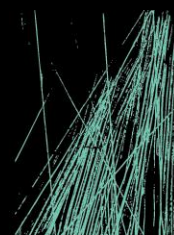




HYDRAULIC INFRASTRUCTURE DUE DILIGENCE REPORT

TOGA PENWAY PLACE PENRITH

MULTIDISCIPLINARY CONSULTANY SERVICES



JHA

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DOCUMENT CONTROL SHEET

Project Number	180377
Project Name	TOGA Penrith
Description	Infrastructure Due Diligence Report for Hydraulic Services
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Prepared By

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Revision History

Issued To	Revision and Date								
Toga Group	REV	DRAFT	FINAL	B					
	DATE	29/07/19	16/01/20	5/10/2021					

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1 EXECUTIVE SUMMARY

JHA Consulting Engineers (NSW) Pty Ltd has been engaged by Toga Group to undertake an infrastructure assessment report pertaining to hydraulic services for the proposed developments.

This report outlines the availability & suitability of authority infrastructure to serve the 2 buildings including:

- Gas service – Jemena
- Water mains availability – Sydney Water
- Sewer drainage availability – Sydney Water

Additional calculations have also been undertaken regarding potable cold water demands for use by the Water Services Co-ordinator (WSC).

Our engineering advice is based on documentation provided by the relevant authorities, previous site visits & Toga's current architectural set of drawings issued to JHA on the 30th September 2021.

2 INTRODUCTION

The proposed Toga development comprises of two (2) sites each containing two (2) towers separated by John Tipping Grove. The sites are located at 87-91 Union Road / 634 High Street & 640-652 High Street respectively. It is understood that the eastern site, which is the subject of the proposed Development Application will consist of 3 levels of basement car parking, 357 apartments, ground floor with commercial tenancies, and 3 levels of podium containing car parking.

Refer to figure 2-1 & 2-2 below for extent of the site..



Figure 2-1 Site Plan



Figure 2-2 3D snapshot

3 HYDRAULIC INFRASTRUCTURE

3.1 NATURAL GAS

3.1.1 EXISTING INFRASTRUCTURE

The local gas authority for the site development is Jemena. The below Dial Before You Dig plan has been obtained on 24.07.19 to assess gas connection points for each development. A new gas connection will be required to serve the site.

There are four existing gas lines within the sites vicinity:

- 1) 200ST 1,050kPa secondary gas main
- 2) 200ST 3500kPa primary gas main through Mulgoa Rd & Union Rd
- 3) 50NY 210kPa through Union Rd
- 4) 63 PE 210kPa through High street

3.1.2 CONNECTION POINTS

Connections to both the primary & secondary gas mains are not permitted by Jemena. The 1,050kPa & 3,500kPa lines shall be remained untouched throughout all stages of construction due to their hazardous nature.

Advice from the gas authority Jemena indicates that the existing 50NY 210kPa line through Union Rd adjacent the Eastern site development does not have sufficient capacity to service the development. Recommendation from the authority is to extend the existing 63 PE 210kPa medium pressure gas main in High street approximately 200m into John Tipping Grove. JHA Consulting Engineers advise that Toga as the developer make contact with Jemena to discuss contribution costs for the proposed gas main extension & overall master planning implications for future developments.

