

8 – 10 New Mclean Street, Edgecliff

Services Infrastructure Report

Prepared for: Mount St 4 Pty Ltd

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Date: 14 November 2023

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Revision

Revision	Date	Comment	Prepared By	Approved By
A	06.03.2023	Draft Issue for Review	PM, TH, JB	RB
B	27.07.2023	Issue for Approvals	PM, TH, JB	RB
C	14.11.2023	Updated section on flooding	PM, TH, JB	JB

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1. Introduction

The purpose of this report is to provide Mount St 4 Pty Ltd and Landmark Group with information on the current provision and condition of the existing public utilities and likely authority requirements to support the new development. The report also identifies opportunities for utility infrastructure provision for future development of the sites.

This report is based on the following sources of information:

- Dial Before You Dig information.
- Publicly available information.

At this time, no discussions have been had with authorities for the project. The expectation is that once the risks and opportunities are defined and communicated to internal stakeholders, the strategy and approach to instigating discussions with external stakeholders will be developed.

Limitations of this report are as follows:

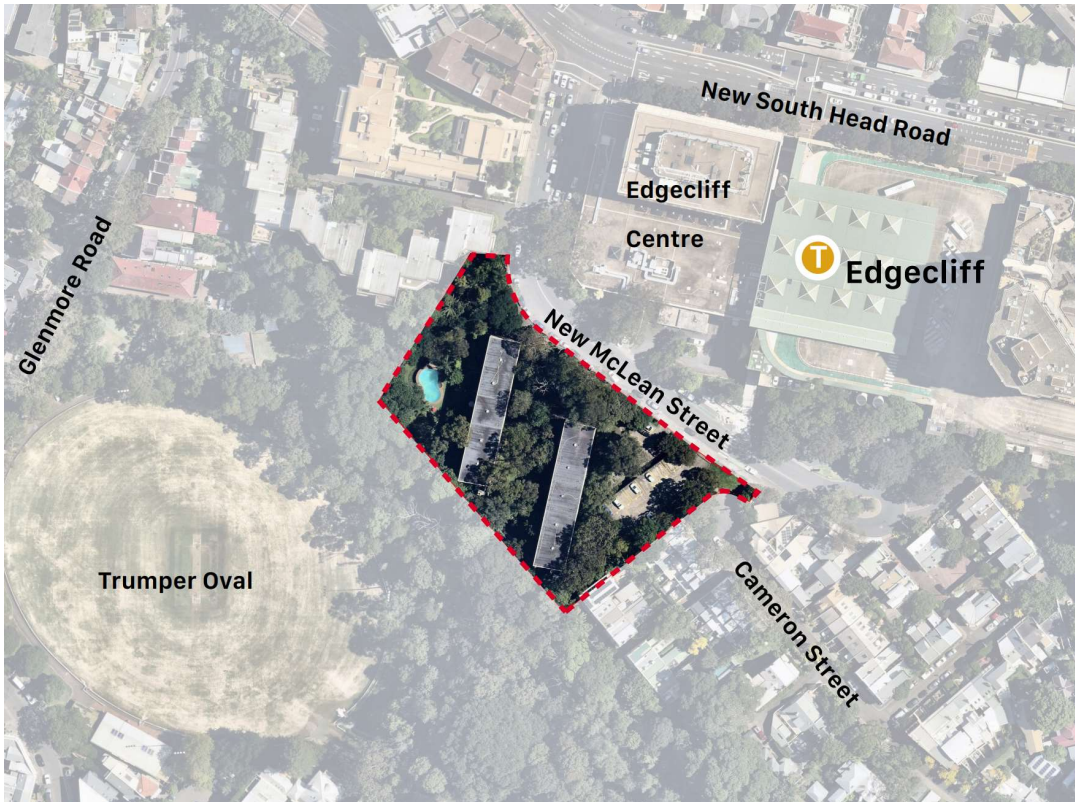
- No calculations were performed to check system capacities.
- No taking or testing of material samples was carried out.
- All information provided by others; particularly verbal information has been taken at face value.
- No testing for or advice is provided with respect to asbestos, microbiological or other contaminants.
- No detailed survey and detailed authority information is available.
- No formal discussions with Authorities (feedback only available through a formal submission).



2. Site Information

The proposed project site is located at New McLean Street, Edgecliff and is part of a development site having an area of approximately 7,225m². There are two multi-story residential buildings on the existing site and these buildings are serviced by driveways accessed via New McLean Street.

The image below indicates the site and location of the existing buildings.



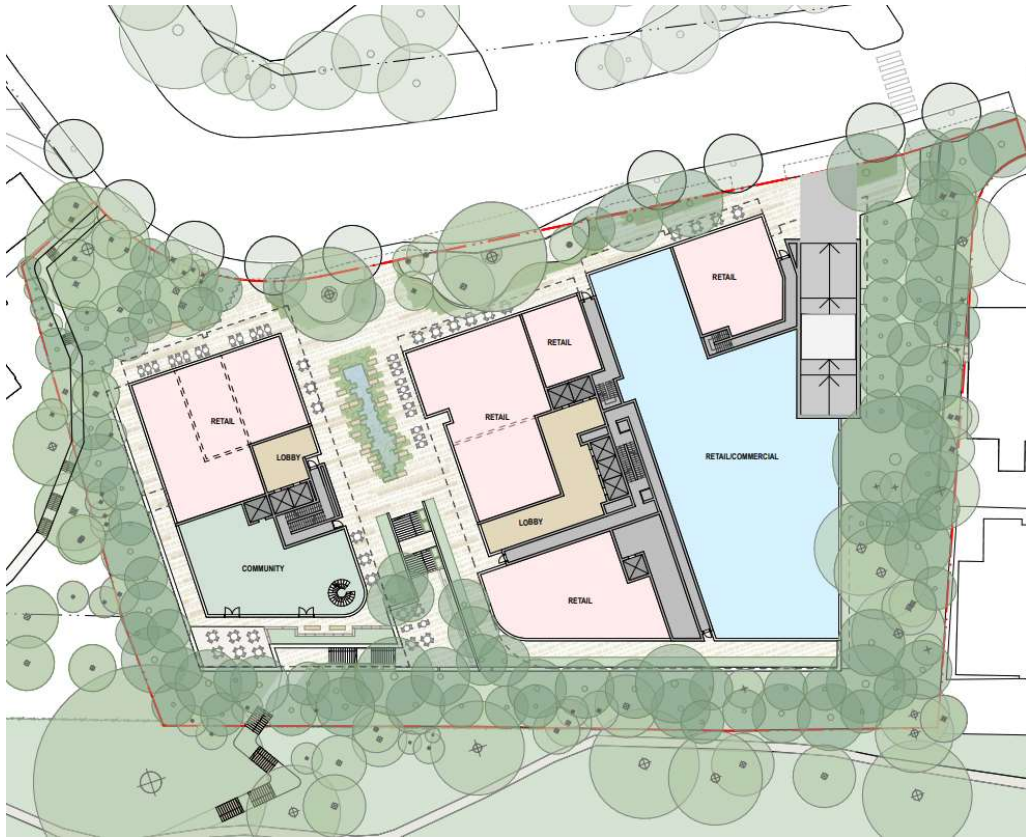
3. Proposed Development

The proposed development is on New Mclean Street, Edgecliff. The design of the proposed development is currently under design progression with FJMT and Landmark, however, the current proposal includes the following:

Principal/Client	Mount St 4 Pty Ltd
Site Address	8-10 New Mclean St, Edgecliff
LGA	Woollahra Council
Lot & DP	SP20548
Site Area	7226 m2
Planning proposal description	Amendment to Woollahra Local Environmental Plan 2014 as it applies to Nos. 8-10 New McLean Street, Edgecliff to insert an “Additional Permitted Use” clause for the subject site to permit food and drink premises, increase the maximum height of buildings standard to RL110m (23 storeys), and increase the FSR development standard to 4.5:1
Reference Scheme	FJC have prepared a reference scheme outlining how the proposal would accommodate the additional GFA and height standard while providing for improved urban design outcomes.
Current FSR	0.75:1
Proposed FSR	4.5:1
Affordable Housing	5% of residential GFA uplift
Current Site	Apartment building with 106 units total, est. 50 studios 44 1bedroom units and 12 2 bedroom units

The current master planning layout for the development is shown in the below figures.





4000 — Programmatic Section
Mount Street 4 Pty Ltd — 8-10 New McLean Street, Edgecliff

Scale 1:500 @ A3
0 5 10 20m



4. Authority Infrastructure Cost Estimates

Approximate cost estimate:

Services Description	Estimate
Water connection	\$20,000
Gas Connection (By Authority pending mains capacity)	Authority works
Sewer Anticipated Connection West – (Note excludes any works for disconnection of existing sewer infrastructure)	\$30,000
Sewer Anticipated Connection South – (Note excludes any works for disconnection of existing sewer infrastructure)	\$30,000
Sewer diversion and augmentation – (Note excludes protection and augmentation of services not directly impacted by the proposed building footprint)	Scope to be developed as part of section 73 and WSC. (\$250,000 - \$300,000)
Stormwater Infrastructure (OSD, Water Quality, External Drainage)	\$400,000
Substation provisions as described within the report.	\$400,000 to \$700,000
11kV feeder upgrades	\$100,000 to \$150,000
Ballpark Total	Approx \$1,230,000 to \$1,630,000



5. Electrical Services

5.1 Power Network

5.1.1 Existing Supply Authority LV Network

The site has an existing LV connection to 8 McLean St and 10 McLean St. These connections originate at the substation S003167 within the Edgecliff Centre carpark. These connections are likely 400A feeders each.

Below is a clip from the Ausgrid WebGIS showing the low voltage distribution network.



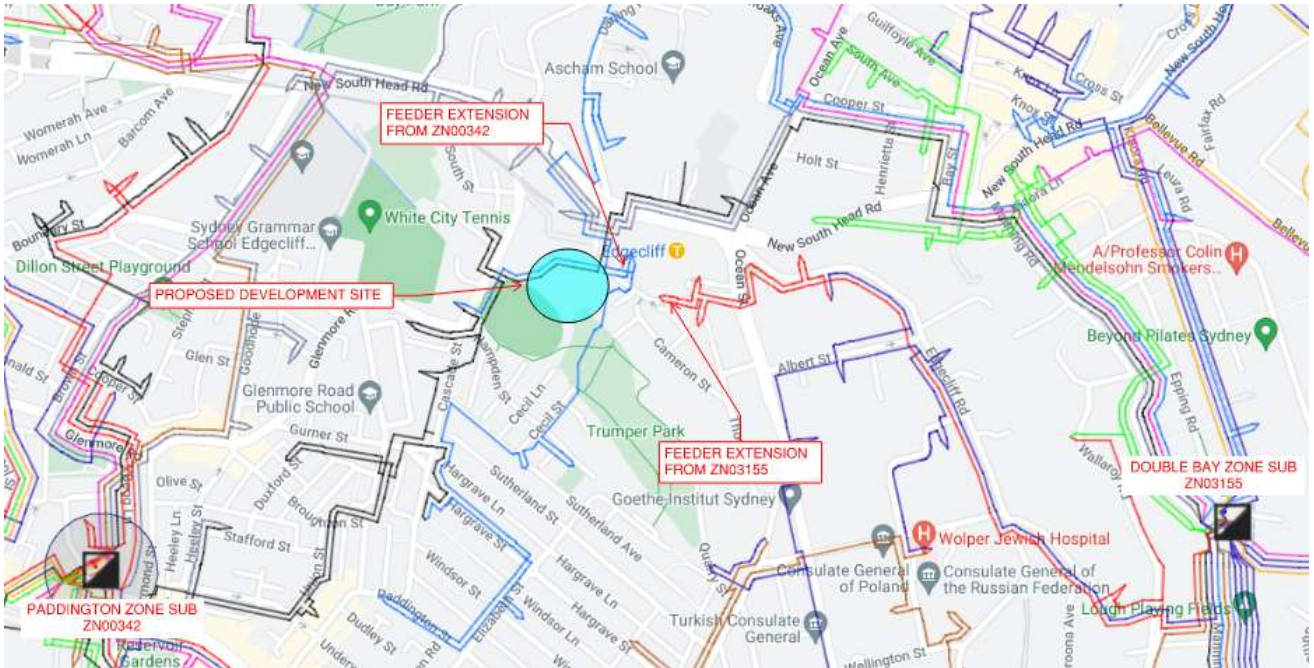
Ausgrid WebGIS extract showing LV network

5.1.2 Existing Supply Authority HV Network

The distribution substation S03167 is fed from the Paddington zone substation ZN00342. An application is required to be made to Ausgrid to confirm the capacity available in the zone substation to feed the new development. There is another HV feeder cable which feeds substation S36097 which originates at the Double Bay zone substation NZ03155.

