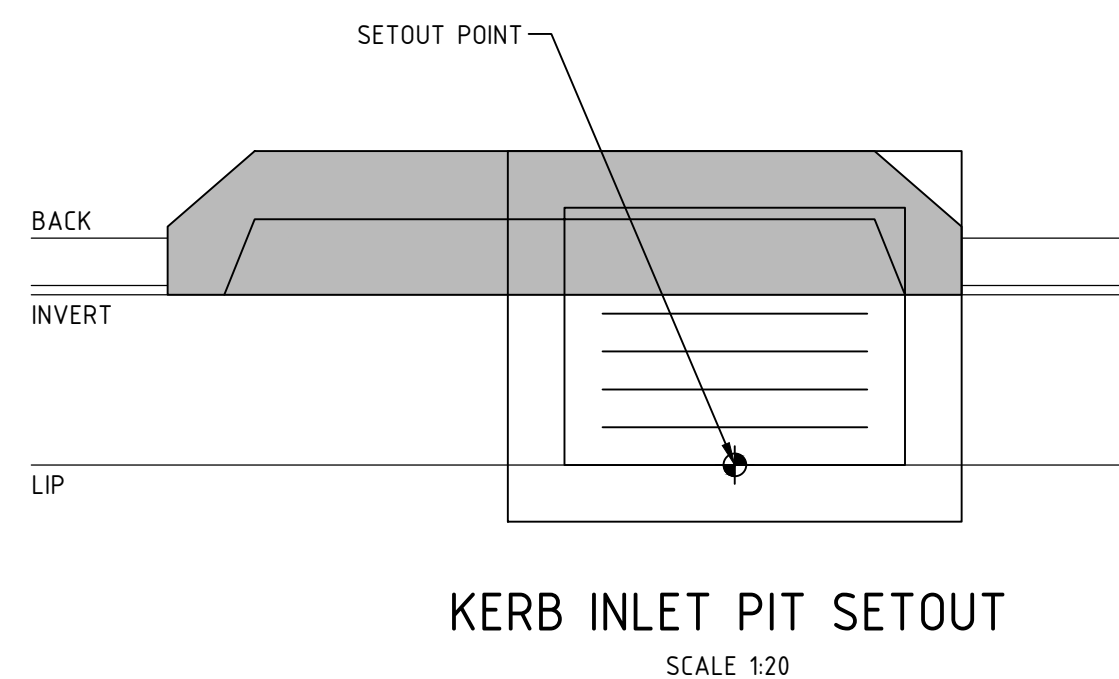
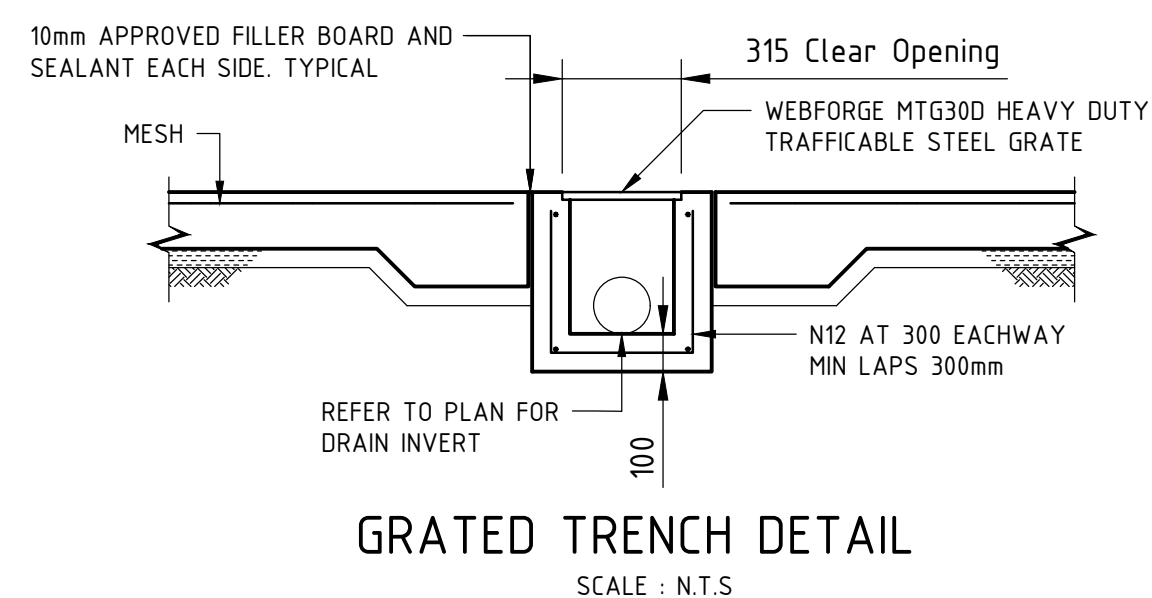
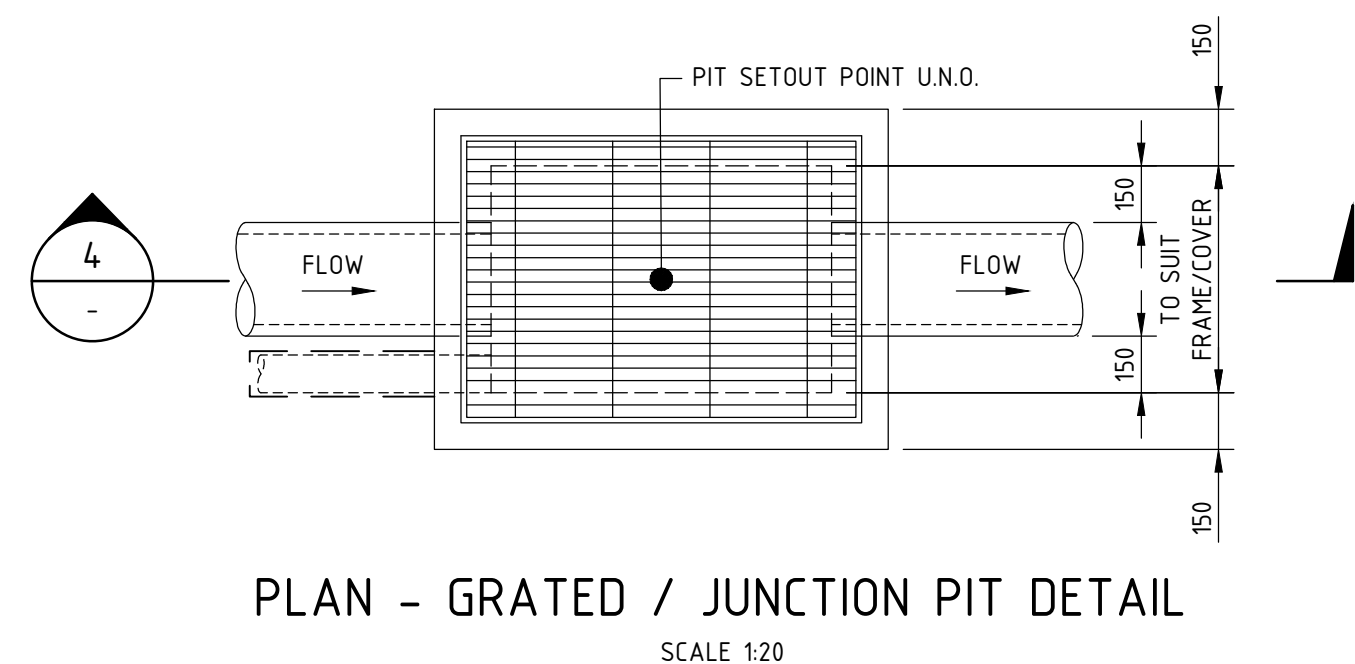
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PYMBLE LADIES COLLEGE
20 AVON ROAD, PYMBLE, NSW, 2073

STATUS			
ISSUED FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION			
DRAWN JC	DESIGNED SM	CHECKED PF	APPROVED
DATUM AHD	GRID GDA2020 MGA-56	SCALE 1:250	AT A1 SIZE

TITLE	
DRAINAGE CATCHMENT PLAN	
PROJECT No. S23158	DRAWING No. CI-0300
REV D	



SURCHARGE PITS SIZE TABLE		
PIT	OPENING SIZE	GRATE TYPE.
TYPE A	1.2 x 1.2	P.C.9090 B*

SURCHARGE PIT DETAIL

[illegible]

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20 AVON ROAD, PYMBLE, NSW, 2073

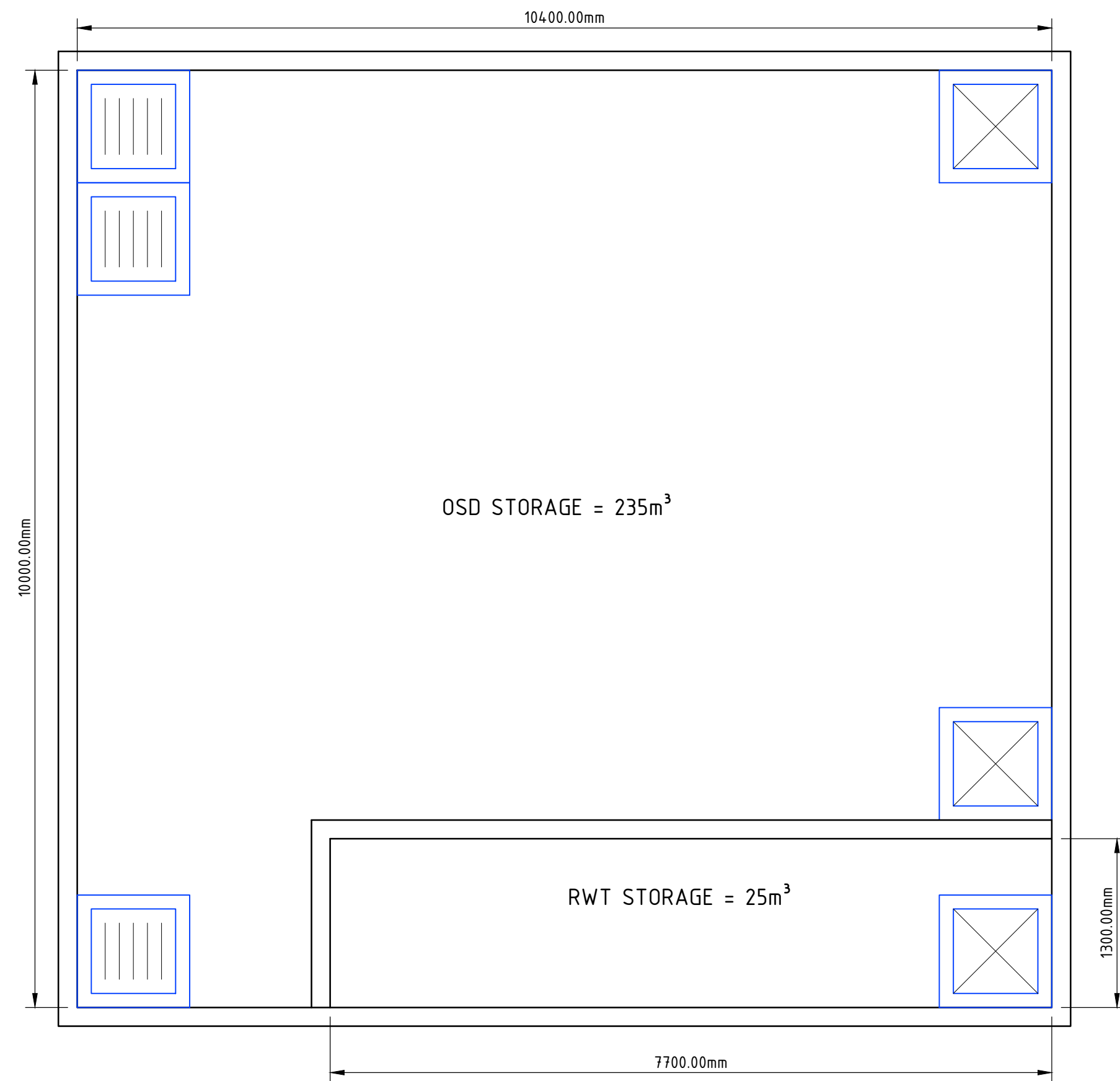
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DATUM AHD	GRID GDA2020 MGA-56	SCALE AS SHOWN	