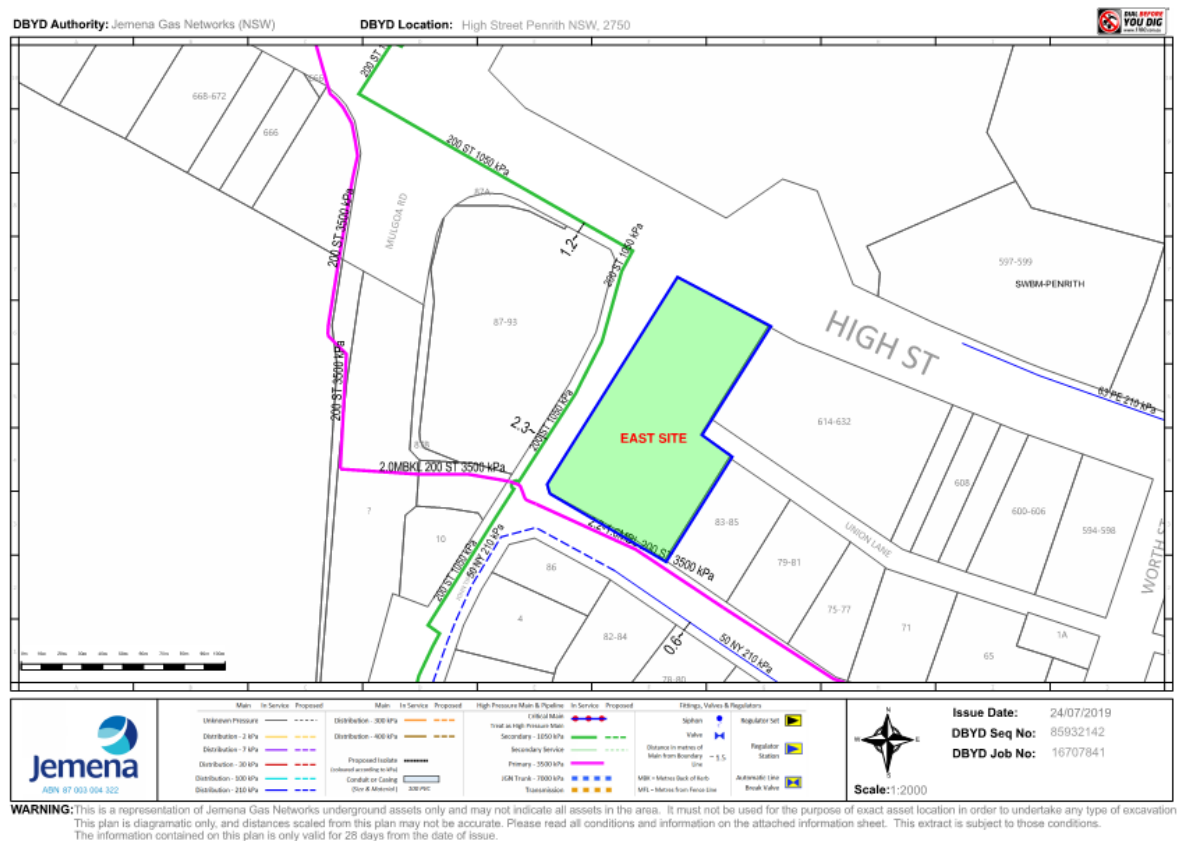
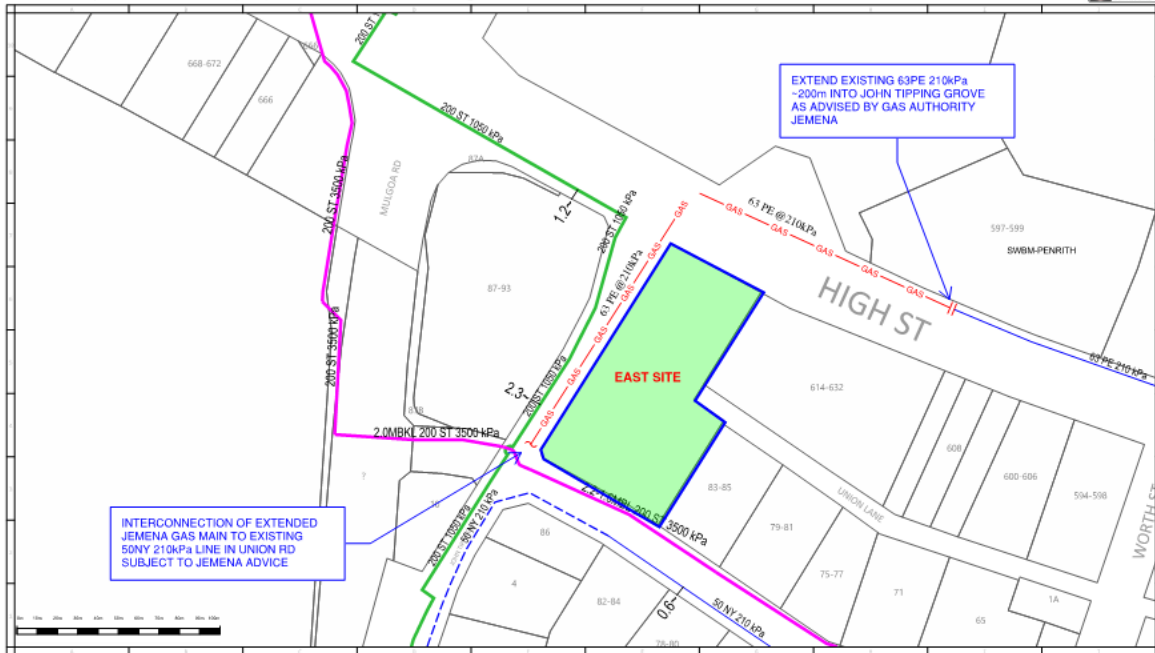


