WATERLOO METRO QUARTER OVER STATION DEVELOPMENT

Environmental Impact Statement
Appendix T - Services and Utilities Infrastructure Report

SSD-10437 Southern Precinct

Detailed State Significant Development
Development Application

Prepared for **Waterloo Developer Pty Ltd**

30 September 2020

Reference	Description
Applicable SSD Applications	SSD-10437 Southern Precinct
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1. Glossary and Abbreviations

Reference	Description
ACHAR	Aboriginal Cultural Heritage Assessment Report
ADG	Apartment Design Guide
AfC	Application for Connection
AHD	Australian height datum
AQIA	Air Quality Impact Assessment
ASP	Accredited Service Provider
BC Act	Biodiversity Conservation Act 2016
BCA	Building Code of Australia
BC Reg	Biodiversity Conservation Regulation 2017
BDAR	Biodiversity Development Assessment Report
CEEC	critically endangered ecological community
CIV	capital investment value
CMP	Construction Management Plan
Concept DA	A concept DA is a staged application often referred to as a 'Stage 1' DA. The subject application constitutes a detailed subsequent stage application to an approved concept DA (SSD 9393) lodged under section 4.22 of the EP&A Act.
Council	City of Sydney Council
CPTED	Crime Prevention Through Environmental Design
CSSI approval	critical State significant infrastructure approval
CTMP	Construction Traffic Management Plan
DA	development application
DPIE	NSW Department of Planning, Industry and Environment
DRP	Design Review Panel
EP&A Act	Environmental Planning and Assessment Act 1979
EPA	NSW Environment Protection Authority
EPA Regulation	Environmental Planning and Assessment Regulation 2000

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EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ESD	ecologically sustainable design
GANSW	NSW Government Architect's Office
GFA	gross floor area
HIA	Heritage Impact Assessment
IAP	Interchange Access Plan
LGA	Local Government Area
NCC	National Construction Code
OSD	over station development
PDS	Proposed Design Scope
PIR	Preferred Infrastructure Report
POM	Plan of Management
PSI	Preliminary Site Investigation
RMS	Roads and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SEPP 55	State Environmental Planning Policy No 55—Remediation of Land
SEPP 65	State Environmental Planning Policy No. 65 – Design Quality of Residential Apartment Development
SRD SEPP	State Environmental Planning Policy (State and Regional Development) 2009
SREP Sydney Harbour	State Regional Environmental Plan (Sydney Harbour Catchment) 2005
SSD	State significant development
SSD DA	State significant development application
SLEP	Sydney Local Environmental Plan 2012
Transport for NSW	Transport for New South Wales
TIA	Traffic Impact Assessment
The proposal	The proposed development which is the subject of the detailed SSD DA

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The site	The site which is the subject of the detailed SSD DA
VIA	Visual Impact Assessment
WMQ	Waterloo Metro Quarter
WMP	Waste Management Plan
WSUD	water sensitive urban design

Table 1 Glossary and Abbreviations

2. Executive Summary

This planning report has been prepared by WSP and Waterloo Developer, with key input information from our design consultant WSP Pty Ltd, to accompany a detailed State significant development (SSD) development application (DA) for the Southern Precinct over station development (OSD) at the Waterloo Metro Quarter site.

This report has been prepared to address the relevant conditions of the concept SSD DA (SSD 9393) and the Secretary's Environmental Assessment Requirements (SEARs) issued for the detailed SSD DA (SSD 10437).

This report concludes that the proposed Southern Precinct OSD is suitable and warrants approval subject to the implementation of the following mitigation measures.

- Disconnection and demolition of the existing utilities and services to allow the proposed Southern Precinct development construction
- Proceed with Sydney Water Notice of Requirements application for Southern Precinct, and associated conditions of consent for connection of Potable Water, Sewer and Stormwater services
- Proceed with Ausgrid contestable works approval process for Southern Precinct, associated submissions and approvals for connection of high voltage power and construction of mini chamber substations
- Proceed with City of Sydney and Sydney Water Tap In application for Southern Precinct, and associated conditions of consent for connection of Stormwater services
- Proceed with Jemena connection application for Southern Precinct, and associated conditions of consent for connection of Natural Gas services
- Proceed with Carrier and communication provider applications for connection process for Southern Precinct, and associated conditions of consent for connection of carrier communication services
- Proceed with NBN application for connection process for Southern Precinct, and associated conditions of consent for connection of NBN communication services

Following the implementation of the above mitigation measures, the remaining impacts are appropriate.

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3. Introduction

This report has been prepared to accompany a detailed State significant development (SSD) development application (DA) for the Southern Precinct over station development (OSD) at the Waterloo Metro Quarter site. The detailed SSD DA is consistent with the concept approval (SSD 9393) granted for the maximum building envelope on the site, as proposed to be modified.

The Minister for Planning, or their delegate, is the consent authority for the SSD DA and this application is lodged with the NSW Department of Planning, Industry and Environment (DPIE) for assessment.

The detailed SSD DA seeks development consent for the design, construction and operation of:

Southern Precinct

- 25-storey residential building (Building 3) comprising student accommodation, to be delivered as a mixture of studio and twin apartments with approximate capacity of 474 students
- 9-storey residential building (Building 4) above the southern station box to accommodate 70 social housing dwellings
- ground level retail tenancies including Makerspace and gymnasium lobby, and loading facilities
- level 1 and level 2 gymnasium and student accommodation communal facilities
- landscaping and private and communal open space at podium and roof top levels to support the residential accommodation
- new public open space including the delivery of the Cope Street Plaza, including vehicle access to the site via a shared way from Cope Street, expanded footpaths on Botany and Wellington streets and public domain upgrades
- signage zone locations
- utilities and service provision
- stratum subdivision (staged).

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 8 April 2020 and issued for the detailed SSD DA. Specifically, this report has been prepared to respond to the SEARs requirements summarised below.

Item	Description of requirement	Section reference (this report)
14. Utilities	Identify and address the existing capacity to service the development proposed and any augmentation requirements for utilities in consultation with relevant agencies.	Potable Water – Section 9.1.2 Wastewater – Section 9.3.2 Natural Gas – Section 9.4.2 Stormwater – Section 9.5.2 High Voltage Electrical – Section 9.6.2 Communications – Section 9.7.2 Appendix 1 – Waterloo Station Utility Design

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Item	Description of requirement	Section reference (this report)
14. Utilities	Identify any potential impacts of the proposed construction and operation on the existing utility infrastructure and service provider assets, and demonstrate how these will be protected, or impacts mitigated.	Potable Water – Section 9.1.4 Wastewater – Section 9.3.4 Natural Gas – Section 9.4.4 Stormwater – Section 9.5.4 High Voltage Electrical – Section 9.6.4 Communications – Section 9.7.4 Appendix 1 – Waterloo Station Utility Design

Table 2 SEARs requirements

This report has also been prepared in response to the following conditions of consent issued for the concept SSD DA (SSD 9393) for the OSD as summarised in the table below.

Item	Description of requirement	Section reference (this report)
B5	Refer to WMQ Design Amenity Guidelines 2020-03 Clause 13 Section 3D: Integrate New and relocated utilities underground within the street reservation, with services located underground and in a manner that facilities tree planting	Potable Water – Section 9.1.2 Wastewater – Section 9.3.2 Natural Gas – Section 9.4.2 Stormwater – Section 9.5.2 High Voltage Electrical – Section 9.6.2 Communications – Section 9.7.2 Appendix 1 – Waterloo Station Utility Design
B5	Refer to WMQ Design Amenity Guidelines 2020-03 Clause 3 Section 3Q: The utility services for the station must not pass through the OSD	14.2.3 – Station Precinct

Table 3 Conditions of Concept Approval

4. The Site

The site is located within the City of Sydney Local Government Area (LGA). The site is situated about 3.3 kilometres south of Sydney CBD and eight kilometres northeast of Sydney International Airport within the suburb of Waterloo.

The Waterloo Metro Quarter site comprises land to the west of Cope Street, east of Botany Road, south of Raglan Street and north of Wellington Street (refer to Figure 1). The heritage-listed Waterloo Congregational Church at 103–105 Botany Road is within this street block but does not form a part of the Waterloo Metro Quarter site boundaries.

The Waterloo Metro Quarter site is a rectangular shaped allotment with an overall site area of approximately 1.287 hectares.

The Waterloo Metro Quarter site comprises the following allotments and legal description at the date of this report. Following consolidation by Sydney Metro (the Principal) the land will be set out in deposited plan DP1257150.

- 1368 Raglan Street (Lot 4 DP 215751)
- 59 Botany Road (Lot 5 DP 215751)
- 65 Botany Road (Lot 1 DP 814205)
- 67 Botany Road (Lot 1 DP 228641)
- 124-128 Cope Street (Lot 2 DP 228641)
- 69-83 Botany Road (Lot 1, DP 1084919)
- 130-134 Cope Street (Lot 12 DP 399757)
- 136-144 Cope Street (Lots A-E DP 108312)
- 85 Botany Road (Lot 1 DP 27454)
- 87 Botany Road (Lot 2 DP 27454)
- 89-91 Botany Road (Lot 1 DP 996765)
- 93-101 Botany Road (Lot 1 DP 433969 and Lot 1 DP 738891)
- 119 Botany Road (Lot 1 DP 205942 and Lot 1 DP 436831)
- 156-160 Cope Street (Lot 31 DP 805384)
- 107-117A Botany Road (Lot 32 DP 805384 and Lot A DP 408116)
- 170-174 Cope Street (Lot 2 DP 205942).

The detailed SSD DA applies to the Southern (the site) of the Waterloo Metro Quarter site. The site has an area of approximately 4830sqm. The subject site comprises the following allotments and legal description at the date of this report.

Southern Precinct DA

- 130–134 Cope Street (Lot 12 DP 399757) (Part)
- 136–144 Cope Street (Lots A-E DP 108312) (Part)
- 93–101 Botany Road (Lot 1 DP 433969 and Lot 1 DP 738891) (Part)
- 156–160 Cope Street (Lot 31 DP 805384)
- 107–117A Botany Road (Lot 32 DP 805384 and Lot A DP 408116)

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- 119 Botany Road (Lot 1 DP 205942 and Lot 1 DP 436831)
- 170–174 Cope Street (Lot 2 DP 205942).

The boundaries of the overall site are identified at Figure 1, and the subject site of the detailed SSD DA is identified at Figures 2 and 3. The site is reasonably flat with a slight fall to the south.

The site previously included three to five storey commercial, light industrial and shop top housing buildings. All previous structures except for an office building at the corner of Botany Road and Wellington Street have been demolished to facilitate construction of the new Sydney Metro Waterloo station. As such the existing site is predominately vacant and being used as a construction site.
Construction of the Sydney metro is currently underway on site in accordance with critical State significant infrastructure approval (CSSI 7400).

Figure 1 Aerial image of the site
Source: Urbis

The area surrounding the site consists of commercial premises to the north, light industrial and mixed-use development to the south, residential development to the east and predominantly commercial and light industry uses to the west.

