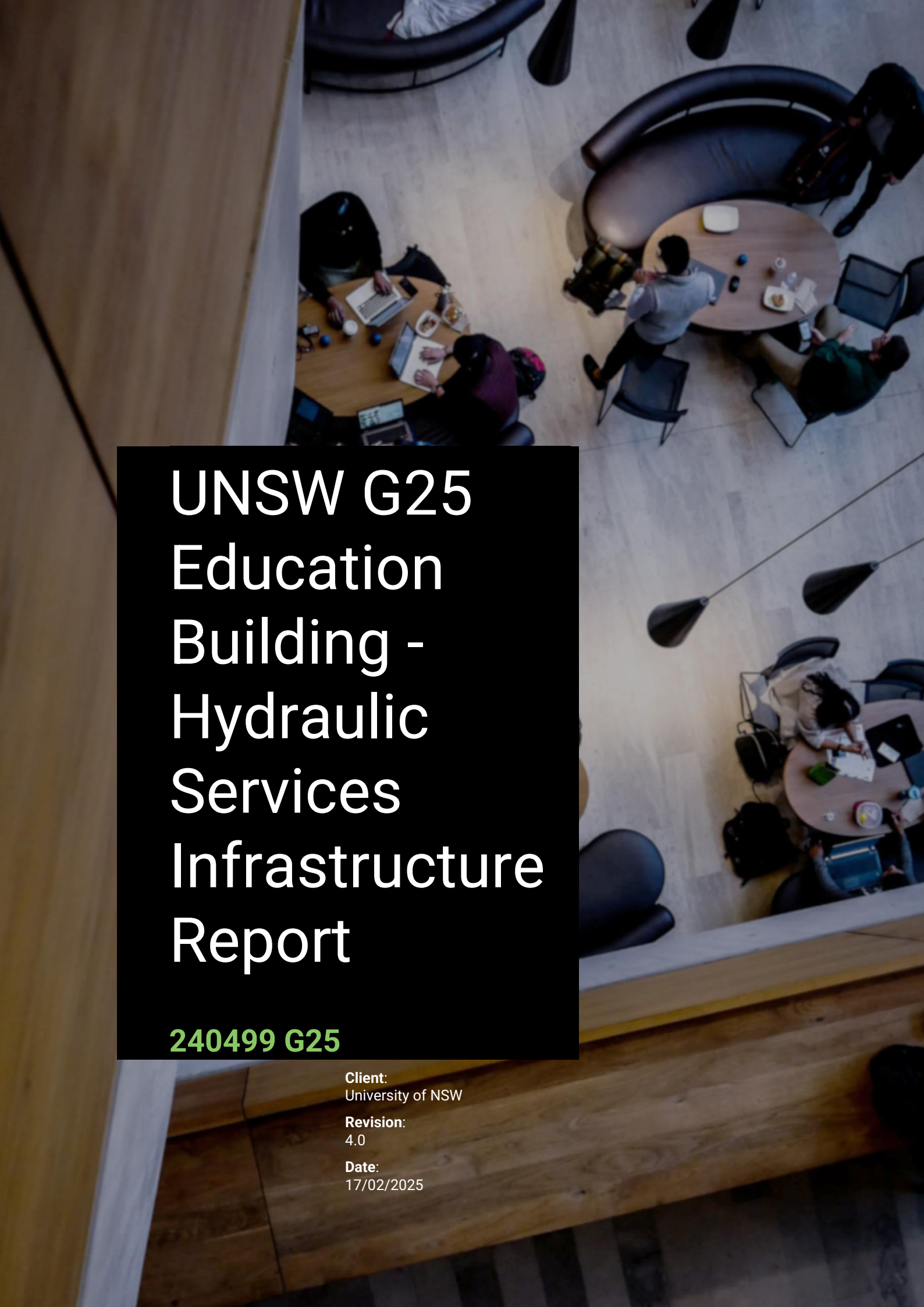

UNSW G25 Education Building - Hydraulic Services Infrastructure Report

240499 G25

Client:
University of NSW

Revision:
4.0

Date:
17/02/2025

REPORT INFORMATION

Project	G25
Title	UNSW G25 Education Building - Hydraulic Services Infrastructure Report
Client	University of NSW
Revision	4.0
Revision Date	17/02/2025
Prepared By	LCI Consultants Sydney Office Level 5, 73 Miller Street North Sydney, NSW 2060
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REVISION SCHEDULE

