

Upgrade to Cammeray Public School

Hydraulic & Fire Engineering Services

Prepared for: NSW Department of Education (DoE)

ACOR Project no.: NA232021

Document no.: ACOR-RPT-001

Revision no: E



Disclaimer

This Report has been prepared in accordance with the scope of services described in the contract or agreement between ACOR Consultants Pty Ltd and the Client. The Report relies upon data, surveys, measurements and results taken at or under the particular terms and conditions specified herein. Changes to circumstances or facts after certain information or material has been submitted may impact on the accuracy, completeness or currency of the information or material. This Report has been prepared solely for use by the Client, ACOR Consultants Pty Ltd accepts no responsibility for its use by other parties without the specific authorisation of ACOR Consultants Pty Ltd. ACOR Consultants Pty Ltd reserves the right to alter, amend, discontinue, vary or otherwise change any information, material or service at any time without subsequent notification. All access to, or use of, the information or material is at the user's risk and ACOR Consultants Pty Ltd accepts no responsibility for the results of any actions taken on the basis of information or material provided, nor for its accuracy, completeness or currency. Any reference to "Report" where used in this Disclaimer is also a reference to any plan, table, data or other document that has been created for the purposes of the "Report" and referred to in the "Report"

Revision

Revisions	Date	Purpose	Prepared by	Approved by
A	8/10/2024	Concept Design - Draft	BdK/MV	RE
B	05/11/2024	Concept Design - Final	RE	RE
C	19.12.2024	100% Schematic Design	RE	MS
D	19.02.2025	Issued for Tender	RE	MS
E	05.03.2025	Issued for Tender (updated Pre-Amble)	RE	MS

It is the responsibility of the reader to verify the currency of the version number of this report.

Unless otherwise advised, the parties who have undertaken the Review and Endorsement confirm that the information contained in this document adequately describes the conditions for the Group 2 school packages.

Table of Contents

1	Executive summary	3
2	Introduction and Purpose	3
	2.1 Hydraulic and Fire Services Principles/Systems.....	3
3	Project Description.....	4
4	Existing Utility Asset Infrastructure	4
	4.1 Sewer Drainage	4
	4.2 Drinking Water Services	4
	4.3 Natural Gas	5
5	Existing Site Infrastructure	5
	5.1 Sewer Drainage	5
	5.2 Domestic Water Services	6
	5.3 Natural Gas	6
	5.4 Fire Hydrant	6
6	Overarching Hydraulic Services and Fire Protection Services Design Principles	7
	6.1 Design Standards and Criteria	7
	6.2 Systems Description.....	7
	6.3 System Materials	8
	6.4 Environmentally Sustainable Design Initiatives.....	8
	6.5 Safety in Design.....	9
7	Project Specific Challenges	9

Appendices

Appendix A - Water Pressure and Flow Advice – Test Locations	10
Appendix B - Onsite Fire Hydrant Flow testing.....	11
Appendix C - Hydraulic & Fire Services Concept Layouts – Site Infrastructure	12

COPYRIGHT

This document and its contents are intended for NSW Schools Infrastructure only and contain opinions held by the author based on material available at the time.

No part of this document (where "document" includes any plan, specification, detail, report or other document created by ACOR Consultants Pty Ltd or any of its related or associated entities) may be reproduced, adapted, transmitted or stored in a retrieval system in any form or by any means without written permission unless otherwise permitted under the Copyright Act, 1968. Enquiries should be addressed to ACOR Consultants Pty Limited.

© ACOR Consultants Pty Limited

All intellectual property and copyright reserved.

1 Executive summary

ACOR Consultants Pty Ltd, in the capacity of the project Hydraulic and Fire Services engineering consultants is currently reviewing and analysing the environmental and functional requirements as well as the performance standards to be met by the hydraulic & fire services.

This Report has been prepared to set the basis for staged planning and delivery phases of the hydraulic and fire protection requirements for the upgrade to Cammeray Public School.