Figure 3-1 DBYD Jemena Gas map & extension

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: High Street Penrith NSW, 2750



ADN 87 803 504 322

Main		In Service		Proposed	
Unknown Pressure	-----	-----	-----	-----	-----
Distribution - 2 kPa	-----	-----	-----	-----	-----
Distribution - 7 kPa	-----	-----	-----	-----	-----
Distribution - 30 kPa	-----	-----	-----	-----	-----
Distribution - 100 kPa	-----	-----	-----	-----	-----
Distribution - 210 kPa	-----	-----	-----	-----	-----

Main		In Service		Proposed	
Distribution - 300 kPa	-----	-----	-----	-----	-----
Distribution - 400 kPa	-----	-----	-----	-----	-----

High Pressure Main & Pipeline		In Service		Proposed	
Critical Main	-----	-----	-----	-----	-----
Treat or High Pressure Main	-----	-----	-----	-----	-----
Secondary - 3000 kPa	-----	-----	-----	-----	-----
Primary - 3000 kPa	-----	-----	-----	-----	-----
JGN Trunk - 3000 kPa	-----	-----	-----	-----	-----
Transmission	-----	-----	-----	-----	-----

Fittings, Valves & Regulators	
Valve	-----
Regulator Set	-----
Regulator Station	-----
Automatic Line Break Valve	-----

Issue Date: 24/07/2019

DBYD Seq No: 85932142

DBYD Job No: 16707841

Scale: 1:2000

WARNING: This is a representation of Jemena Gas Networks underground assets only and may not indicate all assets in the area. It must not be used for the purpose of exact asset location in order to undertake any type of excavation. This plan is diagrammatic only, and distances scaled from this plan may not be accurate. Please read all conditions and information on the attached information sheet. This extract is subject to those conditions. The information contained on this plan is only valid for 28 days from the date of issue.

3.2 POTABLE COLD WATER

3.2.1 EXISTING INFRASTRUCTURE

There are several Sydney Water authority mains surrounding the development including:

- 1) 200/225 Cast Iron Cement Lined along High Street
- 2) 100 Cast Iron Cement Lined along the Northern side of Union Road
- 3) 150 uPVC line along the Southern side of Union Road
- 4) 600 Cast Iron Cement Lined (trunk main to be avoided)

Pressure & Flow inquiries for each of these can be found within the appendices section of this report.

