

Pendle Hill High School

Services Infrastructure Report Schools Infrastructure NSW

Reference: 507914

Revision: 4

30 April 2021

Document control record

Document prepared by:

Aurecon Australasia Pty Ltd

ABN 54 005 139 873

Level 5, 116 Military Road

Neutral Bay NSW 2089

PO Box 538

Neutral Bay NSW 2089

Australia

T +61 2 9465 5599

F +61 2 9465 5598

E sydney@aurecongroup.com

W aurecongroup.com

A person using Aurecon documents or data accepts the risk of:

- a) Using the documents or data in electronic form without requesting and checking them for accuracy against the original hard copy version.
- b) Using the documents or data for any purpose not agreed to in writing by Aurecon.

Document control						aurecon
Report title		Services Infrastructure Report				
Document ID		507914-0001-REP-JJ-0005	Project number		507914	
File path		Https://aurecongroup.sharepoint.com/sites/507914/5 Deliver Design/01 - Pendle Hill HS/501 Engineering/Reports/06 - SSD Report/507914-0001-REP-JJ-0005 Pendle Hill HS Infrastructure Report[4].docx				
Client		Schools Infrastructure NSW				
Client contact		Katy Johnson	Client reference		SINSW00107/19	
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver
1	15 March 2021	Issue for review	JL	PD		PD
2	24 March 2021	Final	JL	PD		PD
3	31 March 2021	Incorporate review comments	JL	PD		PD
4	30 April 2021	Incorporate illuminated sign requirements	JL	PD		PD
Current revision		4				

Approval			
Author signature		Approver signature	
Name	Jason Lee	Name	Phuc Do
Title	Electrical Engineer	Title	Associate

Contents

1	Introduction	1
1.1	Introduction	1
1.2	Project Overview	1
1.3	Scope	2
2	Potable Water	4
2.1	Authority	4
2.2	Performance requirements	5
2.3	Supply Utility Interaction	5
3	Sewer	7
3.1	Authority	7
3.2	Demand Assessment	8
3.3	Stormwater drainage	8
3.4	Utility Interaction	9
4	Natural Gas	10
4.1	Authority	10
4.2	Demand Assessment	10
5	Electrical	11
5.1	Authority	11
5.2	Demand Assessment	13
5.3	Utility Interaction	13
5.4	Initial Design Assessment	13
5.5	Illuminated Sign	13
6	Telecommunications	14
6.1	Authority	14
6.2	Existing Infrastructure	14
6.3	Utility Interaction	15
6.4	Initial Design Assessment	15
7	Fire Protection Services	17
7.1	Authority	17
7.2	Existing Infrastructure	18
7.3	Utility Interaction	19
7.4	Initial Design Assessment	20
8	Next steps	21

1 Introduction

1.1 Introduction

The Department of Education (DoE) and SINSW is proposing to redevelop Pendle Hill High school, to increase student capacity for up to 1,360 students, in addition to an overall improvement of the site layout, infrastructure and street presence.

Aurecon has been engaged by SINSW to undertake an assessment of the existing utilities infrastructure surrounding Pendle Hill High School and adjacent areas. This report will inform the design and assessment of the infrastructure elements influenced by the construction of a new three-storey school building 'Building H', as required by Section 14 in the Planning Secretary's Environmental Assessment Requirements (SEARs) SSD-9579147, issued 26 October 2020.

1.2 Project Overview

Pendle Hill High School is located in Toongabbie, approximately 30 kilometres west of the Sydney central business district. The site fronts Binalong Road (East), Knox Street (South) and Cornock Avenue to the west of the school.

The proposed school upgrades consists of;

- Construction of a new three-storey courtyard building on Binalong Road comprising two (2) three-storey wings under a connected roof which will accommodate a library, staff unit, lecture theatre, multimedia and senior learning spaces, administration unit and student amenities;
- External transport infrastructure upgrade works;
- New covered walkways and upgraded landscaping; and
- New hard stand areas for bicycle parking.

The building design shall adhere to the Educational Facilities Standard & Guidelines (EFSG) for new buildings.

Building H is also targeting Environmental Sustainable Design (ESD) measures with the objective to achieve 5 Star Green Star rating.





Figure 1: Site plan of existing Pendle Hill HS layout indicating proposed Building H

1.3 Scope

The proposed new school building consists of 3-storeys. The overall demand on existing utility services infrastructure will grow. As a result, the site will require upgrades to impacted authority connections.