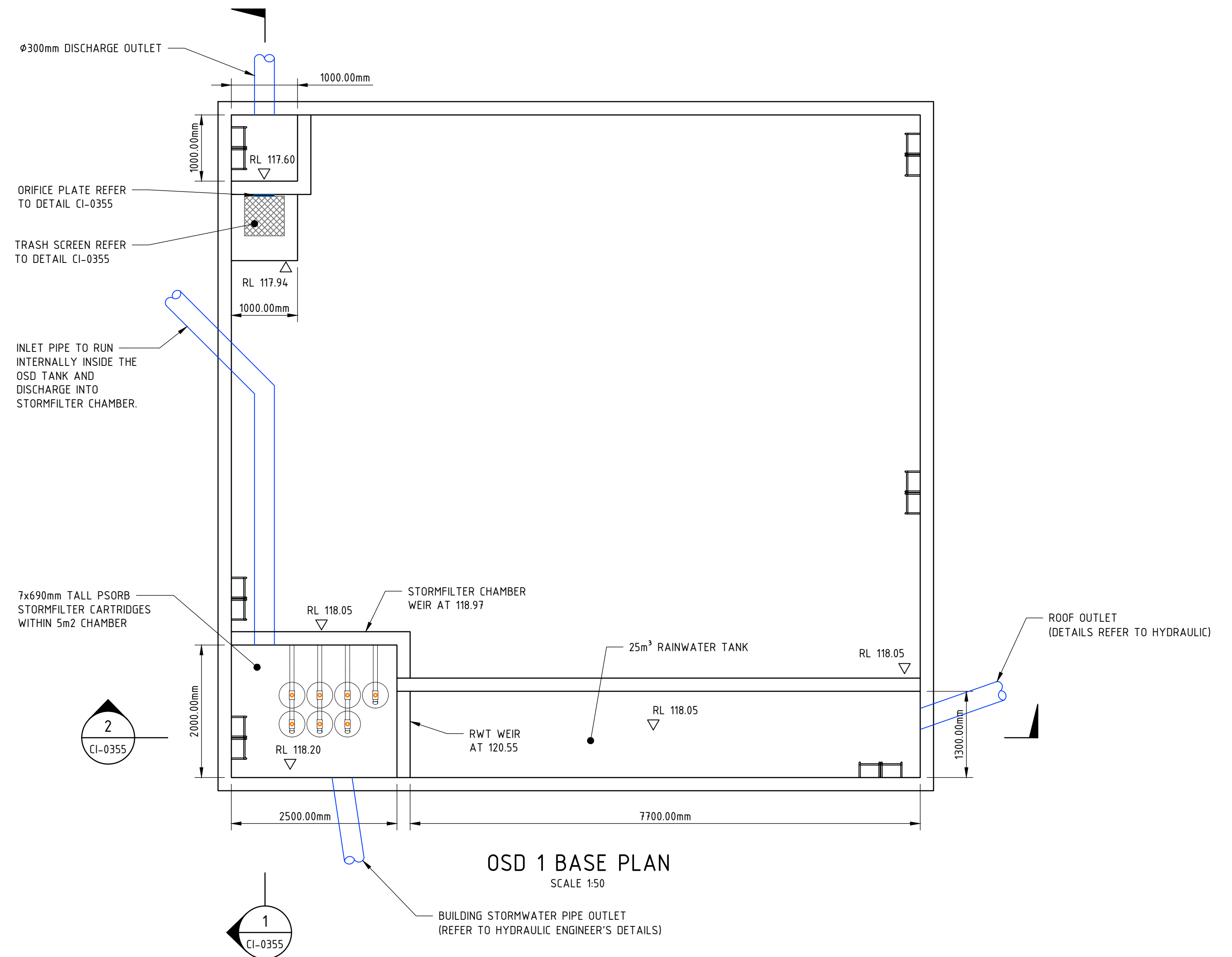
TITLE	DRAINAGE DETAILS PLAN
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PROJECT No.	DRAWING No.	REV.
S23158	CI-0340	C

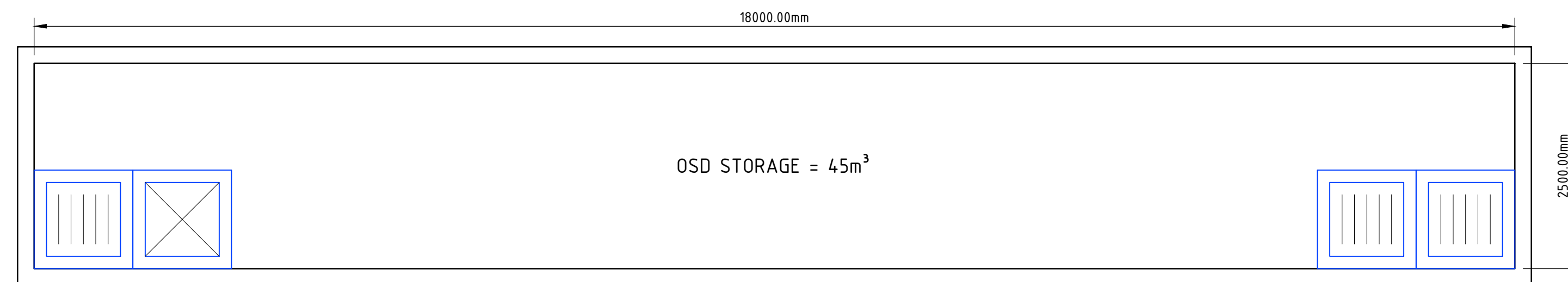
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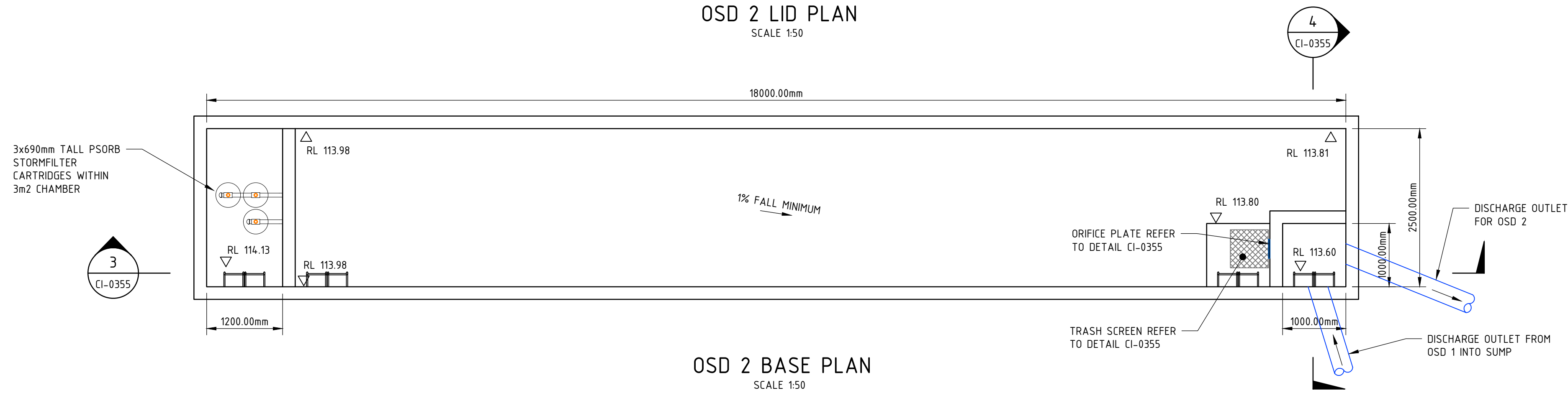
OSD 1 LID PLAN
SCALE 1:50



OSD 1 BASE PLAN
SCALE 1:50



OSD 2 LID PLAN
SCALE 1:50



OSD 2 BASE PLAN
SCALE 1:50

0 0.5 1.0 1.5 2.0 2.5 3.0m
SCALE 1:50 AT A1 SIZE

REV	DATE	DESCRIPTION	RVD	REV	DATE	DESCRIPTION	RVD
C	30.05.2025	ISSUED FOR SSDA APPROVAL	PF				
B	04.03.2025	ISSUED FOR SSDA APPROVAL	PF				
A	25.02.2025	ISSUED FOR INFORMATION	PF				
REVISIONS							

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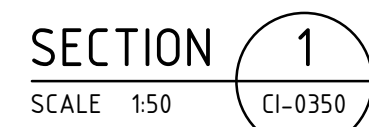
PROJECT

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PYMBLE LADIES COLLEGE 20 AVON ROAD, PYMBLE, NSW, 2073
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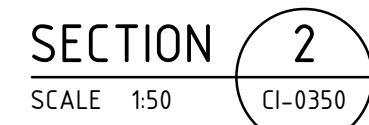
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DRAWN	JC
DESIGNED	SM
CHECKED	PF
APPROVED	
DATUM	AHD
GRID	GDA2020 MGA-56
SCALE	1:50
AT	A1 SIZE