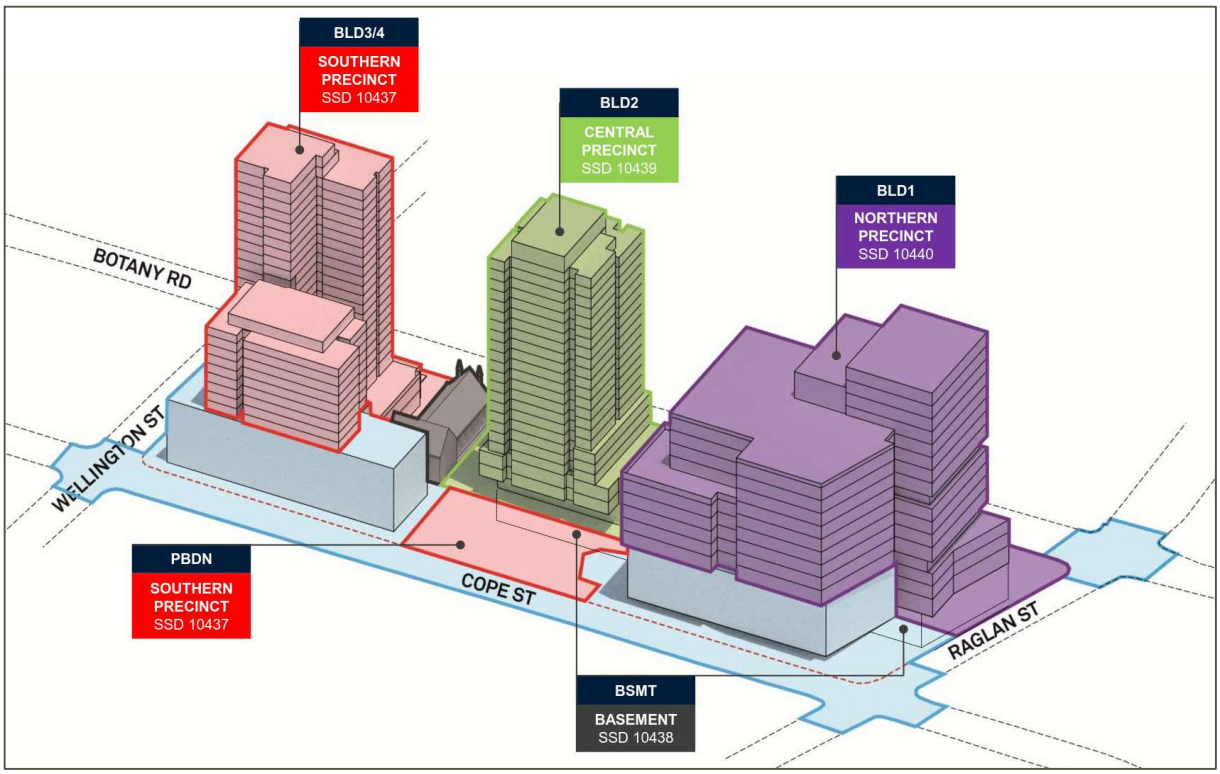

Figure 2 Waterloo Metro Quarter site, with sub-precincts identified
Source: HASSELL

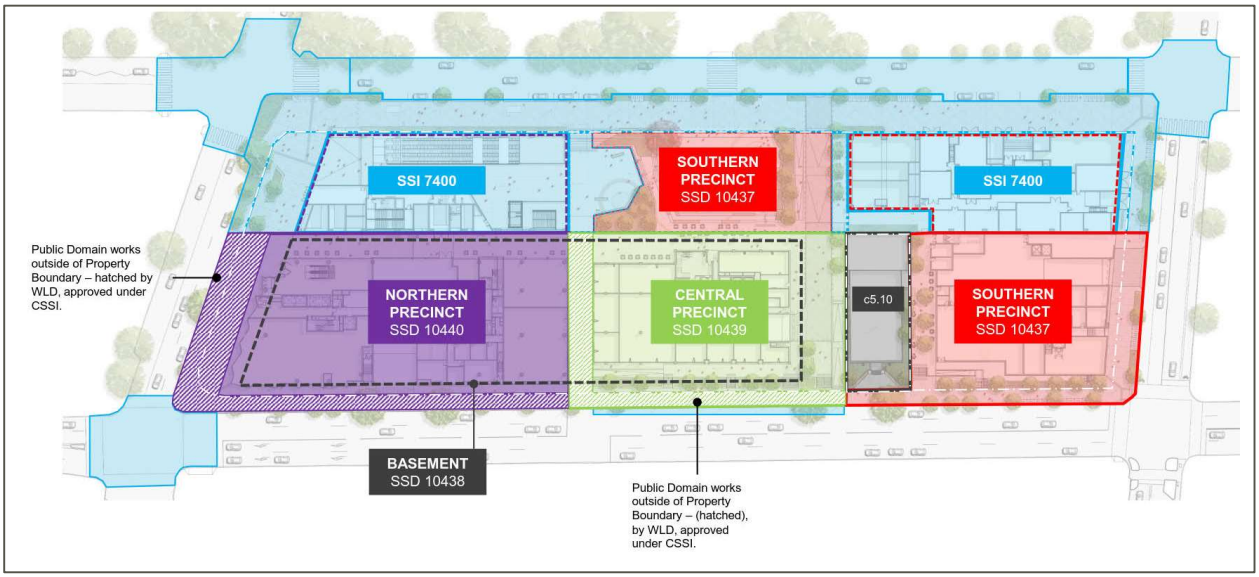

Figure 3 Waterloo Metro Quarter site, with sub-precincts identified
Source: Waterloo Developer Pty Ltd

5. Background

5.1 About Sydney Metro

Sydney Metro is Australia's biggest public transport project. Services started in May 2019 in the city's North West with a train every four minutes in the peak. A new standalone railway, this 21st century network will revolutionise the way Sydney travels.

There are four core components:

5.1.1 Sydney Metro North West

This project is now complete and passenger services commenced in May 2019 between Rouse Hill and Chatswood, with a metro train every four minutes in the peak. The project was delivered on time and $1 billion under budget.

5.1.2 Sydney Metro City & Southwest

Sydney Metro City & Southwest project includes a new 30km metro line extending metro rail from the end of Metro Northwest at Chatswood, under Sydney Harbour, through new CBD stations and southwest to Bankstown. It is due to open in 2024 with the ultimate capacity to run a metro train every two minutes each way through the centre of Sydney.

Sydney Metro City & Southwest will deliver new metro stations at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street, Waterloo and new underground metro platforms at Central Station. In addition, it will upgrade and convert all 11 stations between Sydenham and Bankstown to metro standards.

5.1.3 Sydney Metro West

Sydney Metro West is a new underground railway connecting Greater Parramatta and the Sydney CBD. This once-in-a-century infrastructure investment will transform Sydney for generations to come, doubling rail capacity between these two areas, linking new communities to rail services and supporting employment growth and housing supply between the two CBDs.

The locations of seven proposed metro stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays.

The NSW Government is assessing an optional station at Pyrmont and further planning is underway to determine the location of a new metro station in the Sydney CBD.

5.1.4 Sydney Metro Greater West

Metro rail will also service Greater Western Sydney and the new Western Sydney International (Nancy Bird Walton) Airport. The new railway line will become the transport spine for the Western Parkland City's growth for generations to come, connecting communities and travellers with the rest of Sydney's public transport system with a fast, safe and easy metro service.

The Australian and NSW governments are equal partners in the delivery of this new railway.

The Sydney Metro project is illustrated below.

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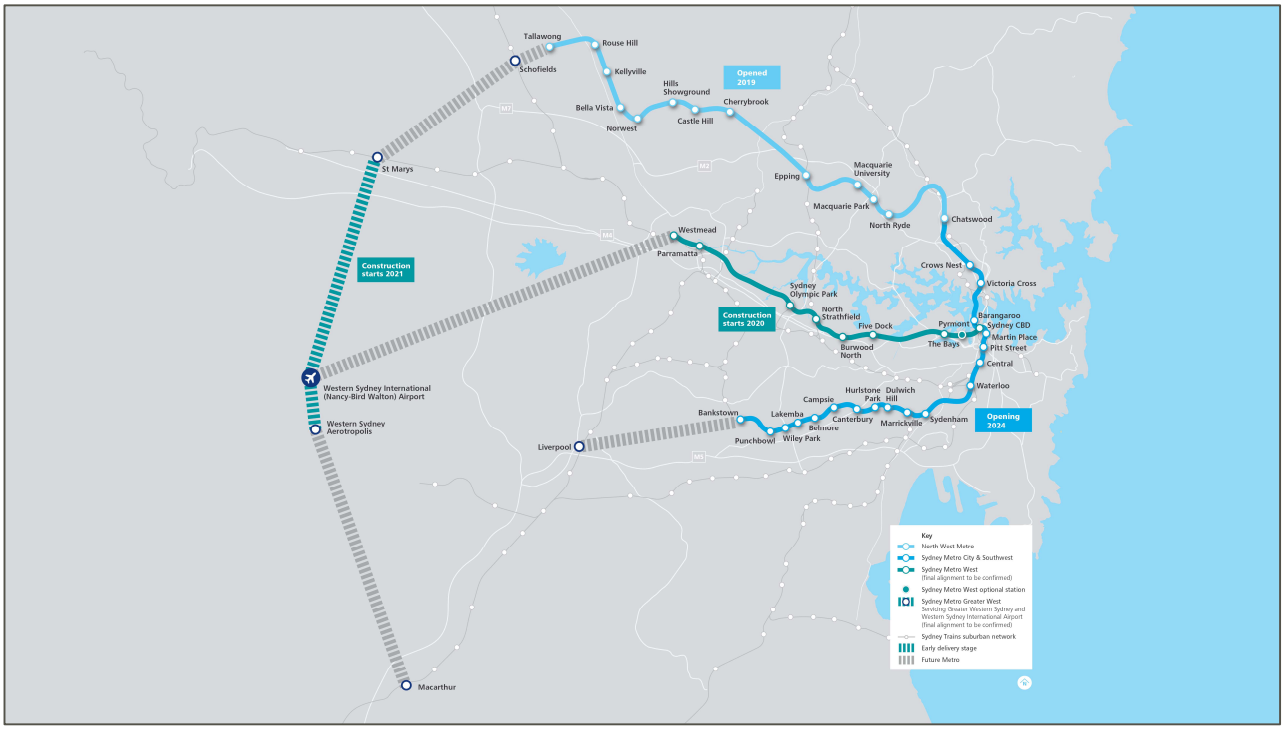

Figure 4 Sydney Metro alignment map
Source: Sydney Metro

5.2 Sydney Metro CSSI Approval (SSI 7400)

On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham project as a critical State significant infrastructure (CSSI) project (reference SSI 7400) (CSSI approval). The terms of the CSSI approval includes all works required to construct the Sydney Metro Waterloo Station. The CSSI approval also includes the construction of below and above ground works within the metro station structure for appropriate integration with the OSD.

With regards to CSSI related works, any changes to the 'metro station box' envelope and public domain will be pursued in satisfaction of the CSSI conditions of approval and do not form part of the scope of the concept SSD DA or detailed SSD DA for the OSD.

Except to the extent described in the EIS or Preferred Infrastructure Report (PIR) submitted with the CSSI application, any OSD buildings and uses do not form part of the CSSI approval and will be subject to the relevant assessment pathway prescribed by the EP&A Act.

The delineation between the approved Sydney Metro works, generally described as within the two 'metro station boxes' and surrounding public domain works, and the OSD elements are illustrated in Figure 5.

