The Department of Education

Arthur Phillip High School and Parramatta Public School Redevelopment

Infrastructure Management Plan/Integrated Water Management Plan

REP-EL-INF-01

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ARUP

Contents

1 Introduction

NSW Department of Education propose new 35,000 m^2 building for Arthur Phillip High School and 9,000m2 building for Parramatta Public School on the corner of Macquarie and Charles Streets.

This is a brownfield site with a number of utility services located across the site. A dial before you dig investigation was carried out to ascertain the utility assets that are currently located on the site.

A site survey was provided by Rygate & Company identifying a number of existing services.

The intent of this document is to highlight existing utility services located on the site and advise of any works that are required in order to remove or relocate the existing services to allow for the redevelopment.

The plan has been reviewed with regard to addressing the relevant SEAR's requirements:

- Preparation of an Infrastructure Management Plan in consultation with the relevant agencies, detailing the information on the existing capacity and any augmentation requirements of the development for the provision of utilities including staging of infrastructure.
- Preparation of an Integrated Water Management Plan detailing any proposed end uses of potable and non-potable water, and water sensitive urban design.

2 Existing Electrical Services

A dial before you dig investigation was carried out to identify the existing utilities located on the proposed development site. The dial before you dig survey highlighted that there are a number of Endeavour Energy assets within the existing site boundary. Subsequently a site survey was commissioned by Grimshaw Architects to identify any key utilities within the site boundary.

The site survey identified that there are a number of Endeavour Energy LV ducts within the site boundary. Some of the incoming LV ducts have been identified and are indicated on the survey layouts as detailed below. Other expected LV ducts are being surveyed at the moment to determine exact location.

Endeavour Energy have been contacted in order to establish the extent of their assets currently within the site boundary. This will be used to determine the extent of works required in relation to their assets and the scope of works involved.

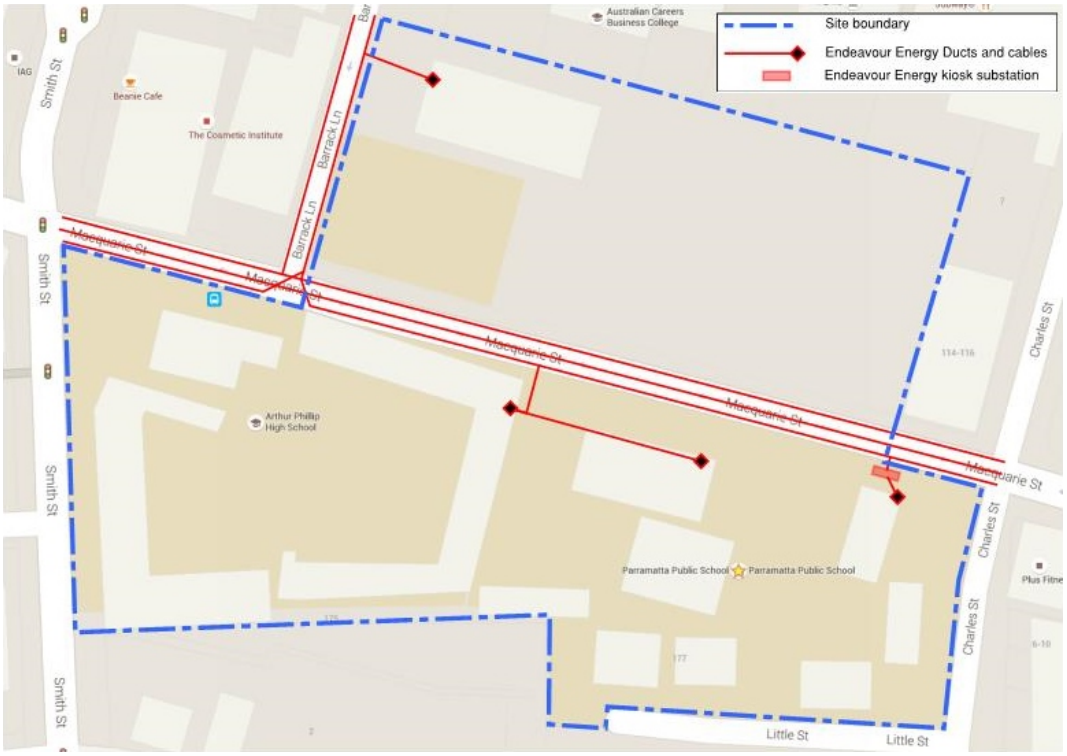

Figure 1 Endeavour Energy Assets

There is an existing Endeavour Energy supplies to the site. An old main switchboard in Arthur Phillip High School seem to be supplied from Macquarie Street. This MSB in turn feeds switchboards in Arthur Phillip High School, two Heritage Buildings and parts of Parramatta Public School.