Revision	Date	Issue Name	Author	Authorised
1.0	25/01/2024	Draft for Comment	MMc	AK
2.0	11/11/2024	Issue for SSDA	MMc	AK
3.0	27/11/2024	Issue for SSDA	MMc	AK
4.0	17/02/2025	Issue for SSDA	MMc	AK

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1 Declaration

PROJECT DETAILS	
PROJECT NAME	**UNSW G25 EDUCATION BUILDING**
Application number	SSD-74670005
Address of subject land	8 High Street, Kensington, NSW, 2033
Lot / DP	Lot 5 DP 1264171
APPLICANT DETAILS	
Applicant name	University of NSW
Applicant address	High St, Kensington NSW 2052 Australia
REPORT DETAILS	
Report this declaration relates	Hydraulic Services Infrastructure Report
Report date	27/11/24
Company name	Lehr Consultants International
Author name	Mitchell McLennan
Author qualifications	Certifier Hydraulic – BDC04933
Author address	L5 – 73 Miller Street, North Sydney NSW 2060
DECLARATION BY CONSULTANT	
Name	Mitchell McLennan
Registration no.	BDC04933
Registered with	Fair Trading NSW

PROJECT DETAILS

Declaration

The undersigned declares that Hydraulic Services Infrastructure Report:

- has been prepared in accordance with the following policy, guidelines, or legislative requirements:
  - BCA 2022
  - AS/NZS3500.1
  - AS/NZS3500.2
  - UNSW Design Specification – Section E.1 Hydraulic Services
- contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the report relates;
- does not contain information that is false or misleading;
- identifies and addresses the relevant Planning Secretary's environmental assessment requirements (SEARs) for the project;
- identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments to which the report relates;

Signature	Mitchell McLennan Digitally signed by Mitchell McLennan DN: C=AU, E=mitchell.mclennan@lciconsultants.com.au, CN=Mitchell McLennan Location: North Syd Reason: I am the author of this document Date: 2025.02.17 17:29:49+11'00'
Date	**17/02/25**

2 Introduction

2.1 Purpose

This UNSW G25 Education Building Hydraulic Services Infrastructure Report has been prepared by LCI on behalf of the University of New South Wales (UNSW) for construction and operation of a teaching and learning facility (the Proposal) to be known as the UNSW G25 Education Building, on land at 8 High Street, Kensington (the Site).

This report has been prepared to highlight the hydraulic infrastructure to support the G25 education building and any impacts the new building may have on existing hydraulic services.

This report accompanies a State Significant Development Application (SSDA) that seeks approval for the construction and operation of a teaching and learning facility at the G25 site, within the Upper Campus of UNSW. Specifically, the SSDA seeks consent for the following:

- Site preparation works including demolition of the existing at-grade car park, tree removal, and excavation works.
- Construction of an eleven (11) storey (plus roof plant) teaching and learning building with approximately 20,000m2 of gross floor area, comprising:
    - Basement plant/services, Bike Storage, End of Trip facilities, ancillary service areas such as Mail and Print rooms as well as Staff Amenities
    - Ground level Food and Beverage premises and informal educational spaces
    - Teaching and Learning spaces throughout Levels 1-7, and workspace to Levels 8-10 for UNSW Faculties
    - Rooftop level including landscaping, outdoor terrace and learning space, mechanical plant and services
- Associated landscaping, replacement trees and public domain embellishment works in and around the proposed building
- Extension and augmentation of infrastructure and services as required

The Proposal will seek to deliver improvements including:

- Providing new, purpose built learning and teaching spaces to support the University activities and strategic goals such as the development of the Randwick Health and Education Precinct
- Delivering an enhanced ground plane connection
- Providing flexible and adaptable teaching and learning spaces
- Creating a healthy, green, and welcoming place for students, staff and visitors
- Creating an experience that is an open, permeable, and connected public realm
- Creating pedestrian priority and inclusive shared public space

For a detailed project description refer to the Environmental Impact Statement prepared by Ethos Urban.