In response, this report aims to provide the following items to inform the strategy for servicing the proposed development:

- A summary of how the existing school is serviced:
 - Identification of any adverse effects on the supplies to the existing school which may be caused by the new building.
 - A summary of existing infrastructure services in the vicinity of the site.
 - A preliminary assessment of existing and proposed demand for each utility service.
 - An assessment of the indicative capacity of utility infrastructure currently servicing the site.
 - Potential external services infrastructure layouts to cater for the proposed development.

This report focuses on the following utility services infrastructure:

- Potable water infrastructure (Water)
- Wastewater infrastructure (Sewer)
- Natural gas infrastructure (Gas) and
- Electrical infrastructure (Elec)
- Data and telecommunications infrastructure (Telco)
- Fire Protection Services

Stormwater drainage and flood management infrastructure is described in a separate Stormwater Management Plan (SMP) and is not considered in this report.

Please note that the utility infrastructure information provided in this report is detailed on record drawings provided by utility authorities through DBYD and technical enquiries made by Aurecon and existing visual non-intrusive services surveys.

Assumptions included within this report, including existing site conditions, existing and proposed infrastructure capacity, and existing and proposed demand will need to be confirmed prior to detailed design and further consultation with the utility authorities.

2 Potable Water

2.1 Authority

The existing Sydney Water infrastructure has been identified based on Dial Before You Dig (DBYD) records. These records indicate the presence of a Sydney Water asset in the vicinity of the existing high school.

The school site has the following water mains:

- DN180 PE Sydney Water along Binalong Road;
- DN100 CICAL Sydney Water along Cornock avenue; and
- An existing incoming 50mm water supply with a smart water meter that serves the entire site (located off the Binalong road water main).

The existing incoming 50mm water supply along Binalong Rd is required to be upgraded to 65mm to provide sufficient capacity to service the proposed development according to the pressure and flow results from Sydney Water. The water main located in Cornock avenue currently supplies the Hall and will remain as is.

Final determination of any upgrade works required will be subject to Sydney Water assessment and approval under a Section 73 Application. It is not however anticipated that any water mains upgrade will be required.

Please note that fire services demands have not been included in the above assessment - Refer to Fire Protection section of this report for further detail.



Figure 2: Sydney Water Sewer and Water Diagram (Water connection point)

2.2 Performance requirements

All water systems will be designed in accordance with legislation and standards, with the following noted performance requirements:

- Working velocities in pipes shall be limited to a maximum of 1.8 m/s
- Maximum operational pressure 500 kPa
- Minimum operational pressure 200 kPa
- The following maximum flow rates shall be provided to fixtures:
 - WC cistern 3.5 l/min (4.5 / 3 litre dual flush)
 - Basins 4.5 l/min
 - Sinks 7.5 l/min
 - Hose taps 12.0 l/min
 - Showers 7.5 l/min
- Water sub-metering
 - Water sub-metering will be provided for each of the main buildings and irrigation to facilitate individual monitoring of water use

2.3 Supply Utility Interaction

A pressure flow enquiry response has been received on 14/11/2019 for the proposed main connection location on Cornock Avenue as shown below.

Statement of Available Pressure and Flow



Anthony Figueroa
116 Military Road
Neutral Bay, 2089

Attention: Anthony Figueroa

Date: 10/01/2020

Pressure & Flow Application Number: 764899

Your Pressure Inquiry Dated: 2019-11-14

Property Address: Knox Street, Pendle Hill 2145

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: Binalong Road	Side of Street: West
Distance & Direction from Nearest Cross Street	170 metres South from Bora Place
Approximate Ground Level (AHD):	59 metres
Nominal Size of Water Main (DN):	180 mm

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	57 metre head
Minimum Pressure	42 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	42
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5	46
	10	45
	15	44
	25	42
	30	40
	40	37
	50	33
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	60	28
	5	41
	10	41
	15	39
	25	37
	30	35
	40	31
Maximum Permissible Flow	50	27
	60	22
	67	18

Figure 3: Sydney Water Pressure and Flow Statement (Binalong Road)

3 Sewer

3.1 Authority

An assessment has been made on the existing sewer supply, with the intent to investigate the likely requirements for Sewer supply to service the proposed Pendle Hill High School upgrade.

Aurecon has performed non-invasive investigations with regards to the existing site conditions and additional loading from the proposed building onto the existing utility infrastructure available for connection to the site.