The list below captures some key elements of the design progression thus far:

- The design team has attended the school to sight the proposed location of the new building to gain a familiarisation of the scope
 - All site attendances were carried out in the second half of July 2024
- Applications have been lodged to the respective local authorities for:
 - Water supply performance (pressure and flow) characteristics
 - Existing sewer services diagrams
 - Record plans of internal site infrastructure as lodged by the licensed installing plumbing contractor
- Embellishment of the Aust Standards and the EFSGs being considered to address project climate change

2 Introduction and Purpose

ACOR Consultants have been engaged by NSW Department of Education (our client) as the Hydraulic & Fire Services engineering consultant on the Cammeray Public School. Schematic design was endorsed midway through November 2024.

The purpose of this report is and will:

- Outline the proposed design of the hydraulic and fire services site infrastructure for the new building works
- Confirm adequacy of Authority and existing site infrastructure for the proposed building works
- Ensure compliance with EFSG, local supply authority requirements, statutory building codes and industry education facility best practise

This report has been prepared to discuss the Hydraulic & Fire Services works and establishes design principles for the preferred development option and is based on:

- Architectural drawings prepared by Fulton Trotter Architects
- EFSG guidelines
- Design team meetings
- Site attendance by Burt de Keyzer
 - July 2024
- Technical Stakeholder Group Session #1 – 31st Oct 2024
- Technical Stakeholder Group Session #2 – 11th Dec 2024
- Safety in Design Workshops
- Value Engineering workshop
- Sustainability Workshop

2.1 Hydraulic and Fire Services Principles/Systems

The proposed Hydraulic Services systems for the project is as follows:

- Sanitary plumbing and drainage systems
- Domestic potable cold-water supply
- Domestic recycled water supply for flushing and irrigation
- Domestic hot and warm water supplies
- Roof water collection and disposal to civil trunk stormwater systems
- Fire hydrant protection
- Fire hose reel protection
- Portable fire extinguishers and blankets

It is important to note that specifically for the new permanent buildings, our scope is limited to providing supplies to the battery limit of the building site.

3 Project Description

The proposed activity involves upgrades to the existing CPS, including the following:

- Construction of 4 new permanent teaching spaces in a two-storey building incorporating 2 general learning spaces and 2 practical activity areas
- New egress lift and stairs for access to all building levels
- External covered walkways connecting the new building to the existing school network
- Landscaping and external works including compensatory planting
- Upgrades to site infrastructure and services to support the new buildings
- Removal of 3 temporary (demountable) classrooms from the eastern side of the school
- 50 bicycle parking spaces

The intent of the activity is to provide 4 permanent teaching spaces (PTS) plus 2 practical activity areas (PAA) across a two-storey addition, adjoining Building E. This will result in CPS retaining the capacity of a 'large' school (553-1,000 students) under EFSG (SINSW Education Facilities Standards and Guidelines).

The new facilities will be constructed using a combination of conventional and modern construction methods, ensuring the designs follow the latest DoE standards.

4 Existing Utility Asset Infrastructure

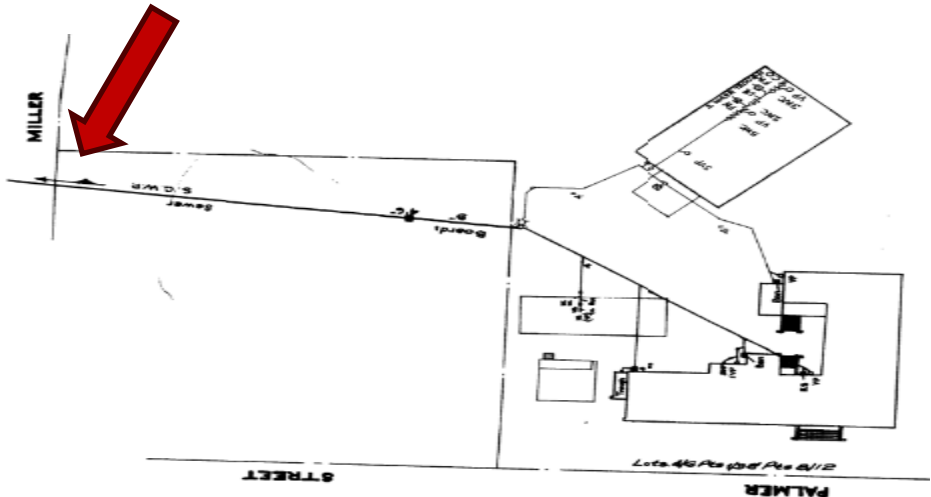
Applications have been made to the respective authorities. These applications have been summarised below:

4.1 Sewer Drainage

The authority sewer location and capacity are tabled below:

School	Location	Capacity / Commentary
Cammeray Public School	There are several sewer connections on the site. The sewer connection most relevant to the proposed building is in Miller Street and is shown below	The capacity is deemed as sufficient to service the proposed building

Authority Sewer Main:



4.2 Drinking Water Services

The authority drinking water services location and capacity are tabled below:

School	Location	Capacity / Commentary
Cammeray Public School	The site is serviced by a DN200mm main located in Bellevue Street.	The capacity is deemed as sufficient to service the proposed building

Water Supply Authority Main:



4.3 Natural Gas

Existing authority natural gas systems have not been analysed as the building and scope is to mandate electrified buildings to meet sustainability targets.

Gas meter:

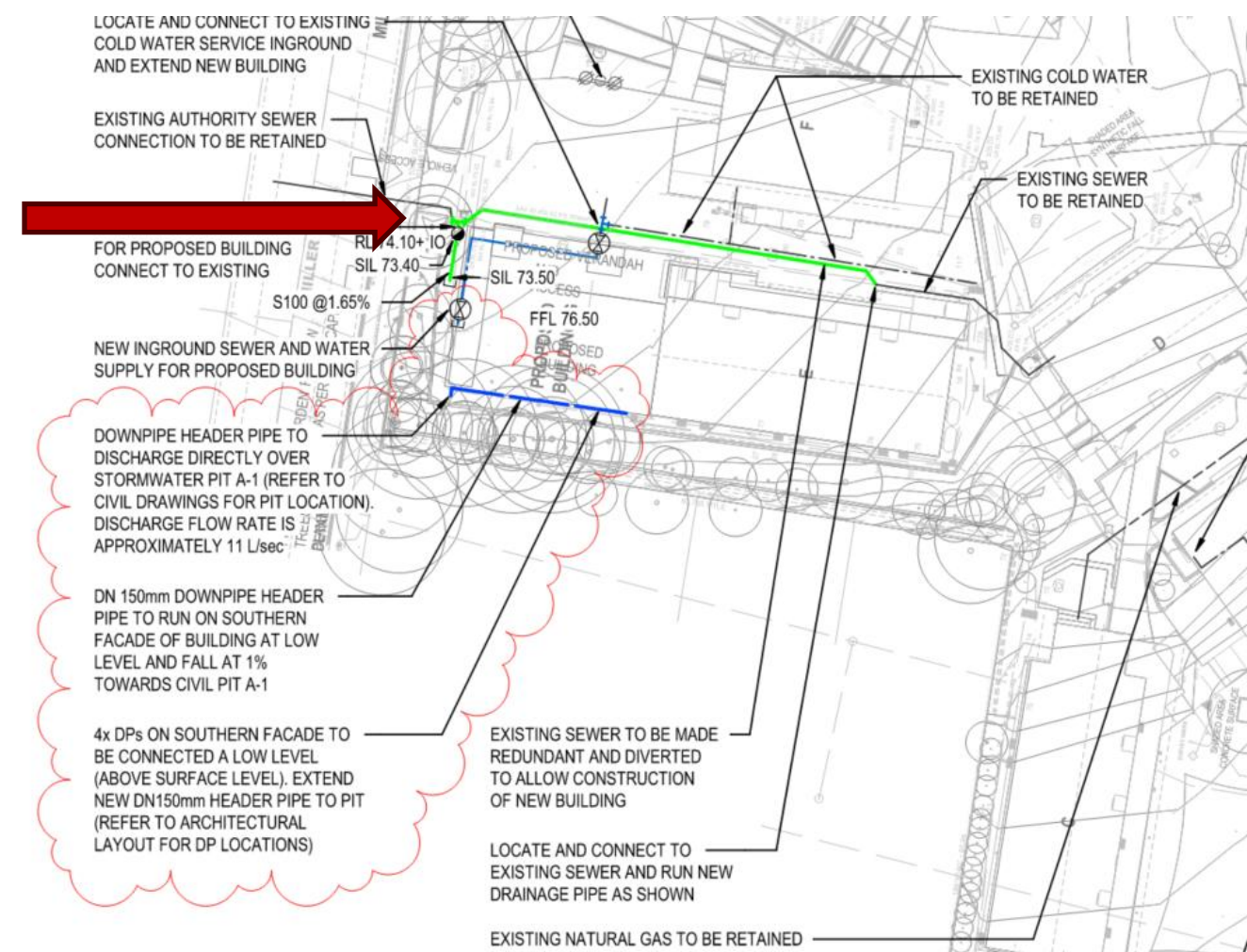


5 Existing Site Infrastructure

5.1 Sewer Drainage

School	Location	Capacity / Commentary
Cammeray Public School	The sewer service is traversing the northern side of the proposed building footprint.	The capacity is deemed as sufficient to service the proposed building. The location whilst close to the proposed building has viability to remain in-situ.

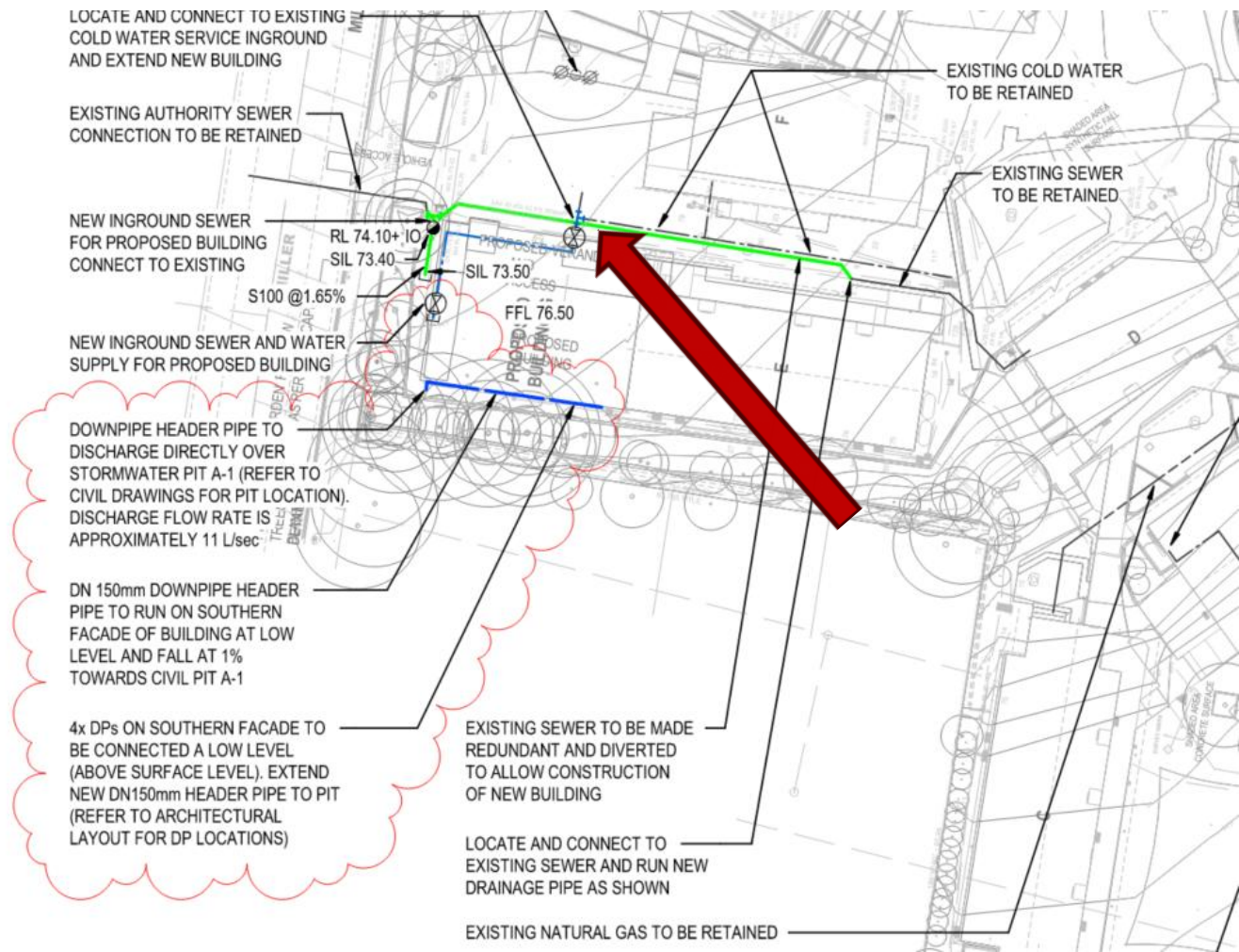
Existing site sewer mains and new connection