Interface with Ausgrid can be through a Preliminary Enquiry to obtain the understanding of capacity in zone substations to better concept plan the proposed works in the street or straight to an application where the load is requested and the process moves into design.

The following clip from the Ausgrid WebGIS shows the high voltage distribution network in the region:



Ausgrid WebGIS extract showing HV network

5.2 Calculated Maximum Demand

The maximum demand of the site has been calculated to be approximately 2832A.

MAXIMUM DEMAND CALCULATION						DATE	6-Mar-23	
PROJECT NO	301351173 8-10 McClean St Edgecliff							
	Total Site apartments and other areas					295		
AS/NZS 3000:2018 Wiring Rules Table C1								
TABLE C1						Number of Units per Phase	99	
						A/C load per unit in Amps	15	
						HW load per unit in Amps	0	
	1	2	3	4	5			
LOAD GROUP	DESCRIPTION	Single Domestic electrical installation	2 to 5 Units per Phase	6 to 20 Units per Phase	21 or more Units per Phase	LOAD		
Ai	Lighting	3A for 1 to 20 points + 2A for each additional 20 points or part thereof	6A	5A + 0.25 per unit	0.5 per unit	50		
Aii	Outdoor lighting	75% of connected Load	No assessment for purpose					
Bi	Socket Outlets not exceeding 10A	10A for 1 to 20 points + 5A for each additional 20 points or part thereof	10A + 5A per living unit	15A + 3.75A per living unit	50A + 1.9A per living unit	238		
Bii	Socket Outlets not exceeding 10A (SSO above 2.3m, perm installed heatering or combination SSO) in Buildings with Permanent heating/cooling	10A						
Biii	Socket Outlets exceeding 10A (SSO above 2.3m or combination)	15A						
C	Appliances for cooking, instant water heaters, heating and cooling	50% of connected load	15A	2.8A per living Unit		277		
D	Fixed space heating or air conditioning equipment, saunas or socket outlets rated at more than 10A	75% of connected load					1238	
E	Instantaneous water heaters	33.3% of connected load	6A per living Unit	100A + 0.8A per unit		0		
F	Storage water heaters	33.3% of connected load	6A per living Unit	100A + 0.8A per unit		0		
G	Swimming Pools, Spas	75% of largest spa, plus 75% of largest swimming pool, plus 25% of remainder					0	
Loading not associated with individual units - connected to each phase (communal lighting, laundry, lifts, motors etc)								
H	Communal Lighting	N/A		Full connected load			50	
I	Socket outlets not included in groups J and M below. Permanently connected electrical equipment not exceeding 10A	N/A		2A per point, up to maximum of 15A			15	
Ji	Appliances rated at more than 10A : Clothes dryers, water heaters, self heating washing machines	N/A		50% of connected load				
Jii	Appliances rated at more than 10A : Fixed space heating, air conditioners	N/A		50% of connected load				
Jiii	Appliances rated at more than 10A : Spa and swimming pool heaters	N/A		75% of largest spa plus 75% of largest swimming pool, plus 25% of remainder			20	
Jiv	Charging equipment associated with electric vehicles	Full connected load		100% connected load	90% connected load	75% connected load	120	
K	Lifts	Largest lift motor : 125%, next largest lift : 75%, Remaining lift motors : 50%					320	
L	Motors	Largest motor : 125%, next motor : 75%, Remaining motors : 50%						
M	Appliances, including socket outlets other than those set out in groups A to L above	Connected load 10A or less : no assessment ; Connected load over 10A : By assessment		Connected load 10A or less : no assessment ; Connected load over 10A : By assessment				
Other	Carpark (m ²)	6000 @ 10W/m2		60			96	
Other	Community (m ²)	1000 @ 60W/m2		90			144	
Other	Retail (m ²)	1000 @ 120W/m2		180			289	
TOTAL						2857		

The maximum demand is calculated to be 2857A which is 2050kVA.

The following assumptions have been made on the maximum demand calculation:

- 6 x lifts with 80A load.
- 10 x 16A electric car chargers running at 75% capacity.
- 6000m² basement
- 100W/m² for retail and 60W/m² for community areas.
- 15A for air conditioning per apartment
- 2.8A for cooking per apartment, this figure is proposed in the AS3000 Table C1 calculation. This figure assumes gas within the development. For a no gas cooking calculation, the calculation increases to 5A per apartment. For 5A per apartment the total maximum demand is 3074A ~ 2200kVA

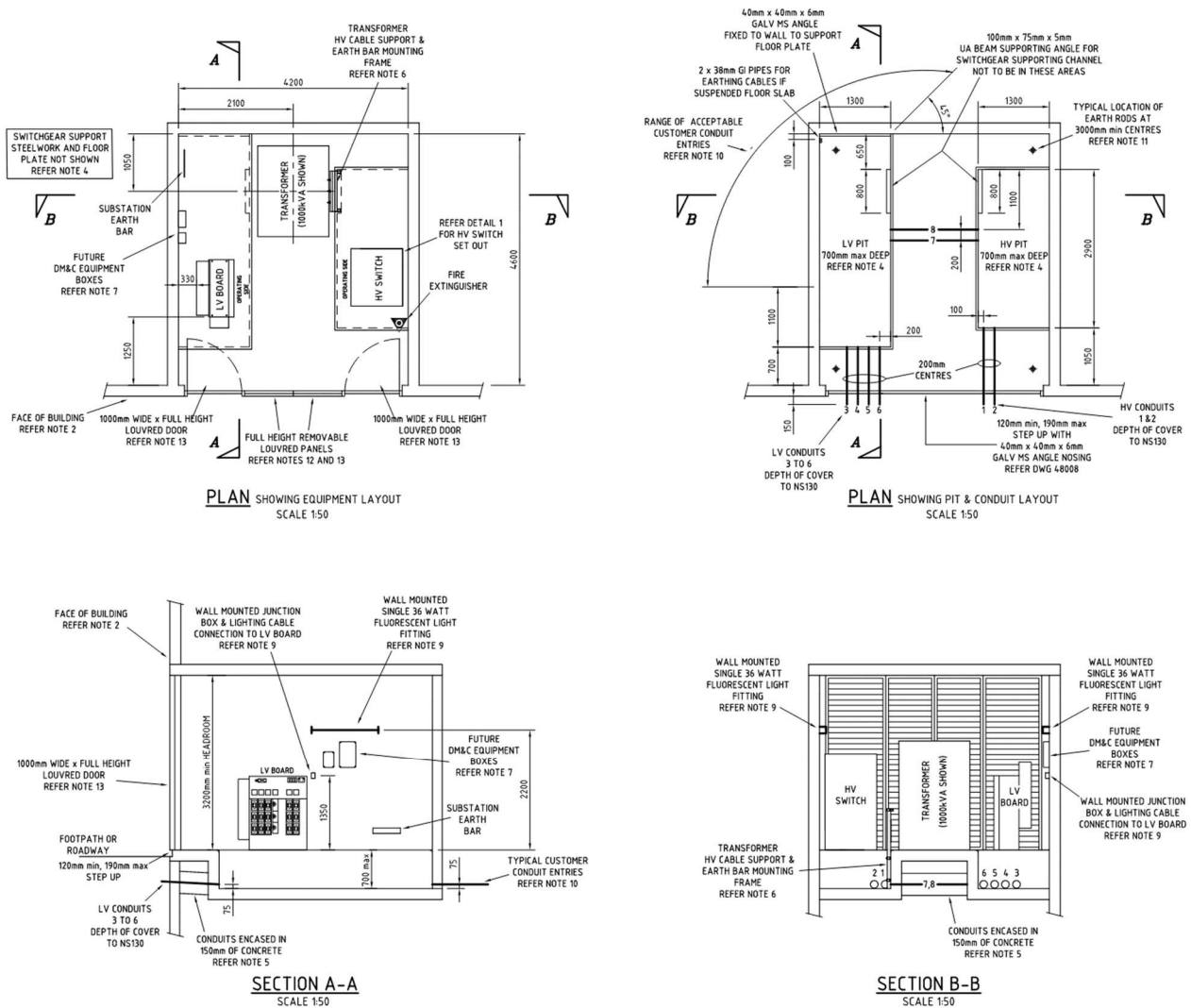
Further refined maximum demand calculations may be able to be undertaken once the extent of the development is defined to keep the maximum demand under 2000kVA.



5.3 Proposed Supply Arrangement to New Development

The new power supply is proposed to be fed from a new chamber or two surface chamber substations to obtain 2MVA of capacity. The clip below shows the plans and sections of the surface chamber substation, these are required to be on ground level. A full chamber substation may be provided on one level below ground, this will require 4m floor to floor height, two dedicated exits and approximately 150m² area. A chamber substation will require bespoke design.

Should the development increase in size or power demand, there is a high likelihood that additional load above 2MVA will be required. The design works well with the two surface chambers, additional load will be an increase in electrical complexity.



Ausgrid Standards extract showing surface chamber

5.4 Street and Area Lighting

Street lighting shall be provided in accordance with local council requirements.



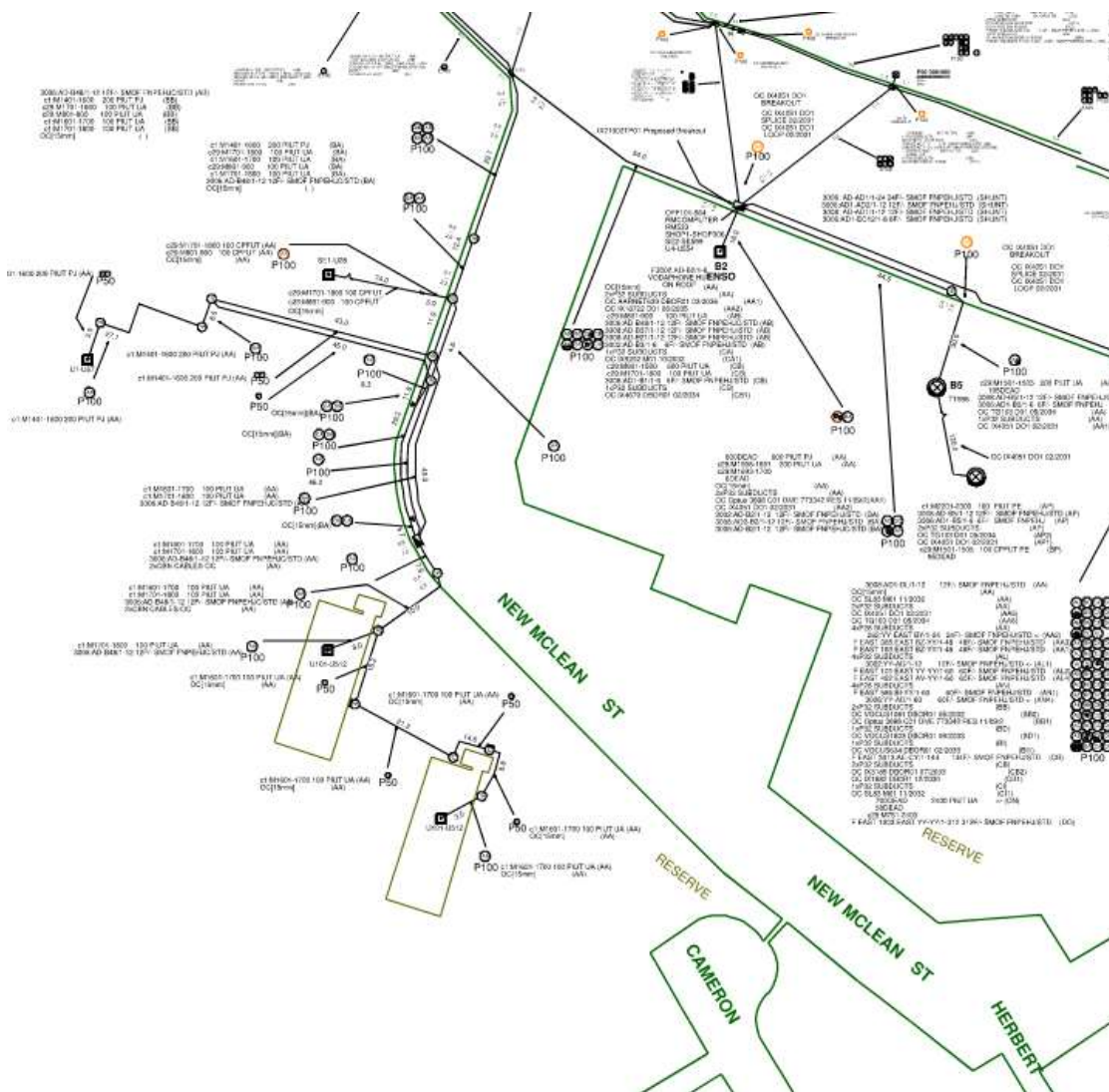
5.5 Telecommunications

5.5.1 General

NBN network cabling shall be provided throughout the streets to supply the developments. The incoming cabling shall be reticulated from McLean St and run through pits along the street front. Connection to the building shall be provided by the building developers.