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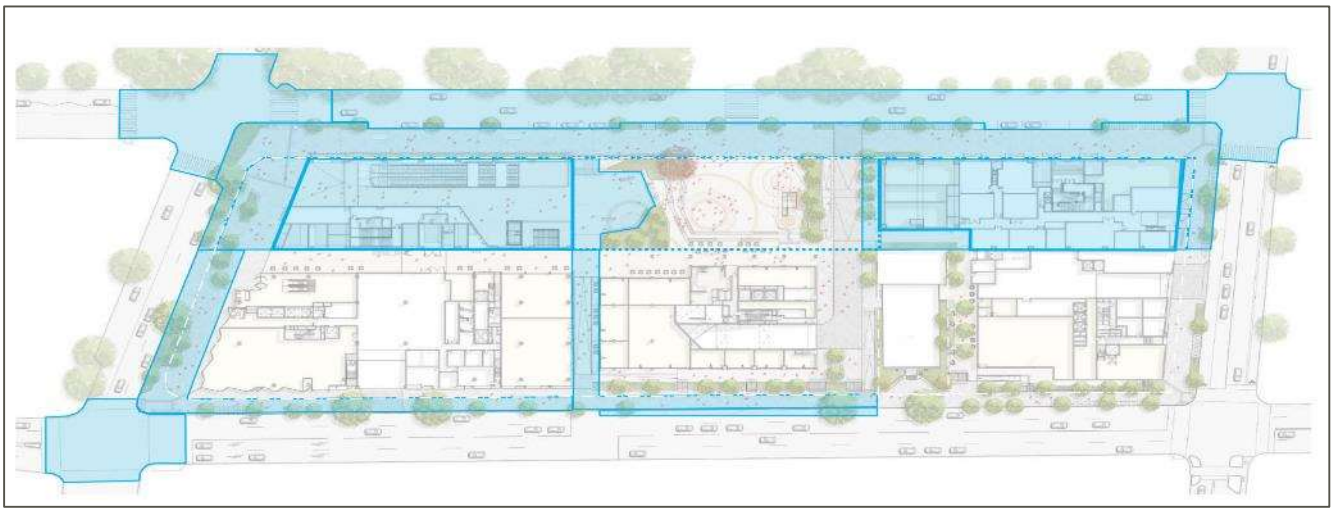

Figure 5 CSSI Approval scope of works
Source: WL Developer Pty Ltd

5.3 Concept Approval (SSD 9393)

As per the requirements of clause 7.20 of the *Sydney Local Environmental Plan 2012* (SLEP), as the OSD exceeds a height of 25 metres above ground level (among other triggers), development consent is first required to be issued in a concept DA (formerly known as Stage 1 DA).

Development consent was granted on 10 December 2019 for the concept SSD DA (SSD 9393) for the Waterloo Metro Quarter OSD including:

- a maximum building envelope for podium, mid-rise and tower buildings
- a maximum gross floor area of 68,750sqm, excluding station floor space
- conceptual land use for non-residential and residential floor space
- minimum 12,000sqm of non-residential gross floor area including a minimum of 2,000sqm of community facilities
- minimum 5% residential gross floor area as affordable housing dwellings
- 70 social housing dwellings
- basement car parking, motorcycle parking, bicycle parking, and service vehicle spaces.

The detailed SSD DA seeks development consent for the OSD located within the Southern Precinct of the site, consistent with the parameters of this concept approval. Separate SSD DAs have been prepared and will be submitted for the Northern, Central and Basement proposed across the Waterloo Metro Quarter site.

A concurrent amending concept SSD DA has been prepared and submitted to the DPIE which proposed to make modifications to the approved building envelopes at the northern precinct and central building. This amending concept SSD DA does not impact the proposed development within the southern precinct.

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6. Proposed Development

6.1 Waterloo Metro Quarter Development

The Waterloo Metro Quarter OSD comprises four separate buildings, a basement carpark and public domain works adjacent to the Waterloo Metro station.

Separate SSD DAs will be submitted concurrently for the design, construction and operation of each building in the precinct;

- Southern precinct SSD-10437,
- Basement Car Park SSD-10438,
- Central precinct SSD-10439, and
- Northern precinct-SSD-10440.

An overview of the Development is included below for context. This detailed SSD DA seeks development consent for the design, construction and operation of the Southern Precinct:

6.1.1 Northern Precinct

The Northern Precinct comprises:

- 17-storey commercial building (Building 1) comprising Commercial floor space, with an approximate capacity of 4000 workers
- ground level retail tenancies, loading dock facilities serving the northern and central precinct including Waterloo metro station
- landscaping and private open space at podium and roof top levels to support the commercial tenants
- new public open space including the delivery of the Raglan Street Plaza, Raglan Walk and expanded footpaths on Raglan Street and Botany Road and public domain upgrades
- external licensed seating areas
- signage zone locations
- utilities and service provision
- stratum subdivision (staged).

6.1.2 Central Precinct

The Central Precinct comprises:

- 24-storey residential building (Building 2) comprising approximately 126 market residential and 24 affordable housing apartments, to be delivered as a mixture of 1 bedroom, 2 bedroom and 3 bedroom apartments
- Ground level retail tenancies, community hub, precinct retail amenities and basement car park entry
- level 1 and level 2 community facilities (as defined in the SLEP) intended to be operated as a childcare centre
- landscaping and private and communal open space at roof top levels to support the residential accommodation
- new public open space including the delivery of the Church Square, including vehicle access to the basement via a shared way from Cope Street, expanded footpaths and public domain upgrades on Botany Road

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- external licensed seating areas
- signage zone locations
- utilities and service provision
- stratum subdivision (staged).

6.1.3 Southern Precinct

The Southern Precinct comprises:

- 25-storey residential building (Building 3) comprising student accommodation, to be delivered as a mixture of studio and twin apartments with approximate capacity of 474 students
- 9 storey residential building (Building 4) above the southern station box to accommodate 70 social housing dwellings
- ground level retail tenancies including Makerspace and gymnasium lobby, and loading facilities
- level 1 and level 2 gymnasium and student accommodation communal facilities
- landscaping and private and communal open space at podium and roof top levels to support the residential accommodation
- new public open space including the delivery of the Cope Street Plaza, including vehicle access to the site via a shared way from Cope Street, expanded footpaths on Botany and Wellington Streets and public domain upgrades
- signage zone locations
- utilities and service provision
- stratum subdivision (staged).

6.1.4 Basement Car Park

The Basement Car Park comprises:

- 2-storey shared basement car park and associated excavation comprising
- Ground level structure
- Carparking for the Commercial Building 1, Residential Building 2, social housing Building 4, Waterloo Congregational Church and Sydney Metro
- Service vehicle bays
- commercial end of trip and bicycle storage facilities
- Retail end of trip and bicycle storage facilities
- residential storage facilities
- shared plant and services.

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7. Methodology

7.1 Infrastructure

- Engage relevant agencies to identify and address existing capacity to service the proposed development
- Incorporate requirement for proposed utility design in consultation with relevant agencies
- Identify any potential impact of the proposed construction and operation on the existing utility
- Coordinate and manage to remove, relocate or protect existing utilities in accordance with the relevant agencies requirements if required

To establish connections to all the utility services required for the operation of over the Station development the Southern Precinct development, including:

- Portable and non-portable water connection to Sydney Water network
- Sewer connection to Sydney Water network
- Stormwater connection to local road drainage network
- Telstra/NBN (Communication) connection to main backbone network
- Gas connection to local distribution network
- High voltage electricity connection to local Ausgrid substation

A combined utilities model is developed through incorporating design inputs from other engineering design disciplines and utility provider engagement and design development including utility provider design certifications; and a clash register is developed to track any potential utility clashes identified during the design development, refer to Appendix 1 for detail.

7.2 Building Services

- Engage relevant designers to identify required demand and capacity to service the proposed development
- Coordinate, manage and Incorporate services requirements into development concept designs
- Ensure all services designs, are designed to an extent that they will not have an impact to the Sydney Metro Station.

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8. Infrastructure Assessment and findings

8.1 Survey Input

A survey of the existing utilities within and around the site has been completed, and a 3D revit model has been compiled to document the existing utilities and proposed connections to the respective utilities. The method of surveying and data used to generate the 3D utility model varies according to the specific utility services and available information.

The below table clarifies the various data quality levels for each utility services surveyed in line with AS 5488-2019 Classification of Subsurface Utility Information (SUI).

The survey quality levels exist to define the relative special accuracy of the surveyed lines to the physical position of the utility. Due to interference from other utilities and structures, varying ground conditions and limitations in the technology, the spatial tolerances outlined in AS 5488 are defined.

In instances where survey anomalies or inconsistencies are identified due to the conditions outlined above, the utilities are interpolated from standards, DBYB, as-built information or the nearest utility services.

Survey Level	Description of requirement	Section reference (this report)
Level A	Potholing and surveying to give accurate horizontal and vertical position of the existing utility (includes measurement and survey of pit and maintenance structures)	Utility owner identification Utility type, status, material, size and configuration identification Date of installation (if known) Feature codes of surface features, including but not limited to pits, access chambers, poles, valves and hydrants Location of points surveyed on surface and subsurface features measured in terms of absolute spatial positioning with a maximum horizontal tolerance of +/- 50 mm
Level B	Geophysical locating and survey using cable location equipment or ground penetrating radar to generate an approximate horizontal and vertical position.	Utility owner identification Utility type identification Date of installation (if known) Location of surface features measured in terms of relative spatial positioning with a maximum horizontal tolerance of +/- 300 mm Location of surface features measured in terms of relative spatial positioning with a maximum horizontal tolerance of +/- 300 mm and maximum vertical tolerance of +/- 500 mm
Level C	Undertake field ground survey of existing asset features as a surface feature correlation of approximate location	- Utility owner identification - Utility type identification

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Survey Level	Description of requirement	Section reference (this report)
		- Date of installation (if known) - Interpolation of the location and direction of the subsurface utility surface features as a point of reference - Feature codes of surface features, including but not limited to pits, access chambers, poles, valves and hydrants Location of surface features measured in terms of relative spatial positioning with a maximum horizontal tolerance of +/- 300 mm
Level D	Use of 'dial before you dig' hotline and consult Utility Authorities GIS database location information.	- Existing records - Cursory site inspection Anecdotal evidence

Table 4 Classification of Subsurface Utility

Document Reference	Description of requirement	Quality Level	Date of Survey	Format
PR132497-15- Botany RD Waterloo-001-A	Pothole survey	A	19/01/2019	DWG
DBYD (various)	Dial Before You Dig responses for the investigation area	D	15/01/2020	PDF
SMCSWSWL-JHG-SWL-SR-M3D-000001	First preliminary survey, used to create existing ground surface	N/A	21/02/2020	PDF
SMCSWSWL-A28-SWL-DE-CSD-000219	Topographic Detail Survey - Waterloo Station	D	May 2016	PDF

Table 5 Survey information

9. Infrastructure Services

Infrastructure services have been designed to a concept level of design.

9.1 Water Services (Potable Cold Water)

9.1.1 Demand Assessment

The WMQ Southern precinct buildings 3&4 expected water use demand has been designed at 72kL / day (50kL / day Building 3 and 22kL /day Building 4), based on the Proposed Potable Cold Water Services as calculated based on the methods described within DIN 1988-300 and AS3500.1, and Sydney Water requirements.

9.1.2 On-Site Utility Infrastructure

The existing Sydney Water network in the project area consist of potable, wastewater and stormwater mains. Refer to Table 5 for assets are present within the Waterloo ISD area:

Type	Size	Location
Water	450mm CICL	Cope St under northbound lanes
	100mm CICL	Cope St eastern verge
	100mm CICL	Raglan St under westbound lanes
	500mm CICL	Raglan St under westbound lanes
	300mm CICL	Raglan St northern verge
	100mm CICL	Wellington St northern verge
	100mm CICL	Botany Road western verge
	150mm CICL	Botany Road eastern verge

Table 6 Water Assets within the Waterloo ISD area

The location of these services has been documented in Appendix 1, based on surveys as outlined in section 9.1. Although the exact depths and positions of these existing mains will not be known until potholing investigation is conducted during the detail design (DD) phase to confirm the suitability and impacts of the proposed design on the existing network.

The following proposed connections points along Botany Street have been sent to Sydney Water for pressure and flow enquiry by WSP Water service coordinator (WSC):

Potable Water:

- 150CICL network on Botany Road, connection to student accommodation building 3 is proposed approximately ~31m along Botany Road to the north of Wellington Street (Refer to Appendix 1, for indicative location of connection)
- 150CICL network on Botany Road, connection to social housing building 4 is proposed approximately ~17m along Botany Road to the north of Wellington Street (Refer to Appendix 1, for indicative location of connection)

Currently this connection route is designed to comply with Sydney Water requirements and achieves sufficient clearance to other existing utilities. The project Water Services Coordinator (WSC) will provide a detailed connection design after receiving Sydney Water response to the Section 73 Notice of Requirements (NoR) during detail design (DD) phase to be conducted post DA submission.