2.2 Glossary

Table 1: Glossary and Abbreviations

Abbreviation	Meaning
DA	Development Application
DBYD	Dial Before You Dig
DPE	Department of Planning
EIS	Environmental Impact Statement
LCI	LCI Consultants
LGA	Local Government Area
L/s	Liters per Second
NSW DPIE	NSW Department of Planning, Industry and Environment

SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
SWC	Sydney Water Corporation
UNSW	University of NSW

2.3 Site Context

The site is situated within the UNSW Kensington upper campus, within the Randwick Local Government Area (LGA). The site address is 8 High Street, Kensington, which applies to the whole of the UNSW Kensington campus.

The UNSW campus forms part of the wider Randwick Health and Education Precinct, which has been strategically identified to provide a world-class coalition of education, research, innovation and healthcare organisations and to attract growth, investment and employment opportunities. This Precinct has been identified in the Greater Sydney Region Plan – A Metropolis of Three Cities and the Eastern City District Plan, for its strategic importance as a specialised centre providing for health and education research, innovation, teaching and learning.

The UNSW campus is located approximately 6km southeast of the Sydney CBD, immediately adjacent to the east is the Randwick Hospitals Complex which also forms part of the Randwick Health and Education Precinct. The UNSW site is within 600m of the Randwick Shopping Centre to the east and adjacent to Royal Randwick Racecourse to the north (refer

Figure 1 below).