5.2 Domestic Water Services

School	Location	Capacity / Commentary
Cammeray Public School	The water service is traversing along the northern side then turns under of the proposed building footprint.	The capacity is deemed as sufficient to service the proposed building. The existing water service under the building footprint will be demolished.

Water Service:



5.3 Natural Gas

School	Location	Capacity / Commentary
Cammeray Public School	None in the vicinity of the proposed building	Gas is not required

5.4 Fire Hydrant

School	Location	Capacity / Commentary
Cammeray Public School	The fire hydrant booster valve is located on Bellevue Street boundary. The existing system is reticulated to an external fire hydrant standpipe located approx. 25 m north of the proposed building.	1. Onsite fire flow tests were carried out in December with results deeming the existing system to be compliant 2. The existing external fire hydrant offers full coverage

Existing Fire Hydrant Booster:



Existing External Fire hydrant (near Block E):



Existing External Fire hydrant (west of Block F):



Fire Brigade Hydrant Block Plan:



6 Overarching Hydraulic Services and Fire Protection Services Design Principles

6.1 Design Standards and Criteria

6.1.1 Design Standards

Hydraulic and fire protection services will comply with all current statutory requirements and guidelines of the relevant Authorities including (but not limited to) the following:

- National Construction Code of Australia (NCC) 2022
- AS 2419.1:2021 - Fire hydrant installations System design, installation, and commissioning
- AS 2441:2005 - Installation of fire hose reels (non-student areas only)
- AS 3500:2021 (All Parts) Plumbing and drainage
- AS 1670.1:2017 – Fire detection, warning, control and intercom systems. Part 1 – Fire
- AS 2444:2001 – Portable fire extinguishers and fire blankets.
- EFSG (V2) and the Pattern Book

6.2 Systems Description

6.2.1 Sanitary Drainage System

The proposed sanitary drainage system will be designed in accordance with AS3500.2 and NCC Volume 1 and 3.

Generally, all new in-ground drainage shall be constructed of 'Environment Best Practice' uPVC and extended from existing siter sewer infrastructure up to the proposed building footprint. The site sewer will be provisioned with access point (inspection openings) and will navigate the terrain and be deconflicted with existing services where / if they come across each other.

The system shall be designed to:

- Prevent blockages
- Provide accessibility into the system for maintenance in a way that does not place service persons at risk
- Prevent damage to the system from external factors, such as tree root infestation, ingress of stormwater and other foreign matter
- Provide a whole of life option in accordance with EFSG
- 20L/day sewer discharge per student
- 25L/day sewer discharge per staff

6.2.2 Roof Drainage and Roof Water Reuse

All stormwater drainage systems will be designed to comply with the requirements of AS3500.3.

Downpipe sizing will be documented within the hydraulic package and will generally be installed on grid lines.

All other downpipes will terminate above ground level in accordance with the EFSG, and discharge into the site's civil drainage system. Then southern façade DPs are to be routed aerially, above the ground at low level to avoid any excavation.

Refer to the Civil Engineer for details on the in-ground water collection system.

The system shall be designed to:

- Discharge roof drainage to the civil stormwater network or RWTs
- Compliment the sustainability targets
- Prevent blockages
- Provide accessibility into the system for maintenance in a way that does not place service persons at risk
- Prevent damage to the system from external factors, such as tree root infestation, ingress of stormwater and other foreign matter
- Provide a whole of life option in accordance with EFSG

6.2.3 Trade Waste Plumbing and Drainage

There is no trade waste for this project.