9.1.3 Connection

- [Sydney Water has provided preliminary advice via Sydney Water Feasibility letter (as contained in Appendix 3), indicating that the connection to the 150CICL authority main is appropriate for the development.]
- Direct connection to 150CICL Water Authority Main reticulated along Botany Road, for student accommodation building 3 is proposed via a DN150 reticulated from the building 3 Water meter room, to a dedicated building 3 water meter.
- Direct connection to 150CICL Water Authority Main reticulated along Botany Road, for social housing building 4 is proposed via a DN150 reticulated from the building 3 Water meter room, to a dedicated building 4 water meter.
- Alternative connections to Water Authority mains along Wellington Street have also discussed with the water authority. The final connection location to water mains will be confirmed as part of the Section 73 NoR from Sydney Water.
- A reduced pressure zone device (RPZD) shall be installed for site containment on the downstream side of the cold water authority meter and all supply points of high cross contamination risks as required by Sydney Water and code requirements. Pressure boosting pumps where required shall be located within the site water meter room.
- It is noted that Sydney Water reserves the right to amend requirements in the section 73 NoR. The NoR will provide certainty on the available capacity of the existing Sydney Water mains.

9.1.4 Amplifications and/or Diversions

- Requirements for amplifications and/or diversions will be confirmed as part of the Section 73 NoR from Sydney Water.
- [Feasibility Notice of Requirements has been completed for the Waterloo Development and it indicates that modifications will not be required to service the development, and the proposed point of connection is provisionally accepted pending the submission and acceptance of the Section 73 NoR, which will be completed post Southern Precinct DA submission.]
- It is noted that Sydney Water reserves the right to amend requirements in the section 73 NoR. The NoR will provide advice on the available capacity of the existing Sydney Water mains, and indicate where amplifications and/or diversions are required to the Sydney Water network.
- Alternative connections to the existing mains on Cope St will require modifications to authority services on Wellington Street.

9.2 Water Services (Fire)

9.2.1 Demand Assessment

The WMQ Southern precinct buildings 3&4 expected water use demand for the fire protection system has been sized to cater for the highest hazard within the development plus allowance for the fire hydrants and a number of operational drenchers.

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The system shall be fed from the fire pumps in level 1.

- Water supply will be a dual-water supply as defined in AS 2118.6-2012.
- Town main water supply as the primary water supplies (ground level) supplying electric driven primary pumps (ground mezzanine level).
- Fire tanks as the secondary water supplies (located within ground mezzanine level) supplying diesel driven stand-by pumps (ground mezzanine level).

9.2.2 On-Site Utility Infrastructure

Refer to Water services section 9.1.2

9.2.3 Connection

- A new DN150mm diameter connection will be made to the building water supply from within the water meter room. The fire supply will incorporate a double check detector assembly, Fire & Rescue NSW booster assembly and serve the new combined sprinkler and hydrant system. The fire protection services contractor shall extend from this point to service all fire system within the building. Top-up for evaporation purposes to the fire services tank shall be provided from the metered potable cold water supply, all other infills to tank shall be via the fire services system.
- The fire tank and pumps located within student accommodation building 3 will supply the wet fire systems to building 3 and building 4. Student accommodation building 3 and social housing building 4 will maintain their own fire booster assembly and will maintain their own connection to the Botany Road water main.
- It is noted that Sydney Water reserves the right to amend requirements in the section 73 NoR. The NoR will provide certainty on the available capacity of the existing Sydney Water mains.

9.2.4 Amplifications and/or Diversions

Refer to Water services section 9.1.4

9.3 Wastewater Services

9.3.1 Demand Assessment

The WMQ Southern precinct buildings 3&4 expected sewer use demand has been designed at 58kL / day (40kL / day Building 3 and 18kL /day Building 4), based on Sydney Water calculation methods for square meterage of the estimated type and area of the development.

9.3.2 On-Site Utility Infrastructure

The existing Sydney Water network in the project area consist of potable, wastewater and stormwater mains. Refer to Table 6 for assets are present within the Waterloo ISD area:

Type	Size	Location
Sewer	400mm VC	Cope St under road pavement
	225mm VC	Raglan St under road pavement
	300mm VC	Wellington St under road pavement
	225mm VC	Botany Road, under road pavement

Table 7 Sewer assets within the Waterloo ISD area

The location of these services has been documented in Appendix 1, based on DYBD reports and initial site survey inspections. Although the exact depths and positions of these existing mains will not be known until potholing investigation is conducted during the detail design (DD) phase to confirm the suitability and impacts of the proposed design on the existing network.

The following proposed connections points along Botany Street have been sent to Sydney Water for pressure and flow enquiry by WSP Water service coordinator (WSC):

Sewer:

- 225VC network on Botany Road, connection to student accommodation building 3 is proposed approximately ~33m along Botany Road to the north of Wellington Street (Refer to Appendix 1, for indicative location of connection)
- 225VC network on Botany Road, connection to social housing building 4 is proposed approximately ~13m along Botany Road to the north of Wellington Street (Refer to Appendix 1, for indicative location of connection)

Currently this connection route is designed to comply with Sydney Water requirement and achieved sufficient clearance to existing utilities. WSC will provide a detailed connection design after receiving Sydney Water response during detail design (DD) phase to be conducted post DA submission.

9.3.3 Connection

- [Sydney Water has provided preliminary advice via Sydney Water Feasibility letter (as contained in Appendix 2), indicating that the connection to the 225VC authority main is appropriate for the development].
- Direct connection to 225VC Sewer Authority Main reticulated along Botany Road, for student accommodation building 3 is proposed via a DN225 reticulated from the building 3 stack system.
- Direct connection to 225VC Sewer Authority Main reticulated along Botany Road, for social housing building 4 is proposed via a DN225 reticulated through building 3 from the building 4 stack system.
- Alternative connections to Authority Sewer mains along Wellington Street have also discussed with the water authority. The final connection location to water mains will be confirmed as part of the Section 73 NoR from Sydney Water.
- Provision will be made for a Sanitary drainage system complete with boundary trap, IPMF and overflow relief gully located on the ground level to provide a safe release from the connection point. Reflux valves shall be provided to drainage located below the overflow surcharge level.
- It is noted that Sydney Water reserves the right to amend requirements in the section 73 NoR. The NoR will provide certainty on the available capacity of the existing Sydney Water mains.

9.3.4 Amplifications and/or Diversions

- Requirements for amplifications and/or diversions will be confirmed as part of the Section 73 NoR from Sydney Water.

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- [Feasibility Notice of Requirements has been completed for the Waterloo Development and it indicates that modifications will not be required to service the development, and the proposed point of connection is provisionally accepted pending the submission and acceptance of the Section 73 NoR, which will be completed post Northern Precinct DA submission.]
- It is noted that Sydney Water reserves the right to amend requirements in the section 73 NoR. The NoR will provide certainty on the available capacity of the existing Sydney Water mains, and indicate where amplifications and/or diversions are required to the Sydney Water network.
- Alternative connections to the existing mains on Cope St will require modifications to authority services on Wellington Street.

9.4 Natural Gas Services

9.4.1 Demand Assessment

The WMQ Southern precinct buildings 3&4 expected gas use demand has been designed (inclusive of the Community, and the Retail tenancy from the southern Metro Box) equivalent to 5900mj/hr. This includes a 500mj/hr for the Southern Station box retail spaces.

9.4.2 On-Site Utility Infrastructure

Within the Waterloo ISD work zone Jemena gas has underground assets within Cope St, Wellington St and Raglan St. Refer to Table 7 for Natural assets are present within the Waterloo ISD area:

Type	Size	Location
Natural Gas	32mm NY 210kPa	Cope St under verge, east side of road
	32mm NY 210kPa	Cope St under verge, west side of road
	50mm NY 210kPa	Wellington St under verge, south side of road
	50mm NY 210kPa	Raglan St under verge, north side of road
	75mm NY 210kPa	Raglan St under verge, north side of road
	110mm NY 210kPa	Botany Road under verge, west side of road (this transitions to 50mm NY 210kPa heading south halfway between Wellington and Raglan)
	110mm NY 210kPa	Botany Road under verge, east side of road

Table 8 Natural Gas assets within the Waterloo ISD area

There are also 2 valves located at the North-West corner of Raglan St and Cope St, for isolation of the above services.

The location of these services has been documented in Appendix 1, based on surveys as outlined in section 9.1. Although the exact depths and positions of these existing mains will not be known until potholing investigation is conducted during the detail design (DD) phase to confirm the suitability and impacts of the proposed design on the existing network.

The following proposed connection point along Botany Street have been discussed with Jemena (Refer to Appendix 4):

Natural Gas:

- 7kPa network on Botany Road, connection is proposed approximately ~46m along Botany Road to the north of Wellington Street (Refer to Appendix 1, for indicative location of connection)

Currently this connection route is designed to comply with Jemena requirements and achieve sufficient clearance to existing utilities. A detailed connection design will be compiled and issued to Jemena during detail design (DD) phase to be conducted post DA submission.

9.4.3 Connection

- Jemena has provided preliminary advice via Connection email letter dated 18-June-20 (as contained in Appendix 3), indicating that the connection to the 110NY 210kPa authority main to Botany Road as indicated will provide 7kPa at point of connection for the Southern precinct buildings 3&4.
- The natural gas meter room shall be located at ground level on an external boundary wall with direct access to open space and shall be in strict accordance with Jemena's requirements for gas meter rooms. The gas meter room shall be a shared room and will house the main volume meter/gas regulator for the site and the main authority meters for the tenants.
- The natural gas is intended to supplied directly from the authority mains to the respective Retail tenancy's.
- It is noted that Jemena reserves the right to amend the connection requirements when the application for connection is made and certainty on the available capacity of the existing Jemena mains is confirmed.

9.4.4 Amplifications and/or Diversions

- Requirements for amplifications and/or diversions will be confirmed as part of the Notice of Requirements from Jemena.
- Advice provided from Jemena (as contained in Appendix 3) confirms that there is sufficient capacity in the mains surrounding the site and amplifications will not be required.
- It is noted that Jemena reserves the right to amend the connection requirements when the application for connection is made and certainty on the available capacity of the existing Jemena mains is confirmed.

9.5 Stormwater Services

9.5.1 Demand Assessment

The WMQ Southern precinct buildings 3&4 expected stormwater demand is outlined in the SSD-10439 Southern Precinct EIS Appendix O – Stormwater Management and Flooding Impact Assessment Report, this report details the catchment areas for the Southern precinct and expected discharge into authority mains.

This report details the point of connection for the Southern precinct.

9.5.2 On-Site Utility Infrastructure

There is existing Sydney Water and City of Sydney network stormwater mains in the project area. Refer to Table 8 for Stormwater assets are present within the Waterloo ISD area:

Type	Size	Location
Stormwater Drainage	900 Pipe [City of Sydney]	Botany Road, western verge
Stormwater Drainage	900 Pipe [City of Sydney]	Botany Road, western verge
Stormwater Drainage	914 x 914Box Culvert [Sydney Water]	Cope Street, western verge
Stormwater Drainage	900 Pipe [City of Sydney]	Cope Street, western verge
Stormwater Drainage	Pipe	Wellington Street – drainage pit connections at the intersection of Wellington an Cope Street, discharging to Cope Street drainage.
Stormwater Drainage	Pipe	Raglan Street – drainage pit connections at the intersection of Raglan and Cope Streets, discharging to Cope Street drainage.