TITLE	OSD PLAN
PROJECT No.	S23158
DRAWING No.	CI-0350
REV.	C

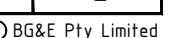


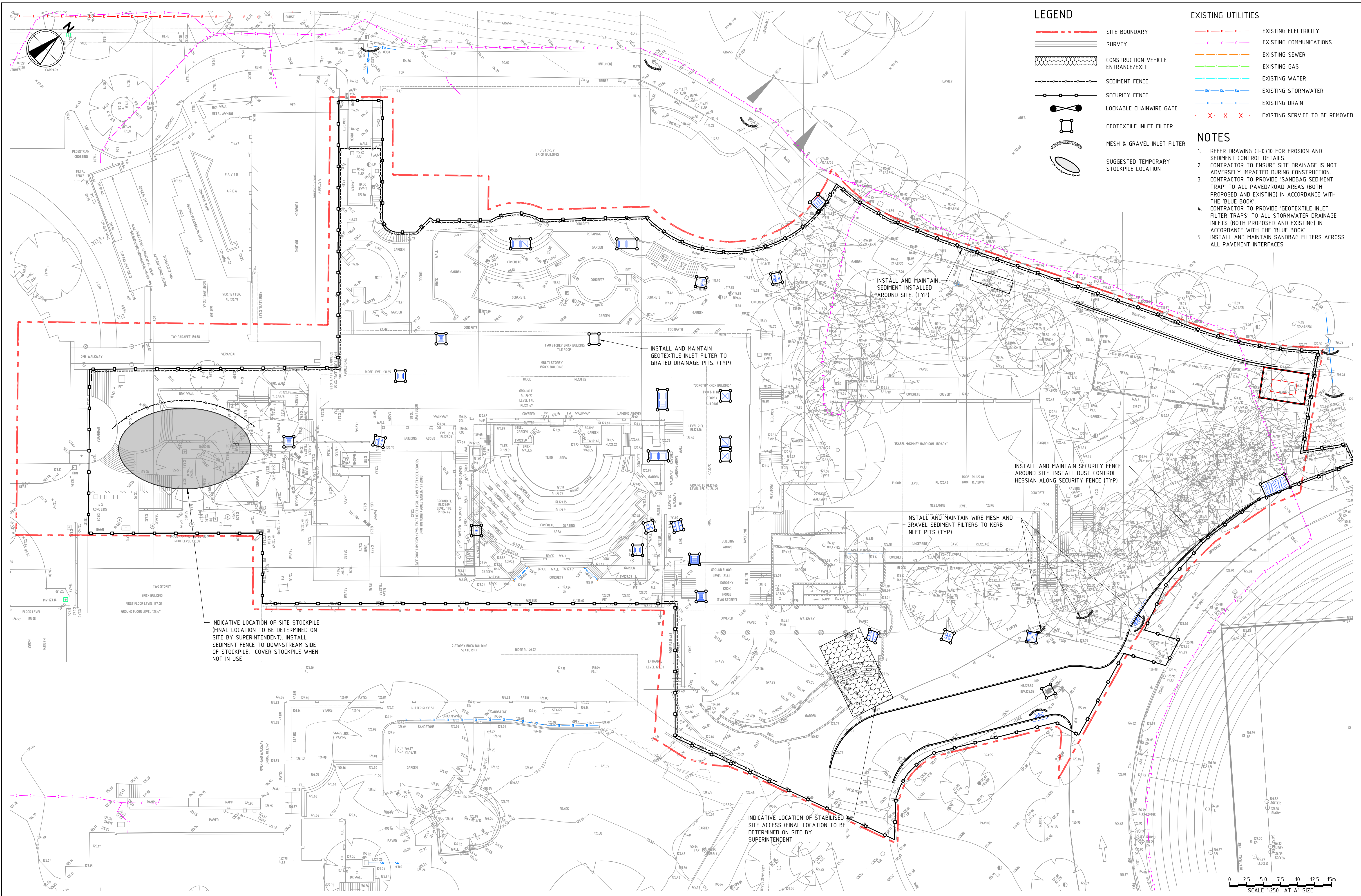
Plan view of the OSD base showing dimensions and elevations:

- Overall dimensions: 10400.00mm (length) x 2500.00mm (width).
- Left side dimensions: 200.00mm (top offset), 200.00mm (bottom offset), 2500.00mm (main width).
- Right side dimensions: 2500.00mm (main width), 200.00mm (bottom offset).
- Top access lid: 900 x 900 SEALED ACCESS LID (RL 121.12).
- Right access lid: 900 x 900 SEALED ACCESS LID (RL 118.05).
- Stormfilter chamber weir: RWT WEIR RL 120.55, RWT TWL RL 120.55, RL 118.97.
- Stormfilter cartridges: PROPOSED 7 x 690mm PSORB STORMFILTER CARTRIDGES (RL 118.20).
- Step irons: STEP IRONS REFER TO DETAIL (multiple locations).
- Bottom note: ALLOW 100mm FOR FALSE FLOOR TO INSTALL PIPE FROM FILTERS TO OSD BASE.



Technical drawing of the front elevation of the 'B' section of the 'A' building. The drawing shows a rectangular structure with a total width of 2500.00mm and a total height of 1300.00mm. The top edge is labeled '900x900 ACCESS GRATED'. The right side features two discharge pipes: a 300mm diameter pipe from OSD 2 at RL 113.80 and a 300mm diameter pipe from OSD 1 at RL 113.60. The drawing includes various level markers: RL 115.25 at the top left, RL 115.20 at the top right, RL 114.90 for the top floor level, RL 113.81 for the ground level, and RL 113.80 for the first floor level. The drawing is labeled 'STEP IRONS REFER TO DETAIL'.





LEGEND

- SITE BOUNDARY
- SURVEY
- CONSTRUCTION VEHICLE ENTRANCE/EXIT
- SEDIMENT FENCE
- SECURITY FENCE
- LOCKABLE CHAINWIRE GATE
- GEOTEXTILE INLET FILTER
- MESH & GRAVEL INLET FILTER
- SUGGESTED TEMPORARY STOCKPILE LOCATION

EXISTING UTILITIES

- EXISTING ELECTRICITY
- EXISTING COMMUNICATIONS
- EXISTING SEWER
- EXISTING GAS
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING DRAIN
- EXISTING SERVICE TO BE REMOVED

NOTES

- REFER DRAWING CI-0710 FOR EROSION AND SEDIMENT CONTROL DETAILS.
- CONTRACTOR TO ENSURE SITE DRAINAGE IS NOT ADVERSELY IMPACTED DURING CONSTRUCTION.
- CONTRACTOR TO PROVIDE 'SANDBAG SEDIMENT TRAP' TO ALL PAVED/ROAD AREAS (BOTH PROPOSED AND EXISTING) IN ACCORDANCE WITH THE 'BLUE BOOK'.
- CONTRACTOR TO PROVIDE 'GEOTEXTILE INLET FILTER TRAPS' TO ALL STORMWATER DRAINAGE INLETS (BOTH PROPOSED AND EXISTING) IN ACCORDANCE WITH THE 'BLUE BOOK'.
- INSTALL AND MAINTAIN SANDBAG FILTERS ACROSS ALL PAVEMENT INTERFACES.

REV	DATE	DESCRIPTION	REVISED	REV	DATE	DESCRIPTION	REVISED
C	30.05.2025	ISSUED FOR SSQA APPROVAL	PF				
B	04.03.2025	ISSUED FOR SSQA APPROVAL	PF				
A	25.02.2025	ISSUED FOR INFORMATION	PF				

REV	DATE	DESCRIPTION	REVISED

REV	DATE	DESCRIPTION	REVISED

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BGE

PROJECT
PYMBLE LADIES COLLEGE
20 AVON ROAD, PYMBLE, NSW, 2073

STATUS
ISSUED FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

DRAWN	DESIGNED	CHECKED	APPROVED
JC	SM	PF	

DATUM
AHD

GRID
GDA2020
MGA-56

SCALE
1:250

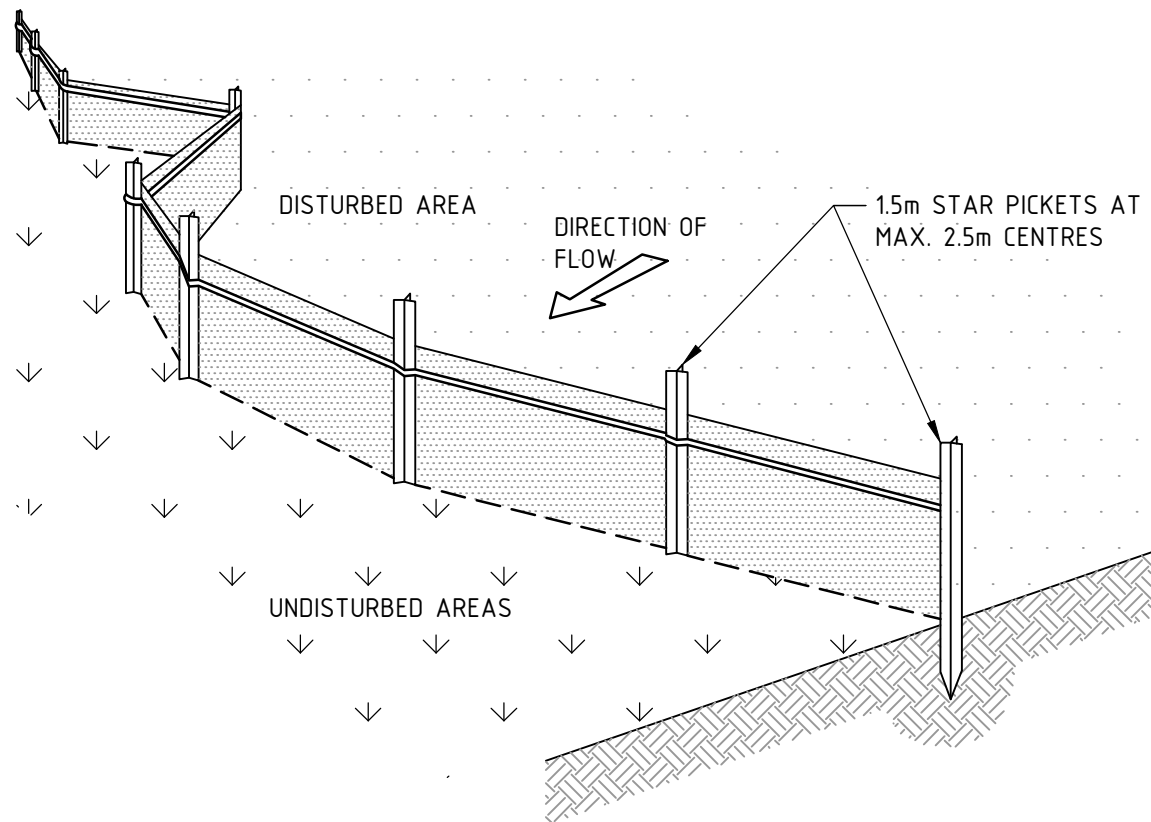
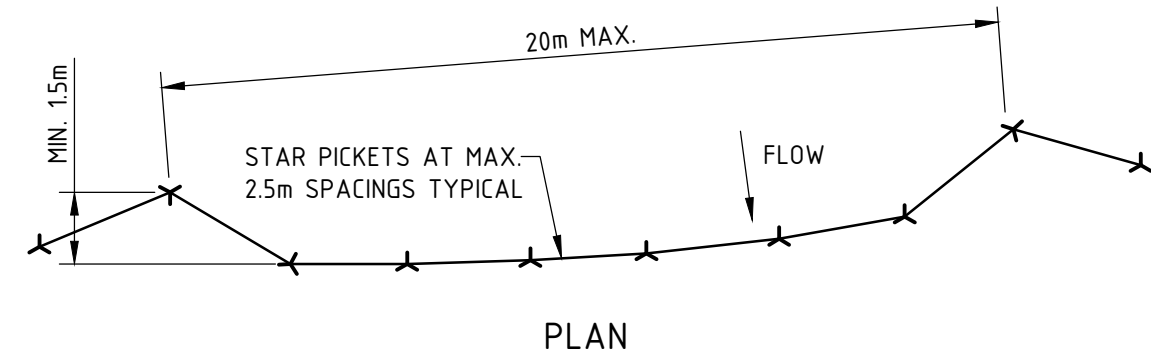
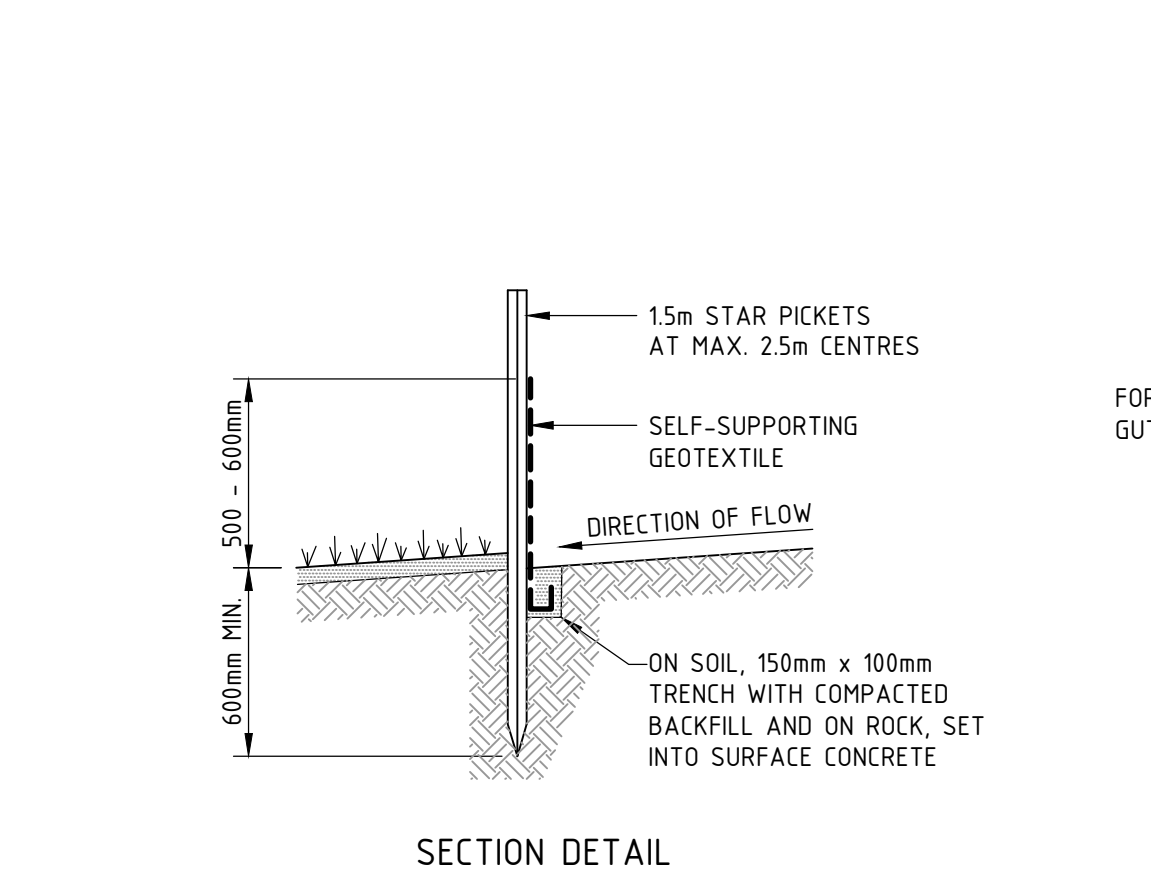
AT
A1 SIZE