Our assessment has been based on information provided by the Dial Before You Dig (DBYD) drawings.

The development has access to the following Sydney Water sewer mains:

- 150mm VC Sydney Water Sewer Main located to the rear of properties located on Cornock avenue
- 150mm VC Sydney Water Sewer Main in Binalong road.

Currently there are two connection points to Sydney Water sewer main from the property. The main connection is a 150mm connection discharging into the sewer located in Binalong road. The second connection discharges into the sewer located adjacent to Cornock avenue. This connection is also a 150mm sewer.



Figure 4: Sydney Water Sewer and Water Diagram (Sewer connection)

3.2 Demand Assessment

According to the below table from the Sewerage Code of Australia - Sydney Water Edition, WSA-02-2002, the existing sewer mains in close proximity to the site meet the minimum size limitations to cater for the site. The existing catchment area and current EP loading on these sewer mains however is currently unknown. It is possible that these mains are currently at peak capacity and are unable to cater for additional loading without an increase in pipe size.

Final determination of any upgrade works required will be subject to Sydney Water assessment and approval under a Section 73 Application. It is not anticipated that any sewer mains upgrade will however be required.

Table 1: Sewage EP Capacity Limitation

Pipe Size (DN)	Maximum Allowable EP
<u>150</u>	<u>600</u>
225	1,600
300	3,200

Sydney Water design for an Ø 150 sewer main accounts for a maximum estimated population of 600 which equals to a maximum of 3000 students (based on 0.2 EP / student). It is not anticipated that any sewer mains upgrade will be required.

3.3 Stormwater drainage

A stormwater system will be provided to the new building via a conventional drainage system. The system will receive flows from all roofs, terraces and landscape areas within the building footprint and discharge via pit to the site stormwater system. Syphonic drainage systems are not proposed due to additional cost.

Surrounding site flows will be captured by the site wide stormwater system captured within the civil scope.

3.3.1 Performance requirements

Rainwater systems shall be designed to the intensity as outlined in Australian Rainfall and Runoff and AS/NZS 3500.3:

Table 2: AS/NZS 3500.3 Design Condition

System	AS/NZS 3500.3 Design Condition
Primary – minor	20 year, 5 min intensity
Overflow and overland flow	100 year, 5 min intensity
Box gutters	100 year, 5 min intensity
Eaves gutters	20 year, 5 min intensity
All confined areas	100 year, 5 min intensity
All open areas	20 year, 5 min intensity

3.3.2 Rainwater Reuse Tank

As the school is located in the City of Parramatta Council Region rainwater tanks are required with a minimum storage size of 10kL as site area is greater than 1,500 m². All rainwater reuse systems must

have a first flush diversion device fitted and screening to prevent mosquito breeding and entry of animals/foreign matter. In addition, all rainwater tanks must comply with Sydney Water requirements.

It is Department of Education (DoE) policy to include roof water harvesting and tank storage in new schools as noted within DoE DG 53 Water. All rainwater tanks must adhere to all legislation and local council requirements including DoE design guidelines.

The concept rainwater tank is proposed above ground adjacent the Southern Facade to facilitate easy maintenance and installation. There is the option for the rainwater tank to be installed as part of the onsite detention (OSD) system below ground. This option and subsequent final size and location can be explored in the next design phase of the project.

It is recommended by DoE that the final sizing and reticulation of the rainwater reuse system is confirmed by a whole of life (WoL) analysis. This will ensure that the most cost effective solution is selected.

3.3.3 Tradewaste

No tradewaste requirements exist for the development.

3.4 Utility Interaction

Section 73 Application will be submitted to Sydney Water by the D&C builder before construction phase.

4 Natural Gas

4.1 Authority

The development has the following Jemena mains:

- 32mm secondary 210kPa gas main located within Cornock avenue
- 75mm Nylon 210kPa natural gas main located within Binalong road

The existing Jemena natural gas mains located within Cornock avenue and appears to have sufficient capacity to service the proposed development if natural gas supply will be required. A gas application with Jemena will be required to be lodged once development application consent is granted.