Table 9 Stormwater assets within the Waterloo ISD area

The overall development site (of which the Northern Precinct is one part) drains to four (4) frontages; Botany Road, Cope, Wellington and Raglan Street.

Botany Road frontage is serviced by a 900-diameter pipe with undersized and poorly maintained (based on recent visual inspection on-site) inlet pits.
Cope St is serviced by a Council stormwater main located under the kerb and gutter and a Sydney Water owned box culvert located under the western footpath. Raglan and Wellington Street is provided with surface drainage infrastructure. The site drains to Sheas Creek via Sydney Water trunk drainage and ultimately to Alexandra Canal and Botany Bay.

The location of these services has been documented in SSD-10437 Southern Precinct EIS Appendix O – Stormwater Management and Flooding Impact Assessment Report, based on surveys as outlined in section 9.1. Although the exact depths and positions of these existing mains will not be known until potholing investigation is conducted during the detail design (DD) phase to confirm the suitability and impacts of the proposed design on the existing network.

9.5.3 Connection

- Stormwater drainage for the site is proposed to comply with the City of Sydney A4 Drainage Design Guidelines and City of Sydney – Interim Floodplain Management Policy.
- Direct connection to DN900 Authority Main, reticulating along Botany Road is proposed via a DN300 reticulated from building Onsite Detention tank.
- The potential connection to the Sydney Water asset along Cope St will be further evaluated during the detail design phase post DA submission.

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- It is noted that City of Sydney and Sydney Water reserve the right to amend requirements in the Tap In application for connection. The Tap In application for connection will provide certainty on the available capacity of the existing City of Sydney mains.

9.5.4 Amplifications and/or Diversions

- Requirements for amplifications and/or diversions to the City of Sydney and Sydney Water assets will be confirmed as part of the detailed design phase post DA submission. It is not currently anticipated that amplifications will be required to the existing Botany Road DN900 Pipe.
- Alternative connections to the existing mains on Cope St will require modifications to authority services on Wellington Street.

9.6 High Voltage Electrical

9.6.1 Demand Assessment

The WMQ south precinct buildings 3 and 4 expected electrical use demand has been designed to a proposed maximum demand of 2,113 Amps per phase.

9.6.2 On-Site Utility Infrastructure

The existing Ausgrid network comprises of low voltage and high voltage assets that utilises a combination of overhead and underground method of reticulation.

The current arrangement includes overhead LV cabling along south side of Raglan street, the east side of Botany Road and the south side of Wellington Street, along with LV auxiliary cabling and HV Cabling within conduits back around the perimeter of the site.

The LV overhead network is supplying street lights and properties within the ISD area supplied from existing Kiosk Substations.

9.6.3 Connection

A Proposed Design Scope (PDS) has been submitted to Ausgrid for the development following the initial Application for Connection (AFC) being submitted to Ausgrid and the assignment of a Contestable Project Coordinator by Ausgrid (refer to Appendix 4).

The PDS proposes the establishment of 2no. 1x 1,000kVA transformer ‘mini’ surface chamber substation within the South precinct, to support both the building 3 and 4 loads.

It is proposed that the chamber substations shall be looped in to the local HV network between the Zetland zone substation and substation No. 8838.

It is noted that the application for connection AN21263 is currently under determination with Ausgrid, in accordance with the Contestable works process.

9.6.4 Amplifications and/or Diversions

During Stage 2 of the Waterloo station package design development, Ultegra has been engaged to prepare a concept design to enable the relocation of existing assets to facilitate the undergrounding of the surround overhead aerial network and facilitate the reticulation of the HV underground routing to supply the development.

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The current design has been modelled in 3d for utility design coordination and in accordance with the relevant Ausgrid design requirement. This design has been sent to Ausgrid for review and comment.

Any utility connection and protection requirements will be further detailed by the WSP ASP level 3 designer in the next design stage.

It is currently expected that a new trench and conduits will be required from the point of network at the intersection of Wellington Street, Botany Road and Buckland Street, to the Mini Chamber Substations within the southern Precinct.

Requirements for amplifications and/or diversions will be confirmed as part of the AN21263 Ausgrid response.

9.7 Communication and Data

9.7.1 Demand Assessment

The WMQ Southern precinct buildings 3&4 expected communications requirements will be further designed during the DD phase.

9.7.2 Existing Providers

The WMQ Southern precinct buildings 3&4 site has access to following communication providers;

- NBN, NSW-Act
- Nextgen, NCC – NSW
- PIPE Networks, NSW
- Verizon Business (NSW)
- Vocus Fibre Pty Ltd (NSW)
- Telstra, NSW
- Optus, NSW

The Existing Telstra assets a mixture of copper and fibre optic cables in 100 mm and 50mm conduits, with trench arrangements ranging from single conduits to banks of 20.
Telstra assets such as pillars and exchanges are located outside the Waterloo ISD area on the corner of Botany-Wellington and Botany-Raglan. Any impact to these assets by Waterloo OSD buildings may results in alterations to existing assets within the ISD site.

NBN have assets located within the Telstra conduit network. Where Telstra conduits are being relocated, NBN will be notified as their services will also be transferred to the new routes.

The location of these services has been documented in Appendix 1, based on DYBD reports and initial site inspections. Although the exact depths and positions of these existing mains are unknown, and further investigation will be required during the detail design (DD) phase to confirm the suitability and impacts of the proposed design on the existing network.

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9.7.3 Connection

The proposed design is currently requiring two separate connections lead-ins for Northern Precinct development on Botany Street;

- 2 x 100mm conduits, Communications provider TBC, approximately 30m along Botany Road to the south of Raglan Street (Shared Trench with Southern Precinct buildings 3&4)

The requirements for communication connection is still under design development, the relevant service provider will be engaged to review the design during the detail design phase post DA submission.

9.7.4 Amplifications and/or Diversions

Requirements for amplifications and/or diversions will be confirmed as part of the engagement with NBN Co., Carriers and other communication and data providers.

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9.8 Coordination with Other Services

Coordination of the proposed new infrastructure works within and around are the site will be based on the Streets Opening Conference standards.

9.8.1 Water Services Coordination

In addition, Section 5.12.5.2 of the Water Services Association of Australia codes (WSA 03-2011-3.1, Sydney Water Edition – 2012) states the clearance requirements for water mains, shall not be less than the minimum vertical and horizontal clearances as detailed.

9.8.2 Wastewater Services Coordination

In addition, Section 5.12.5.2 of the Water Services Association of Australia codes (WSA 02-2002-2.2, Sydney Water Edition – Version 3) states the clearance requirements for sewer mains, shall not be less than the minimum vertical and horizontal clearances as detailed below.

9.8.3 Electrical Services Coordination

In addition, Ausgrid network standards for design and reticulation of services will apply for all works, including but not limited to;

- NS114: Electrical Design and Construction Standards for Chamber Type Substations
- NS130: Specification for Laying Underground Cables up to and including 11kV

9.8.4 Data and Communication Services Coordination

In addition, clearances for NBN services from other utilities is given in Section 5.2.13 of “New Development: Deployment of the NBN Co Conduit and Pit Network – Guidelines for Developers”.

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10. Mechanical Services

Mechanical services have been designed to a concept level of design.

10.1 General

The general approach and design criteria for the mechanical services for the Southern precinct buildings 3&4 are detailed in the following sections and comprise:

- Air conditioning systems to serve all apartments and occupied areas in the building;
- Tempered air conditioning systems to all lobby's, corridors and common areas in the building;
- Mechanical ventilation to plant rooms, car parks, toilets, retail and other plant areas as necessary;
- Smoke hazard management systems including smoke relief and stair pressurisation systems;
- Associated electrical services;
- Building management systems to control and monitor the mechanical equipment;
- Details are included for the Southern precinct residential building.

10.2 Design Conditions

10.2.1 External Conditions

The following design conditions have been used to size the air conditioning systems:

	Cooling	Heating
Outdoor	32.6°C Dry Bulb / 23.6°C Wet Bulb	7.5°C, saturated

Table 10 Mechanical Outdoor Design Conditions

Notes:

1. Outdoor design conditions are based on AIRAH DA09 with the design dry-bulb temperature being increased as a nominal allowance for climate change.
2. Air cooled condensers for DX units and the like selected to operate up to an outdoor temperature of 45°C and noting that peak design capacity may not be delivered under this temperature

10.2.2 Internal Conditions – Student Accommodation

	Indoor Temperature	Humidity
Air-Conditioned Areas: Summer Air-Conditioned Areas: Winter	23°C +/- 1°C DB 21°C +/- 1°C DB	Not Controlled
Retail – Community and Gym	By Tenant	By Tenant

Table 11 Mechanical Internal Design Conditions

Notes:

1. Lobby and retail design conditions are based on closed doors and no traffic through the lobby. Indoor conditions will be affected by infiltrations and may be outside the nominated control range when infiltrations are significant (high traffic, wind,..etc)
2. Humidity control will generally not be provided however the plant is expected to operate in the range of 40% to 60% RH due to dehumidification occurring as part of the cooling process.

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10.2.3 Outside Air – Student Accommodation

Outside air intake shall comply with AS1668 Part 2, BCA and the projects ESD requirements.
Apartments occupancy is considered as 1 person per bed.

10.2.4 Exhaust Air – Student Accommodation

Exhaust air systems shall comply with AS1668 Part 2, BCA and the projects ESD requirements.

10.2.5 Acoustics – Student Accommodation

Control of noise generated by the mechanical plant is required. Plant shall be designed to maintain noise levels in the building and not exceed noise levels or noise budgets as prescribed in AS2107 and the Waterloo OSD Integration Report.

10.2.6 Internal Conditions – Social Housing

	Indoor Temperature	Humidity
Air-Conditioned Areas	Not provided	Not provided

Table 12 Mechanical Internal Design Conditions

Notes:
1. Air conditioning is not part of the Social Housing design, ceiling fans have been provided for outside air movement.

10.2.7 Outside Air – Social Housing

Outside air intake shall comply with AS1668 Part 2, BCA and the projects ESD requirements. Apartment occupancy is considered as 2 people per double bed.

10.2.8 Exhaust Air – Social Housing

Exhaust air systems shall comply with AS1668 Part 2, BCA and the projects ESD requirements.

10.2.9 Acoustics – Social Housing

Control of noise generated by the mechanical plant is required. Plant shall be designed to maintain noise levels in the building and not exceed noise levels or noise budgets as prescribed in AS2107 and the Waterloo OSD Integration Report.

There is limited mechanical plant to the Social Housing building 4 as there are no air conditioning systems.

10.3 Mechanical Services – Student Accommodation

10.3.1 Proposed Air Conditioning Systems – Apartments

The proposed space cooling and space heating strategy for the student accommodation rooms of this project is as follows:

- A centralised variable refrigerant flow (VRF) system with heat recovery, i.e. simultaneous cooling and heating throughout the building is possible.
- Each room to include an in ceiling-mounted fan coil unit.
- All air cooled VRF outdoor units to be located within a roof top plant room.
- Fan coil unit controls will be standalone for each student accommodation room with a digital display allowing user control of on/off operation and temperature

adjustment. All fan coil units will be able to be monitored via the central building management control system.