6.2.4 Domestic Potable Water Services

Domestic cold-water services will be designed in accordance with AS3500.1 and NCC Volume 3 Plumbing and Drainage Code.

An existing water supply meter is located on the site boundary. In addition to the authority supply meter, a subsidiary meter will be provided throughout the buildings to record water usage and enclosed as to prevent unwarranted tampering / vandalism.

The system shall be designed to:

- The water supply will be distributed to achieve:
 - 250 kPa (dynamic pressure) at the most disadvantaged outlet
 - 1.5m/s velocity through the pipes
- Provide backflow protection as required by the local authority
- Provide potable water to all fixtures in a way that does not cause nuisance to the occupants
- Provide accessibility to the system in a way that does not place service persons at risk
- Provide methods of disconnection in the event of damage to the system
- 25L/day water consumption per student
- 30L/day water consumption per staff
- Recycled water shall be limited to toilet flushing irrigation

6.2.5 Natural Gas Services

Natural gas supply is not being provided to the proposed building as there are no requirements for reticulation. Space heating and domestic water heating will be electrically energised. This also aids in reducing the Greenhouse gas emissions.

6.2.6 Fire Hydrants

The design of the fire hydrant system will be in accordance with the requirements of AS 2419.1 and of the National Construction Code of Australia Volume 1 and local brigade requirements.

External fire hydrants will provide 70m coverage and are to be installed >10m away from the building.

The system shall be designed to:

- Provide water to all on site firefighting equipment at a compliant pressure and flow rate
- Provide accessibility to the system in a way that does not place service persons at risk
- Fire hydrants located to prevent unnecessary risk / injury to staff and pupils
- Provide methods of disconnection in the event of damage to the system

6.2.7 Fire Hose Reels

Fire hose reels are not required in primary school classrooms and associated corridors. On this basis, fire hose reels are not proposed.

6.2.8 Automatic Fire Sprinkler Protection

A fully automatic fire sprinkler system is not required and therefore not proposed at this stage. Should the project move toward a timber-based construction, the requirement for a sprinkler system will be triggered.

6.2.9 Dry Fire Detection and Alarms

Requirement of fire services are assessed based on Class 9b school building, rise in storeys of 3 and conventional construction.

Fire detection system – Not required (Class 9b building not more than 3 rise in storeys).

EWIS – Not required (Class 9b building not more than 3 rise in storeys).

Due to the ducted air handling system and for smoke hazard management, dry fire detection and alarms are required throughout. The system shall be networked with the adjoining, existing building E.

6.3 System Materials

Materials used for construction of hydraulic and fire protection services have been selected based on current industry best practice, whole of life cost, ease of installation, ease of disassembly, ease of reassembly, durability, ease of maintenance. Generally, the materials proposed for hydraulic service piping shall be as follows. Other material selection options will be per AS3500 and EFSG requirements:

Sanitary Systems	PVC-U DWV
Domestic Cold Water	Copper type B for main installations.
Domestic Hot Water	Copper Type B (Thermally insulated).
Fire Hydrant (Above Ground)	Galvanised Mild Steel with Roll Groove joints
Fire Hydrant (Below Ground)	PE100 SDR11 PN16

6.4 Environmentally Sustainable Design Initiatives

The following ESD measures considered for the development:

- Use of recycled (rainwater) water for landscape irrigation and flushing
- Additional metering of water supplies
- Electrification (no natural gas) to the proposed development
- Efficient and economical layout of pipework routes

The following ESD measures should be considered for the development:

- Increased thickness of thermal insulation on all hot water supplies
- Use of recyclable materials
- Minimizing ground excavation

6.5 Safety in Design

The following are safety in design risks that have initially been identified. These will need to be further assessed and addressed during progression of design:

- Location to the existing water and sewer services adjacent to the proposed development and excavating trenches during school hours

7 Project Specific Challenges

The following list is identifying the unique challenges that will be addressed by the project team as the project continues to evolve:

- Conjoined buildings (Block E) to the proposed building and ensuring continuity of services during the construction

Appendix A - Water Pressure and Flow Advice – Test Locations

Statement of Available Pressure and Flow



Katie Adamson
33 Herbert Street
St Leonards, 2065

Attention: Katie Adamson

Date: 26/07/2024

Pressure & Flow Application Number: 1928387
Your Pressure Inquiry Dated: 2024-07-12
Property Address: Palmer Street, Cammeray 2062

The expected maximum and minimum pressures available in the water main given below relate to modelled existing demand conditions, either with or without extra flows for emergency fire fighting, and are not to be construed as availability for normal domestic supply for any proposed development.

ASSUMED CONNECTION DETAILS

Street Name: Bellevue Street	Side of Street: East
Distance & Direction from Nearest Cross Street	67 metres North from Palmer Street
Approximate Ground Level (AHD):	86 metres
Nominal Size of Water Main (DN):	100 mm

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	44 metre head
Minimum Pressure	31 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	31
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	10	30
	15	25
	20	18
	25	10
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	10	27
	15	21
	20	14
Maximum Permissible Flow	25	5

(Please refer to reverse side for Notes)

For any further inquiries regarding this application please email :

hydraulicassessment@sydneywater.com.au

Sydney Water Corporation ABN 49 776 225 038
1 Smith St Parramatta 2150 | PO Box 399 Parramatta 2124 | DX 14 Sydney | T 13 20 92 | www.sydneywater.com.au
Delivering essential and sustainable water services for the benefit of the community

Statement of Available Pressure and Flow



Katie Adamson
33 Herbert Street
St Leonards, 2065

Attention: Katie Adamson

Date: 30/08/2024

Pressure & Flow Application Number: 1960611
Your Pressure Inquiry Dated: 2024-08-23
Property Address: Palmer Street, Cammeray 2062

The expected maximum and minimum pressures available in the water main given below relate to modelled existing demand conditions, either with or without extra flows for emergency fire fighting, and are not to be construed as availability for normal domestic supply for any proposed development.

ASSUMED CONNECTION DETAILS

Street Name: Bellevue Street	Side of Street: West
Distance & Direction from Nearest Cross Street	45 metres North from Palmer Street
Approximate Ground Level (AHD):	87 metres
Nominal Size of Water Main (DN):	200 mm (As per diagram provided)

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	43 metre head
Minimum Pressure	31 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	31
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	10	34
	15	34
	20	34
	25	34
	30	33
	40	33
	50	33
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	60	32
	10	30
	15	30
	20	30
	25	30
	30	30
	40	29
Maximum Permissible Flow	50	29
	60	28
	118	24