5.5.2 Existing Infrastructure

The existing infrastructure in New McLean St is Telstra registered NBN networks servicing the existing properties. Aussie Broadband, Vocus, TPG Telecom and AARNet have assets on New South Head Road which will be easily extended to the new proposed development if the project requests it.



6. Hydraulic Services

The hydraulic services in the following section provides information regarding existing infrastructure across the flowing key utilities;

- Water Supply Network – Network Authority, Sydney Water
- Sewer Network – Network Authority, Sydney Water
- Natural Gas Network – Network Authority, Jemena

6.1 Water Supply

DBYD plans have indicated Sydney Water, water assests within proximity to the subject site.

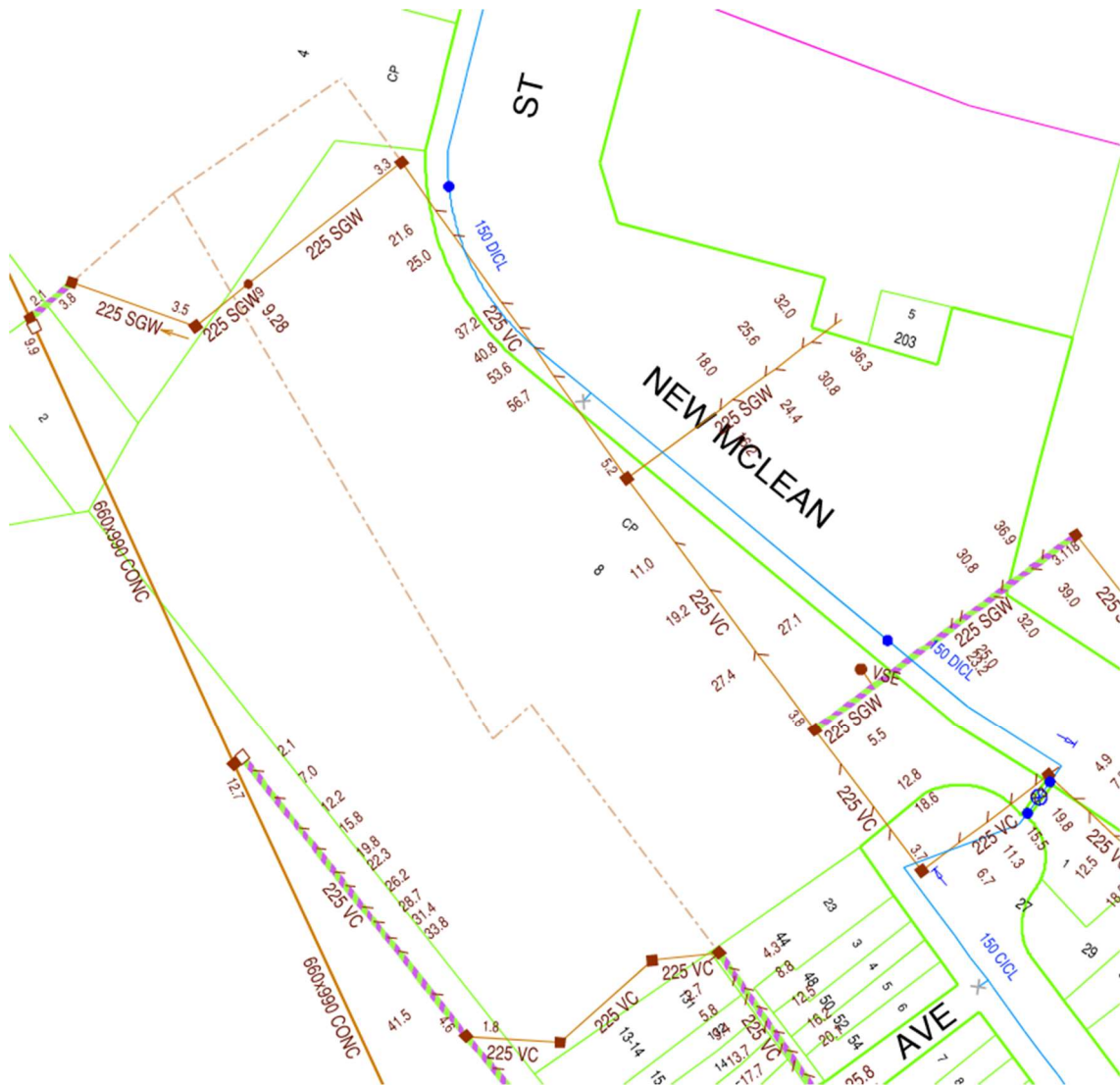


Figure 6.1

This includes the following;

- Ø150 Sydney Water potable water main located on Southern side of New McLean Street.



POTABLE WATER CAPACITY

The approximate domestic potable cold-water demand for the development is 114,036L/day based on Sydney Waters average daily water usage data for the property development type. This may vary depending on the final development product and system selections. Refer to Appendix A for further reference.

Residential

Gross floor area:	24,573 m ²
Average demand:	3.34 L/m ² /day
Potable water demand:	82,073 L/day

Retail

Gross floor area:	2,295 m ²
Average demand:	2.48 L/m ² /day
Potable water demand:	5,692 L/day

TOTAL POTABLE WATER DEMAND: 87,764 L/day

FIRE WATER CAPACITY

Fire Hose Reel System

A fire hose reel will be required to be installed as follows.

Class 7 Basement Carparking – FHR Required

Class 6 Retail – FHR Required

Class 2 Residential – FHR Not Required

A fire hose reel system requires 0.66L/sec @ 220kPa (2x fire hose reels operating simultaneously) pressure and flow for fire-fighting purposes.

The pressure and flow requirements will be achieved via connection to the authority water main and with the use of on-site pressure boosting pumps.



6.1.1 Existing Water Infrastructure

The Water Supply Authority for the area is Sydney Water. The site is serviced by existing water main in New McLean Street. Refer to Figure 6.1.1 for existing water infrastructure. This information is preliminary only and subject to discussion with Sydney Water. Any advice from Sydney Water coordinator during the section 73 application process will override the below information. The pressure and flow inquiry to determine the expected maximum and minimum pressure available in the water main modelled to existing demand conditions from the location as shown below;

The pressure and flow inquiry results are yet to be received and will be attached Appendix when received.

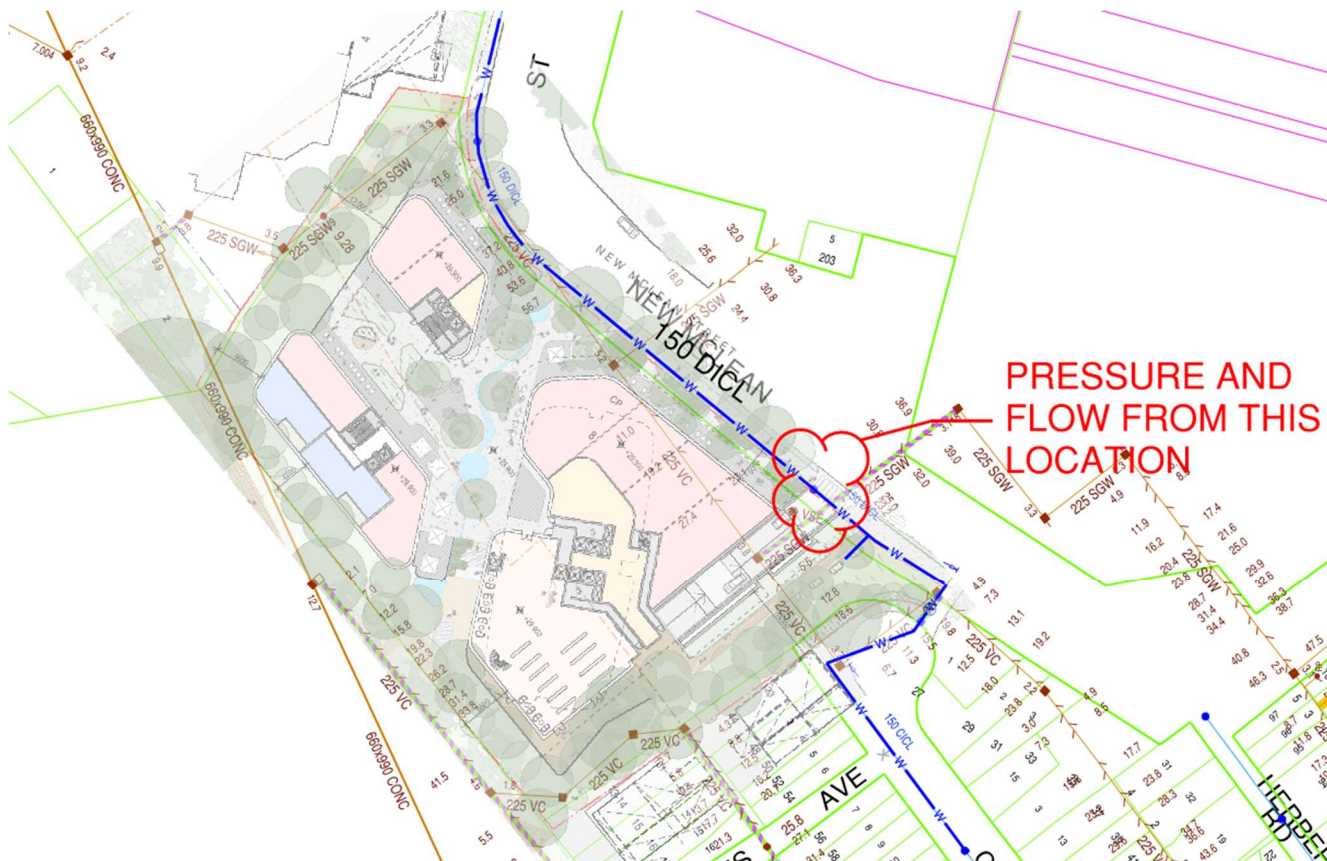


Figure 6.1.1

Fire Hydrant and Fire Sprinkler System

A development of this nature will trigger the requirement for an on-site fire hydrant and automatic fire sprinkler system to be installed throughout the development (all building classes).

It is anticipated the most efficient method of delivering this requirement would be through the implementation of a combined fire hydrant and fire sprinkler system. The combined flow rate for the fire hydrant and fire sprinkler system is anticipated to be within the range of 20 - 40L/sec.

Due to the development having an effective height greater than 25m a fire water storage tank will also be required. It is anticipated that the fire water storage tank will need to have an effective volume of approx. 80,000L or 80m³.