An additional Endeavour Energy supply seem to be made to Parramatta Public School from a kiosk substation on Macquarie Street.

A dedicated Endeavour Energy supply is provided from Barrack Lane to Arthur Phillip High School Sports Hall.

Endeavour Energy will need to be engaged to review these services and quote for removing the connections back to street level. The ducts can be removed as part of the early works for the site.

The existing Endeavour Energy assets in Macquarie Street and Barrack Lane seems to supply a number of other customers. Disconnection of supplies will need to be coordinated to allow for decommissioning and demolition of redundant supplies.

3 Existing Telecoms Services

There are a number of telecommunications services that run within the pedestrian pathways that border the site.

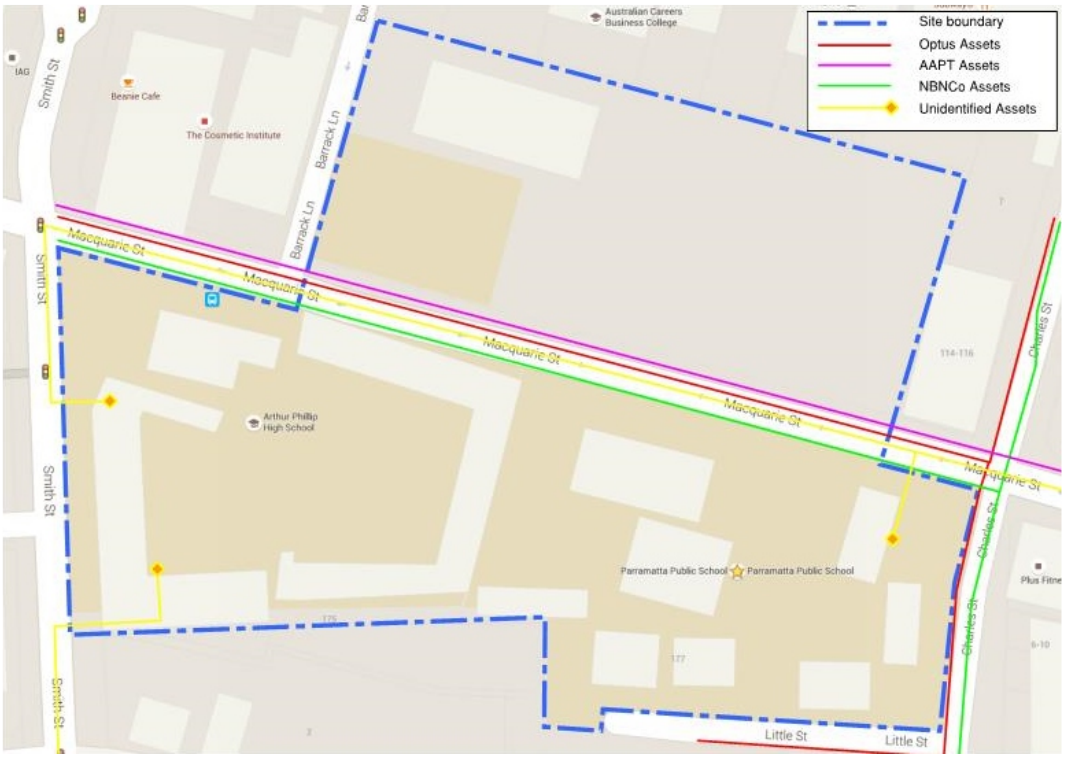

Figure 2 Existing Telecommunication Services

A dial before you dig survey was carried out to identify the telecoms services that could be affected by the planned redevelopment.