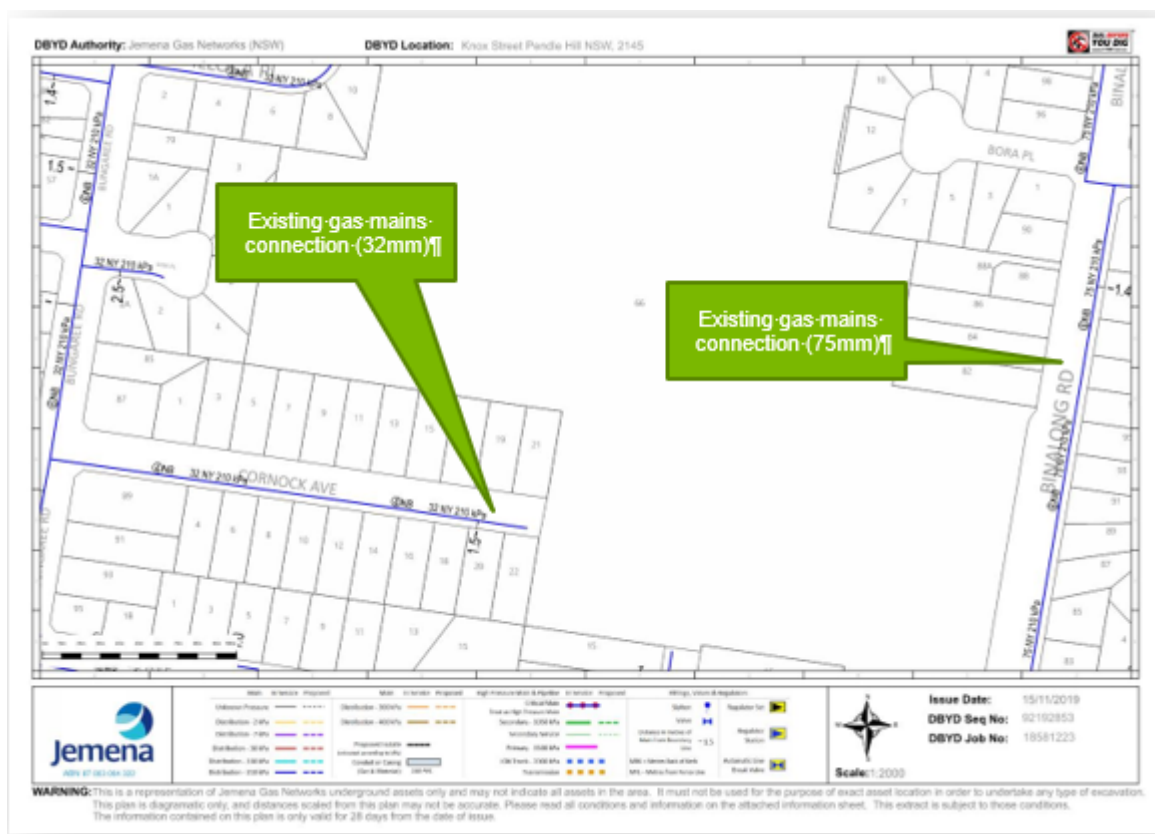


Figure 5: Jemena Gas Diagram

4.2 Demand Assessment

It is understood that there is no gas requirement for the development.

5 Electrical

5.1 Authority

Endeavour Energy (EE) is the electrical supply authority for the site area. The current electrical infrastructure around the site includes assets such as:

- Electrical cables within the streets adjacent to the site, Cornock Ave, Knox St, and Binalong Road.
- Existing padmount kiosk substation No. 15741 which supplies power to the existing high school.

The existing school is supplied from a single site main switchboard located within a dedicated main switchroom located centrally in the school assembly playground. The electrical distribution scheme at high level has been validated on site based on diagrams and labelling on distribution boards. However, the cable sizes and inground reticulation are to be verified.



Figure 6: Endeavour Energy Substation 15741

The dial before you dig (DBYD) information received indicates that the incoming HV supply enters the existing substation directly from Knox St and will not be impacted by the proposed upgrades. Site investigations have also indicated that the consumer's mains run directly from the substation to the existing site Main Switchroom via inground pits and conduit.