The pressure and flow requirements for the combined fire hydrant and fire sprinkler system will be achieved via connection to the authority water main and with the use of on-site pressure boosting pumps and water storage tank.

Further investigations into the existing infrastructure is required to identify any opportunities and/or risks that may be present for the development.



We anticipate the Ø150 CICL water main that extends down New Mclean Street to be most suitable to supply parts of the development. We expect this water main to be capable of supply the required domestic water and water for fire-fighting purposes for the development. Where the water main is deemed to be at capacity, the water main would require amplification from the existing Ø375 CICL water main in New South Head Road. This will be further developed upon application with Sydney Water for the Section 73 Compliance Certificate as part of the DA requirements. Refer to Figure 6.1.2 for proposed connections. This information is provided without receipt of the pressure and flow statement from Sydney Water.

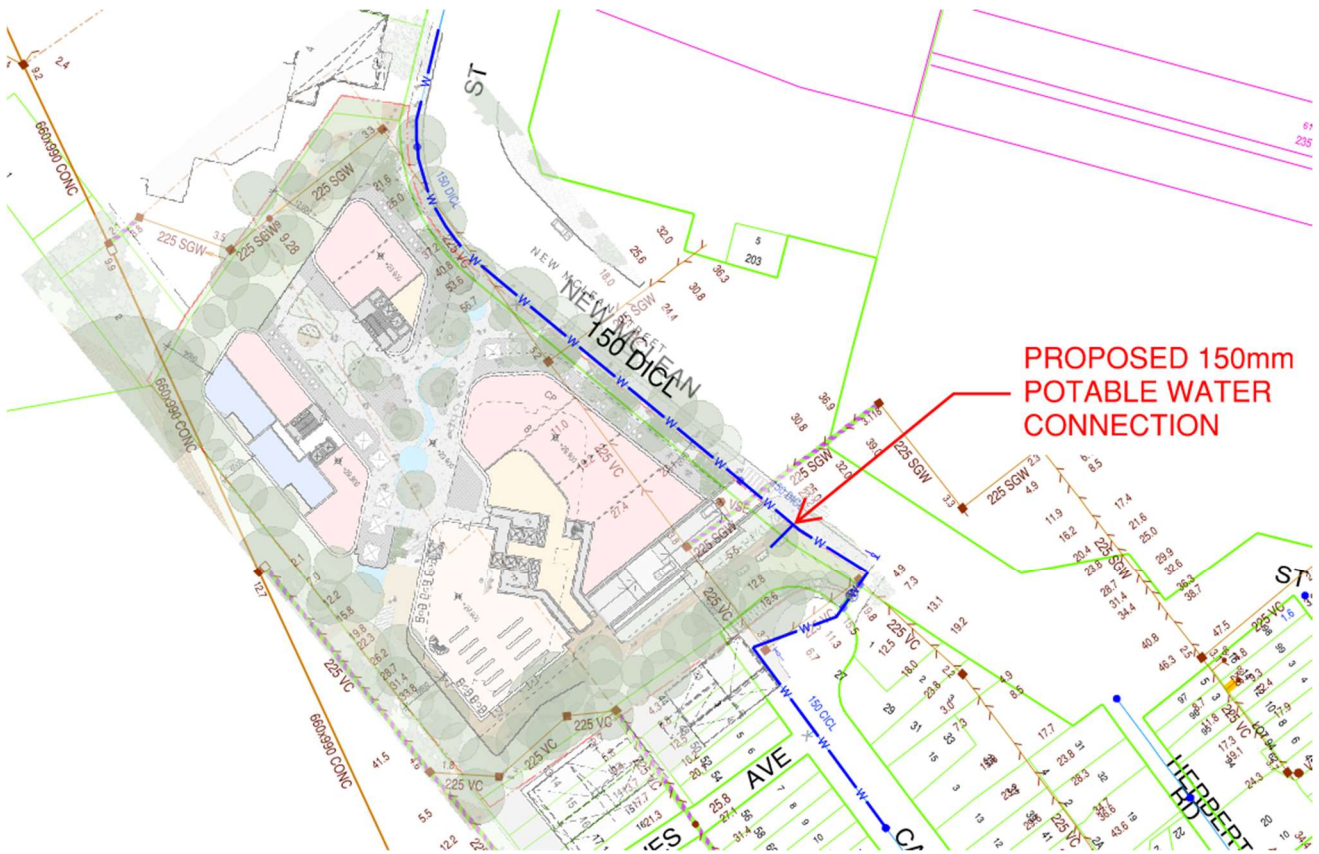


Figure 6.1.2



6.2 Sewer

DBYD plans have indicated Sydney Water, sewer assets within proximity to the subject site.

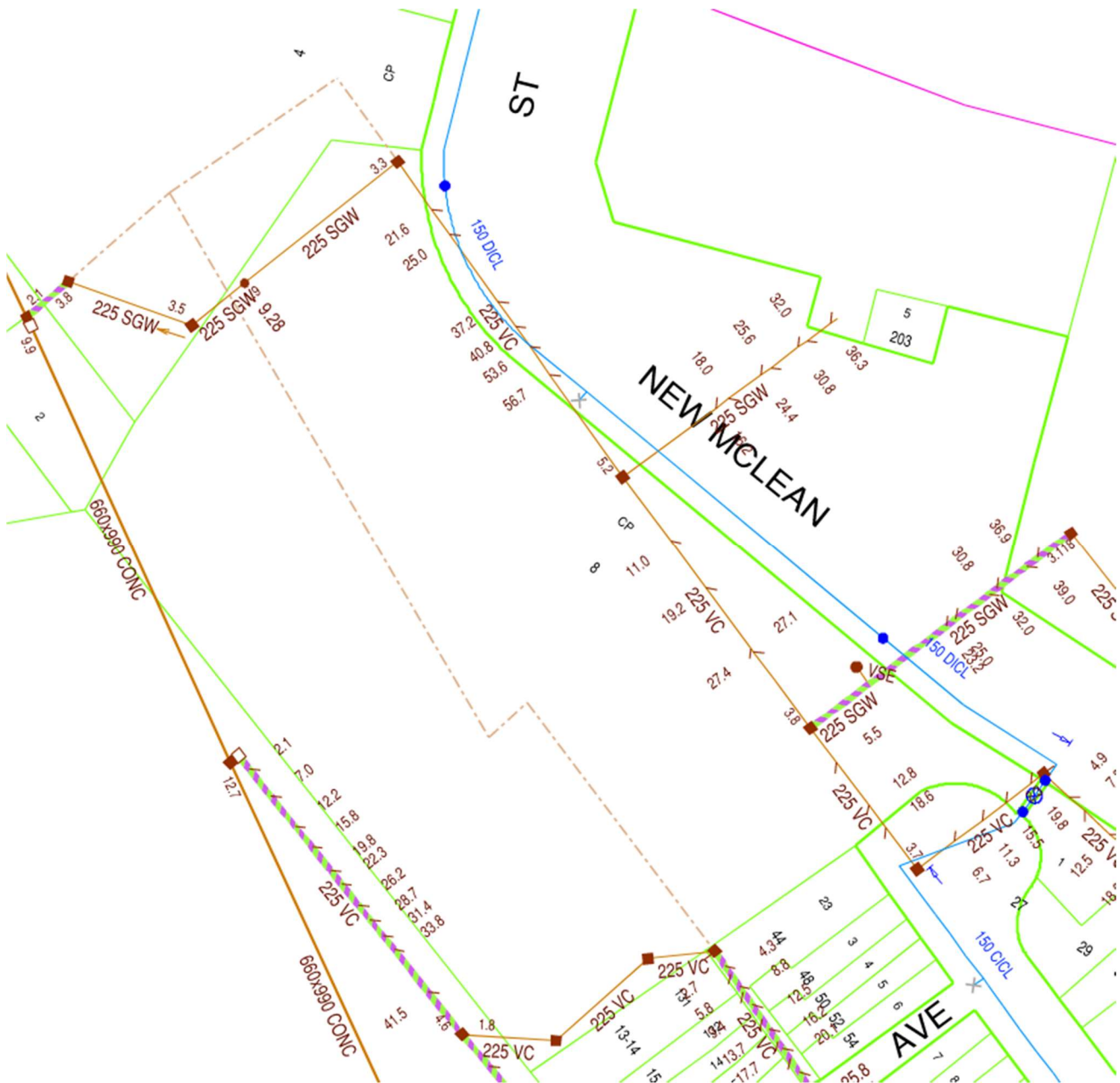


Figure 6.2

This includes the following;

- Ø225 Sydney Water sewer main located within the site along the Northern boundary.
- Ø225 Sydney Water sewer main located within the site along the Western boundary.
- Ø225 Sydney Water sewer main located within the site along the Eastern boundary.
- Ø225 & Ø600 x Ø900 Sydney Water sewer main located within the site along the Southern boundary.



SEWER CAPACITY

- The approximate sewer demand for the development is 91,229L/day (80% of Water Usage) based on Sydney Waters average daily water usage data for the property development type. This may vary depending on the final development product and system selections.

Residential

Gross floor area:	24,573m ²
Average demand:	3.34 L/m ² /day
Sewer demand:	82,073L/day

Retail

Gross floor area:	2,295 m ²
Average demand:	2.48 L/m ² /day
Sewer demand:	5,692 L/day

TOTAL DISCHARGE TO SEWER (80% OF WATER USAGE): 70,211 L/day



6.2.1 Existing Sewer Infrastructure

Existing Infrastructure The Sewer Authority for the area is Sydney Water. The site has access to existing sewer mains situated along all boundaries. The Ø225 VC sewer main is reticulating through the site along the North, West and East Boundaries. Refer to Figure 6.2 for existing sewer infrastructure.

We anticipate that 2 x Ø225 sewer main connections will be required to service the development. It is expected that the Ø225 sewer main that extends along the Southern boundary to have sufficient capacity to service the development. We anticipate a secondary connection to the Ø225 sewer along the Western boundary to have sufficient capacity to service the development. We anticipate the above connection be most suitable point of connection for the development. The existing sewer mains would be within the building footprint of parts of the development and will require argumentation to be diverted around the building. This information is preliminary only and is subject to discussions with Sydney Water. Any advice from the Sydney Water coordinator during the section 73 application process will override the above preliminary information.

Critical Issue – Existing authority sewer main is located within the proposed development footprint. This sewer main services the surrounding residential properties and will be required to be diverted around the building footprint. Sydney Water may also deem other assets within close proximity to the building footprint to be at risk and require augmentation or protection. A water services coordinated will be required to develop a design. Refer to figure 6.2.2 for preliminary information.