As Telstra is the telecom service provider of choice for DoE, We believe that the unidentified services in the plan above are Telstra's. However, Telstra withheld the DBYD information and we have no confirmation that this is the case.

The lead in telecoms conduits can be removed as part of the development early works. The service provider need to be engaged to remove their cables from within the site back to their connection points within the street adjacent to the site. A separate application will be submitted for new incoming Telstra connections.

NBN Co and Optus have fibre optic infrastructure running within the pedestrian walkways or street around the perimeter of the site. It does not appear that they have any services within the site boundary that will be affected by the future development works.

AAPT have fibre optic services that seem to run inside the site boundary - North of Macquarie Street. However, this will be clarified with AAPT as this may be indicative information. The services will need to be relocated to the pedestrian footpath or the street to allow for the redevelopment.

PipeNetworks have infrastructure in the vicinity, however, they are contained in Telstra ducts. Further information is not available.

4 Existing Hydraulic Utilities

The following provides an outline of the existing hydraulic utilities available to the sites.

Details of the existing services have been determined through the Dial Before You Dig (DBYD) services which indicate the existence of the following services adjacent to the sites.

4.1 Sydney Water Services

The design team has interrogated the Dial Before You Dig information and provided below is the Sydney Water Services Location Print identifying the water and sewer services available.

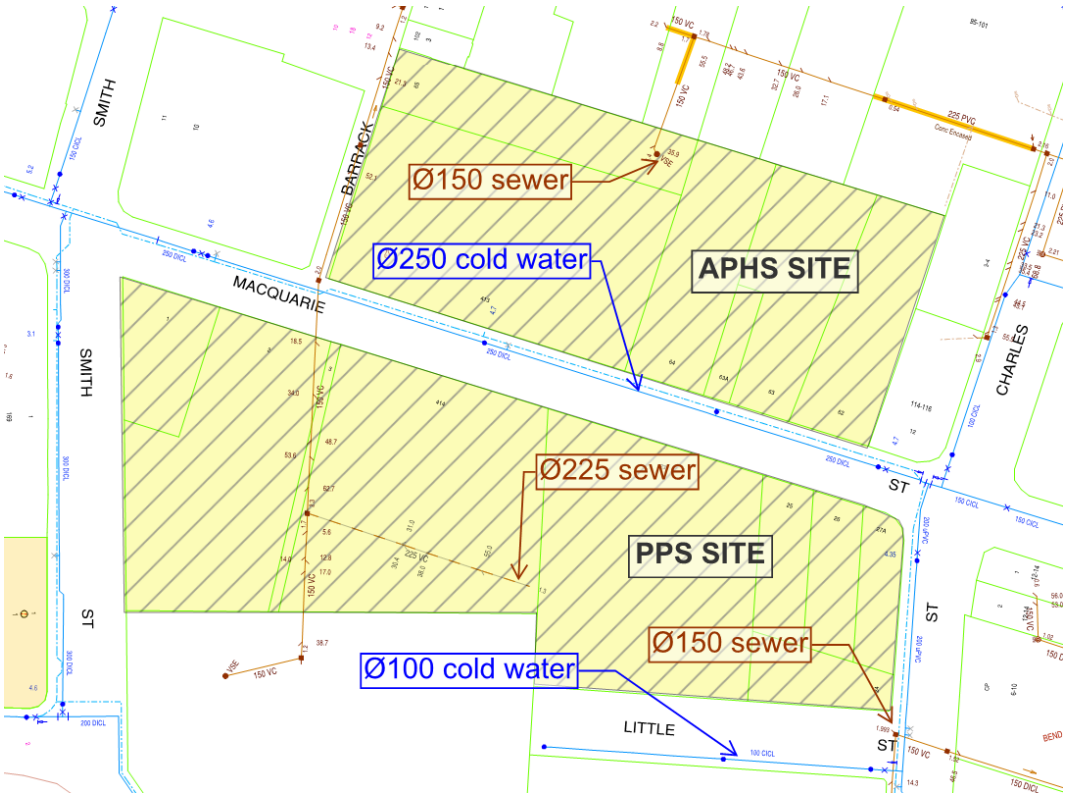

Figure 3 Sydney Water Services Location Print

4.1.1 Cold water Supplies

The APHS site sits on the north of Macquarie Street between Barrack Lane and Charles Street (separated by the adjacent building site).