10.3.2 Proposed Air Conditioning Systems – Lobbies and Common Areas

The proposed space cooling and space heating strategy for the student accommodation lobbies and common areas of this project is as follows:

- A centralised VRF system with heat recovery, i.e. simultaneous cooling and heating throughout the building is possible.
- Each area to include in ceiling-mounted fan coil units.
- All air cooled VRF outdoor units to be located within a roof top plant room.
- System controls are to be via a central building management control system adjustable by the facilities management team. System on/off control will also be based on occupancy detection and time scheduling. No local control of on/off operation and temperature adjustment are to be provided within the common area occupied space

10.3.3 Mechanical Ventilation Systems

Mechanical ventilation system will be provided to comply with statutory code requirement.
The following mechanical ventilation systems shall be provided in accordance with the requirements of AS1668.2:

Student accommodation rooms will generally utilise the following ventilation systems:

- Numerous rooms cannot be naturally ventilated in accordance with NCC 2019 F4.5 due to noise affected apartments. The mechanical concept design contains two options to suit the apartment configuration and proximity southern station mechanical louvres as follows:
  - Option 1: Outside air combined for each floor, with the intakes via the common corridor façades. The system will operate 24/7 with system controls to be via a central building management system. We understand that this is of architectural preference.
  - Option 2: Outside air system separate for each room, with intakes via the room façade. This system will be operated 24/7 with system controls to be via the central building management system.

The options for each apartment will be finalised during DD phase.

- A mechanical toilet exhaust air system per room discharging to the façade to meet the requirements of AS1668.2. Control of the exhaust air fans is to be interlocked with the wall mounted light switch located within the space, with a run-on timer.
- A mechanical domestic kitchen exhaust air system per room discharging to the façade.
- Control of the exhaust air booster fans to be interlocked with range hood operation.
- Make up air to each apartment will be via façade openings, i.e. relying on occupants opening windows and/or balcony doors.

10.3.4 Smoke Hazard Management

Mechanical fire and smoke control are provided in compliance with National Construction Code 2019 and referenced standard AS1668.1"The use of ventilation and air-conditioning in buildings - Part 1: Fire and smoke control in multicompartment buildings". and the Fire Engineering Strategy developed for the building.

This system includes:

- Stair pressurisation to each fire stair (2off)
- Relief of the stair pressurisation via lobby Supply air riser (normally used to provide tempered air to lobby)
- Carpark exhaust system from the car park areas.

10.3.5 Building Management Control System

A Building Management and Control System (BMCS) is an electronic monitoring and control systems with distributed panels through the facility and Southern computer to enable staff to access the system.

A control system based on a common platform technology is to be adopted as an integrated solution for energy metering and building management and control.

The BMCS system shall control and monitor (but not limited to) the following systems:

- HVAC Southern plant (Cooling Towers, pumps, Air to water Heat pump, Residential Lobby AC)
- Central plant ventilation systems (Garbage exhaust, Stair pressurisation and relief systems)
- Interface with Energy Metering System
- Monitor systems installed by other trades. (Lifts, Electrical, Hydraulic and Fire)

10.4 Mechanical Services – Social Housing

10.4.1 Proposed Systems – Apartments

The social housing apartments contain no space heating or cooling systems. Air conditioning systems may be provided by the tenants on a case by case basis, in these situations the heat rejection may be via balcony positioned condenser units. This is not considered to be part of this development application.

Ceiling mounted fans have been provided as part of the Land and Housing Corporation (LAHC) brief requirements.

10.4.2 Proposed Systems – Lobbies, Communal and Music Rooms

The social housing lobbies, Communal rooms and music rooms contain no space heating or cooling systems. Air conditioning systems may be provided by the tenants on a case by case basis, in these situations the specific heat rejection requirements would need to be designed. This is not considered to be part of this development application.

Ceiling mounted fans have been provided as part of the Land and Housing Corporation (LAHC) brief requirements.

10.4.3 Mechanical Ventilation Systems

Social housing apartments will generally utilise the following ventilation systems:

- Natural ventilation to each apartment in line with NCC 2019 F4.6 requirements via façade openings, i.e. windows and balcony doors.
- A mechanical toilet exhaust air system per apartment discharging to the façade to meet the requirements of AS1668.2. Control of the exhaust fans is to be interlocked to the wall mounted light switch located within the space, with a run on timer.
- A mechanical domestic kitchen exhaust air system per apartment discharging to the façade. Each domestic kitchen will be ventilated by mechanical exhaust systems to meet range hood specifications provided by the architect.
- Control of the exhaust booster fans to be interlocked with range hood operation.
- Make up air to each apartment will be via façade openings, i.e. relying on occupants opening windows and/or balcony doors.

There may be modifications to apartment ventilation strategy's due to the proximity of the apartment and Waterloo Station openings. These coordination requirements are set out within the Sydney Metro Scope of Works Technical Criteria (SWTC). This will be further considered during the detail design (DD) Phase.

10.4.4 Smoke Hazard Management

A stair pressurisation system will be provided via a stair pressurisation air shaft for fire isolated staircases and passageways as required by NCC 2019. Stair pressurisation relief will be provided by passive means (via automatic opening vents). Based on review with the architect, it is understood that a passive means is possible for all floors.

A shutdown type smoke hazard management system is to be employed for the social housing apartment floors of the building, in line with the requirements of NCC 2019 and AS1668.1. That is, no smoke exhaust systems.

10.4.5 Building Management Control System

No Building Management Control Systems (BMCS) will be provided for non-essential systems as there is no air conditioning systems throughout

Local toilet and kitchen exhaust fans will be operated as direct online (DOL), with local control switches.

11. Electrical and Communication Services

Electrical and Communication services have been designed to a concept level of design.

11.1 General

The general approach and design criteria for the electrical services for the Southern precinct buildings 3&4 are detailed in the following sections and comprise:

- Power distribution and chamber substation;
- LV power distribution infrastructure;
- Metering;
- General and Emergency Lighting for Internal and External areas;
- Lighting Control System;
- Earthing and Lightning / surge protection systems;
- Communications and Data systems;
- Electronic Security System;

11.2 Power Supply and Distribution

11.2.1 Origin of Supply

The Southern precinct will be supplied via two (2) mini chamber substations within the ground floor of the Southern precinct building 3. It is understood that a 2 x 1000 kVA Mini Chamber Substations will be provided, and this will supply both building 3 and building 4. It is assumed that the substation falls under option number 11 in the Ausgrid document NS109 Design Standards for Overhead Supply Developments and Distribution.

11.2.2 Consumer's Mains and Main Switchboard

Consumer's mains dedicated to the Southern precinct shall be provided from the Ausgrid substations to a main switch room located within building 3 ground floor. Consumer's Mains shall have appropriate fire rating performance in accordance with AS3013 to satisfy AS3000.

The current location of the Main Switchroom is provided within the student accommodation building 3 back of house areas to the centre of ground floor, which is accessible from Botany Road.

The Main Switch Room shall be:

- 2-hour fire rated
- Designed and Constructed to minimise the effects of EMI on Surrounding areas
- Have two separate means of egress

11.2.3 Metering

An energy metering and monitoring system will be provided to each building to meet BCA and Greenstar requirements.

A metering and monitoring headend system will be provided and collate all metering information to facilitate monitoring, reporting and trending required in accordance with BCA Section J8.3.

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Supply Authority Revenue meters will be provided for house services and to each residential apartments power supply.

11.2.4 Lightning / Surge Protection

A complete Lightning Protection System (LPS) will be installed to the requirements of AS1768:2007. The LPS design for the tower will be developed in accordance with the E+B strategy for the station precinct.

The Lighting Protection Level (LPL) will be determined during detailed design.

Lightning protection includes:

- Surge protection on MSB
- Isolation transformer for all supplies to Station Retail Tenancies
- Steel roof and structural frame to be electrically continuous and use air termination network
- Bonding of air termination network into perimeter structural reinforcement.
- Bonding of column and slab reinforcement to ensure continuity of down conductors
- Pad footings utilised as earth electrodes at base of building.

Further design work is required during DD phase to ensure any earthing down conductors do not affect the Metro Station boxes earthing system.

11.2.5 Power to Specialised Equipment

Power shall be provided to all equipment in accordance with the rated requirements of that equipment. It is anticipated that this shall comprise a combination of:

- Single phase outlets;
- 3 phase outlets rated to specific equipment requirements; and
- Permanent connections via local isolator switch.

All power to dedicated equipment shall be coordinated with the final equipment location.

11.2.6 General Power

House Distribution Boards (DB) will be provided on every 5th level and will serve all house lighting and power for the student accommodation building.

House Distribution Boards (DB) will be provided on levels 3, 8 and roof and will serve all house lighting and power for the social housing building.

A House DB will be located within each plantroom and for fire and life safety systems.

Dedicated Mechanical services switchboards (provided by the mechanical trade) will be provided for Student building mechanical plant.

11.2.7 Cable Reticulation

Electrical risers shall be split into tenant and house risers. Tenant risers will contain tenant metering panels and tenant cabling. House risers will contain house distribution boards, essential distribution boards and house cabling. House and essential distribution boards will be located on approximately every 3rd floor and serve the 3 floors surrounding the board.

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All mechanical, hydraulic and fire services submains are reticulated through the house risers.

Submains from Main Switchboards shall generally run on cable trays or cable ladders to electrical risers.

Reticulation to all distribution boards and metering panels from rising mains will be via circuit breaker protected tee off boxes. Submains will be XLPE/PVC insulated and sheathed cables with copper conductors, will be sized for the full rating of the circuit protective device with adjustment for all derating factors.

Fire rated submains reticulated on fire rated cable ladders will be provided for all Fire and Life Safety Services.

11.2.8 General Lighting

Interior lighting shall be designed to comply with NCC requirements for energy efficiency (Section J) as well as taking guidance from AS 1680, BASIX and other codes/standards as applicable. All lighting shall be coordinated with the architectural drawings and inclusions lists, and shall be designed to suit each particular area.

11.2.9 Common Area Interior Lighting

Lighting about corridors to meet levels recommended within AS 1680.1, through the use of LED lights. Feature and landscape lighting is to be installed based upon the architectural drawings, marketing documentation and project brief.

11.2.10 Common Area Lighting Controls

An ILCS shall be provided for all electric lighting throughout the Southern precinct buildings 3&4 which allows for automation of the lighting functionality based on user requirements and environmental influences to maximise energy efficiency, reducing Greenhouse Gases and the facilities carbon footprint.

The ILCS shall include diurnal and timer operation, occupancy sensing, daylight harvesting and maintenance harvesting as a minimum throughout the common areas. The ILCS shall consist of a network of luminaires, sensors and user override control devices which are integrated with the ICN to allow management to undertake modification of the system throughout the

11.2.11 Apartment Interior Lighting

Interior lighting shall be designed to comply with NCC requirements for energy efficiency (Section J) and BASIX as well as taking guidance from AS 1680 and other codes/standards as applicable. Student building apartment lighting shall be in accordance with client requirements.

All lighting shall be coordinated with the architect and shall be designed to suit each particular area. Lighting to apartments are recommended to be LED downlights generally, with lighting recommended to meet the following requirements:

- Energy efficient LED downlights to be used throughout.
- Ensure any lighting specified in wet areas is rated for external use.
- Allow for wall lighting to balcony. Preference is for indirect lighting.

11.2.12 Power to Specialised Equipment

Power shall be provided to all equipment in accordance with the rated requirements of that equipment. It is anticipated that this shall comprise a combination of:

- Single phase outlets;
- 3 phase outlets rated to specific equipment requirements; and
- Permanent connections via local isolator switch.

All power to dedicated equipment shall be coordinated with the final equipment location.

11.2.13 General Power

House Distribution Boards will be provided approximately every 3rd level and will serve all house lighting and power. A House DB will be located on the rooftop plant level.

Essential distribution boards will be provided approximately every 3rd level and will serve fire and life safety services.

Dedicated Mechanical services switchboards (provided by the mechanical trade) will be provided for Southern mechanical plant.

Tenant meter panels will be provided on every retail and residential floor. These metering panels will house the authority service protection device and authority meter

11.2.14 COPE STREET PLAZA Power

Provision will be made for general power to the Cope Street Plaza for access and amenity. General power requirements shall be provided in accordance with the landscape design to the plaza areas managed and maintained by the Waterloo Developer.

General power system cable containment conduits will originate from [building 3] switch room and terminate at the outlet. Outlet types and final system configuration will be designed during the detail design phase post DA submission.