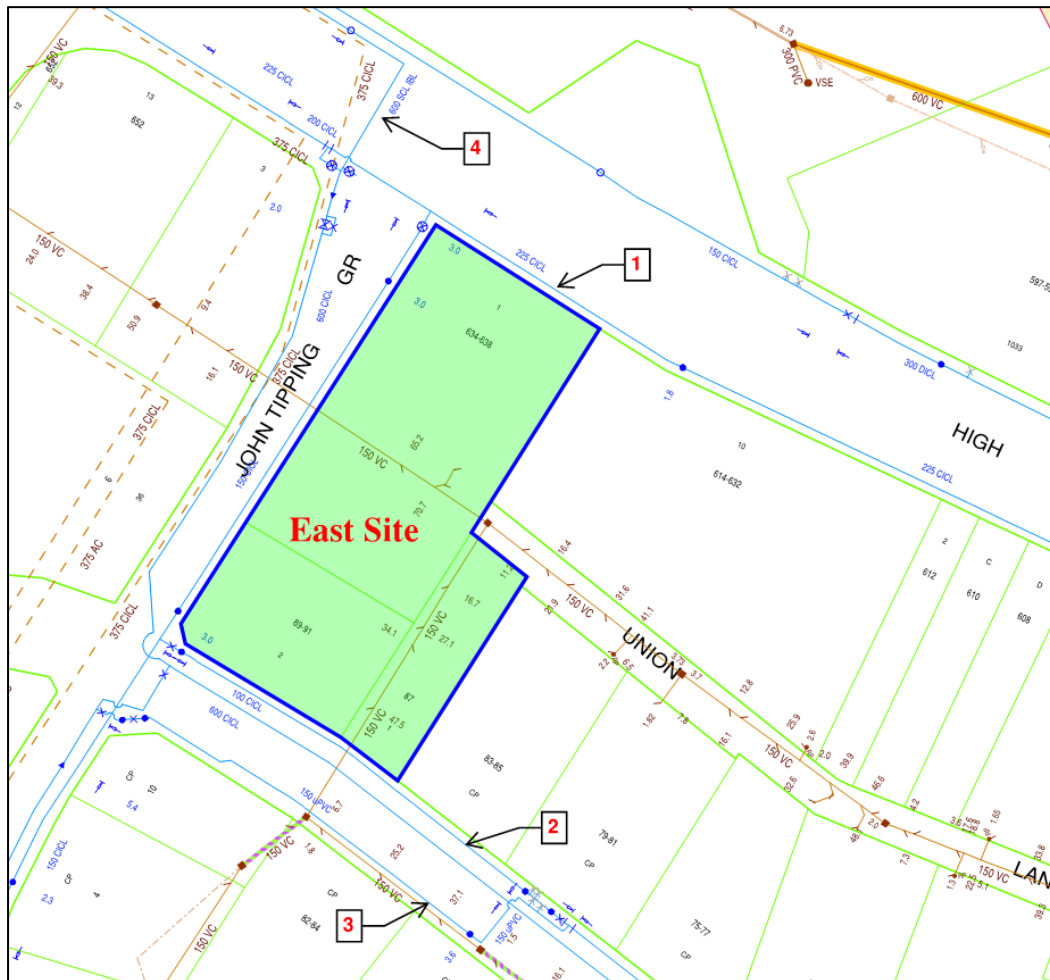


Figure 3-2 DBYD Sydney Water

3.2.2 CONNECTION POINTS

The potable cold water connection points shall be driven by Sydney Water & WSA requirements.

The WSA (Water Services Association of Australia) code outlines the minimum size requirements for water mains in table SW 3.0 shown below. While Sydney Water permits connections to smaller size mains, this is often a very uncommon, lengthy & difficult process to undertake.

The Eastern site outlined in the development brief would be classified as 'Multiple developments of high density residential (> or = 8 storeys)'. A DN200 water main will be required to service the potable water requirements for the site & any future developments within a close vicinity. The Sydney Water main No.1 as outlined in figure 3.2 will be the likely connection point for both the Eastern & Western developments due to minimum flow rates required for the fire service.

**TABLE SW 3.0
MINIMUM PIPE SIZES FOR PARTICULAR DEVELOPMENT**

ZONING/DEVELOPMENT	MINIMUM PIPE SIZE (DN)
Low and medium density residential	100 ⁽¹⁾
High density residential (≥ 4 storeys)	150
Multiple developments of high density residential (≥ 8 storeys)	200
Industrial and commercial	150

NOTE:

1. At its sole discretion, Sydney Water may authorise smaller pipe sizes in certain instances where it is not considered appropriate to require provision of a full sized main.

Figure 3-3 WSA Code Table SW 3.0

3.2.3 RECOMMENDATIONS

Water Services Co-ordinator shall liaise with Sydney Water to confirm suitability of DN225/200 water main in High Street to serve the development. Pressure & Flow inquiry for this main can be found within the appendices section of this report.

SYDNEY WATER CORPORATION 4 Case No: 165157 4. Water and Sewer Works 4.1 Water Your development must have a frontage to a water main that is the right size and can be used for connection. Sydney Water has assessed your application and found that: The existing network fronting the development has capacity to service the proposed development. Also be aware that RMS is making adjustments to the watermain fronting the development in relation to road widening along the Mulgoa Rd / Great Western Highway – High St / Jane St / Castlereagh precinct refer to case no 166479 that is under construction ,please contact the WSC who is managing these works.

Figure 3-3 Sydney Water Notice of Requirements

Previous advice from Sydney Water indicates the discussed water main is suitable for the development. Refer to figure 3-4 for detail.

3.3 FIRE SERVICES

3.3.1 EXISTING INFRASTRUCTURE

The existing water mains that can serve the proposed combined fire sprinkler & hydrant system for the development are the same as outlined in section 3.2.1 of this report.

3.3.2 CONNECTION POINTS

Simultaneous flow from the hydrant and sprinkler services are estimated to be in the order of 55.0l/s, being 30.0l/s for fire hydrant services and 25.0l/s for fire sprinkler services (OH3). The Sydney Water Fire Flow pressure inquires (refer appendix A) indicate that only the 225mm watermain in High St, is able to provide the required simultaneous fire services demand. The water supply demands for fire services will need to be supplied from the existing 225mm watermain in High St, to minimise the size of the storage tanks required.