These streets contain cold water infrastructure as follows:

- Macquarie Street – 250mm diameter Ductile Iron Cement Lined (DICL) water main.
- Barrack Lane – None.
- Charles Street – 100mm diameter Cast Iron Cement Lined (CICL) water main (not considered for the incoming cold water connection as it is separated by the adjacent building site).

The PPS site sits on the south of Macquarie Street between Smith Street and Charles Street, and on the north of Little Street.

These streets contain cold water infrastructure as follows:

- Macquarie Street – 250mm diameter Ductile Iron Cement Lined (DICL) water main on the opposite site.
- Smith Street – 300mm diameter Cast Iron Cement Lined (CICL) water main (not considered for the incoming cold water connection as it is too far from the school building).
- Charles Street – 200mm diameter Unplasticised Polyvinyl Chloride (uPVC) water main (not considered for the cold water connection as it is separated by the adjacent building site).
- Little Street – 100mm diameter Cast Iron Cement Lined (CICL) water main on the opposite side.

4.1.2 Sewer Drainage

The APHS site sits on the north of Macquarie Street between Barrack Lane and Charles Street (separated by the adjacent building site).

These streets contain sewer infrastructure as follows:

- Macquarie Street – None.
- Barrack Lane – 150mm diameter Vitrified Clay (VC).
- Charles Street – 225mm diameter Vitrified Clay (VC) (not considered for the sewer connection as it is separated by the adjacent building site).
- A 150mm diameter Vitrified Clay (VC) extended within the site at the north.

The PPS site sits on the south of Macquarie Street between Smith Street and Charles Street, and on the north of Little Street.

These streets contain sewer infrastructure as follows:

- Macquarie Street – None.
- Smith Street – None.
- Charles Street – None.
- Little Street – 150mm diameter Ductile Iron Cement Lined (DICL).
- A 225mm diameter VC and a 150mm diameter VC extended within the site at the west.

4.2 Natural Gas

The design team has interrogated the Dial Before You Dig information and provided below is the Jemena gas services diagram identifying the gas services available.