TITLE
EROSION AND SEDIMENT
CONTROL PLAN

PROJECT No.
S23158

DRAWING No.
CI-0700

REV
C

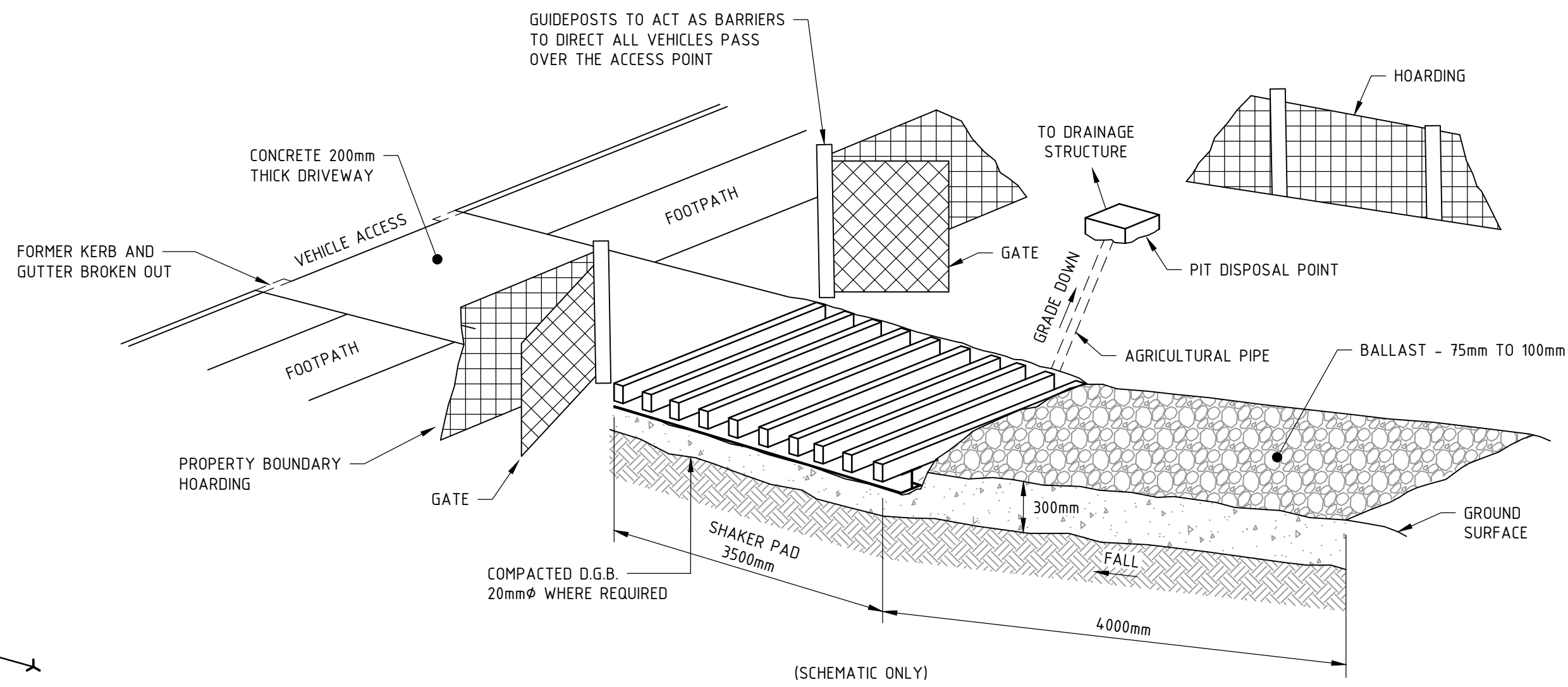


SEDIMENT FENCE CONSTRUCTION NOTES:

- CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITERS PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
- CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
- DRIVE 15m LONG STAR PICKETS INTO GROUND AT 2.5m INTERVALS (MAX.) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
- FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
- JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
- BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

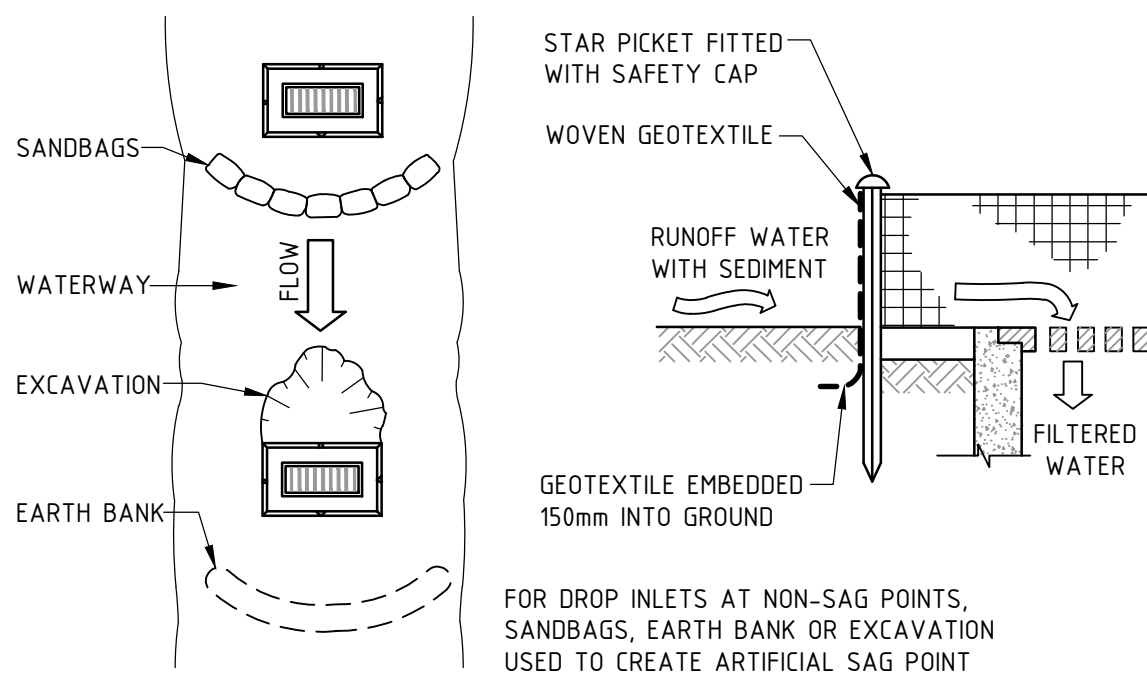
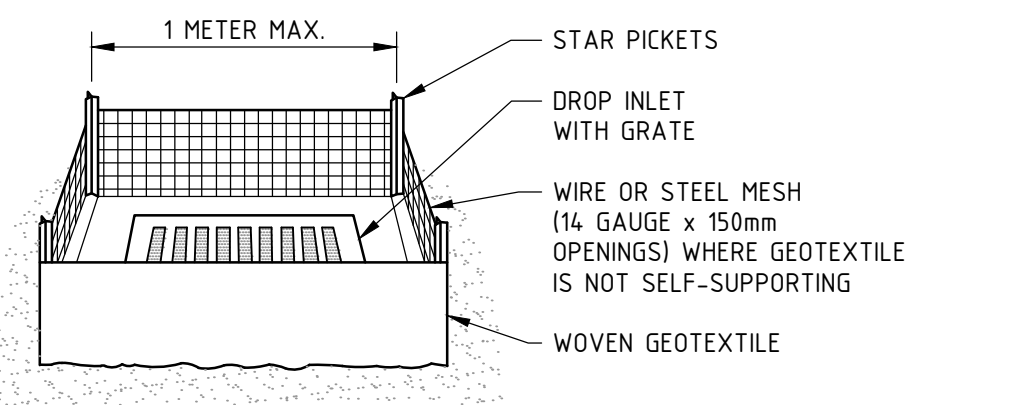
SEDIMENT FENCE