3.4 SEWER DRAINAGE

3.4.1 EXISTING INFRASTRUCTURE

An existing 150 uPVC authority sewer service currently passes through both the proposed Toga development site. Due to the quantity of apartments & retail space, the current sewer drainage service is not sufficiently sized to cater for the additionally proposed sewer discharge. This has been identified in the Sydney Water notice of requirements (refer figure 3-4).

2 off DN375 DICL & DN375 AC sewer effluent pressure mains rise and feed from local sewerage pumping stations in the west & south of the site are also evident.

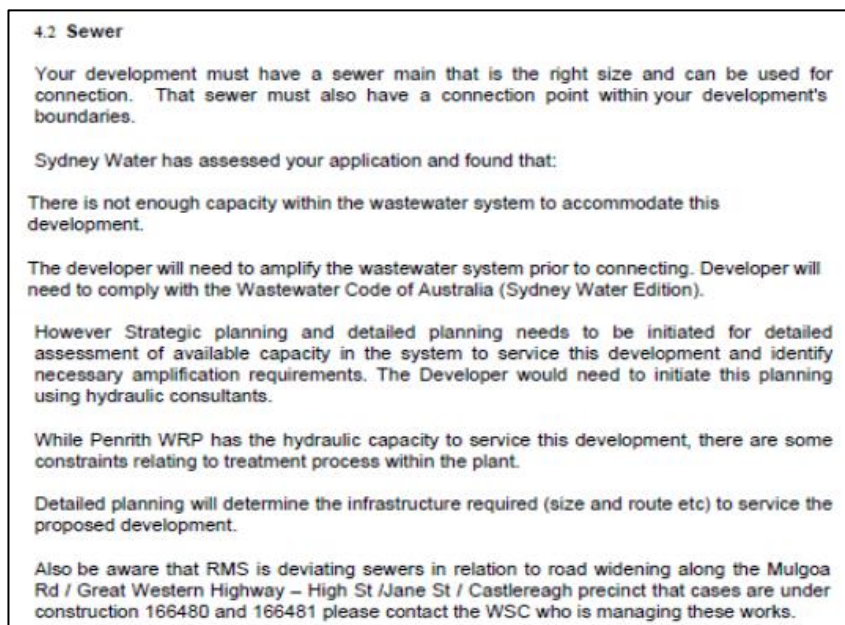


Figure 3-4 Sydney Water Notice of Requirements

3.4.2 CONNECTION POINTS

A new sewer connection will be needed to service the proposed development. Exact locations of connection points are to be determined once the sewer diversion design has been completed & approved by the WSC. Correspondence from the Sydney Water Notice of Requirements can be seen in figure 3-5.

3.4.3 RECOMMENDATIONS

It will be the responsibility of the WSC to liaise with Sydney Water to complete sewer upgrade & diversion works. Indicative design concepts have been completed by LP consulting to illustrate the proposed intent. Refer to Appendix.

4 APPENDICES

4.1 APPENDIX A – PRESSURE & FLOW INQUIRIES

Statement of Available Pressure and Flow



Administrator
89 York Street
Sydney, 2000

Attention: Administrator

Date: 21/07/2017

Pressure & Flow Application Number: 272594

Your Pressure Inquiry Dated: 2017-07-06

Property Address: 89-91 Union Road, Penrith 2750

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: Union Road	Side of Street: North
Distance & Direction from Nearest Cross Street	15 metres East from John Tipping Grove
Approximate Ground Level (AHD):	28 metres
Nominal Size of Water Main (DN):	100 mm

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	82 metre head
Minimum Pressure	52 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	52
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5	52
	10	49
	15	43
	20	35
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	5	51
	10	47
	15	41
	20	33
Maximum Permissible Flow	24	23

(Please refer to reverse side for Notes)

For any further inquiries regarding this application please email :

swtapin@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



Administrator
89 York Street
Sydney, 2000

Attention: Administrator

Date: 21/07/2017

Pressure & Flow Application Number: 272621
Your Pressure Inquiry Dated: 2017-07-06
Property Address: 634-638 High Street, Penrith 2750

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: John Tipping Grove	Side of Street: East
Distance & Direction from Nearest Cross Street	50 metres South from High Street
Approximate Ground Level (AHD):	29 metres
Nominal Size of Water Main (DN):	150 mm

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	81 metre head
Minimum Pressure	52 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	52
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5	52
	10	48
	15	41
	20	32
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	5	50
	10	46
	15	39
	20	29
Maximum Permissible Flow	24	17