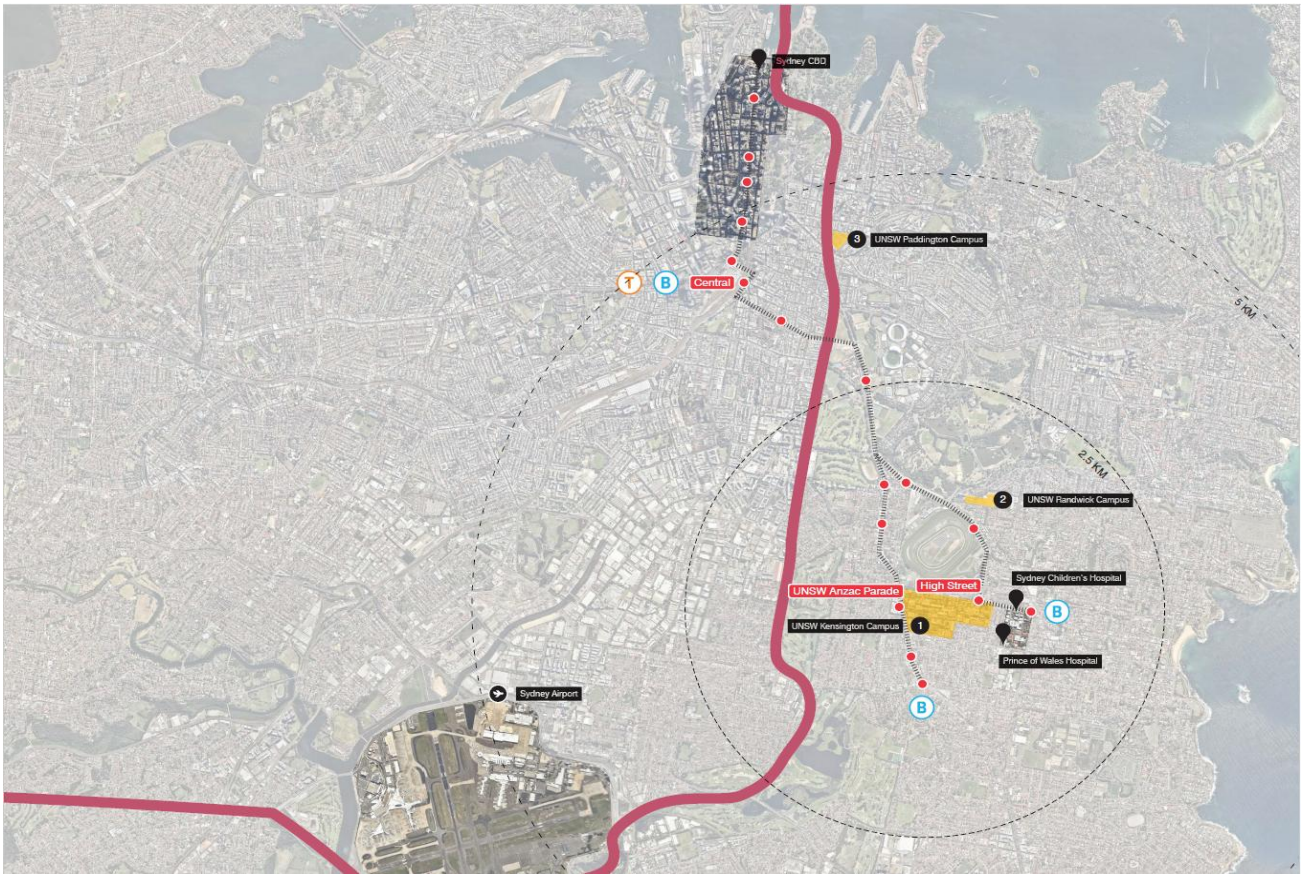

Figure 1 Site Context

Source: Ethos Urban, Google Maps

2.4 Site Description

The subject site known as the G25 site, is an existing on-grade carpark comprising of hardstand pavement with line-marked spaces, trees and landscaped areas. The site also includes the eastern portion of Library Walk and the loading dock area of the AGSM (Australian Graduate School of Management) Building (G27), with no other existing development on the site.

It is bounded to the north by the Samuels Building (F25) and Mathews Building (F23), to the west by the Solar Industrial Research Facility (SIRF) Building (G23), to the south by the multi-storey Botany Street Carpark Station (H25), and to the east by the Australian Graduate School of Management (AGSM) Building (G27) and the Gate 11 entrance to UNSW from Botany Street.

The broader UNSW Kensington Campus consists of five separate allotments. This site is situated within a single allotment legally described as Lot 5 DP 1264171. The UNSW Kensington campus is bounded by Anzac Parade (to the west), High Street (to the north), Botany Street (to the east), and Barker Street (to the south). It also includes developments to the west of Anzac Parade and north of Day Avenue, such as NIDA, the University Regiment, and the New College Post-Graduate Village. The campus currently has approximately 60,000 student enrolments.

Figure 2 provides an aerial image of the site and its location relative to the upper campus boundaries.