SCALE N.T.S



STABILISED SITE ACCESS - SHAKER GRID

SCALE N.T.S

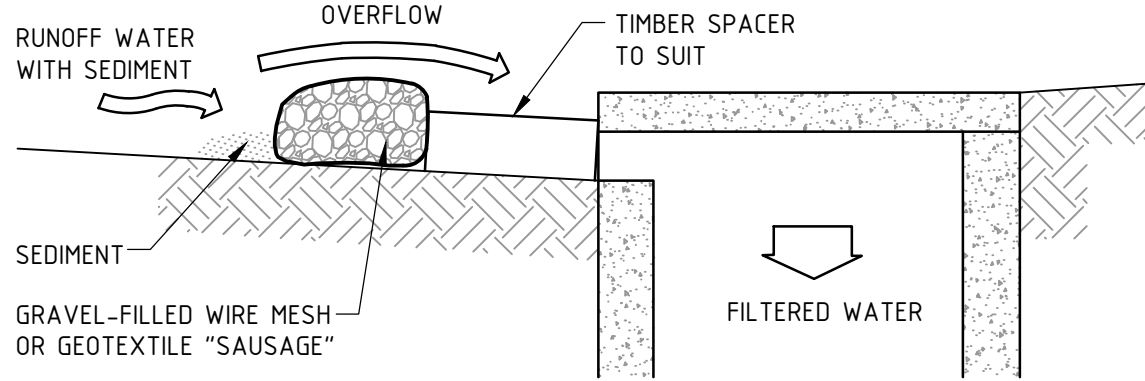
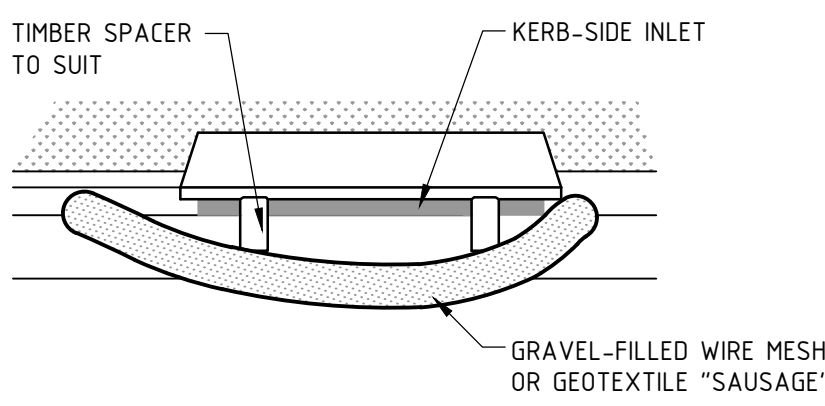
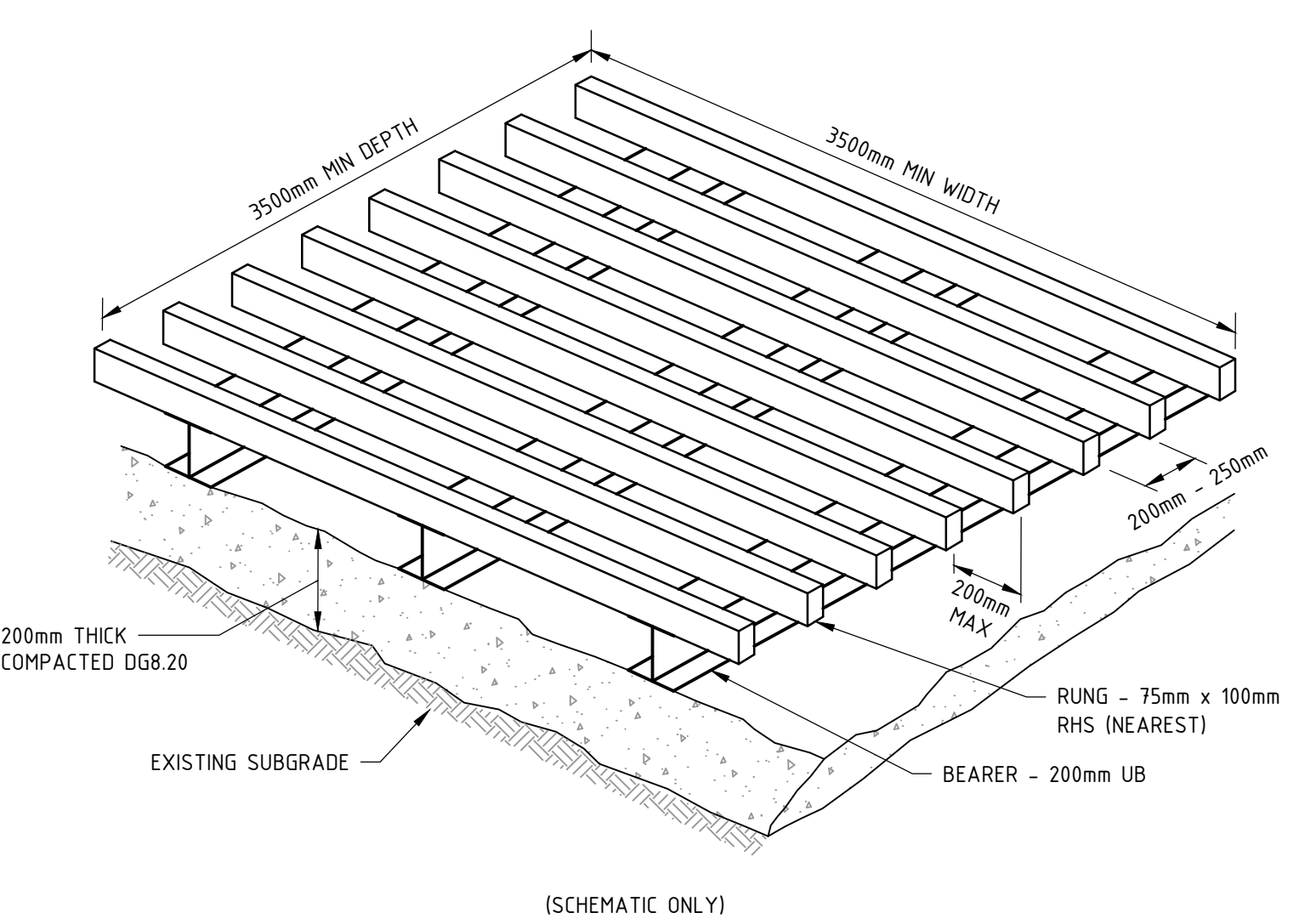


GEOTEXTILE INLET FILTER CONSTRUCTION NOTES:

- FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
- PICKET SPACING TO BE A MAXIMUM 10m CENTRES.
- IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
- DO NOT COVER THE INLET WITH GEOTEXTILES UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER

SCALE N.T.S

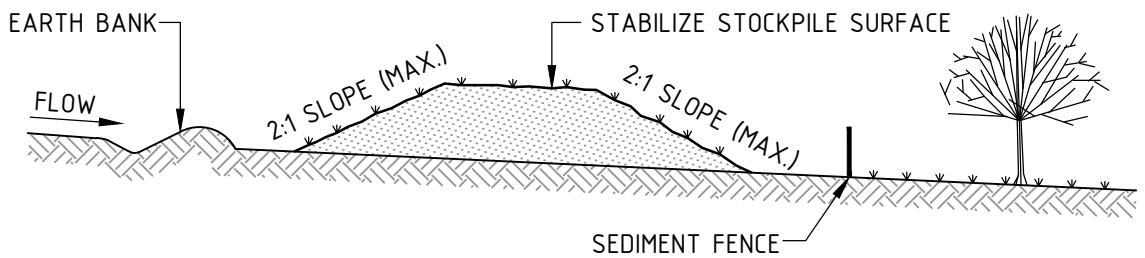


MESH & GRAVEL INLET FILTER CONSTRUCTION NOTES:

- INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
- FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
- FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
- PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
- FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
- SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY CAN FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

MESH & GRAVEL INLET FILTER

SCALE N.T.S



STOCKPILE CONSTRUCTION NOTES:

- PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
- CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
- WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
- WHERE THEY ARE TO BE PLACE FOR MORE THAN 10 DAYS, STABILIZE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
- CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.

STOCKPILES

SCALE N.T.S

REV	DATE	DESCRIPTION	RVD	REV	DATE	DESCRIPTION	RVD
C	30.05.2025	ISSUED FOR SSDA APPROVAL	PF				
B	04.03.2025	ISSUED FOR SSDA APPROVAL	PF				
A	25.02.2025	ISSUED FOR INFORMATION	PF				
REVISIONS				REVISIONS			

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29/05/2025 2:50:17 PM

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PROJECT

PYMBLE LADIES COLLEGE
20 AVON ROAD, PYMBLE, NSW, 2073

STATUS			
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DATUM AHD	GRID GDA2020 MGA-56	SCALE AS SHOWN	AT A1 SIZE

TITLE		
EROSION AND SEDIMENT CONTROL DETAILS		
PROJECT No. S23158	DRAWING No. CI-0710	REV. C

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Appendix C - Flooding Assessment

By email
3 March 2025

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NSW, 2000
Australia

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Avon Road Pymble NSW 2073

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f +612 9320 9321

arup.com

Attn: Scott Egelton
c/o Pier Property Corporation
Suite 305, Level 3, 25 Lime Street, King Street Wharf NSW 2000

Our ref 305487-00

Dear Sir/Madam

PLC Secondary Innovation Precinct **Flooding SSDA – Preliminary Report**

1. Introduction

Arup has been commissioned by Pymble Ladies' College (the College) to prepare this *Flooding Assessment* in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs) and in support of the preparation of an Environmental Impact Statement (EIS) and State Significant Development Application (SSD- 79146716) to the Department of Planning, Housing and Infrastructure (DPHI).

To support the preparation of and SSDA assessment, Arup have undertaken a review of:

- The flooding conditions at the site,
- Available information,
- flood risks associated with the development
- Potential mitigation.

This letter summarises the findings of the desktop flooding review. It is intended to be read in conjunction with the Civil SSDA Stormwater Plan (BG&E, 2025).

2. Project Understanding

The site is located at 20 Avon Road, Pymble, within the Ku-Ring-Gai Local Government Area (LGA). The site comprises multiple parcels of land and is legally described as:

- Lot 1 Deposited Plan 69541
- Lots 11- 17 Deposited Plan 7131

The site and proposed work areas are identified in Figure 1.

Our ref
Date

303074
3 March 2025



Figure 1 Site boundary

The project comprises demolition of several existing buildings and the construction of the Secondary Innovation Precinct (SIP), associated landscaping and Campus Commons at the Pymble Ladies College as outlined in Figure 2. The SIP is a five-storey building that will consolidate STEM based learning opportunities within the college.

As this location is on a local high point, it is not expected to be subject to mainstream flooding associated with the local water courses. The Ku-ring-gai on-line flooding portal confirms that the precinct is not in a documented floodplain (refer Figure 3). However, there may remain a residual flood risk associated with high velocity travelling through the precinct towards the marked watercourses.