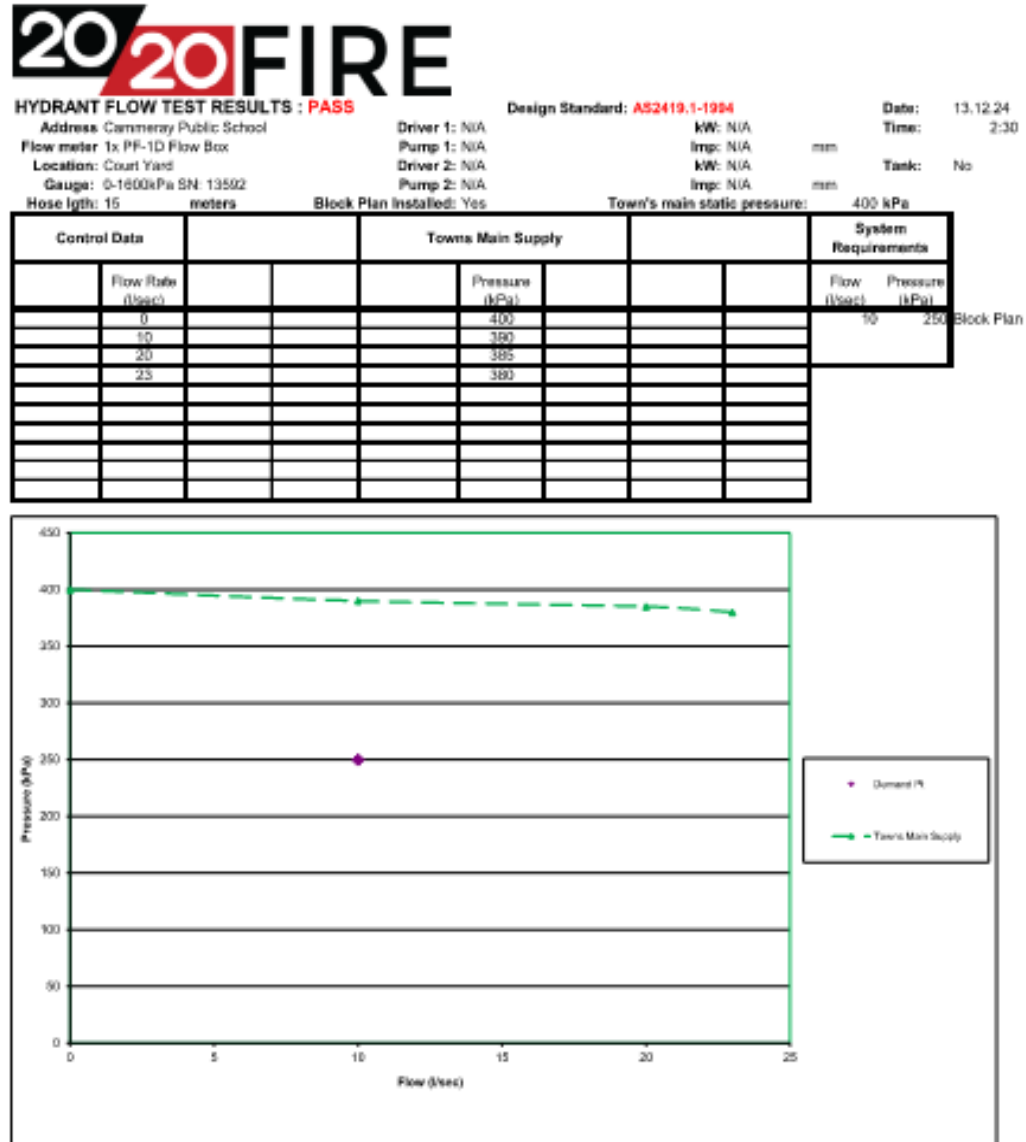
(Please refer to reverse side for Notes)

For any further inquiries regarding this application please email :

hydraulicassessment@sydneywater.com.au

Sydney Water Corporation ABN 49 776 225 038
1 Smith St Parramatta 2150 | PO Box 399 Parramatta 2124 | DX 14 Sydney | T 13 20 92 | www.sydneywater.com.au
Delivering essential and sustainable water services for the benefit of the community

Appendix B - Onsite Fire Hydrant Flow testing



Hydrant Standard: A52419.1-1994

RESULT: **PASS**

- 1) Flow test conducted from the nearest near hydrant located on the property. Behind Block F. Please note that this hydrant was the most favourable hydrant on the hydrant system. Client specifically requested flow test to be conducted from this hydrant.
11.5m Head difference between the most favourable and unfavourable hydrant locations.
13m Head difference between the most favourable hydrant and the booster.
- 2) Pressure readings taken from the most unfavourable hydrant located adjacent booster. However, 11.5m head loss has been taken off to reflect pressure as the desired near hydrant.
- 3) Client requested a hydrostatic test be conducted on the hydrant system.
Hydrostatic conducted in accordance with AS2419.1-1994 Part 1.4.17 which is 1700kPa.

Appendix C - Hydraulic & Fire Services Concept Layouts – Site Infrastructure

DRAWING LIST	
DRAWING No.	DRAWING NAME
CPS-ACOR-00-00-DR-H-0000	COVER SHEET
CPS-ACOR-00-00-DR-H-0001	LEGEND & GENERAL NOTES
CPS-ACOR-00-00-DR-H-1100	EXISTING SITE PLAN & DEMOLITION
CPS-ACOR-00-00-DR-H-1200	PROPOSED SITE PLAN
CPS-ACOR-00-00-DR-H-9000	DETAIL SHEET