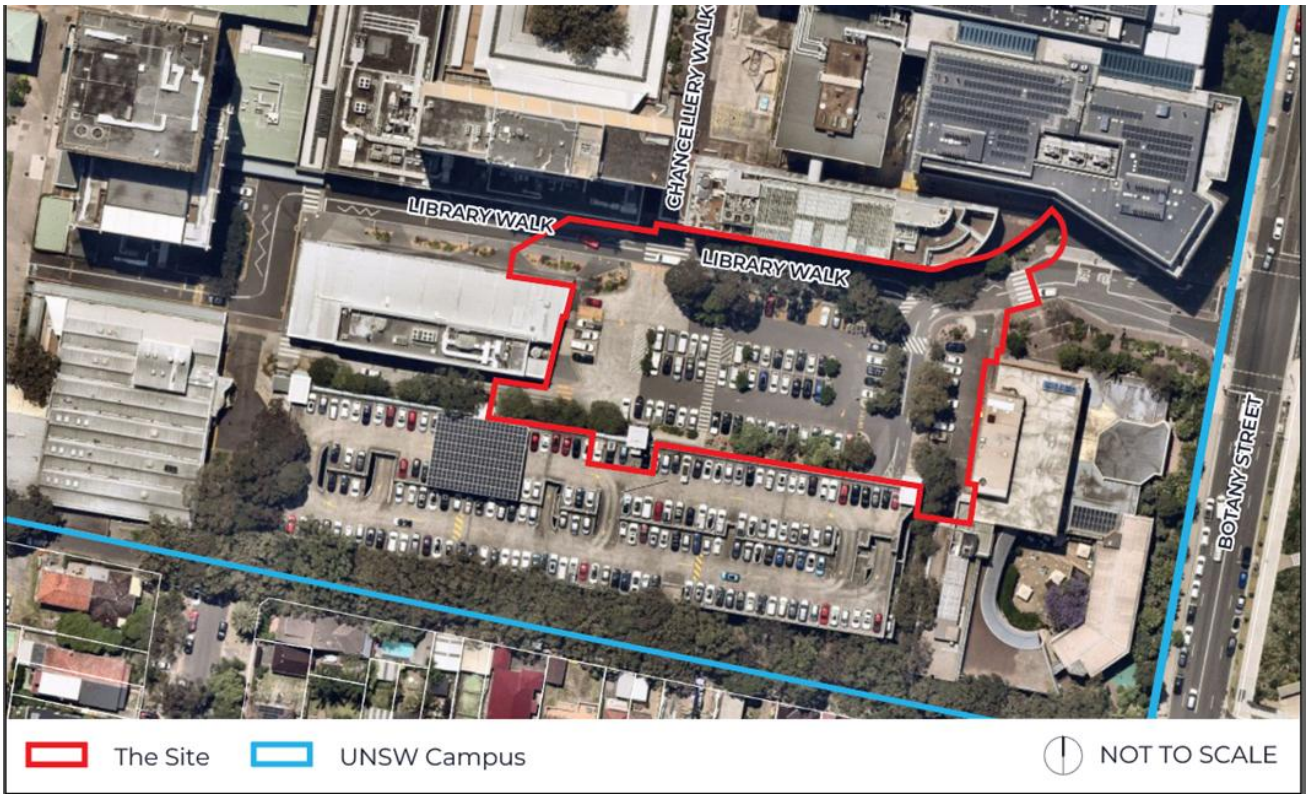

Figure 2 Site Aerial (approximate site area outlined in red)

Source: Nearmap, Ethos Urban

2.5 Surrounding Development

The following development surrounds the site:

- *North: To the north and directly adjacent to the site across from the Library Walk are the Samuels (F25) Building and Mathews (F23) Building, which comprise up to 16-storeys. Further north within the campus are additional education, administration and library buildings. The wider context includes the UNSW High Street Light Rail stop, as well as low to medium density residential development north of High Street.*
- *South: South of the site is the UNSW Botany Street Carpark Station (H25) (5 storeys), which is accessed internally within the UNSW campus. This location includes a pedestrian link from Oval Lane. The wider context includes low-medium density residential development south of Oval Lane.*
- *East: The site directly abuts the ASGM Building (G27) to the east (5 storeys), which fronts Botany Street. To the east and also fronting Botany Street is the Randwick Hospitals Complex including the Prince of Wales Hospital, the Sydney Children's Hospital, and the Royal Hospital for Women, as well as low-medium density residential development to the south-east.*
- *West: The site directly adjoins the Solar Industrial Research Facility (SIRF) (G23) to the west, which also sits within the confines of Library Walk and Valentine Close. The western context of the subject site is primarily characterised by the wider UNSW campus (lower campus) as well as the Anzac Parade Light Rail stop.*

2.6 SEARS Table Response

Table 2: SEARS Responses

Project SEAR	Section of report
22. Infrastructure Requirements and Utilities *In consultation with relevant service providers:* • *Assess the impacts of the development on existing utility infrastructure and service provider assets surrounding the site.*	Section 2
• *identify any infrastructure required on-site and off-site to facilitate the development and any arrangements to ensure that the upgrades will be implemented on time and be maintained.*	Section 2
• *provide an infrastructure delivery and staging plan, including a description of how infrastructure requirements would be co-ordinated, funded and delivered to facilitate the development*	Section 2

3 Infrastructure Requirements

3.1 General

The proposed hydraulic systems require integration with the UNSW Private Potable Water, Bore Water and Sewer Systems, the existing UNSW Information along with studies carried out by others have been used in reviewing the capacities of the infrastructure for the development.