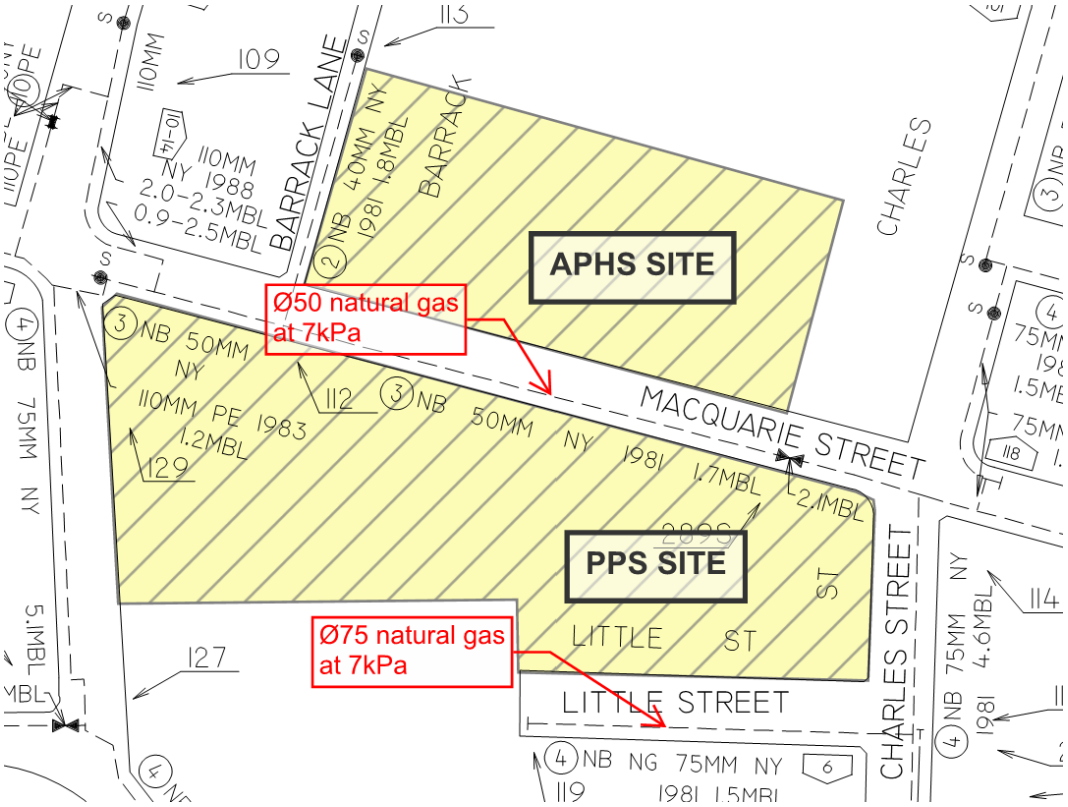

Figure 4 Jemena Gas Services Diagram

The APHS site sits on the north of Macquarie Street between Barrack Lane and Charles Street (separated by the adjacent building site).

These streets contain gas infrastructure as follows:

- Macquarie Street – 50mm diameter Nylon (NY) at 7kPa on the opposite side.
- Barrack Lane – 40mm diameter Nylon (NY) at 7kPa on the opposite side.
- Charles Street – 75mm diameter Nylon (NY) at 7kPa on the opposite side (not considered for the incoming gas connection as it is separated by the adjacent building site).

The PPS site sits on the south of Macquarie Street between Smith Street and Charles Street, and on the north of Little Street.

These streets contain gas infrastructure as follows:

- Macquarie Street – 50mm diameter Nylon (NY) at 7kPa.
- Smith Street – 75mm diameter Nylon (NY) at 7kPa on the opposite side (not considered for the incoming gas connection as it is too far from the school building).
- Charles Street – 75mm diameter Nylon (NY) at 7kPa on the opposite side.
- Little Street – 75mm diameter Nylon (NY) at 7kPa on the opposite side.

5 New Electrical Services

A preliminary maximum demand for Arthur Phillip High School and Parramatta Public School has been calculated to establish the new electrical requirements for the redevelopment.

The preliminary MD was calculated at a total of 2,750 kVA. Arthur Phillip High School is anticipated to require 2,100kVA and Parramatta Public School is around 650kVA. The average load density is in the order of 55VA/m^2.

This is based on the current design GFA of 34,000m^2 for Arthur Phillip High School and 9,500m^2 for Parramatta Public School.

The response provided from Endeavour Energy to the Technical Review Request, is that the existing HV and LV infrastructure do not have sufficient spare capacity. Therefore, new HV feeders are required from the Zone Substation opposite to Parramatta RSL Club on 2 Macquarie Street. This is approximately 1 kilometre away from the proposed site location.

An application for connection of load has been submitted and a supply offer received from Endeavour Energy as per below:

1. New HV feeders required from the Zone substation
2. Arthur Phillip High School to be supplied with two new kiosk substation.
3. Parramatta Public School to be supplied with a new kiosk substation.

Further meetings are being scheduled with Endeavour Energy to investigate other supply opportunities – such as Parramatta Public School to be supplied from the existing kiosk substation.

Additional spare capacity may be required to allow for future developments, this will be investigated during the design stage.

6 New Telecoms Services

New Telstra incoming telecoms services will be required for the new schools. Single mode fibre cables, CAT3 copper cables and 3G connection will be proposed.

The copper services will be dedicated to lifts intercom, fire alarm and security alarm.

The 3G service is intended as a back-up for the critical telecommunication services, which will be determined by DoE during design development.

A new application will need to be submitted to Telstra to allow for the provisioning of the services described above.

Incoming telecommunications pits will be laid as part of the new development to a pit located on the boundary of the site to allow the connection of the new telecoms services.

7 New Hydraulic Services

New hydraulic services will be required for the new developments. Sydney Water and Jemena services are available for the site connections as described below.

7.1 Water Supply

The water supply infrastructure within the Parramatta CBD is considered a critical asset by Sydney Water. The mains are heavily interconnected and served from multiple reservoirs. The mains therefore are very reliable and are maintained to a high degree by Sydney Water commensurate with their critical asset status. Sydney Water has management plans in place to redirect supplies should failures occur resulting in a high degree of security for the developments served from this infrastructure.