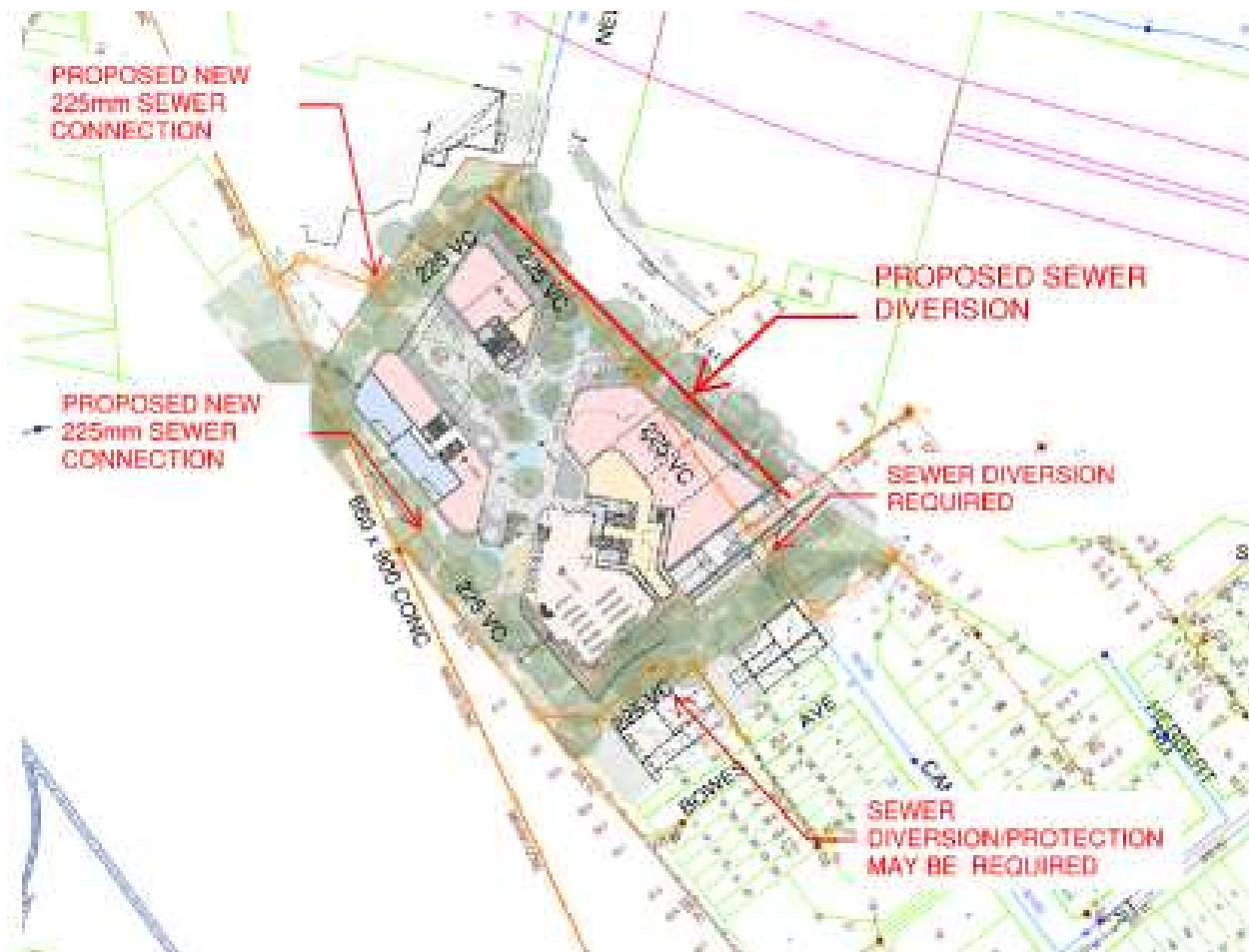


Figure 6.2.2

6.3 Gas

DBYD plans have indicated Jemena, natural gas assets within proximity to the subject site.

6.3.1 Existing Gas Infrastructure

The Gas Authority for the area is Jemena. The site is serviced by existing high pressure (210kPa) gas mains in New McLean Street. Refer to Figure 6.3 for existing gas infrastructure.

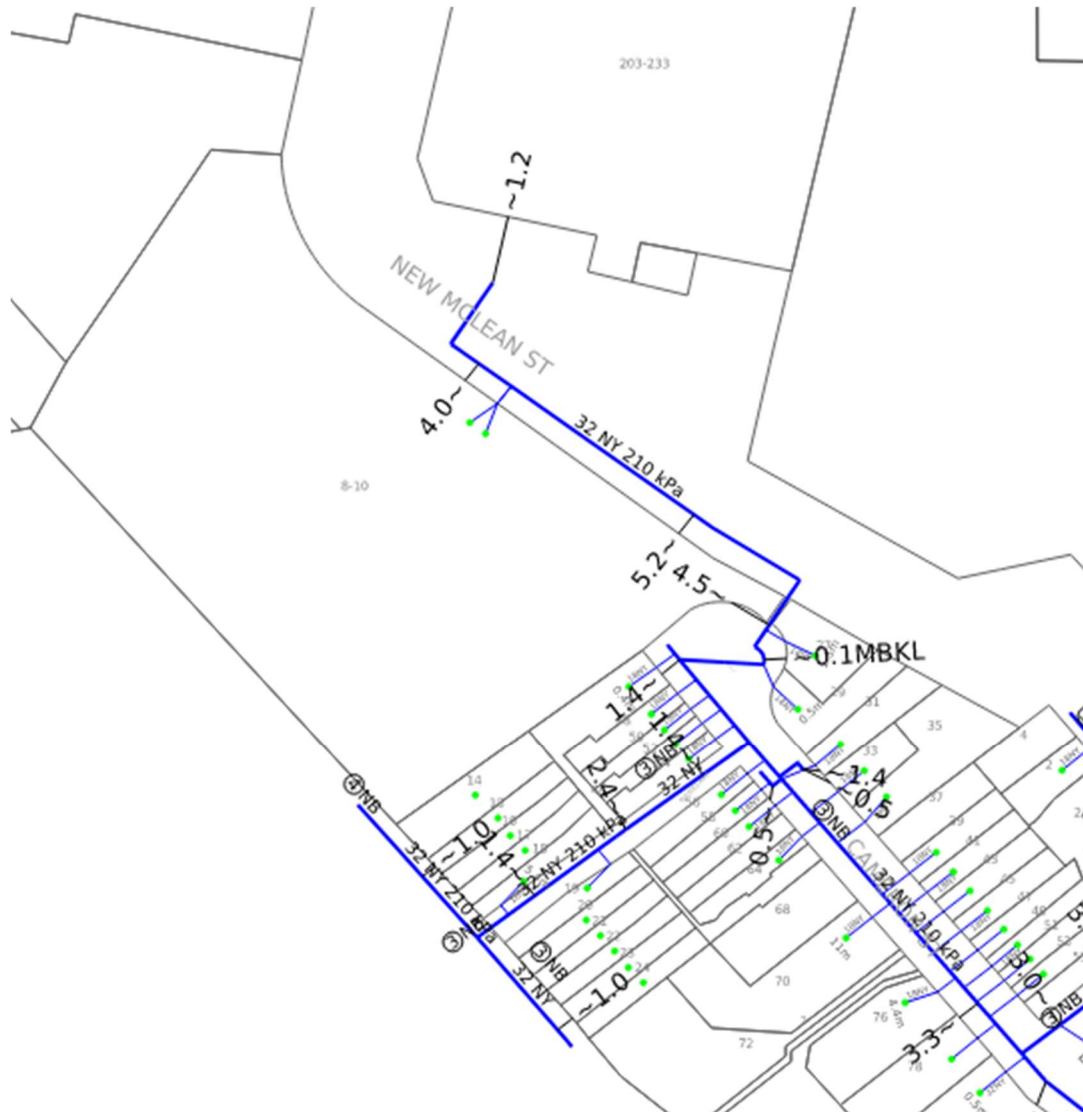


Figure 6.3

This includes the following;

- Ø32 Jemena gas main (210kPa) located in New McLean Street.



We anticipate that the Ø32 natural gas main that reticulates in New Mclean Street will have sufficient capacity however, Jemena is strictly managing any new connection to these networks. Refer to Figure 6.3.3 for the proposed anticipated connection strategy. Whilst the development may not require gas in the future, we recommend contacting Jemena to identify how the development can be serviced if required. This information is preliminary only and is subject to discussions with Jemena.

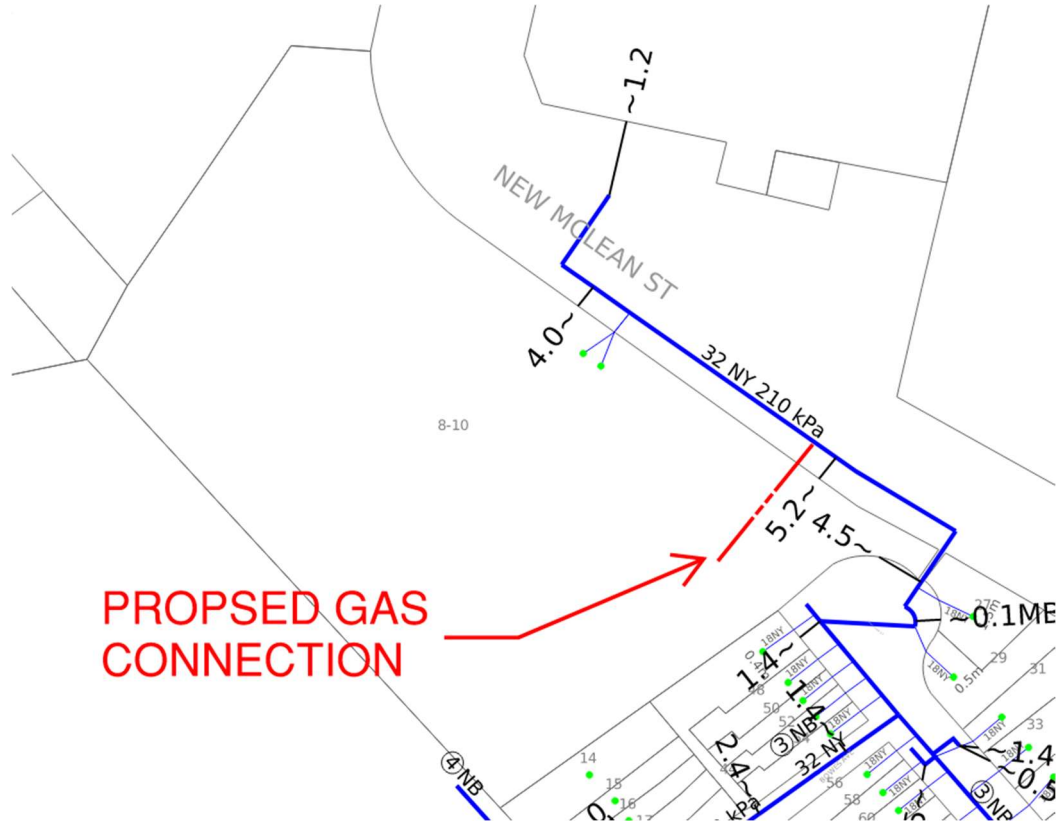


Figure 6.3.3

GAS CAPACITY

The approximate gas demand for the development is 50,125MJ/day based off usage data and operating hours for the proposed gas equipment. This may vary depending on the final development product and system selections.

Residential

Number of apartments:	295 apartments
Gas cooking:	35MJ/hr (1hr cooking per day)
Hot water heating:	4,950MJ/hr (4 hours operation per day)
Gas demand:	30,125 MJ/day

Retail

Retail tenancy:	500MJ/hr (allowance for HW heating & cooking)
Number of:	5 (8 hours of operation per day)
Gas demand:	20,000 MJ/day
TOTAL NATURAL GAS DEMAND:	50,125 MJ/day

Refer to the Electrical services section 5.2 for no gas option relating to cook top electric loads.



7. Civil and Stormwater Services

The civil and stormwater services in the following section provides information regarding existing infrastructure and design policies applicable to the development.

7.1 Existing Civil Infrastructure and Flooding

7.1.1 Site Characteristics



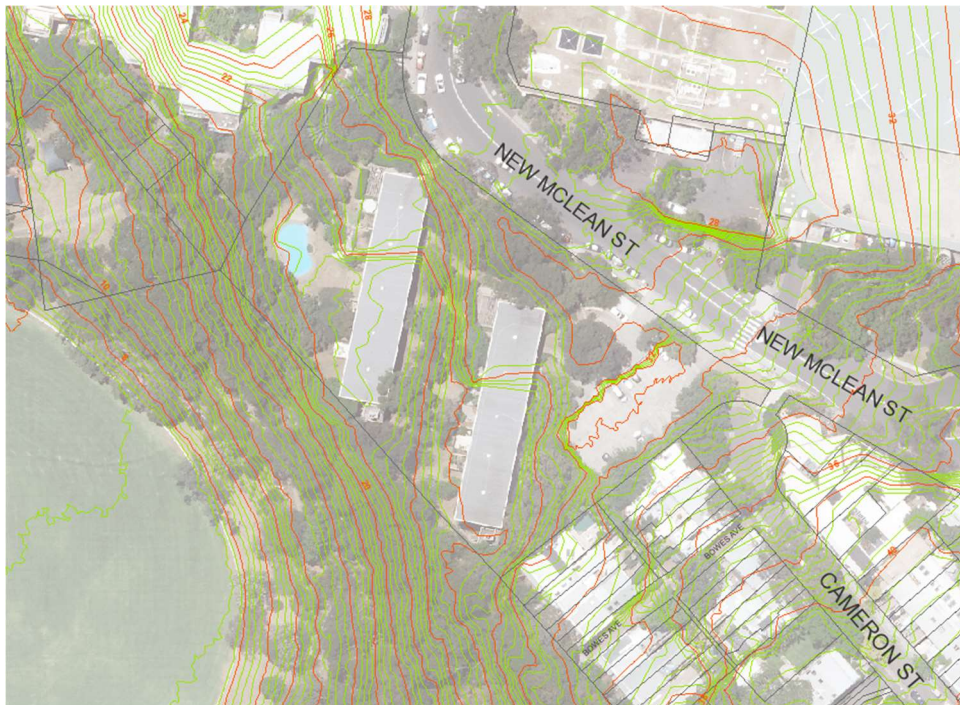
Development Site Location Plan

The proposed development is located on New Mclean Street, Edgecliff, where planning controls need to refer to the Woollahra Municipal Council Development Control Plan (DCP) 2015. This publication identifies civil requirements for land use and grading.