(Please refer to reverse side for Notes)

For any further inquiries regarding this application please email :

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Statement of Available Pressure and Flow



Administrator
89 York Street
Sydney, 2000

Attention: Administrator

Date: 21/07/2017

Pressure & Flow Application Number: 272580
Your Pressure Inquiry Dated: 2017-07-06
Property Address: 634-638 High Street, Penrith 2750

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: High Street	Side of Street: South
Distance & Direction from Nearest Cross Street	15 metres East from John Tipping Grove
Approximate Ground Level (AHD):	28 metres
Nominal Size of Water Main (DN):	225 mm

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	102 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	39
	10	39
	15	38
	20	38
	30	36
	40	35
	50	34
	60	32
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	5	38
	10	38
	15	37
	20	36
	30	35
	40	34
	50	32
	60	31
Maximum Permissible Flow	118	18

(Please refer to reverse side for Notes)

For any further inquiries regarding this application please email :

swtapin@sydneywater.com.au

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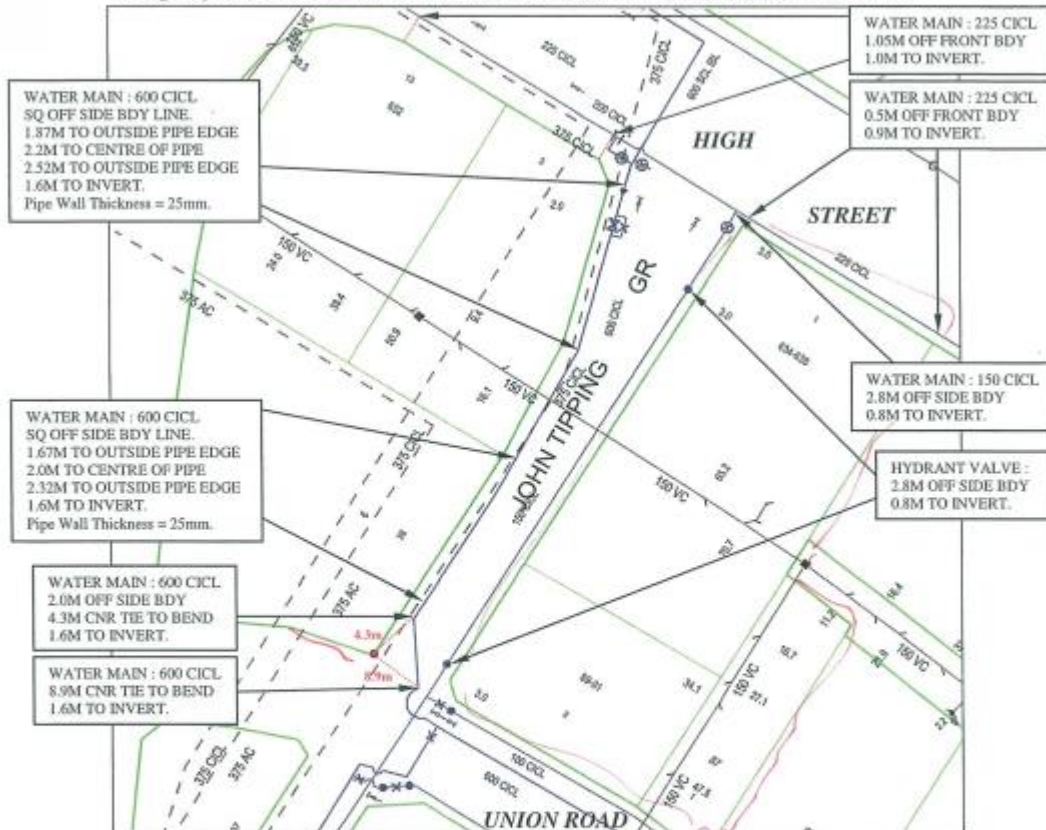




SERVICE PROTECTION REPORT

Supplier No: 1165

Property Address: JOHN TIPPING GR. / HIGH ST. / MULGOA RD. / PENRITH.



Asset Location Method: Electronic Equipment / Accessing Structures.
Pipe Size: 150 / 225 / 600mm **Pipe Type:** CICL.
Strata: Clay **Asset Indicators:** Paint mark on Pavement.

I, Greg McCarthy of All Sydney Side Lines Pty Ltd, being accredited to carry out a Service Protection Report, certify that the information shown on the report has been prepared in accordance with the relevant instructions and accept full responsibility for the accuracy of the report.