Our ref
Date

303074
3 March 2025

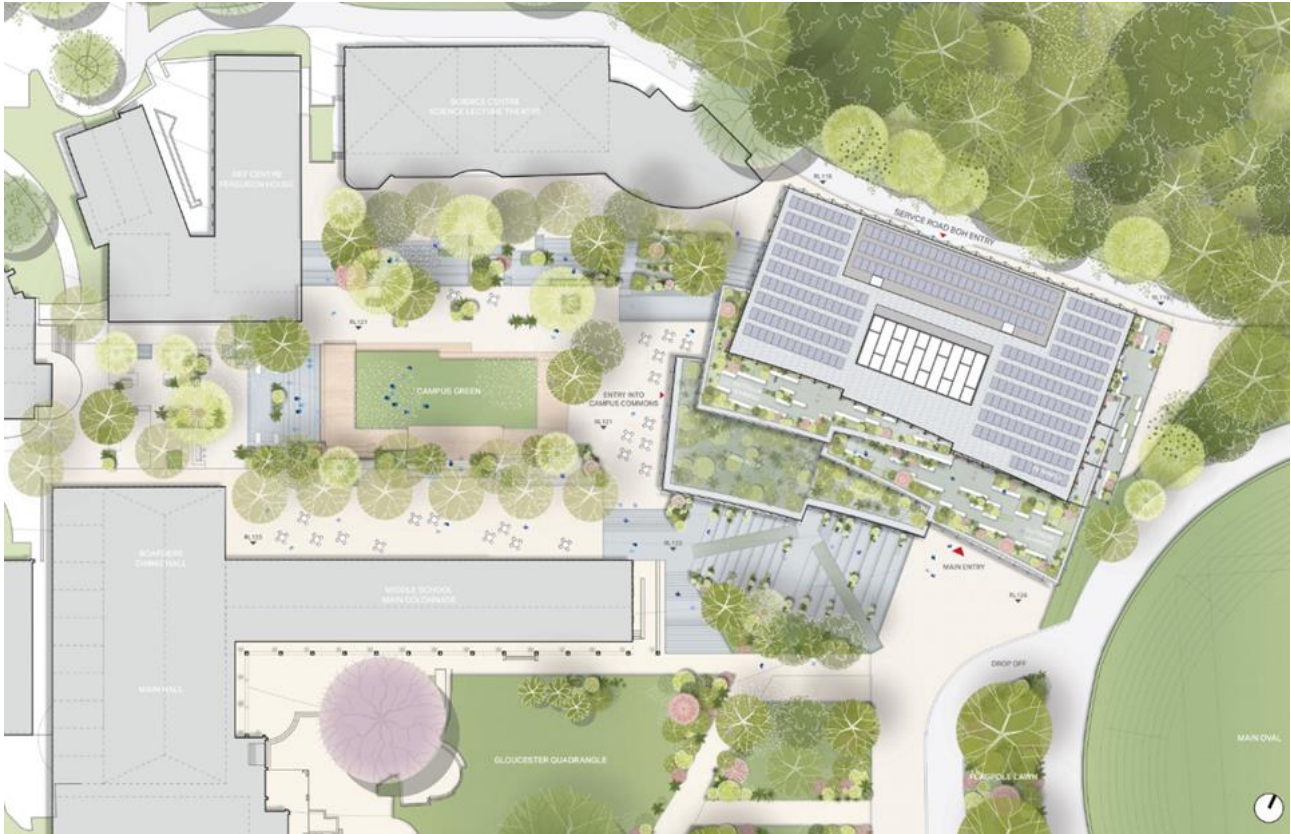


Figure 2 Site plan (3XN, 2025)



Figure 3 Flood extents from the 2024 Ku-ring-gai online mapping portal.

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Date

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3 March 2025

Available Data

Blackbutt Creek Flood Risk Management Study and Plan

Flooding in the southern portion of the PLC site is covered in the Blackbutt Creek Flood Risk Management Study and Plan prepared for Council in 2016 (GHD). This study considered the flood risk associated with the creeks and tributaries that flow in the Blackbutt Creek; however this study did not cover catchment of the SIP.

The hydrology for this study was prepared using a DRAINS model, which established inflows to a 2D TUFLOW hydraulic model. This hydraulic model is used to calculate flood levels, depths and hazard conditions across the study area.

LiDAR

LiDAR data providing site wide topographic information is available from the NSW Division of Department of Finance, Services and Innovation: Spatial Services. This data was collected by Airborne Laser Scanning (ALS) in May 2011, and has a notational accuracy of +/- 0.3 m vertically, and +/-0.8 m vertically.

Civil Drainage Plan

A drainage plan has been prepared for the site by the project civil engineers BG&E (Figure 4). This plan outlines how the local stormwater will be directed around the site, including the catchment areas within the site, catchment areas external to the site but drainage to the site, overland flows and associated overland flow hazards.

In the case of rainfall falling directly on the precinct, the grading plan is intended to direct runoff away from building entrances, and towards the stormwater drainage pits and pipes. These measures are demonstrated by BG&E to be sufficient to manage the stormwater flows crossing the site.

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3 March 2025

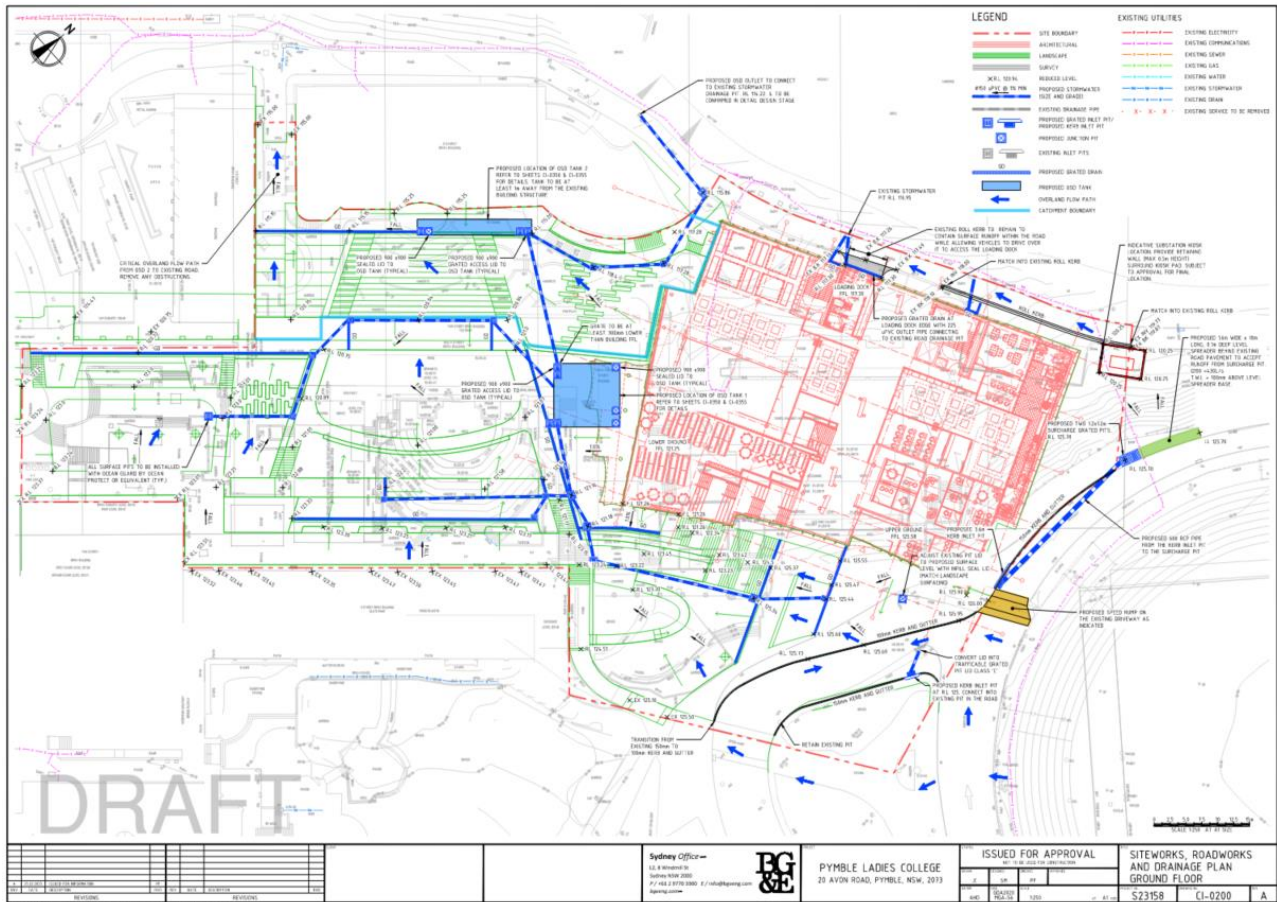


Figure 4 Civil Drainage Plan (BG&E, 2025)

Flood Planning Requirements

The development assessment requirements are set out in the project SEARs. Specific flood planning requirements applicable to the site are outlined in the Ku-ring-gai Local Environment Plan 2015 (the LEP), and the associated Development Control Plan (DCP).

Project SEARs

The Secretaries Environmental Assessment Requirements with respect to flooding are outlined in Table 1 Project SEAR SSD 79146716 for flooding. This letter has been prepared to address these SEARs requirements by outlining the flood risk, and presenting any measures relevant to managing flooding to this site or other surrounding properties.

Our ref

303074

Date

3 March 2025

Table 1 Project SEAR SSD 79146716 for flooding

Requirements	Where Addressed
- Identify the flood planning level as set out in the relevant council LEP or SEPP and identify any: - flood risks on site having regard to adopted flood studies - the potential effects of climate change, and - any relevant provisions of the NSW Flood Risk Management Manual. - Where the development is occurring on flood prone land a flood impact and risk assessment (FIRA) must be prepared having regard to the Flood Impact and Risk Assessment Guideline - LU01 (FIRA guide). When determining the scope and category of the FIRA the requirements outlined in the FIRA guide must be considered. - Detail any flood risk management measures that are to be incorporated as part of the development having regard to relevant guidelines (including any design solutions, flood modification measures, property modification measures, operational procedures or Flood Emergency Response Plan).	- Guidance in the DCP: is used to inform the flood risk and applicable flood planning levels (below). - Management measures are documented in the civil design (BG&E)

Local Environment Plan

The Ku-ring-gai Local Environmental Plan 2015 (LEP) is the Council's principal planning document that typically applies to development within the local government area (LGA). The LEP requires that the following objectives be satisfied:

- to minimise the flood risk to life and property associated with the use of land,*
- to allow development on land that is compatible with the flood function and behaviour on the land, taking into account projected changes as a result of climate change,*
- to avoid adverse or cumulative impacts on flood behaviour and the environment,*
- to enable the safe occupation and efficient evacuation of people in the event of a flood.*

These requirements are documented in Section 5.21 of the LEP.

Ku-ring-gai Development Control Plan

The Ku-ring-gai Development Control Plan (DCP) outlines the controls and outcomes typically applied to developments within the plans applicable scope. This document serves to assist in the application of the LEP.

Water management, including flooding and stormwater, are documented in Part C Section 24. The requirements with respect to flooding, as well as the response applied to this site, are outlined in Table 2 (Section 24D.2: Flood Studies and The Design Flood Standard), and (section 24D.3: Development Over or Adjacent to a Natural Waterbody, Open Channel or Drainage Depression). Other controls, including the stormwater controls, are addressed in the civil design report (BG&E, 2025).