Topography

The local topography around the site shows that the site primarily falls north-east to south-west. The highest point of the site is located at the north-eastern corner of the site at a level of approximately RL 32m AHD and the lowest point is located along the western boundary at a level of approximately RL 17m AHD. This is an average slope of 14%.



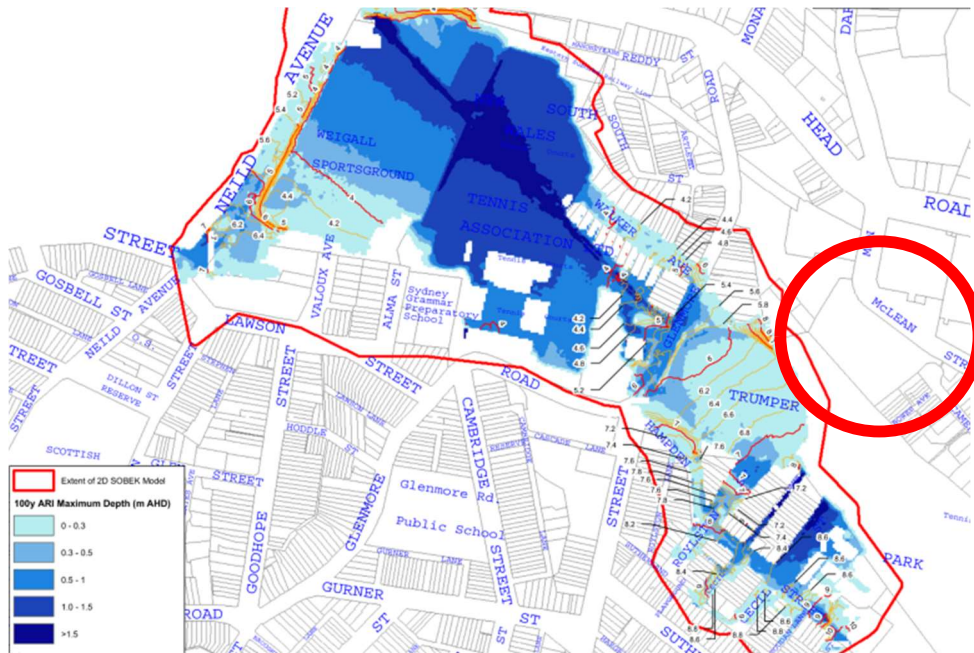


Site Topography (Woollahra Council GIS Mapping)

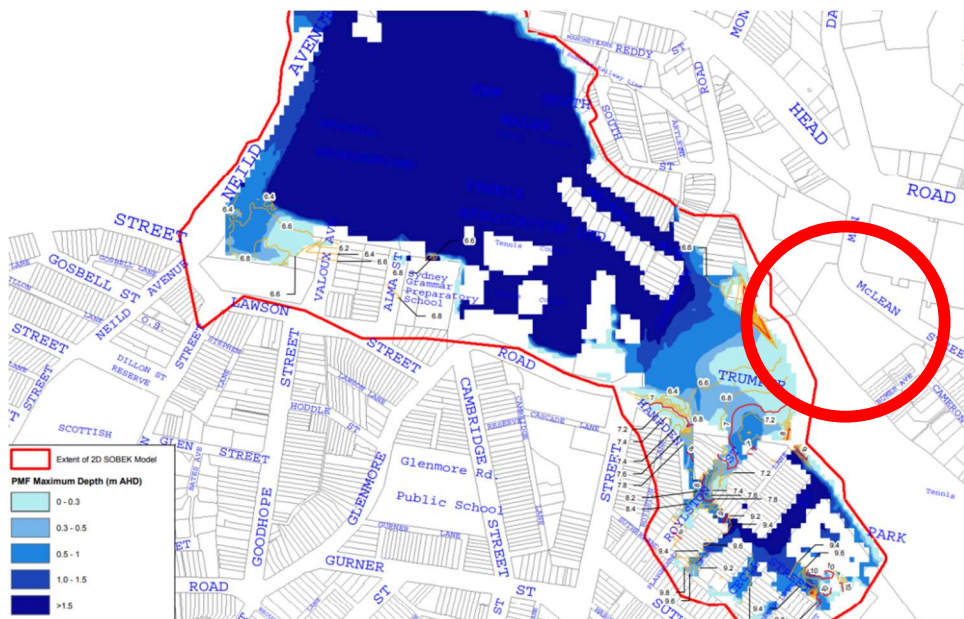
Stormwater Catchment and Flooding

The surrounding area has been investigated to determine the likely impact of existing external stormwater catchments on the proposed site. The site is currently surrounded by residential apartments some residential dwellings and the Trumper Oval parklands. The site is located in the Rushcutters Bay runoff catchment; however, this site is located at the upper sections.

A flood study has been undertaken by Webb, McKeown & Associates Pty Ltd (WMA) for Woollahra Municipal Council for the Rushcutters Bay catchment in October 2007. Within this flood modelling, it confirmed that the site is not subject to flooding in any major storm events. Flooding does exist downstream of the proposed development and in the greater area of Rushcutters Bay and Darling Point. The figures below identify flood extents in the 100yr ARI storm event and PMF events.



100yr ARI Flood Extent and Depths (Source: Rushcutters Bay Flood Study)



PMF Flood Extent and Depths (Source: Rushcutters Bay Flood Study)

However, the subsequent Paddington Floodplain Risk Management Study and Plan undertaken by Catchment Simulation Solutions (2019) assessed the area in more detail, taking into consideration existing infrastructure performance. Within this study, it was identified that areas of floodwater and overland flow existed on the site in storm events greater than the 5% AEP storm event.





1% AEP Flood Extent and Depths (Source: Paddington Floodplain Management Study)

This flood extent is isolated from other overland flow paths and floodways conveying runoff into Rushcutters Bay. This indicates that flood waters on this property are a result of low points in the topography, trapped low points in the stormwater drainage of site, or the stormwater drainage having inadequate capacity. All of the above items can be addressed through the proposed site regrading works and new stormwater infrastructure proposed under the development. It is recommended that upon finalisation of the proposed development and stormwater design, that a detailed flood impact assessment take place to confirm flood conditions adjacent to site are not impacted by the proposed upgrade works to site.

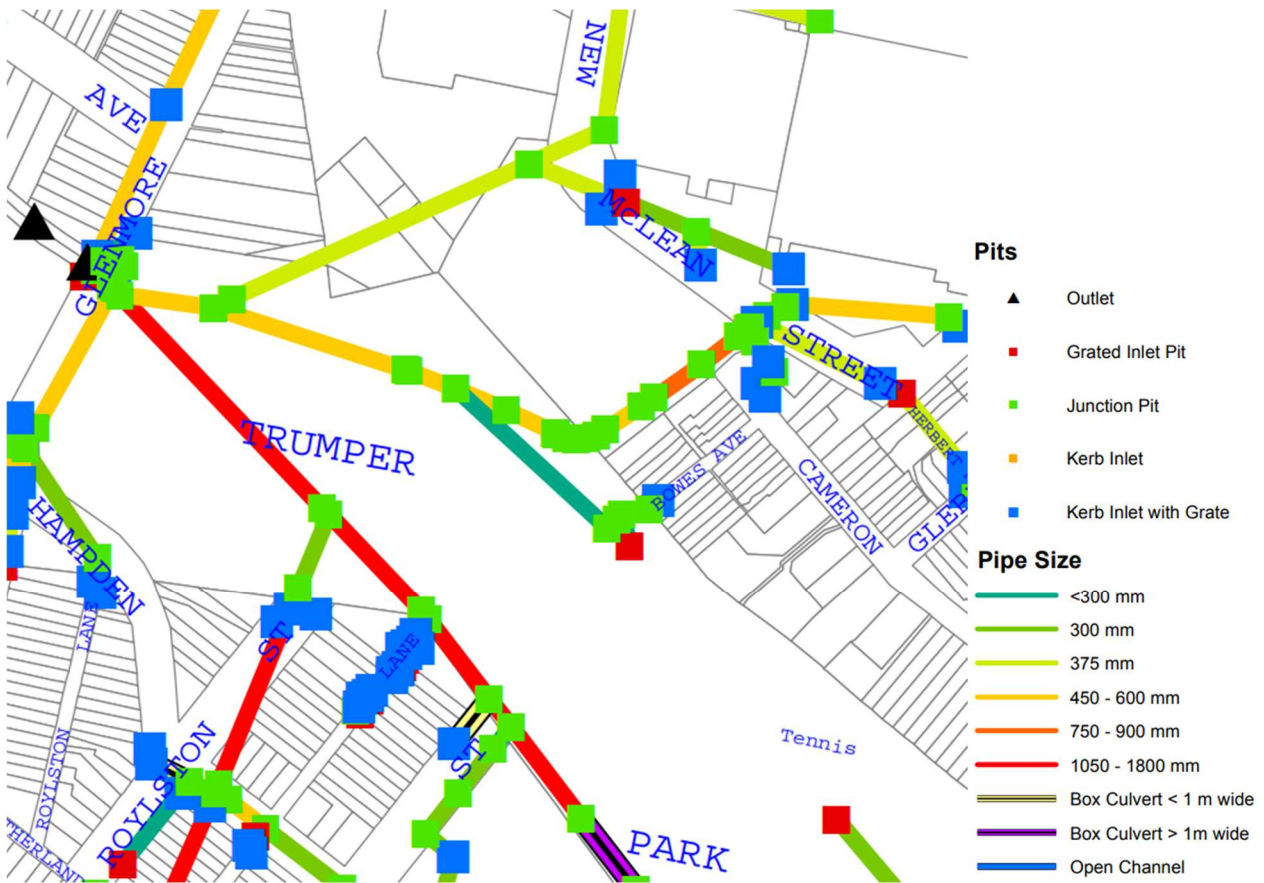
Existing Stormwater Infrastructure

Through review of flood study has been undertaken by WMA for Woollahra Municipal Council for the Rushcutters Bay catchment it has been determined that the site contains pit and pipe infrastructure to convey surface flows and roof drainage to the public stormwater network. This stormwater infrastructure was incorporated into the flood model undertaken by WMA. Within this flood study, the stormwater infrastructure and overland flow paths were assessed for flow and capacity.

Council stormwater infrastructure exists in New Mclean Street in the form of kerb inlet pits. Pipe infrastructure exists along the eastern boundary which conveys stormwater downstream into the Trumper Oval area. It is assumed that the existing multi-storey residential buildings fronting the street are conveyed via a gutter and downpipe system and discharged to this existing infrastructure.

As the flood study is from October 2007, the infrastructure in the vicinity of the development would need to be verified and reassessed as part of any development design.