Report completed by: Greg McCarthy
Date: 19/09/2017

Signature:

Greg McCarthy Mobile 0408 612 184 Fax (02) 9583 2750 Andrew Murphy Mobile 0412 494 769 Fax (02) 8569 1344

SYDNEY WATER ACCREDITED CONTRACTORS

4.3 APPENDIX C – EXPECTED WATER USAGE

Development Type	Development Sub-Type	Key Metric	Metric Unit	Average Demand (L/Metric unit/Day)
Residential	Single Lot Torrens	Dwelling	Each dwelling	623.00
	Flats Torrens	Net floor area	Square metre	2.36
	High Rise Units	Net floor area	Square metre	3.34
	Single Lot Community	Dwelling	Each dwelling	623.00
Mixed	Residential / Commercial	Combined floor area	Each dwelling / Square metre	Use separate rates for each component
	Commercial / Industrial	Combined floor area	Square metre	Use separate rates for each component
Commercial	Aged Accom - Self Care	Net floor area	Square metre	2.50
	Aged Accom - Hostel	Bed	Each bed	271.00
	Aged Accom - Full Care	Bed	Each bed	271.00
	Childcare	Net floor area	Square metre	3.60
	Hotel / motel / serviced apartments	Room	Each room	359.94
	Office	Net floor area	Square metre	2.27
	Shopping Centre	Net floor area	Square metre	3.00
	Laundry / Dry Cleaner	Net floor area	Square metre	10.50
	Café / Fast Food / Butcher / Deli	Net floor area	Square metre	2.48
	Retail Units	Net floor area	Square metre	2.48
	Medical / Veterinary	Net floor area	Square metre	2.48
	Mechanical Repair	Net floor area	Square metre	2.48
	Car / Boat Sales	Net floor area	Square metre	2.48
	Car Wash	Net floor area	Square metre	9.40
	Club	Net floor area	Square metre	3.77

Expected water usage for both the Eastern development has been based on Sydney Water recommendations outlined above in conjunction with the Toga brief. The below figures are estimates only based on square meter rates for apartments, retail areas & car wash bays.

Commercial Loading Per Site							
	Childcare (m²)	Avg demand (L/day)	Retail (m²)	Avg demand (L/day)	Car Wash (m²)	Avg demand (L/day)	Est water usage (Kl/day)
East Site	0	3.6	993	2.4	27.04	9.4	2.64

Residential Loading				
	1 Bed	2 Bed	3 Bed	Est water usage (Kl/day)
East Site	114	201	42	
Occupants per room (avg)	1.5	2.5	3.5	
Total Apartments			357	131.2