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303074
3 March 2025

Table 2 Ku-ring-gai DCP section 24D.2: Flood Studies and The Design Flood Standard

Clause Number	Requirements	Response required for the proposal
1	Where a Catchment Flood Study has been completed and the site is identified on the Flood Planning Area map any development proposal is to demonstrate: i) Development is confined to a part of the site which is flood free; or ii) All dwellings are set at or above the specified freeboard; and iii) Development will not exacerbate flooding depth, extent or flow velocities on adjoining properties; and iv) Any part of the dwelling house or any ancillary development that is erected at or below the flood planning level is to be constructed of flood compatible material, and able to withstand the forces exerted during a flood by water, debris and buoyancy up to the flood planning level. Note: Absence of Flood Planning Area or Probable Maximum Flood mapping on a property does not mean the site is free from overland flows during major rainfall events – all development is to carefully consider potential flow paths and incorporate good drainage design to minimise potential impacts during major rainfall events.	No catchment flood study has been completed for this site. Flooding information is available for adjoining watercourses in the <i>Blackbutt Creek Flood Risk Management Study and Plan</i>. This study indicates that due to the position of the school site on a local high-point, and as such, is not subject to flooding as identified in Council flood studies (this being flooding having escaped the confines of a defined of identifiable watercourse). Notwithstanding, the site may be subject to overland flows generated either as a result of runoff within the site area directly, or the immediately upstream catchment area.
2	Where a Catchment Flood Study has not been completed or Council considers that a development proposal, associated with a nearby drainage system, may: v) be subject to inundation from overland flows causing damage to property or belongings; and/or vi) be subject to structural damage from overland flows or debris associated with the overland flows; and/or vii) impede the passage of stormwater associated with the design flood standard to cause a rise (afflux) in the flood level upstream greater than 50mm; and/or viii) divert overland flows onto or into surrounding properties; and/or ix) increase the downstream velocities of flow for the design flood standard. Council reserves the right to request that a flood study be undertaken and prepared in accordance with 24R.3 of this Part.	As above, this site is outside the extent of an applicable catchment flood study prepared by Council. Flooding information is available for adjoining watercourses in the <i>Blackbutt Creek Flood Risk Management Study and Plan</i>. This study indicates that due to the position of the school site on a local high-point, and as such, is not subject to flooding as identified in Council flood studies (this being flooding having escaped the confines of a defined of identifiable watercourse). A review of the local topography has been undertaken to review the potential for changes in site hydrology and potential for this to impact surrounding properties.

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Clause Number	Requirements	Response required for the proposal
3	The design flood standard is to be calculated based on either: i) the overland flow associated with the 1% AEP storm event with any above-ground channels and underground pipes / culverts operating at a maximum of 50% capacity; or ii) the overland flow associated with the 20% AEP storm event with any above-ground channel or underground pipes / culverts fully blocked; iii) whichever is the greater	This design flood standard will be reviewed in the civil and stormwater design. The grading plan and stormwater design will be revised in-order to achieve this require stormwater design standard.
4	For sensitive and hazardous development Council may require the adoption of events between the 1% AEP and Probable Maximum Flood (PMF) as the design flood event where it is considered that the proposed works pose a greater than usual risk to persons and/ or property. i) Sensitive and hazardous development includes: a. Early education and care facilities. b. Educational establishments. c. Emergency services facilities. d. Group homes. e. Hospitals. f. Respite day care centres. g. Seniors housing. h. Hazardous storage establishments.	As the development is an educational institution, it would be classified as a sensitive development.

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Table 3 Ku-ring-gai DCP section 24D.3: Development Over or Adjacent to a Natural Waterbody, Open Channel or Drainage Depression

Clause Number	Requirements	Response required for the proposal
1	Where works are proposed to be undertaken adjacent to the design flood standard conveyance zone associated with a watercourse, open channel or drainage depression, and Council considers it to be necessary, a flood study is to be prepared in accordance with 24R.3 of this Part to demonstrate that the development will not: i) be subject to inundation from flows associated with the watercourse causing damage to property or belongings; and /or ii) be subject to structural damage from flows associated with the watercourse or debris associated with the flows; and/or iii) impede the passage of stormwater associated with the watercourse to cause a rise (afflux) in the flood level upstream greater than 50mm; and/or iv) divert flows associated with the watercourse onto or into adjacent properties; and/or v) increase the downstream velocities of flow for the design flood standard	While there is a watercourse or drainage depression on the PLC campus to the north-east of the site does not include works that would encroach on this watercourse or depression. As such, this clause is not applicable to this proposal.
2	Bridges may be considered, where: i) the underside of any bridge structure, including any attached utility services, is not less than 300mm above the level of the design flood standard; ii) the existing velocity of water in the watercourse would not be affected; iii) not more than one bridge is established per property; and iv) the watercourse and banks beneath the bridge are stabilised by rock lining or equivalent to prevent erosion that would otherwise result from reduced plant growth due to restricted solar access. Note: Lower level bridges may be considered subject to demonstration that they are structurally adequate, will not impact upon stormwater flows (including backwater affecting upstream property) and will enable dry access during storm events up to the 5% AEP.	This proposal does not include any bridges or watercourse crossings. As such, this clause is not applicable to this proposal.

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Clause Number	Requirements	Response required for the proposal
3	Where the design flood standard is less than 20m³/s, or identified as overland flow on the Flood Planning Area Map* the minimum floor level of all enclosed areas and structures, including all habitable floor areas, is to be either: i) 300mm above the design flood standard level; or ii) 300mm above the highest existing ground level along the associated overland flow path; or iii) whichever is the greater, except in the case of garages, where the minimum height is to be 150mm instead of 300mm, and in-ground swimming pools, which is to be designed in accordance with the provisions of 24D.7 (4) of this Part *where a flood study has been completed.	The runoff from the catchment upstream of the site is documented by BG&E 2025). The peak flow rate in the 1% AEP is less than 20m³/s. As such, this clause is not applicable to this proposal.
4	Where the design flood standard exceeds 20m³/s, or as identified as mainstream flow on the Flood Planning Area Map* the minimum floor level for all enclosed areas, including all habitable floor areas, are to be 500mm above the design flood standard level, except in the case of garages, where the minimum height is to be 300mm, and in- ground swimming pools, which is to be designed in accordance with the provisions of 24D.7 (3,4,5) of this Part. *where a flood study has been completed. Note: Council may require, as a condition of consent, that the following burdens be placed on the title of the subject property over the following areas of the property: i) a restriction-on-use over the determined design flood standard conveyance zone for an overland flow path associated with a natural waterbody, open channel or drainage depression, the terms of which do not permit the placement of any structures within that zone which may impede the design flood standard; and/or ii) a drainage easement to the benefit of Council and/or upstream properties as applicable.	The runoff from the catchment upstream of the site is documented by BG&E 2025). The peak flow rate in the 1% AEP is less than 20m³/s. As such, this clause is not applicable to this proposal.

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Clause Number	Requirements	Response required for the proposal
5	Safety fencing that is required to reduce hazard to persons to acceptable limits may be installed in any areas that are subject to overland flow. Safety fencing is to be able to withstand a velocity x depth ratio of $0.4\text{m}^2/\text{s}$, not impede flows or debris, and meet the minimum requirements of AS1926.1-1993: Fencing for Swimming Pools or any standard that replaces it. If fencing is not feasible, other suitable measures may be provided to restrict access to areas which exceed this limit	Overland flow hazards to be reviewed in the civil design (BG&E, 2025).
6	Parking areas are not to be established in areas where vehicles would become buoyant in an overland flow zone, and hence unstable. A maximum velocity x depth ratio of $0.6\text{m}^2/\text{s}$ to $0.7\text{m}^2/\text{s}$ applies in these instances in accordance with Australian Rainfall and Runoff. Note: Australian Rainfall and Runoff is published by Engineers Australia www.eabooks.com.au . Information on updates to Australian Rainfall and Runoff can be found at www.arr.org.au	Parking areas will not be subject to flows greater than the applicable safety criteria. This is reviewed in the drainage assessment (BG&E, 2025).

Ku-ring-gai Council Technical Guideline for Water Management

Ku-ring-gai Council have published this technical guideline to support development in the local government area. This guidelines covers technical aspect of stormwater management, including the design and specification of stormwater networks, bioretention and water sensitive urban design measure, as well as On-site Stormwater Detention (OSD). This document does not address flooding, and as such these requirements are considered in the drainage design prepared by BG&E.

Topographic Assessment

Using the topographic information, an assessment of the site topography has been undertaken for the site and the area surrounding (Figure 5). A review of this broad scale topography indicates that in most circumstances, rainfall-runoff will be directed to the drainage depression north of the site. While this runoff may be intercepted by structures such as road kerbs, these will still act to direct runoff to this depression.

The proposed drainage plan retains many of the features of the existing site drainage, and as such does not divert flows associated with the watercourse onto or into adjacent properties.

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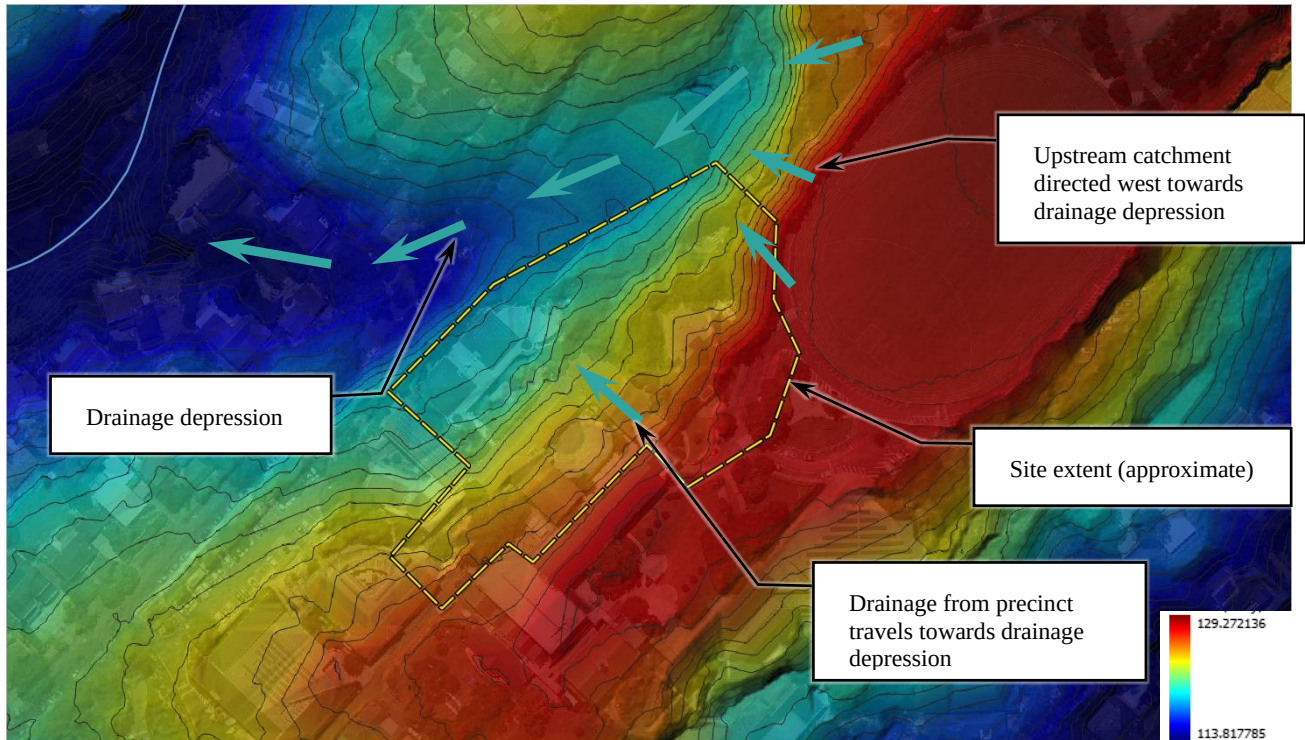


Figure 5 Local site topography

Flood Hazard

As the catchment area is small, being limited to the immediate precinct, the potential flood hazards are also correspondingly small. Overland flow hazards are documented in the stormwater design report (BG&E, 2025). Under the provisions of the DCP, as well as the standard established by other nearby flood studies, this site is not located on flood prone land, and is subject to stormwater management requirements only.