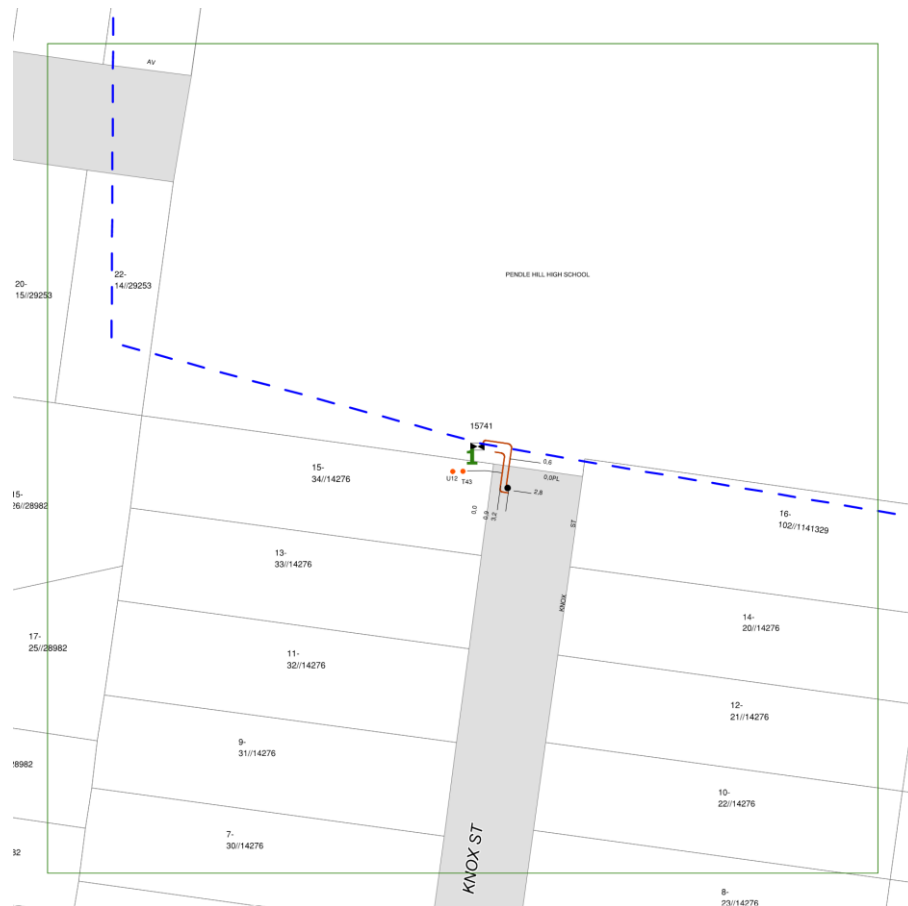


Figure 7: DBYD on existing electrical services

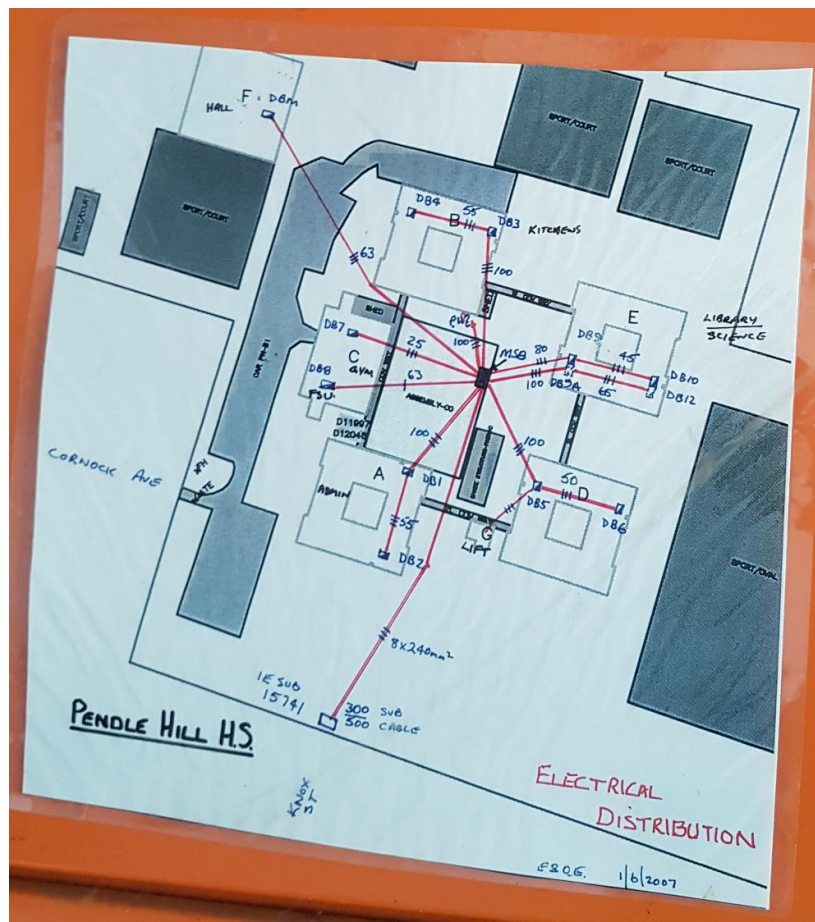


Figure 8: Site electrical installation sketch located on site MSB

5.2 Demand Assessment

High level electrical demand figures have been calculated based on the current proposed plans developed by Fulton Trotter Architects. Whilst the design is in progress and subject to change, the figures presented in this document are expected to be representative of the final maximum demand for the upgraded high school.

The Following table outlines the Electrical Demand assessments:

Table 3: Maximum Demand Estimate

Pendle Hill HS	Area (m2)	Power density (VA/m2)	Power demand (kVA)	Power demand (Amps)
Existing area to remain	8,182	-	154.8	223.43
New Build	4153	60	249.18	359.66
Total	12,335		404.0	583.10
15% spare capacity (EFSG requirement)			60.6	87.5
Additional demand for growth to 1080 students			287.48	414.94
Grand Total			752.1	1085.52

5.3 Utility Interaction

A preliminary technical enquiry was submitted to Endeavour Energy on 23 January 2020. Two options have been proposed to provide power supply for the development;

- Upgrading the existing kiosk substation No. 15741 to 1000kVA substation OR
- Install a new 1000kVA kiosk substation along Binalong Road and apply for a new connection onto EE network along Binalong Road

There is no formal confirmation on network capacity along Binalong Road until when a connection application is submitted.

5.4 Initial Design Assessment

From the available information and advice from EE, it is proposed that a new 1000kVA kiosk substation is to be installed along Binalong Road to service the development. A new Site Main Switchboard with capacity to supply all buildings on site post construction will be provided within new Building H. The existing power supply to the school from kiosk substation 15741 will be decommissioned once the new infrastructure is in place. The existing Main Switchboard will be supplied from the new Site Main Switchboard. This proposed design will minimize disruption to the school operation during construction, maintaining existing infrastructure where possible and providing sufficient capacity for the development and some spare capacity for potential future growth.

5.5 Illuminated Sign

The LED illuminated sign to be installed on the school shall follow all below relevant guidelines governing the installation of signage systems:

- AS 4282 – Control of the obtrusive effects of outdoor lighting