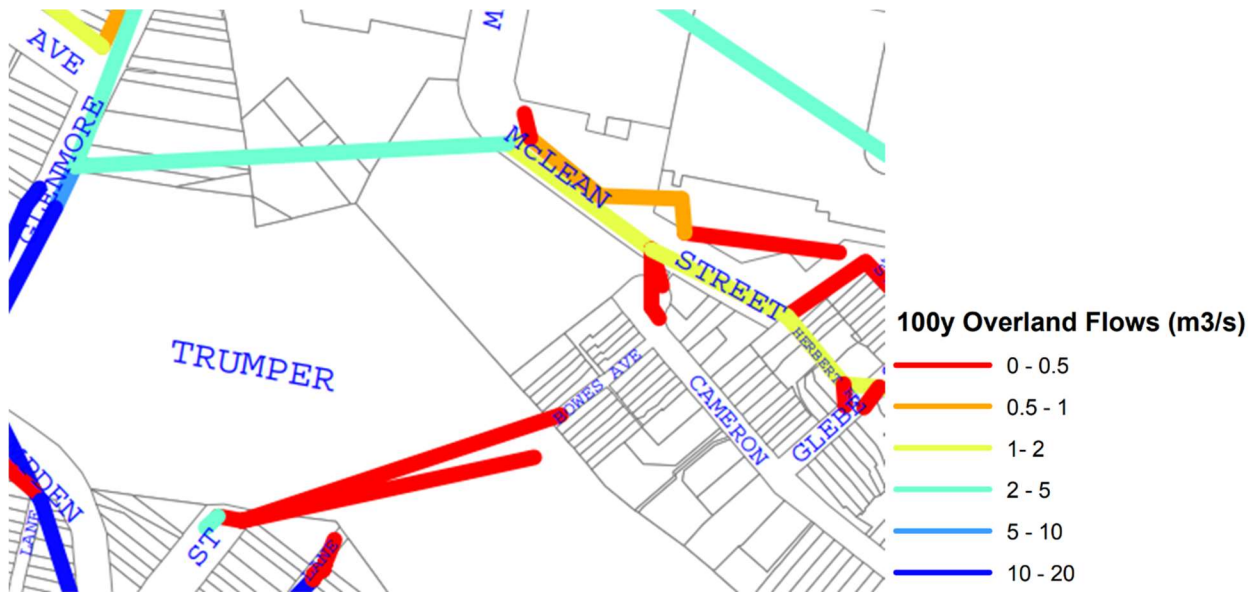


Existing Stormwater Infrastructure (Source: Rushcutters Bay Flood Study)



Existing Stormwater Infrastructure Capacity (Source: Rushcutters Bay Flood Study)





Existing Stormwater 100yr ARI Overland Flow Rates (Source: Rushcutters Bay Flood Study)

Based on the flood study has been undertaken by WMA for Woollahra Municipal Council for the Rushcutters Bay, it appears that the existing inground stormwater infrastructure is in the vicinity of 450mm – 600mm diameter and only designed to manage stormwater flows up to the 5yr ARI storm event. The flood study also identifies overland flow through the site towards Trumper Oval in the vicinity of 1-2 m³/s.

Existing Stormwater Discharge

Due to the falls across the site, the majority of site runoff appears to be directed in a south-westerly direction to the existing stormwater in Trumper Oval and into the downstream open channel that runs towards Rushcutters Bay. The stormwater infrastructure appears to be undersized, so on-site detention (OSD) will need to be integrated as part of the development to limit impact on the existing networks capacity.

7.1.2 Stormwater Infrastructure Upgrades

Existing inground stormwater infrastructure appears to be suitable for reuse to service any new development. As capacity issues exist, any development would be required to manage stormwater discharge in a way that does not impact current capacity. This will best be managed via OSD prior to entering the existing network. OSD will be required to be designed in accordance with Council’s Stormwater Management policy.

7.2 Proposed Site Grading Requirements

Ramps and primary aisles

The minimum dimensions for the design of ramps and primary aisles which do not have direct access to or from parking bays are shown in AS/ NZS 2890.1- Section 2.5 Design of Circulation Roadways and Ramps.

The ramp grading is to be designed to ensure that the breakover angle coming onto, or off, a ramp is not so severe as to cause scraping of a vehicle undercarriage. Design of ramps and gradients will be consistent with AS/ NZS 2890.1.

Turning Paths

The design of turning paths for manoeuvring, parking space access and aisle designs are set out in AS/NZS 2890.1 Appendix B Section B3 Swept Paths for cars (for the B85 vehicle) and AS 2890.2 Part 2: Off-section street commercial vehicle facilities.



Some laneways or narrow streets do not have sufficient turning space for B85 vehicles. The removal of on-street parking to establish a turning space into private property should be avoided and will only be considered in the following circumstances:

- No more than a maximum of 5.4m of on-street parking, measured at the kerb line, is removed to provide for a turning space;
- The use and quantity of the remaining on-street parking spaces is not adversely affected; and
- 5.4m is a maximum. If Council can demonstrate that a B85 vehicle can access and egress the site with the removal of less than 5.4m of on-street parking, then this lesser amount if all that will be approved.

Driveways and Access Points

The following requirements apply to the siting and design of driveways:

- The design of driveways and access points, except for dwelling houses, is to be such that vehicle entry and exit from a site, onto a public road, is made by driving in a forward direction, unless otherwise required by council
- All driveways, except for dwelling houses, are signposted indicating 'IN/ENTRANCE', 'OUT/EXIT' and 'KEEP LEFT' as appropriate.
- Driveways are situated so that any vehicle turning from, or into, the street can be readily seen by the driver of an approaching motor vehicle or pedestrian.
- Access driveway locations comply with Figure 3.1 in Section 3.2.3 of AS/NZS 2890.1.
- Driveway splays shall be provided in accordance with Figure 3.3 in Section 3.2.4 of AS/NZS 2890.1. Exceptions to this may be accepted in the following circumstances:
 - for dwelling house, dual occupancies and attached dwellings in residential zones in low pedestrian activity locations a fence to a maximum height of 0.9m is permitted in the splay area.
 - where an object in the adjoining property creates an obstruction to visibility within the splay area.
- The width of internal access driveways are to comply with Section 3.2 of AS/NZS 2890.1 regarding driveway access requirements. Wider internal driveway widths may be acceptable depending on the site conditions. A passing bay is to be provided where the driveway length exceeds 40m.
- Vehicular access to an ancillary dwelling is provided from the same vehicular crossing for the principal residence.
- Where possible, all car parking and garage structures are located at the rear, with access from the rear lane or side driveway.
- Car parking and driveway areas are located and designed to:
 - Enable the efficient use of car spaces and accessways, including safe maneuverability for vehicles between the site and street;
 - Fit in with any adopted street hierarchy and objectives of the hierarchy and with any related local traffic management plans;
 - Preserve significant trees and vegetation; and
- Vehicle crossings are constructed at an angle of 90° to the carriageway of the road. Vehicle crossings must take the shortest route across the footpath, between the kerb and boundary.
- The width of vehicle crossings is minimised so as to retain on-street parking. Footpath crossings will not be permitted where:
 - One off-street parking space will result in the loss of two on-street parking spaces. For example, where the street is narrow with parking on both sides
 - The provision of off-street parking will result in the loss of a significant tree
- Vehicle crossings are located to minimise the loss of useable on-street parking. That is, they are located immediately adjacent to the adjoining property's vehicle crossing (0m) or a minimum distance of one on-street car parking space (5.4m) from any existing driveway crossing.

7.3 Proposed Stormwater

The Woollahra Municipal Council DCP (2015) states multiple prescriptive measures for stormwater management such as: -



Connection to Council's Below Ground Drainage:

In general, the stormwater drainage discharge from development sites is connected to Council's below ground drainage system. Where there is no Council drainage system located adjacent to the site, the applicant must extend Council's drainage system to the site in order to permit the below ground connection.

The Woollahra Municipal Council requirements are as follows:

- The connection from the development site to Council's below ground drainage system is a direct route and is generally laid perpendicular to the line of the kerb and gutter
- Stormwater drainage lines are located under the kerb and gutter where possible
- All connections pits are constructed in accordance with the appropriate industry standards (AS3500 National Plumbing and Drainage Code)
- No portion of the connection pipe intrudes into Council's pipe
- All stormwater pipes within the road carriageway are designed and installed to meet Council's specifications
- A standard Council double grated gully pit with 1.8m kerb lintel is constructed over the new line where it intersects with the private stormwater line. A capped pipe stub is provided to ensure future extension of the line upstream.

Subsoil Drainage

All below ground structures with habitable or non-habitable floor spaces are fully tanked and do not require permanent dewatering. Subsoil drainage does not discharge to Council's stormwater network, including stormwater pipes, pits and/ or kerb and gutter.

Pipes for subsoil drains shall be 100mm diameter "socked" corrugated black high density polyethylene unless noted otherwise. Unless otherwise specified, pipes shall be 100mm diameter.

Depth of Pipe Cover

Depth of cover to the conduit invert shall be as follows:-

- Public system not subject to vehicle loads- 450mm
- Public system subject to vehicle loads- 600mm
- Private system not subject to vehicle loads- 300mm
- Private system subject to vehicle loads- 600mm

If it is not practical to provide for the minimum cover requirements specified above, then at least 50mm thick granular overlay shall be provided over the invert of the conduit with a 150mm thick reinforced concrete slab constructed over it or conduit is to be mass concrete surrounded.

Pipe Class

The appropriate class of pipe to be used shall depend on the minimum cover provided and the loading onto the pipe in accordance with AS3725-1989, loads on buried concrete pipes.

Design Velocity of Flows

The Design Velocity of flows shall be as follows:-

- Conduits: 0.6m/s minimum, 6.0m/s maximum
- Surface flow: 2.0m/s maximum

Maximum Depth of Flows

Maximum permitted depth of surface flow shall be:-

- Road carriageway, driveways, footpath and parks- 150mm



- Landscaped area- 300mm

Structures over or near drainage lines and easements

Controls for structures over or near drainage lines and easements are as follows:

- Generally, new buildings, structures and overhanging structures are not permitted over existing or proposed drainage lines and easements.
- All structural foundations adjoining an easement or drainage line have a minimum depth lower than the invert of the adjacent drainage line. Additional depth is required for foundations adjoining natural water courses. All foundations are designed by a suitably qualified practitioner.
- Overland flow paths are maintained over drainage lines and easements. Driveways and landscaped areas may be located on overland flow paths.

Low level properties and easements

The requirements for low level properties and easements, as outlined by the Woollahra Municipal Council DCP (2015) are:

- Drainage discharge to Council's stormwater system is gravity fed. This may require the creation of an easement through the downstream property to discharge stormwater from the subject property.
- Where an overland flow system is not available, the drainage system is designed to cater to a minimum 1 in 100 ARI event.
- Where an overland flow system is available, the drainage system is designed to cater to a minimum 1 in 20 ARI event; and the drainage system, in combination with the overland flow system, is designed to cater to a minimum 1 in 100 ARI event.

Where easement consent is granted:

- The easement is created on the certificate of title for all impacted properties.
- The private drainage easement is of sufficient width to allow the required pipe to be installed and maintained.