Total Loading	
	Est water usage (Kl/day)
East Site	133.84

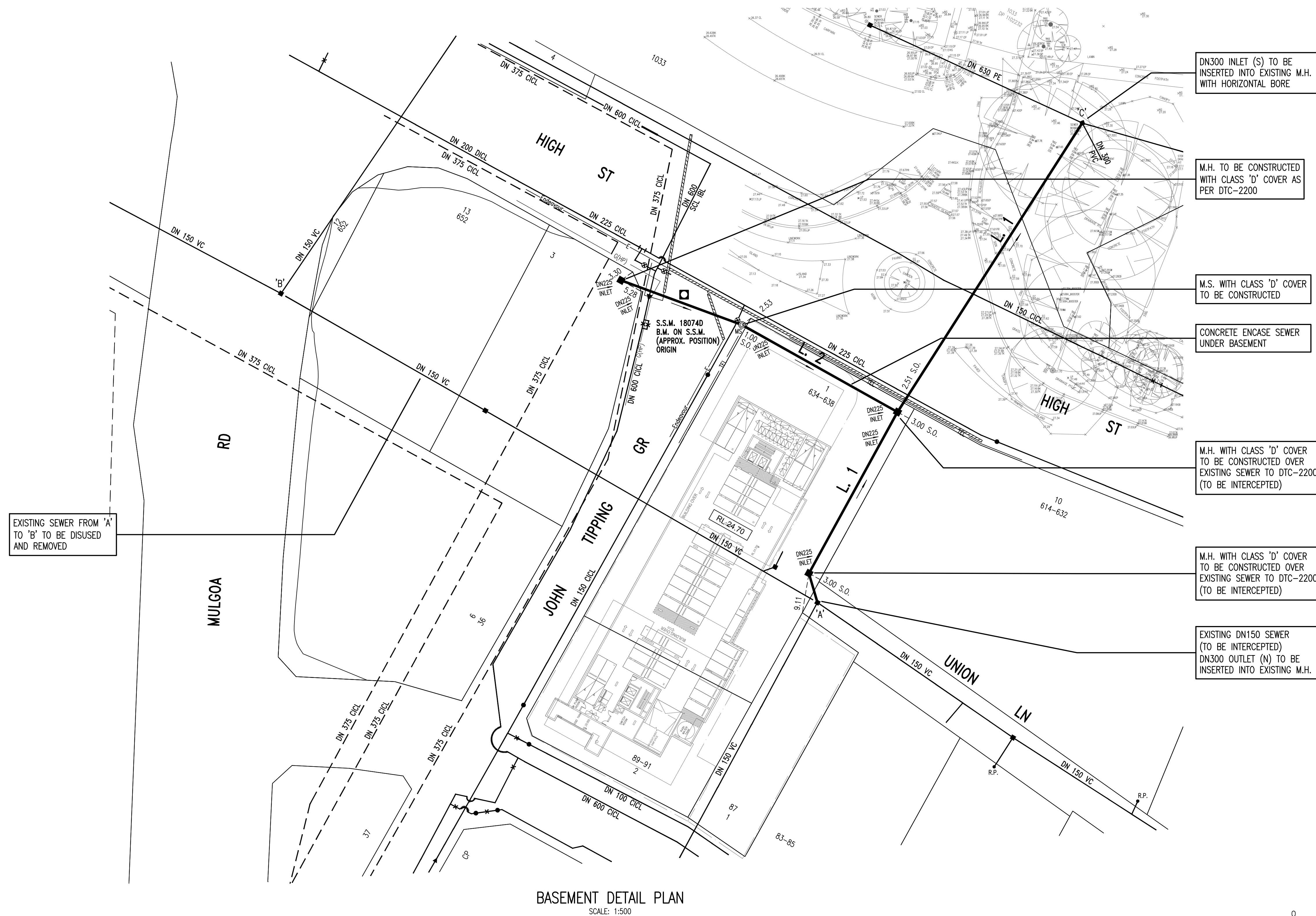
4.4 APPENDIX D – EXPECTED FLOW RATES

2	Determination of PSD for dwellings exceeding the scope of this Table may be estimated using the following equation: $Q = 0.03n + 0.4554\sqrt{n}$ where Q = flow rate, in litres per second n = number of dwellings
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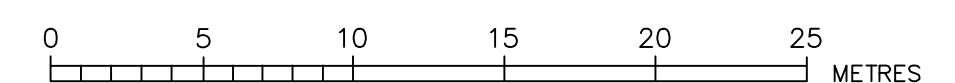
PIPE SECTION	RESID UNITS	PSFR FLOW	CONT FLOW	TOTAL FLOW	MAX VEL
Number	Each	l/s	l/s	l/s	m/s
Building 1	87	6.86		6.86	1.60
Building 2	270	15.58		15.58	1.60
East Site Total	357	19.31		19.31	1.60

Expected Peak Flow Rates			
	Residential (L/s)	Commercial (L/s)	Total peak flow rate (L/s)
East Site	19.31	2.64	21.95

4.5 APPENDIX D – LP CONSULTING SEWER DIVERSION CONCEPT



BASEMENT DETAIL PLAN
SCALE: 1:500



6	ISSUE FOR TENDER	L.P.	18.04.19
5	ISSUE FOR TENDER	L.P.	13.03.19
4	ISSUE FOR TENDER	L.P.	11.03.19
4	ISSUE FOR SYDNEY WATER APPROVAL	L.P.	07.03.19
3	ISSUE FOR PENRITH CITY COUNCIL	L.P.	26.02.19
	PERMISSION TO ENTER		
2	ISSUE FOR CLIENT REVIEW	L.P.	13.08.18
1	ISSUE FOR CLIENT REVIEW	L.P.	22.06.18
No.	AMENDMENT DESCRIPTION	BY	DATE

WORK AS CONSTRUCTED CERTIFICATION		 SYDNEY WATER CORPORATION	
DEVELOPER		Case No. 171557WW SHT 2 OF 5 SHTS.	
W.S.C.			
CONSTRUCTOR			
COMPLETED			
W.A.C. PREPARED		SYDNEY WATER CORPORATION I CERTIFY THAT THE WORKS HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH THE WORK AS CONSTRUCTED DRAWINGS FOR DETAILS OF SERVICES SEE SHEET 1	