- City of Parramatta Council Development Control Plan (DCP)
- State Environmental Planning Policy No. 64 – Advertising and Signage SEPP 64
- Transport Corridor Outdoor Advertising and Signage Guidelines

6 Telecommunications

6.1 Authority

Telstra is believed to be the primary service provider in the area. However we understand there are a number of other telecommunications suppliers present in the area.

6.2 Existing Infrastructure

The existing telecommunications infrastructure within the vicinity of the proposed development has been identified based on Dial Before You Dig (DBYD) records. These records indicate the presence of infrastructure belonging to various utility authorities in the vicinity of the site. Based on the DBYD records provided, Telstra, and NBN are the only authorities with telecommunications infrastructure entering the site.

6.2.1 Telstra

Telstra assets serve the existing high school and enter from Knox St into the high school. This is shown on both the as installed documentation and DBYD drawings, communications pits in the locations shown on the documentation were also observed on site. The As Installed documentation indicate that from these pits the communications lead-in cabling travel directly to the campus distributor located in block B. Various Telstra infrastructure is also located throughout surrounding streets.



Figure 9: Communication Lead-in from Knox St



Figure 10: Communications Lead-in outside building Block B

6.2.2 NBN – National Broadband Network

The National Broadband Network is currently being rolled out across NSW. The school is already connected to NBN.

6.2.3 Other Telcos

Other telecommunications providers, including Optus and Verizon have infrastructure within surrounding streets but not within the site or the adjacent footpaths.

6.2.4 Structured Cabling System

The communications lead-in reticulates appears to reticulate within inground pits and conduit from the southern end, Knox street, to Block B main communications room. The communications room consists of two 45RU racks where the fibre lead-in connects to the school. The cooling system for the communications equipment appears to adequately ventilate the space. The main communications racks serve the building distributors located within buildings throughout the school. There was no other main communications room on site.

6.3 Utility Interaction

Department of Education – IT Department are in the process of liaising with NBN and Telstra to establishing new connection for the school from Binalong Road.