The size of the water mains in the surrounding streets can easily support this development. The design is progressing with the water main connections entering the sites as below. The final form of these connections will develop through detailed design.

- APHS – from water main in Macquarie Street
- PPS – from water main in Little Street

The Sydney Water Statements of Available Pressure and Flow dated 22/2/16 for the water mains in Macquarie Street and Charles Street provide data on the available flows and pressures from the water mains for firefighting. Refer to the attached statements for information.

7.2 Sewer Drainage

The sewer infrastructure around and within the sites can easily support the developments. The design is progressing with the sewer connections exiting the sites as below. The final form of these connections will develop through detailed design.

- APHS – to northern sewer main
- PPS – to sewer main in Little Street

7.3 Natural Gas

The gas infrastructure around the sites can easily support the developments. The design is progressing with the gas connections entering the sites as below. The final form of these connections will develop through detailed design.

- APHS – from gas main in Macquarie Street
- PPS – from gas main in Little Street

8 Integrated Water Management

The below water supplies have been considered and the following are proposed:

1. Potable water

   Uses: Amenities areas, drinking water, fire services.

2. Non-potable water (via rainwater harvesting)

   Uses: Landscape irrigation (Other uses such as WC flushing, bin washdown, etc. subject to ESD requirements).

9 Statement of Available Pressure and Flow

9.1 Town Main in Macquarie Street

Sydney WATER

Statement of Available Pressure and Flow

Rudolph Chan
Kent Street
Sydney, 2000

Attention: Rudolph Chan Date: 22/02/2016

Pressure & Flow Application Number: 22289
Your Pressure Inquiry Dated: Fri, Jan 29, '16
Property Address: Macquarie St, Parramatta 2150

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: Macquarie Street	Side of Street: North
Distance & Direction from Nearest Cross Street	117 metres West from Charles Street
Approximate Ground Level (AHD):	8 metres
Nominal Size of Water Main (DN):	250 mm

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	54 metre head
Minimum Pressure	38 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	38
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5 10 15 20 26 30 40 50	40 40 39 39 39 39 38 38
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	5 10 15 20 26 30 40 50	37 37 37 37 36 36 36 35
Maximum Permissible Flow	103	31

(Please refer to reverse side for Notes)

For any further inquiries regarding this application please email :

connections@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

9.2 Town Main in Charles Street

Statement of Available Pressure and Flow

Sydney WATER

Rudolph Chan
Kent Street
Sydney, 2000

Attention: Rudolph Chan Date: 22/02/2016

Pressure & Flow Application Number: 22299
Your Pressure Inquiry Dated: Fri, Jan 29, '16
Property Address: 6-10 Charles St, Parramatta 2150

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: Charles Street	Side of Street: West
Distance & Direction from Nearest Cross Street	50 metres South from Macquarie Street
Approximate Ground Level (AHD):	8 metres
Nominal Size of Water Main (DN):	200 mm

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	54 metre head
Minimum Pressure	38 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	38
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5 10 15 20 26 30 40 50	40 40 39 39 39 39 38 38
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	5 10 15 20 26 30 40 50	37 37 37 37 36 36 35 35
Maximum Permissible Flow	78	32

(Please refer to reverse side for Notes)

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10 Conclusion

It must be noted that one of the communications services appear to be running through the site boundary north to Macquarie Street. This needs to be clarified and possibly relocated outside the site.

The existing electrical and telecoms services within the site boundary have been reviewed and is all intended to be removed as part of the early works to prepare the existing site for the future development. Both Telstra and Endeavour Energy.

New electrical and telecoms provision will be provided as required for the new development to allow connection to the utility services. New kiosk substations are proposed within the new development.

Telecoms lead in infrastructure will be provided from a pit on the site boundary to the main incoming telecoms room within the proposed development to allow incoming telecoms services to be connected into the building in a timely fashion.

The above investigations have identified the hydraulic utility services surrounding the site and it is concluded that both developments are capable of being serviced subject to final consultation with the relevant authorities and service providers.