Flood and Overland Flow Mitigations

Based on a review of the existing flood studies, and the at-site topography, the site is not subject to flooding (either overland or mainstream), but rather is subject to shallow depth rainfall-runoff that is generated in from within the precinct or the area immediate upstream. Based on the stormwater drainage plan (BG&E, 2025), this is able to be managed by grading the pavements away from building entrances (e.g. at the southern entrance and at the loading dock). The required measures are documented in the civil design (BG&E, 2025).

The drainage plan prepared by BG&E also includes an On-site Stormwater Detention tank to manage stormwater runoff from the site. This will minimise the potential for increasing the downstream velocities of flow.

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Conclusion

Based on a review of the site topography and the existing drainage plan, as well as the nearby flood study (Blackbutt Creek Flood Risk Management Study and Plan), the site is only subject to locally generated rainfall runoff. Under the provisions of the DCP, as well as the standard established by other nearby flood studies, this site is not located on flood prone land.

Any rainfall-runoff is expected to be relatively shallow in depth, and able to be managed safely through the grading plan and the pit and pipe drainage (BG&E 2025), and the design and assessment of this plan is documented in the civil design report. Off-site flows will be managed through the provided OSD tank, which acts to limit the peak discharge relate to the drainage depression north of the site, noting that drainage for the site is currently directed to this depression.

As such, the development has a minimal flood risk that falls outside the scope of the flooding controls identified in Part C Section 24 of the Ku-ring-gai Development Control Plan.

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Appendix D - OSD Calculation Sheets

24R.4 ON-SITE DETENTION CALCULATION SHEET

Address Secondary Innovation Precinct (SIP) Pymble Ladies' College (PLC) - OSD 1

Catchment Detail

1.	Catchment Name	Blackbutt Creek		
2.	Catchment Discharge Rate	0.0141	l/sec/m ²	A
3.	Catchment Storage Rate	0.0302	m ³ /m ²	B

Site Details

4.	Site Area	7.700	m ²	60% of site area	-	m ²	C
5.	Area(s) not draining to the detention system	0	m ²				
6.	Total impervious area (roofs, driveways, paving, etc.)	3.300	m ²				D
7.	Impervious area bypassing detention system	0	m ²				E

Permitted Site Discharge

8.	C	[7.700 m ²]	x A	[0.0141 l/sec/m ²]	=	108.57	l/sec	Flow 1
9.	Adjustment for any uncontrolled impervious flow	E / D	=	0	(<0.25)			F
10.	Flow 1	[108.57 l/sec]	x F	[0]	=	0	l/sec	Flow 2
11.	Flow 1	[108.57]	- Flow 2	[0]	=	108.57	l/sec	PSD

Site Storage Requirement

12.	C	[7.700 m ²]	x B	[0.0302 m ³ /m ²]	=	232.54	m ³	SSR1
13.	If the storage is in a landscaped basin, SSR1 x 1.2 =					n/a	m ³	SSR2

Outlet Control

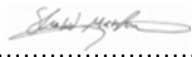
14.	Height difference between top water surface level and the centre of the orifice	2.66	m	G	
15.	Orifice Diameter	$21.8 \times \sqrt{\frac{PSD}{\sqrt{G}}}$	177.8	mm	OD

PSD = Permitted Site Discharge

SSR1 = Site Storage Requirement (except for landscaped basins)

SSR2 = Site Storage Requirement (landscaped basins) (Note: Use only SSR1 or SSR2)

OD = Orifice Diameter

Signature  Name S. Mahfouz

Qualifications BEng MIEAust Date 02.09.2025

24R.4 ON-SITE DETENTION CALCULATION SHEET

Address Secondary Innovation Precinct (SIP) Pymble Ladies' College (PLC) - OSD 2

Catchment Detail

1.	Catchment Name	<u>Blackbutt Creek</u>		
2.	Catchment Discharge Rate	<u>0.0141</u>	l/sec/m ²	A
3.	Catchment Storage Rate	<u>0.0302</u>	m ³ /m ²	B

Site Details

4.	Site Area	<u>1,340</u>	m ²	^	60% of site area	<u>-</u>	m ²	C
5.	Area(s) not draining to the detention system	<u>0</u>	m ²					
6.	Total impervious area (roofs, driveways, paving, etc.)	<u>3,300</u>	m ²					D
7.	Impervious area bypassing detention system	<u>0</u>	m ²					E

Permitted Site Discharge

8.	C [<u>1,340</u> m ²] x A [<u>0.0141</u> l/sec/m ²] =	<u>18.894</u>	l/sec	Flow 1
9.	Adjustment for any uncontrolled impervious flow E / D =	<u>0</u>	(<0.25)	F
10.	Flow 1 [<u>18.894</u> l/sec] x F [<u>0</u>] =	<u>0</u>	l/sec	Flow 2
11.	Flow 1 [<u>18.894</u>] – Flow 2 [<u>0</u>] =	<u>18.894</u>	l/sec	PSD

Site Storage Requirement

12.	C [<u>1,340</u> m ²] x B [<u>0.0302</u> m ³ /m ²] =	<u>40.46</u>	m ³	SSR1
13.	If the storage is in a landscaped basin, SSR1 x 1.2 =	<u>n/a</u>	m ³	SSR2

Outlet Control

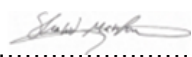
14.	Height difference between top water surface level and the centre of the orifice	<u>1.1</u>	m	G
15.	Orifice Diameter $21.8 \times \sqrt{\frac{\text{PSD}}{\sqrt{G}}}$	<u>92.52</u>	mm	OD

PSD = Permitted Site Discharge

SSR1 = Site Storage Requirement (except for landscaped basins)

SSR2 = Site Storage Requirement (landscaped basins) (**Note: Use only SSR1 or SSR2**)

OD = Orifice Diameter

Signature  Name S. Mahfouz

Qualifications BEng MIEAust Date 02.09.2025

Appendix E - Rainwater Tank Calculations

Irrigation	
Building Roof Area	1450 m2
Irrigation Rate	0.5 kL/year/m2
Yearly Usage	725 kL
Daily Usage	1987 L/day
Total Water Usage	1987 L/day
	1.987 m3/day

Number of Rainfall Days	169	
50% of Rainfall Days	84.5	
Total Water Usage	1.987	m3/day
Rainwater Tank Volume	25	m3
Total Runoff Days	51	
Total Reduction (%)	69.8	%

Rainwater Tank Volume (m3)

Days	January	February	March	April	May	June	July	August	September	October	November	December
1	23.0	25.0	11.1	11.1	3.2	21.3	0.0	0.1	0.0	23.0	0.0	9.6
2	21.6	24.2	9.7	25.0	1.2	19.3	0.0	0.0	0.0	21.0	0.0	7.6
3	19.6	22.2	8.3	25.0	0.0	17.6	0.0	0.0	0.0	19.0	0.0	5.9
4	19.4	21.6	20.0	25.0	0.0	18.8	3.2	0.0	0.0	17.1	0.0	6.3
5	25.0	19.7	18.0	23.6	0.0	17.1	4.4	0.0	0.0	25.0	25.0	4.3
6	24.5	18.5	16.0	23.3	0.0	16.9	2.7	2.9	0.0	23.0	25.0	2.3
7	25.0	16.6	14.0	22.5	0.0	14.9	0.8	1.0	0.0	23.3	23.0	0.3
8	25.0	14.9	12.0	25.0	8.7	12.9	0.0	3.6	7.0	21.4	21.0	0.0
9	23.0	23.3	10.0	23.0	6.8	10.9	0.0	1.6	8.5	19.4	20.2	0.0
10	21.0	25.0	8.0	21.0	4.8	8.9	0.0	0.0	6.5	17.4	25.0	2.7
11	19.0	23.0	6.1	19.0	2.8	7.0	0.0	0.0	4.5	15.4	23.0	1.2
12	17.1	21.0	4.1	17.1	0.8	5.3	0.0	0.0	2.5	13.4	21.0	0.0
13	15.1	20.2	2.1	15.1	0.0	3.6	0.0	0.0	0.5	14.3	21.4	0.0
14	13.1	20.2	1.8	25.0	25.0	2.2	0.0	16.0	0.0	12.3	19.7	0.9
15	11.1	25.0	21.6	25.0	24.5	0.2	0.0	25.0	0.0	10.4	18.0	0.0
16	9.1	23.0	19.6	23.3	22.8	0.0	0.0	23.3	0.0	8.4	16.0	0.0
17	7.1	21.0	17.6	21.3	25.0	0.0	0.0	21.6	0.0	9.3	25.0	0.0
18	5.1	19.0	15.6	19.3	23.3	0.0	0.0	25.0	0.0	16.9	23.0	0.0
19	21.1	25.0	13.9	17.6	21.3	0.0	0.0	23.0	0.0	15.5	21.0	0.0
20	25.0	23.3	12.0	25.0	19.3	0.0	0.0	21.0	0.0	13.5	19.0	5.6
21	25.0	21.3	12.0	25.0	17.3	0.0	0.0	19.0	0.0	11.5	17.9	25.0
22	23.6	25.0	10.0	23.3	15.4	0.0	0.0	17.1	3.2	9.5	16.2	25.0
23	25.0	25.0	8.0	25.0	13.4	9.0	0.0	17.4	2.1	7.5	14.8	25.0
24	23.0	25.0	9.5	25.0	11.4	7.0	8.5	16.0	0.1	5.5	25.0	25.0
25	25.0	23.3	7.8	25.0	9.4	5.1	6.8	14.0	0.0	3.5	25.0	25.0
26	23.0	21.6	9.3	23.3	7.4	3.1	5.1	12.3	0.0	1.5	25.0	25.0
27	21.3	19.9	7.3	21.6	5.7	1.1	3.1	10.6	0.0	13.5	23.0	25.0
28	21.4	19.1	5.6	19.9	3.7	0.3	1.1	8.6	6.7	17.6	21.0	25.0
29	19.4	17.1	6.5	20.0	1.7	6.1	0.0	6.9	5.0	15.6	25.0	23.0
30	20.3	15.1	7.2	25.0	0.0	4.1	0.0	4.9	3.3	13.6	25.0	25.0
31	24.1	13.1	5.2	23.0	0.0	2.1	0.0	25.0	1.6	11.6	23.9	25.0

At BG&E, we are united by a common purpose – we believe that truly great engineering takes curiosity, bravery and trust, and is the key to creating extraordinary built environments.

Our teams in Australia, New Zealand, South East Asia, the United Kingdom and the Middle East, design and deliver engineering solutions for clients in the Property, Transport, Ports and Marine, Water, Defence, Renewables and Resources sectors.

We collaborate with leading contractors, developers, architects, planners, financiers and government agencies, to create projects for today and future generations.

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