6.4 Initial Design Assessment

6.4.1 New Telecommunications Carrier Lead-in

The development will be provided with a telecommunications conduit and pit system lead-in pathway for new connection into Binalong Road NBN and Telstra network.

6.4.2 Campus Backbone Pathways

OS2 fiber cable and inground pathway will be provided to interconnecting all existing Building Communication Rooms to the new Main Communications Room located within new Building H.

6.4.3 Site Main Communication Room

A new Main Communication Room will be available in new building H having sufficient capacity to service the whole school post construction. Existing NBN and Telstra headend equipments will be migrated into the new Main Communication Room towards the end of construction phase.

This proposed design will minimize disruption to the school operation during construction, maintaining existing infrastructure where possible and providing sufficient capacity for the development.

7 Fire Protection Services

7.1 Authority

The existing high school has access to the following Sydney Water mains:

- DN180 PE Sydney Water along Binalong Road;
- DN100 CICL Sydney Water along Cornock avenue;

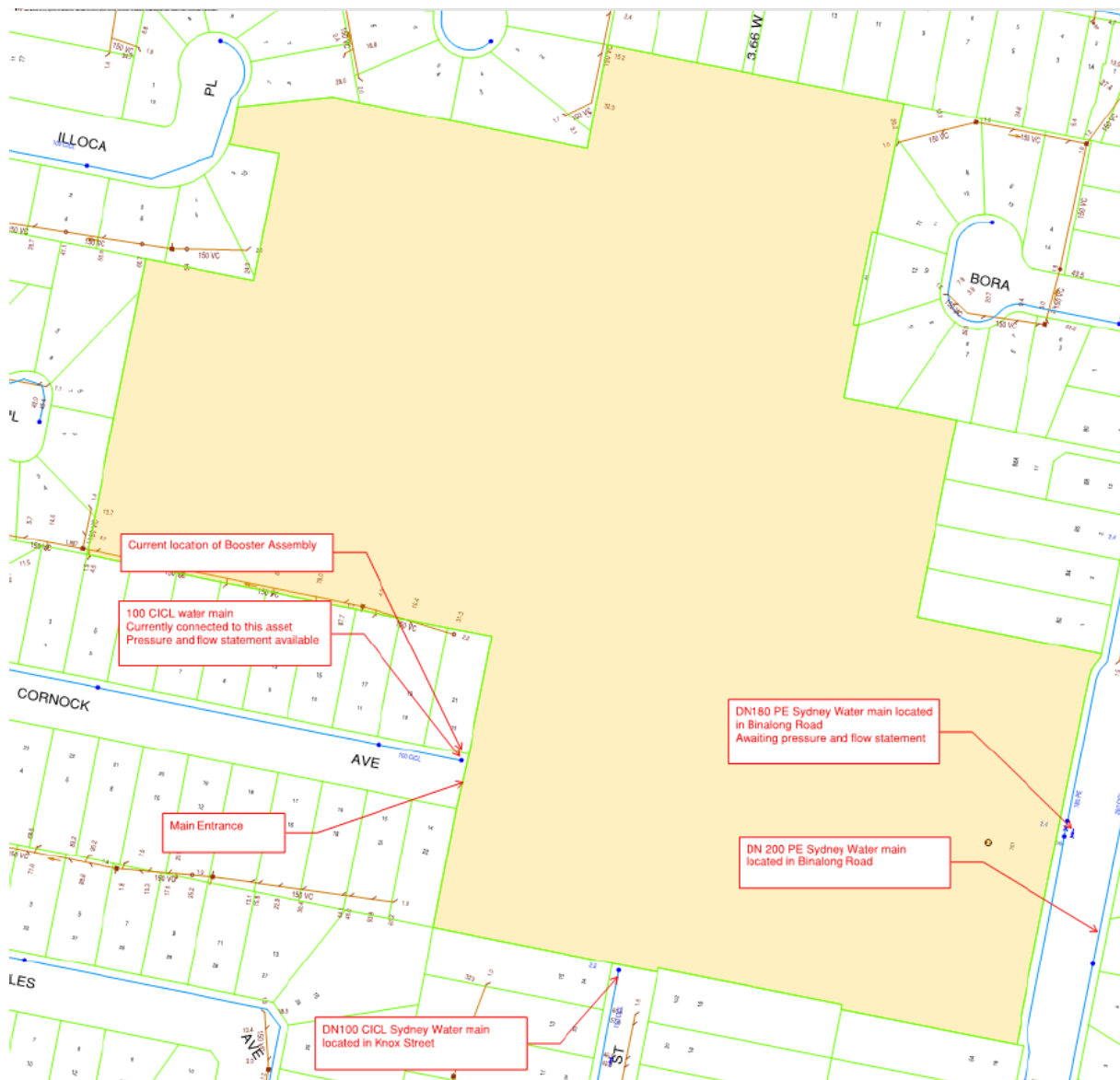


Figure 11: Location of Sydney Water Mains

7.2 Existing Infrastructure

7.2.1 Fire Hydrant System

The site has been provided with a fire brigade booster assembly adjacent to the main entrance and is connected to the existing Sydney Water main on Cornock Avenue. The fire hydrant does not comply with the requirements of BCA and AS 2419.1:2005.



Figure 12: Fire Brigade Booster Assembly

7.2.2 Fire Detection System

There are no fire detection and alarm system installed on site.

7.2.3 Portable Fire Extinguishers

Generally, the site appears to be supported throughout with fire extinguishers. Fire extinguishers were sighted in the following locations:

- Library
- Within main switchboard room
- Laboratory.

7.2.4 Fire Hose Reels

No fire hose reels were sighted on site.

7.3 Utility Interaction

Water pressure and flow rate inquiry response have been received from Sydney Water for the existing DN100 CICL in Cornock Avenue and DN 180 PE water main in Binalong road.

The pressure and flow rate of water main on Binalong Road is sufficient for a fire hydrant system for the development.



Statement of Available Pressure and Flow

Anthony Figueroa
116 Military Road
Neutral Bay, 2089

Attention: Anthony Figueroa

Date: 10/01/2020

Pressure & Flow Application Number: 764899
Your Pressure Inquiry Dated: 2019-11-14
Property Address: Knox Street, Pendle Hill 2145

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: Binalong Road	Side of Street: West