3.2 Applicable Standards

The hydraulic systems for the proposed development and requirements of utility supplies have been calculated using the following relevant Australian Standards, National Construction Code and University Infrastructure Standards.

Table 3: Applicable Standards

References, codes and standards	
AS/NZS 3**500.2**	Plumbing and Drainage – Water Services
AS/NZS 3**500.3**	Plumbing and Drainage – Sanitary Plumbing and Drainage
AS 2419	Fire Hydrant installations
Building Code of Australia 2022	
UNSW Standard – Hydraulic Services – Rev6.2	
UNSW Standard – Bore Water Manual Part 1 Rev 2	

3.3 Potable Water

UNSW Private Water Main

UNSW has a private potable water main reticulating around campus. The size is DN200 and is supplied from the Sydney Water Corporation water mains. UNSW have applied a maximum flow rate for the main of 50 Litres per second. The proposed G25 building has a calculated flow rate of 2.5 litres per second maximum flow rate for domestic water use, the fire systems which also use the potable water supply have been calculated for a combined flow rate of 34L/s, split into 20L/s for Fire Hydrants and 14L/s for fire sprinklers.

UNSW have a provided a modelled pressure and flow statement for this water main which indicates that 50L/s is available 95% of the time. See figure 3 below.

Whilst the flow rate from the water main is greater than the potable water requirements of the site, UNSW standards require a break tank and pumps to reduce pressure and flow fluctuations on the water main. The combined fire flows for the development are also within the available flow rate of the water main, the water main however at the required flow rate does not have adequate pressure to supply the site. Fire tanks, tank suction booster assembly and fire pumps are proposed as part of the development to overcome this pressure shortfall.

It should be noted that these numbers above are for Potable water use only. All non potable water use on site is supplied from the Bore water mains.

No utility water mains upgrades are required for this project.

Assumed Connection Details

UNSW Street Name:	Library Walk
Distance and direction from nearest cross street	105m West of Botany St
Approximate Ground Level (AHD)	52.2 Meters
Nominal Size of Water Main	203mm MDPE Main

Summary Flow Rates with Property Fire Prevention Demands

	Fire Flow (L/sec)	Pressure Head (M)
Fire Hose Reel Installations (Two Fire Hose Reels Simultaneously)	0.66	22.6
Fire Hydrant/ Sprinkler Installations (Pressure & flow expected to be maintained 95% of the time within UNSW water mains)	5 10 20 30 40	21.8 20.8 18.4 15.5 12.3
Maximum Permissible Design Flow ***	50	8.6
Maximum Mains Flow (Brigade)	58	5.4

Figure 3 UNSW Kensington Campus Potable Water Pressure and Flow Statement - Source: UNSW