11.2.15 Cable Reticulation

Electrical risers shall be split into tenant and house risers. Tenant risers will contain tenant metering panels and tenant cabling. House risers will contain house distribution boards, essential distribution boards and house cabling.

All mechanical, hydraulic and fire services submains are reticulated through the house risers.

Submains from Main Switchboards shall generally run on cable trays or cable ladders to electrical risers.

Reticulation to all distribution boards and metering panels from rising mains will be via circuit breaker protected tee off boxes. Submains will be XLPE/PVC insulated and sheathed cables with copper conductors, will be sized for the full rating of the circuit protective device with adjustment for all derating factors.

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Fire rated submains reticulated on fire rated cable ladders will be provided for all Fire and Life Safety Services.

11.2.16 General Lighting

Interior lighting shall be designed to comply with NCC requirements for energy efficiency (Section J) as well as taking guidance from AS 1680 and other codes/standards as applicable. All lighting shall be coordinated with the architect, marketing drawings and inclusions lists, and shall be designed to suit each particular area.

11.2.17 Common Area Interior Lighting

Lighting about corridors to meet levels recommended within AS 1680.1, through the use of LED
downlights. Feature and landscape lighting is to be installed based upon the architectural drawings, marketing documentation and project brief.

11.2.18 Common Area Lighting Controls

An ILCS shall be provided for all electric lighting throughout the Southern precinct buildings 3&4 which allows for high level automation of the lighting functionality based on user requirements and environmental influences to maximise energy efficiency, reducing Greenhouse Gases and the facilities carbon footprint.

The ILCS shall include diurnal and timer operation, occupancy sensing, daylight harvesting and maintenance harvesting as a minimum throughout the common areas. The ILCS shall consist of a network of luminaires, sensors and user override control devices which are integrated with the ICN to allow management to undertake modification of the system throughout the

11.2.19 Apartment Interior Lighting

Interior lighting shall be designed to comply with NCC requirements for energy efficiency (Section J)
as well as taking guidance from AS 1680 and other codes/standards as applicable.

All lighting shall be coordinated with the architect and shall be designed to suit each particular area. Lighting to apartments are recommended to be LED downlights generally, with lighting recommended to meet the following requirements:

- Energy efficient LED downlights to be used throughout.
- Ensure any lighting specified in wet areas is rated for external use.
- Allow for wall lighting to balcony. Preference is for indirect lighting.
- LED feature strip lighting is installed in bathrooms/ensuites, they shall be separately switched to main light and not connected to bathroom exhaust fan (this allows ambient lighting for bathroom use without fan activation)

11.2.20 Apartment Lighting Controls

Lighting control within the apartments shall be independent of the facility ILCS and utilise a wireless control protocol such as Zigbee to allow residents to control their lighting via fixed wireless switches as well as from their smart devices.

11.2.21 COPE STREET PLAZA Lighting

Provision will be made for lighting to the Cope Street Plaza for access and amenity. Lighting poles shall be provided in accordance with the landscape design to the plaza areas managed and maintained by the Waterloo Developer.

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Lighting system cable containment conduits will originate from [building 3] switch room and terminate within the base of each light pole. Lighting types, operation, control and final system configuration will be designed during the detail design phase post DA submission.

11.2.22 Emergency Lighting

Emergency egress and signage lighting provided throughout the Student accommodation and Social Housing buildings 3&4 will be of a single-point battery back-up type and will be monitored via the predominant ILCS platform provided throughout the building.

The emergency lighting design shall be carried out in accordance with AS/NZS 2293.1:2018: Emergency escape lighting and exit signs for buildings, Part 1: System design, installation and operation as well as National Construction Code (NCC) (Formerly Building Code of Australia(BCA)) 2019.

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11.3 Data / Communications

11.3.1 General

The Data / Communication Services for the Southern precinct residential building generally include but are not limited to the following systems:

- House network infrastructure including:
  - Network headend cabinets
  - Structured cabling system
  - Field enclosures
  - Field equipment patching
- NBN infrastructure including:
  - Incoming connections
  - NBN Enclosures
  - Structured cabling system
- Master Antenna Television System (MATV) infrastructure including:
  - Rooftop communications system
  - MATV headend
  - Structured cabling system

11.3.2 NBN Co Provisions

Fibre to the Premises (FTTP) by the national broadband network (NBN) will be provided for the student accommodation building 3 and social housing building 4.

The NBN infrastructure for building 3 and 4 has four major components:

- Premise Distribution Hub (PDH)
- Fibre Distribution Terminal (FDT)
- Tenant NBN Terminal (TEN)
- Structured cabling system

These components will be supplied and installed as per NBN requirements.

The NBN incomers will be reticulated from the property boundary to the building 3 telecommunications room.

The PDH will be within a mounted enclosure located within the telecommunications room on ground floor of building 3.

The FDT will be a wall mounted enclosure located within the ICT riser on each floor. The structured cabling system will be a star topology and will be comprised of optic fibre.

The telecommunications room on ground floor to building 3 shall be a shared NBN Shared NBN/Communications room and contain the NBN Co Premises Distribution Hub (PDH) which will be shared between Social Housing (Building 4), Station Retail, Podium Retail and Student Accommodation.

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11.3.3 House Services Communications

The house network provides communication services to the following systems:

- Publicly available WI-FI in public and plant spaces;
- All building automation systems;
- All essential and non-essential building communication systems;

11.3.4 Apartments

Each apartment or tenant will have a final fibre cable leading into their premises to a Tenant NBN terminal. FTA and PayTV infrastructure cabling shall be provided to each apartment to suit apartment configuration and requirements.

11.3.5 Wireless Access

A wireless access point system will be provided to the Student accommodation building 3, the areas of coverage will be determined during the detail design phase.

11.3.6 COPE STREET PLAZA Wireless Access

Provision will be made for a wireless access point system (or Wifi system) to the Cope Street Plaza for public use. Wifi coverage will be provided to the plaza areas managed and maintained by the Waterloo Developer. Wireless access points shall be designed and positioned on the selected light pole locations within Cope street plaza as part of public domain works.

Wifi system cable containment conduits will originate from [building 3] shared communications room and terminate within the base of each light pole. Wireless access point locations and final system configuration will be designed during the detail design phase post DA submission.

11.3.7 MATV System

The master antenna television system shall be provided to the Student accommodation and Social housing buildings which encompasses the following components:

- Rooftop communications system
- MATV headend
- Structured cabling system

Free to air TV and Pay TV to be of an IPTV type and be provided by the Client through the cat 6 structured cabling to each unit.

PayTV will only be provided within the communal area and extended through the IPTV.

All free-to-air TV and PayTV headend equipment to be located within the MCR01 and reticulate through the communication riser and terminate at the IPTV outlet within the accommodation units on each floor.

11.4 Electronic Security Systems

11.4.1 General

The electronic security systems to be installed in Southern precinct buildings 3&4 of the Waterloo Integrated Station Development will consist of the following:

- Closed Circuit Television (CCTV) System;

- Intruder Detection System (IDS);
- Electronic Access Control System (EACS), inclusive of relevant alarm points; and
- Intercom and remote door release system.

All electronic security systems will be connected to the respective Building's communication network, and all head-end equipment will be located in a secure rack within the Main Communications Room.

11.4.2 Access Control and Intruder Detection

The EACS and IDS will be responsible for the coordination and information exchange between the different security systems, and it will present this information to the Operators through a single Graphic User Interface (GUI) software package.

All monitoring and control of the electronic security systems head ends of Student accommodation building 3 will be located within the MCR01 within building 3. An EACS master station (including proximity card programming device) will be provided at the student accommodation admin office or a location nominated by Client, for real time monitoring and recording purposes as well as remote door release.

All monitoring and control of the electronic security systems head ends of Social Housing building 4 will be located within the BLD4 Communications room at Roof Level within building 4. An EACS master station (including proximity card programming device) will be provided at the BLD4 Communications room or the building managers office, for real time monitoring and recording purposes as well as remote door release.

11.4.3 Intercom and Remote Door Release System

An audio intercom system for building 3&4 to each apartment shall be provided that interconnects to the street level panel. The system shall incorporate the following features:

- Monitor stations within each apartment shall only be able to provide remote door release to the external doors, lift call and operation of loading dock roller doors;
- Upon providing access via remote door release from a monitor station the door of the apartments from which the request came from is to be released.
- Vandal resistant / weather proof and provided with a colour camera and full duplex audio system
- 2hour UPS battery backup

The building 3 Intercom shall be a fully digital IP type, with head end equipment located in the MCR01. The building 3 reception desk shall be provided with a master intercom station which will provide remote door release based on the caller's intercom location.

The building 4 Intercom shall be a fully digital IP type, with head end equipment located in the rooftop Communications room.

11.4.4 Closed Circuit TV (CCTV) System

A digital CCTV System shall be installed in Southern precinct buildings 3&4 of the Waterloo Integrated Station Development will be provided for the development comprising:

- Video Management and Recording System;

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- Equipment Rack Cabinet;
- IP Cameras;
- Signage; and
- Power Supplies.

The CCTV system shall be IP-based and will monitor the following specific areas of the building:

- Main Lift Lobby and Lift cars;
- Main entry points
- Loading dock
- Building perimeter
- Main communications rooms
- Communal areas (on every floor)
- Residential corridor lobby (on every floor)
- Public Areas
- External entry points

The general CCTV system will be IP based and operate on a 24-hour basis with all footage stored for a minimum of 31 days by means of network hard drive storage devices. UPS battery backup will be provided to the system for a two (2) hour period. All storage / head end equipment will be in the B4 communications room on roof level.

To avoid doubling up on cameras, it is proposed for both Building 3 and Building 4 CCTV headend systems to be interfaced to allow for viewing and recording access within shared areas. Cameras within the shared areas will have the multi cast feature enabled to allow data transfer to building 3 and building 4 CCTV system head ends and allow for monitoring access within building 1 property manager's office.

A CCTV monitoring and management station will be provided in the building 4 main communications room.

11.4.5 COPE STREET PLAZA Closed Circuit Television (CCTV) System

Provision will be made for a CCTV system to the Cope Street Plaza for security monitoring of areas managed and maintained by the Waterloo Developer. CCTV cameras shall be designed and positioned on the selected light pole locations within Cope street plaza as part of public domain works.

CCTV system cable containment conduits will originate from [building 3] shared communications room and terminate within the base of each light pole.

12. Hydraulic Services

Hydraulic services have been designed to a concept level of design.

12.1 General

The general approach and design criteria for the hydraulic services for the Southern precinct student accommodation building 3 and social housing building 4 are detailed in the following sections and comprise:

- Potable cold-water services;
- Non-potable and recycled water systems;
- Potable Hot-water services;
- Natural Gas;
- Sanitary Plumbing and Drainage;
- Stormwater Drainage services;
- Acoustic insulation to all pipework, including bracketing, separation between structure and insulation;

12.1.1 Backflow Prevention

The Southern precinct buildings 3&4 shall have a back-flow prevention device installed directly downstream of the Sydney Water master meter. Additional backflow prevention shall be provided for:

- Mechanical plant and equipment;
- Trade waste equipment e.g. car wash
- Recycled water system top-up; and
- Irrigation plant and equipment.

Furthermore, additional zone protection in accordance with the Sydney Water requirements shall be provided for irrigation system, swimming pool, water fountain, cooling towers.

12.1.2 Rainwater Collection and Drainage

Rainwater collected from plantroom, roof and surrounding controlled roof areas shall be via 'siphonic' pipework system and be directed to the rainwater harvesting system

Rain water from areas other than those noted above shall be collected via a separate Gravity or alternate 'siphonic' system picking up the surface water and will be directed to the stormwater drainage system.