Distance & Direction from Nearest Cross Street	170 metres South from Bora Place
Approximate Ground Level (AHD):	59 metres
Nominal Size of Water Main (DN):	180 mm

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	57 metre head
Minimum Pressure	42 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	42
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5	46
	10	45
	15	44
	25	42
	30	40
	40	37
	50	33
	60	28
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	5	41
	10	41
	15	39
	25	37
	30	35
	40	31
	50	27
	60	22
Maximum Permissible Flow	67	18

Figure 13: Pressure and Flow Rate Statement (Binalong Road)

7.4 Initial Design Assessment

A BCA report has been developed for the development by Blackett Maguire + Goldsmith which specifies the requirement for fire protection system. In responding to BCA requirements, the proposed fire protection system for new building H includes;

- A new booster assembly and hydrant pump set located on the front of building H along new student drop off zone connecting to Sydney Water main along Binalong Road
- One external hydrant to be located 10m away from building H to provide protection coverage for the building
- Internal hydrant located within the fire staircase on each floor
- Fire alarm system throughout building H
- Emergency warning and intercom system throughout building H
- Central fire alarm and emergency warning and intercom panel located on ground floor within the reception area
- No sprinkler system is required
- A fire engineering performance solution is required to address the location of booster assembly not being within sight of main entrance of all buildings on site

8 Next steps

A number of elements will need to be confirmed as part of the design development and further interaction with the authorities need to take place, in particular:

- Feedback from Endeavour Energy upon submission of connection application.
- Obtain confirmation from Sydney Water and Jemena that their infrastructure will be able to sustain the proposed development.
- Obtain approval from the relevant authorities for the proposed connections to the infrastructure.
- Potential application to NBN Co as required.



*Bringing ideas
to life*

Document prepared by

Aurecon Australasia Pty Ltd

ABN 54 005 139 873

Level 5, 116 Military Road
Neutral Bay NSW 2089

PO Box 538
Neutral Bay NSW 2089
Australia

T +61 2 9465 5599

F +61 2 9465 5598

E sydney@aurecongroup.com

W aurecongroup.com

Aurecon offices are located in:

Angola, Australia, Botswana, China, GDC, Ghana, Hong Kong, Indonesia, Kenya,
Lesotho, Mozambique, Namibia, New Zealand, Nigeria, Philippines, Qatar,
Rwanda, Singapore, South Africa, Swaziland, Tanzania, Thailand, Uganda,
United Arab Emirates, Vietnam, Zambia,