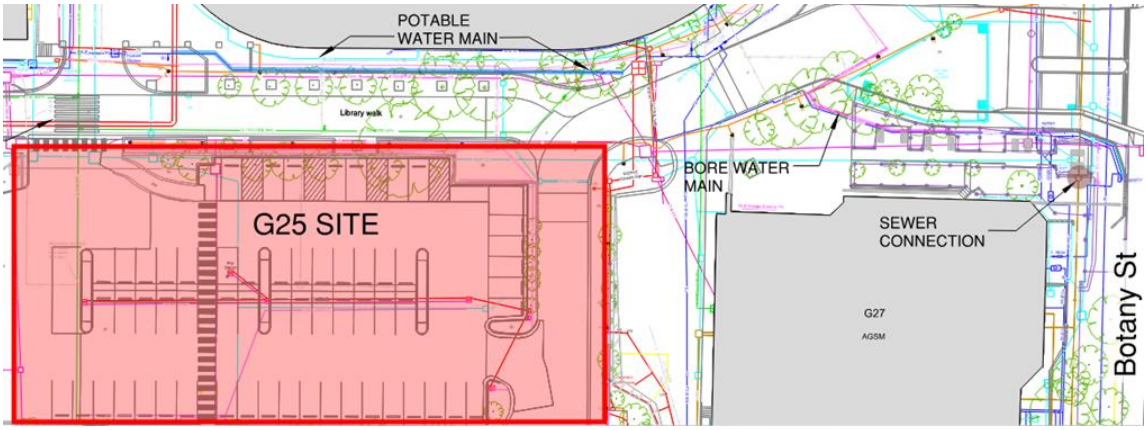

Figure 4 Site Plan Indicating Location of Potable Water Main – Supplied UNSW

3.4 Bore Water

UNSW Private Network

UNSW has two(2) private bore water mains reticulating around the Kensington campus, the bore water supplies all non potable water uses on campus. The bore water is drawn from the Botany Sands Aquifer, stormwater discharge from the campus is used as the recharge of the aquifer in agreement with Randwick Council.

The development has been calculated at a flow rate for bore water of 3.62litres per second during a peak period. UNSW have a provided a modelled pressure and flow statement which indicates that a maximum flow rate of 4L/s per design See figure 5 below. However, UNSW planning proposes additional developments on the campus. To accommodate greater loads, the maximum bore water flowrate for any building has been revised down to 2.0L/second for the preferred bore water main.

A bore water tank is provided to supply all non-potable water uses; we have allowed for a 2L/s inflow from the UNSW bore water main as top up to the storage tank as advised by UNSW planning.

The size of the bore water tank has been calculated for two (2) uses, toilet flushing and cooling tower. Toilet flushing has been calculated using the Green Building Council Australia, Predicted Water Consumption table for office use. The allowances in the table are for an office occupied 100% of the time, we expect that G25 being predominantly teaching spaces will be more transient with occupants bathroom uses, as such for the teaching and student levels we have applied a 33% and 40% weighting to the below numbers. Additionally we have assumed that the building will be occupied 50 / 50 female to male, WC full flush will be 4.5L and urinal flush will be 1L, for the purposes of this calculation all flush is assumed full flush. The calculation for total flushing volume per day first calculates the total flushing per person (adjusted) for male and female. This is calculated as 4.5L x 0.3 + 1 x 2 for male and 4.5 x 2.3 for female, this is then applied to the adjusted population giving us 15,500L / Day.

Cooling Tower make up water has been calculated by mechanical engineers as 1.852L/s peak flow. This flow rate has been allowed for a 12hour operational day for a total of 80kL / day peak flow.

Total for all non-potable water uses is calculated at 95.5kL / Day, an inflow rate of 2L/s can provide 86.4kL over a 12 hour period. This calculation indicates that we require as a minimum 10KL effective volume bore water storage tank to provide the buffer to the make up. Current schematic design includes a 30KL bore water storage tank to allow for peak water usage along with emergency storage for maintenance, main failure and other unforeseen outages. This tank will undergo further analysis as design progresses.

No utility bore water main upgrades are required for this project.

Assumed Connection Details

UNSW Street Name:	Library Walk.
Distance and direction from nearest cross street	55m West of Botany St
Side of Street:	South
Approximate Ground Level (AHD)	52.5 Meters
Nominal Size of Water Main	100mm MDPE Main

Summary Flow Rates with Property Demands

Description	Flow (L/sec)	Pressure Head (M)
Treated Bore Water for non-potable use (Pressure & flow expected to be maintained 95% of the time within UNSW water mains) Maximum Permissible Design Flow ***	2 3 4 4	51.0 50.8 49.1 49.1
Maximum Mains Flow	19	25.0

Figure 5 UNSW Kensington Campus Bore Water Pressure and Flow Statement - Source: UNSW

3.5 Gas

Natural Gas is available on site and has capacity for G25. However UNSW's ESD aspirations include electrification of buildings, G25 being no different the project is aiming for zero gas to the building.

There is however a current Natural gas main running through the site and needs to be relocated prior to construction and excavation. The figure 6 below indicates the proposed relocation strategy. The proposed route has been coordinated with existing services locations and clearances.