Flood Planning Levels

Flood planning levels (FPLs) set the floor level height for development in areas which are subject to flooding. The FPLs vary depending on the relative flood risk and proposed development type. The objectives of FPLs as outlined by Woollahra Municipal Council are:

- To minimise risk to people and property
- To maintain Council's streetscape objectives in existing commercial and heritage area

In some cases, the determination of an appropriate freeboard will be best done on the merits of the individual case through the Development Application process. However, the minimum freeboard requirement unless overridden by a Flood Study, Draft Flood Study, Floodplain Risk Management Study, Floodplain Risk Management Plan or the DCP (Development Control Plan) shall be as follows:



Development type	Flood (and estuary) planning level
Habitable floor areas	100 Year ARI flood level plus 0.5m freeboard
Non-habitable floor areas	100 Year ARI flood level plus 0.3m freeboard
Habitable floor areas for foreshore developments subject to coastal inundation	The highest RL, calculated from the following: <ul style="list-style-type: none"> ▶ 100 Year ARI flood level plus 0.5m freeboard; or ▶ still water level plus 100 Year ARI wave run-up plus 0.3m freeboard
Ground level, open car parking spaces	20 Year ARI flood level plus 0.3m freeboard
Enclosed car parking spaces, three or fewer vehicles	20 Year ARI flood level plus 0.3m freeboard
Enclosed car parking spaces, more than three vehicles	100 Year ARI flood level plus 0.3m freeboard

To achieve the required FPL and/ or EPL for car parking, Council may allow the use of mechanical barrier such as flood gates. Where mechanical barrier is permitted:

- A 0.5m freeboard is provided.
- The mechanical barrier is located wholly on private property.
- The mechanical barrier may require the provision of an on-site queuing area.
- The mechanical barrier is designed such that, by default, it is in the “closed” position. That is, it opens only to allow vehicles to enter and exit the site

Overland Flow Paths

The Woollahra Municipal Council DCP (2015) states multiple prescriptive measures for overland flow paths such as:

- All overland flow paths are free of structures which prevent the free passage of overland flow.
- All overland flow paths are designed to convey the 1 in 100 ARI event.
- All existing overland flow paths are maintained and hydraulic capacity of the openings between buildings is maintained.
- Overland flow paths are provided on all properties that have upstream contributing catchments of 1,000m² or greater.
- All overland flow paths are designed such that they do not increase velocity or concentrate water on any adjacent property.
- In overland flow paths, fencing is generally not permissible. However, in low ad medium flood risk precincts permeable/ open type fences may be approved where it can be demonstrated that there will be no adverse impact on flooding to the subject land or surrounding properties.
- Any structure located in an overland flow path is designed to be structurally sound in all flood events. A flood study may be required. Structures are designed by a suitably qualified practitioner.
- If an overland flow path is not achievable, a 1 in 100 ARI drainage system may be accepted as an alternative.
- Overland flow paths are grass turfed.
- In (sandy) areas with high-risk erosion potential, overland flow paths are designed to limit velocity and/ or protect against scour.

Where an applicant cannot increase EPLs to take into account the sea level rise planning benchmarks, Council may consider imposing time-limited consent to provide the potential to remove, replace or adapt development in the future. The consent will require the development to cease and all structures to be demolished and removed and the site to be reinstated to a sustainable landscaped form unless a further consent is obtained allowing for the continuation of the development in its originally approved or modified form. Council will consider the appropriateness of such developments on the merits of individual applications.



Stormwater Pipe Cover

Cover of stormwater pipes in roads is to be in accordance with that prescribed by the manufacturer and shall be a minimum of 450mm below gutter level (current Australian Standard or Concrete Pipe Association of Australia "Concrete Pipe Guide").

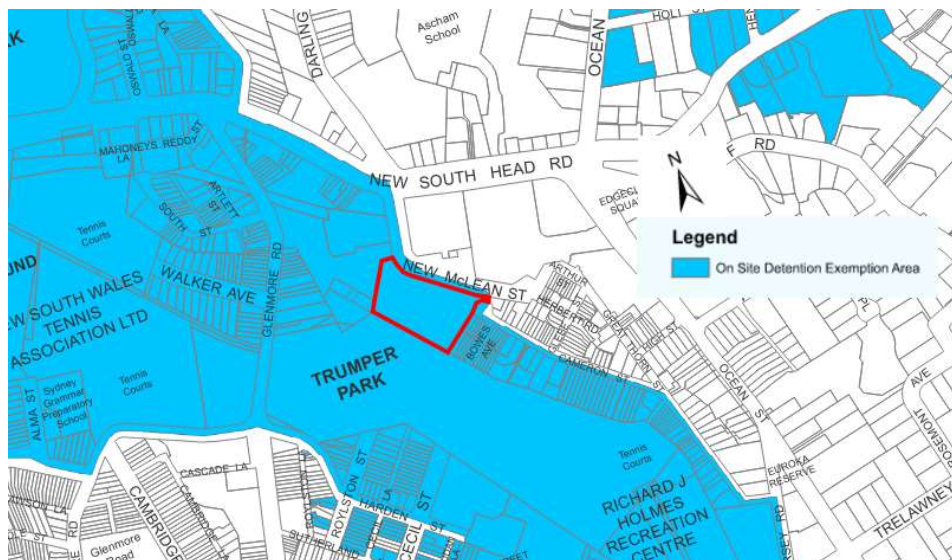
7.3.1 Onsite Detention

The On-Site Detention (OSD) Tank is to comply with the Woollahra Municipal Council DCP (2015). The objectives of an OSD is to reduce and mitigate the peak stormwater flow from a developed site and allow the controlled release of stormwater to the public stormwater system, and to reduce flood risk in urban areas.

An OSD is required for:

- New developments where the total site area is more than 500m²; and
- Developments involving alterations and additions where the additional gross impervious area is greater than 40m² and the total site area is more than 500m².

The proposed site has been identified within Council's On-Site Detention Exemption Area Map as being within an exemption area. Refer to the figure below.



An OSD may still be required for the site to ensure controlled release of stormwater to public stormwater systems without adversely impacting on adjoining or downstream properties and for this project should be planned to have it included as it will be at Council discretion. This can be confirmed during Pre-DA meetings with Council development representatives.

The OSD Requirements for Woollahra Municipal Council are as follows:

- OSD storage is designed in accordance with the storage/ discharge relationship as shown in the table below

OSD requirements per 1,000m ² of the total site area		
Permissible site discharge (l/s)	Minimum site storage requirements (m ³)	ARI (year)
24	4	1 in 2
34	20	1 in 100

- Council may consider independent assessment for on-site detention requirements. The applicant is to submit to Council an OSD assessment report including all modelling and design calculations. Any alternative methodology must be prepared by a suitably qualified practitioner.
- Where possible, the drainage system is designed to direct runoff from the entire site to the OSD system.



- Where OSD is required for alterations and additions, OSD is provided for the entire site, not only the area of new works.
- All OSD systems drain by gravity to Council's drainage system.
- An overland flow path, to convey water to the street in the event of a blockage or failure of the OSD outlet, is provided and is clearly identified in the design.
- All OSD systems have a discharge limiter which is an appropriately sized short length of reduced diameter pipe or a non-removable orifice plate. The discharge limiter is enclosed by a rustproof screen or wire cage to protect against blockage.

OSD Location Requirements

- OSD storage is located as close as possible to the lowest point of the site and if possible at the property frontage so that any surcharge will overflow to the street

Above Ground Storage Requirements

- The OSD system is visually unobstructive and sympathetic with the development. It must not cause hazard or inconvenience to pedestrian or vehicle access.
- A minimum 20% of the OSD storage requirement is incorporated as below ground storage.
- OSD storage in landscaped areas requires an extra 20% volume to compensate for vegetation growth.
- Pedestrian access paths are maintained above the 1 in 100 ARI operating level for any non-enclosed storage. Pounded water depths do not exceed 200mm in parking/ driveway areas, and 300mm in courtyards/ grass/ landscape areas.
- Adequate subsoil drainage is provided in the above ground OSD storage to retain the amenity of the area after a rainfall event.

Below Ground Storage Requirements

The structural design of the OSD storage is certified by a suitably qualified practitioner including the following design issues:

- All structures in the zone of influence of the excavation are checked for structural adequacy.
- Buoyancy of the OSD storage is taken into consideration; and
- The OSD structure is designed to all relevant Australian Standards and industry standards; and
- A minimum slope of 1% is provided on the floor of the OSD storage.

Based on the proposed development area, this development will require an OSD tank approx. 145m³ in storage size which limits stormwater discharge from the site to 245 L/s in the 100yr ARI storm event. Discharge control such as orifice plates and weir walls will be required.

7.3.2 Stormwater Quality

The pollutant reduction targets for the site are to comply with the Woollahra Municipal Council DCP 2015. Development proposals shall comply with the following performance standards:-

Water quality measures are installed that meet the following environmental targets for stormwater runoff leaving the site:-

Pollutant Type	Percentage Retention of Post-development Loads
Total Suspended Solids (TSS)	85%
Total Phosphorus (TP)	65%
Total Nitrogen (TN)	45%
Gross Litter	90% (>5mm)



Based on the proposed development area, this development will require stormwater quality management prior to discharging runoff into adjacent infrastructure. This is likely to come in the form of the below:

- Filter cartridges as part of the proposed OSD tank.
- Grated inlet pit inlet filter baskets.
- Landscaped swales.
- Rainwater collection and reuse tanks.

Monitoring Water Quality

Water quality treatment systems or pollution control devices are to be installed and monitored regularly to ensure that they achieve their treatment objectives and that their performance meets the above criteria. If they fail to meet these targets, or if so required by the Appropriate Regulatory Authority (ARA), it shall be modified to achieve them and the system upgraded.

7.3.3 Stormwater Conveyance

This section of the report discusses the systems proposed to allow for stormwater to be conveyed across the site to the legal point of discharge.

The Woollahra Municipal Council have set serviceability requirements for the stormwater conveyance network such that minor flows are conveyed through piped drainage, and major flows are discharged via controlled overland flow. The average recurrence interval to be adopted for private drainage systems (minor system design) is summarised below:

- Where an overland flow system is available, the drainage system is designed to cater to a minimum 1 in 20 ARI event.

The minor drainage system shall be required to cater for the 20-year ARI, or 5% AEP, storm event. The underground drainage system (includes pipes, conduits, and pits) is to be designed for the 1% AEP storm event where major system flows are likely to surcharge across private property or cause localised flooding.

A surcharge path must also be provided to safely convey surface stormwater across private property within easements. The minimum design AEP for surcharge paths shall be the 1% AEP storm event.

Roof Drainage

The gutter and downpipe drainage system shall be designed in accordance with AS3500.3-2021.

Surface Drainage

The surface areas should be drained through a variety of methods, in accordance with AS3500.3:2021 and Council's stormwater drainage guidelines.

The in-ground drainage shall be designed to meet the following criteria: -

- In the minor design storm event (5% AEP), there will be no surcharging of the in-ground drainage system and;
- In the major design storm event (1% AEP), there will be no uncontrolled discharge from the site onto neighbouring properties or the surrounding street.

7.3.4 Stormwater Attenuation

The attenuation of stormwater discharge from the site must be provided in accordance with the Woollahra Municipal Council DCP (2015).

Council encourages the use of computer models by Professional Civil Engineers for drainage design. Data input and output files of any program used shall be submitted in electronic format to Council. For example, for OSD independent assessment, DRAINS can be used to determine the required on-site detention so as to restrict discharge from the development site back to the prescribed rates to achieve the specified water balance and flood mitigation detention on site. The size and performance of detention will need to be assessed through DRAINS modelling within the concept design phase.



8. Critical Spatial

The following section provides a high-level requirement for authority spatial.

8.1 Electrical

- Surface chamber: 4200mm x 4600mm x 3200mm H clear
Easement of 5,300mm x 3,300mm
- Main Comms Room : 3,000mm x 3,000mm [located in large basement]

8.2 Hydraulic

- Potable meter assembly - 3000mm X 500mm Deep X 1500mm high (within potable water plant)
- Potable Water Plant – 4000mm X 3000mm
- Fire services Booster – 6000mm X 750mm Deep X 1800mm High
- Fire services pump room – 7000mm X 6000mm X 2400mm High
- Gas boundary connection – 3000mm X 2000mm x 2100mm High
- Potable Water Tanks – Size TBC where required
- Rainwater Tanks – Size TBC where required

8.3 Civil and Stormwater

- Existing stormwater network running down eastern boundary appears suitable for connection.
- OSD tank for the development located at the southeastern corner of the site. OSD to connect into existing site stormwater infrastructure.
- OSD volume expected to be minimum 150 m³. However, the size may be required to be increased to manage the discharge from site and the existing stormwater network which has been modelled as under capacity.
- Water quality devices will be required to manage runoff. This is expected to be managed via systems that can be integrated into architectural and landscaped infrastructure. It may lead to the OSD requiring to be approx. 30 m³ larger than required, in order to accommodate filter cartridges.
- The above items to be confirmed following detailed calculations during DA Approval process.



9. Appendix A – Sydney Water Daily Usage



Water Supply Code of Australia	
MWH/PB Flow Study Report	
Water usage survey	

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	
Industrial	Heavy Process	As required		
	Chemical Manufacturing	As required		



10. Appendix B - Sydney Water Pressure and Flow



Design with
community in mind