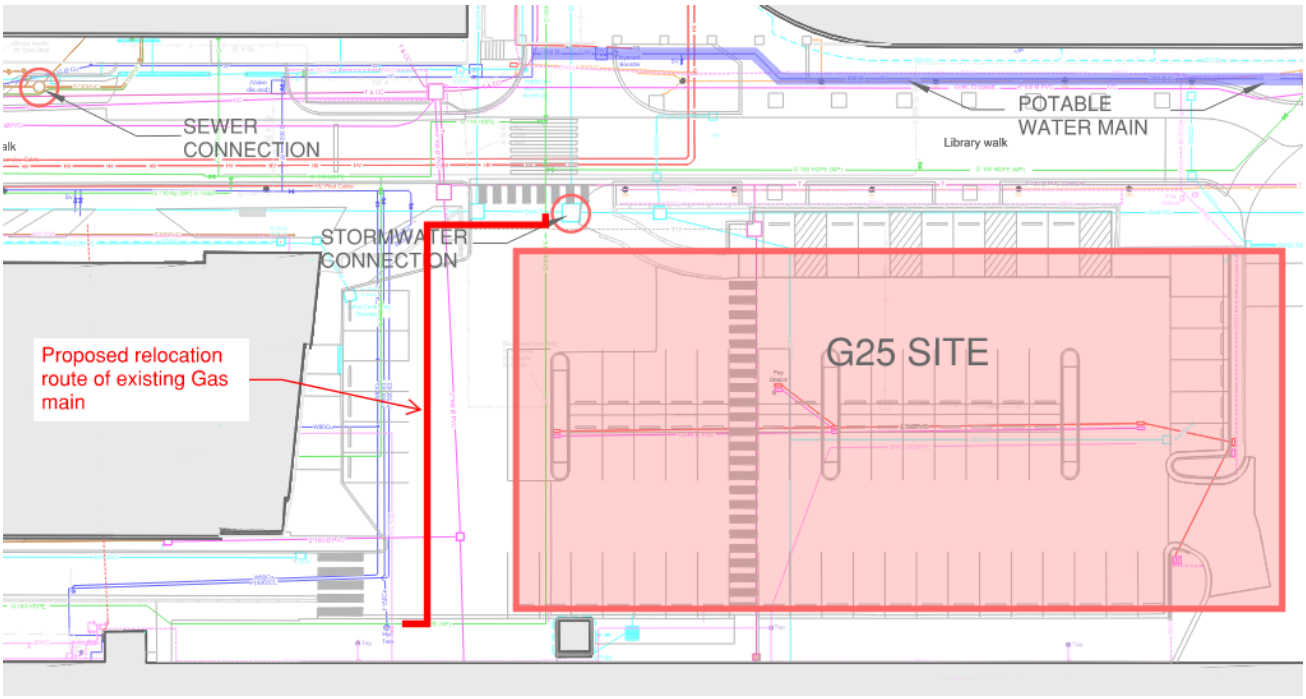

Figure 6 UNSW Kensington Campus Proposed Gas Main Relocation

Consultation History

The following is a summary of the consultation with utilities to date:

Dial Before You Dig (DBYD)

- The DYBD application was lodged on the 11th of September 2024.
- DYBD to be renewed prior to construction.

Potable Water

- UNSW principle Hydraulic engineer Russell Druce, part of the Estate Management Team carried out and provided pressure and flow information from the available mains. This information was provided on 8th October 2024.

Bore Water

- UNSW principle Hydraulic engineer Russell Druce, part of the Estate Management Team carried out and provided pressure and flow information from the available mains. This information was provided on 8th October 2024.

Sewer

- Online meeting with UNSW principle Hydraulic engineer Russell Druce, part of the Estate Management Team and LCI's Mitchell McLennan to discuss Sewer main capacities, proposed routes of connection. 27th September 2024.

4 Methodology

Utilising survey information from both Dial Before You Dig (DBYD) and authority database (UNSW) an initial assessment on the existing services was made to find out which stakeholders may be affected during the development of G25 project, are outlined in this report. These were outlined in section 2 of this report.

5 Mitigation Measures

No mitigation measures have been identified or required at this stage.

6 Conclusion

Based on the preliminary information available at the SSDA stage, there is existing hydraulic services in the vicinity of the site. Further consultation will be required with University of NSW during the next stage of the development to ensure the relevant assets are maintained and available flows are reported.

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