Rainwater collection, treatment and storage tanks suitable for the reuse profile addressed within the development. Uses shall include in order of precedence;

- Landscape irrigation

Design shall include pre-treatment devices to manage the first flush of contaminants. Rainwater harvesting water treatment plants are to consist of a minimum dual parallel arrangement of primary filtration, secondary bag filtration plus additional treatment required to meet the local authority's requirements for use of water.

12.1.3 Natural Gas

The natural gas system will be sized based on the methods described within AS 5601 to satisfy clause 5.2.4 of AS5601(2013), to supply the retail spaces only, there is no requirement for gas for residential apartments heating or hot water.

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Allowance has been made for pressure loss through bends and the like as the number of these will increase significantly during the coordination process.

12.2 Hydraulic Services

12.2.1 Potable Cold Water System

The Probable Simultaneous Demand (PSD) for the Proposed Cold Water Services will be calculated based on the methods described within DIN 1988-300 “Drinking water supply systems; pipe sizing” due to Tables 3.2 and 3.3 within AS 3500.1 “Plumbing and Drainage Set” only being suitable for multiple dwellings and single dwelling.

This will be an alternative solution carried out as per the prescribed verification method BV1(a) of the Plumbing Code of Australia to achieve compliance with the performance requirements stated in Part B1 of the Plumbing Code of Australia.

The main water services within the buildings 3&4 will be provided with one main riser with individual Sydney Water meters for each apartment within a cupboard on each floor in accordance with Sydney Waters “Multi-level individual metering guide” Version 8: 8 March 2019.

12.2.2 Potable Hot Water System

The probable simultaneous demand (PSD) for the potable hot water service within the building will be calculated based on a standard hot and cold water mixing calculation to determine the mixing ration and the methods described within DIN 1988-300 “Drinking water supply systems; pipe sizing” due to Tables 3.2 and 3.3 within AS 3500.1 “Plumbing and Drainage Set” only being suitable for multiple dwelling and single dwelling.

This will be a performance solution carried out as per the prescribed verification method BV2(a) of the Plumbing Code of Australia to achieve compliance with the performance requirements stated in Part B2 of the Plumbing Code of Australia.

The hot water services within the buildings 3&4 will be provided by two separate gas fired instantaneous hot water systems located at roof level of the respective buildings.

Heat lost from hot water within the potable hot water flow and return pipe work systems will be replenished by a pump recirculating the water back to the hot water generation plant for reheating.

12.2.3 Sanitary Plumbing

The sanitary drainage sizing calculations will be based on the fixture unit method, pipe sizes, and pipe grades described within AS 3500.2.

12.2.4 Trade Waste

The trade waste pre-treatment devices will be sized in accordance with the local Guidelines, good engineering practice. Trade waste drainage and sanitary plumbing will be sized based on the fixture units and methods described within AS 3500.2.

12.2.5 COPE STREET PLAZA Hydraulic Requirements

Provision will be made for irrigation, potable cold water and drainage to the Cope Street Plaza for access and amenity. Hydraulic requirements shall be provided in

accordance with the landscape design to the plaza areas managed and maintained by the Waterloo Developer.

Irrigation and potable cold water supplies will originate from [building 3] hydraulic plantrooms and terminate at the outlet. Outlet types and final system configuration will be designed during the detail design phase post DA submission.

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13. Fire Services

Fire services have been designed to a concept level of design.

13.1 General

The building fire protection system is to be designed and installed in accordance with all relevant Australian Standards, codes and authority requirements;

- National Construction Code (NCC) 2019
- Fire hydrants and sprinklers shall form part of a combined sprinkler and hydrant system in accordance with AS2118.6-2012, with dual-water supply consisting of town main water supply and on-site water storage tanks,
- Automatic fire sprinkler system in accordance with AS 2118.1-2017,
- Fire hydrants installed in accordance with AS 2419.1-2017,
- Fire hose reels installed in accordance with and AS 2441-2005,
- Fire detection and alarm system in accordance with AS 1670.1-2018,
- Emergency Warning and Intercom System in accordance with AS 1670.4-2018,
- Smoke hazard management in accordance with AS 1668.1-2018,
- Portable fire extinguishers shall be provided in accordance with Table E1.6 of the NCC with selection and location to AS 2444.
- Fire Engineering Report (To be prepared by Fire Engineer during detail design phase)

13.1.1 Combined Automatic Fire Sprinkler and Hydrant System

A Combined Fire Sprinkler and Hydrant System shall be provided throughout the building in accordance with the referenced standards AS 2118.1-2017, AS 2118.6-2012, AS 2419.1-2005, BCA G3.8 and FEBQ requirements, providing appropriate means of wet fire suppression and fire-fighting provisions for the operation of Fire & Rescue NSW.

The water supply shall consist of a dual-water supply with town main + electric pump, and water tank + diesel pump. In addition a relay pump (electric) will be provided to enable FRNSW system boosting capability to the high-level pressure zone.

FRNSW booster for student accommodation building 3 will be available from Botany Road.

FRNSW booster for social housing building 4 will be available from Wellington Street.

The combined fire sprinkler and hydrant tank and pumps will be provided within building 3 and will service building 3 and building 4 wet fire systems.

13.1.2 Fire Hose Reel System

Fire Hose Reels are to be provided throughout the building in accordance with NCC and located in accordance with AS 2441.

- Hose reels are provided on each floor level adjacent to the fire stairs using 36-meter hose reels.
- Hose reels shall be a separate system fed and pressurized from a stand-alone fire hose reel pump.

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13.1.3 Portable Fire Extinguishers

Portable fire extinguishers and fire blankets are to be provided throughout to comply with NCC table E1.6 and selected, located and distributed in accordance with sections 1 to 4 of AS 2444.

13.1.4 Fire Detection and Alarm Systems

An addressable fire detection & alarm system shall be provided to the student accommodation building 3 and the social housing building 4 in accordance with AS 1670.1 – 2018, E2.2a of the BCA.

A networked addressable analogue Fire Detection (FDCIE) shall be provided in the Fire Control Room of the Building – on ground level. Panels are to be of the non-proprietary type with open protocol.

The Fire Detection & Alarm System will provide interface between the sprinkler and hydrant systems, smoke detectors and shut-down / control of the mechanical smoke control systems, security, audio visual, and BMCS.

The FDCIE will incorporate Fire Fan Control Panel(s) (FFCP) that will automatically and manually control the ventilation and air distribution systems throughout the entire building, for operation of the fire fans by Fire & Rescue NSW, for fire and smoke control.

A network interface will be provided between Building 1 (FDCIE) and Building 2 (FDCIE).

13.1.5 Emergency Warning and Intercommunication System (EWIS)

An EWIS shall be provided to the student accommodation building 3 and the social housing building 4 in accordance with AS 1670.4 – 2018, E4.9 and G3.8 of the BCA.

An Emergency Warning CIE (EWCIE) will be provided in the Fire Control Room adjacent to the FDCIE, FFCP.

The EWIS shall be activated by the automatic operation of an active fire system or manual operation from the Fire Control Room / Fire Detection CIE.

13.1.6 Fire Control Room

A Fire Control Room (FCR) shall be provided within the building which has direct access from Botany street level as required under NCC.

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14. Assessment and findings

14.1 Technical assessment.

The technical assessment of the utility requirements for WMQ Southern precinct buildings 3&4, has determined that all connections to services will be made along Raglan Street and Botany Road, as outlined in Appendix 1.

14.2 Cumulative Impacts

The cumulative impacts of the proposed utility connections on the adjacent precincts has been summarised below;

14.2.1 Northern Precinct

The WMQ Northern precinct commercial building 1 has proposed connections to many of the same utility services along Botany Road, as the Central precinct.

As a result of the northern, central and southern precinct proposed utility connections, amplifications and modifications may be required to some of the authority networks along Botany Road.

The exact details of the authority network utility amplifications and modifications will not be known until after formal applications are completed during the detail design phase post DA submission.

14.2.2 Central Precinct

The WMQ Central precinct residential building 2 has proposed connections to many of the same utility services along Botany Road, as the Southern precinct.

As a result of the northern, central and southern precinct proposed utility connections, amplifications and modifications may be required to some of the authority networks along Botany Road.

The exact details of the authority network utility amplifications and modifications will not be known until after formal applications are completed during the detail design phase post DA submission.

14.2.3 Station Precinct

The WMQ Station precinct has dedicated utility services connections along Cope St and through the Line Wide Tunnel network, for all station operations, with the exception of the station retail spaces.

As a result of these dedicated connections for the Station operations there is not intended to be any impact from the proposed southern precinct utility services connections. The southern precinct will supply the power and trade waste building services to the southern Station retail building services, this is further outlined in the OSD Integration Report.

Through consultation and communication within the WMQ Developer team applications for the Northern, Central and Southern precinct authority utility connections will be coordinated to ensure all requirements are understood.

All authorities that are currently aware of the differing WMQ precincts and their connection requirements, have been outlined in Appendices of this report.

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15. Mitigation Measures

To complete the required utility connections for the Southern Precinct, the following mitigation measures will need to be followed;

- Disconnection and demolition of the existing utilities and services to allow the proposed Southern Precinct development construction
- Proceed with Sydney Water Notice of Requirements application for Southern Precinct, and associated conditions of consent for connection of Potable Water, Sewer and Stormwater services
- Proceed with Ausgrid contestable works approval process for Southern Precinct, and associated submission and approvals for connection of high voltage power and construction of chamber substation
- Proceed with City of Sydney and Sydney Water Tap In application for Southern Precinct, and associated conditions of consent for connection of Stormwater services
- Proceed with Jemena connection application for Southern Precinct, and associated conditions of consent for connection of Natural Gas services
- Proceed with Carrier and communication provider applications for connection process for Southern Precinct, and associated conditions of consent for connection of carrier communication services
- Proceed with NBN application for connection process for Southern Precinct, and associated conditions of consent for connection of NBN communication services

The mitigation measures and application processes as outlined above have been provisionally commenced and are recognised as a condition of consent for the Southern Precinct development application and associated works.

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16. Conclusion

16.1 Utility Provisions

All Utility Authorities that have assets within the area of works will be notified of the proposed adjustments to their assets. The Utility Authorities through their specific application processes will review the impacts to assets and proposed augmentations and provide their individual required conditions of consent for connection of the required utilities.

Based on the confirmation of conditions of consent for asset connection as understood through authority codes, requirements and practices, the proposed northern precinct will be able to achieve the required utilities and building services statutory requirements.

16.2 Assumptions and Constraints

The following assumption and constraints have been considered during the utility coordination and design:

- The locations used for adjusting around, and tying into, existing utilities are based on WSP supplied information. This information is a mix of DBYD data and survey located data to a quality level of A, B, C and D as defined in AS5488. Further detailed survey will be required as design develops
- For communication design, current assumption is to provide 4x100 conduit shared trench for northern and central precincts tap into existing Telstra/NBN backbone network. Telstra/NBN is current reviewing the comms design. Design and connection detail to be confirmed in the next design stage. All other communications connections will be made on a building specific basis.
- It is assumed that Jemena will provide a single 7kPa connection and can be protected if required. Design to be detailed during detail design (DD) phase to be conducted post DA submission.
- ASP 3 design is current under Ausgrid review and subject to change in the next stage. Currently assume design is correct for the HV connection and assumes the chamber substations for the precinct will supply all power to the Metro Quarter buildings and areas. The Waterloo Metro Station will obtain its own dedicated power supply.
- It is assumed that Sydney Water will confirm that connections to Botany Road potable water and sewer will require amplification from Raglan to Wellington to facilitate the new development. The details of this amplification will not be confirmed until the individual notice of requirements is submitted for each building.

16.3 Building Services Provisions

The building services for the southern precinct buildings 3&4 has been designed to a concept level of design, in accordance with the relevant codes, standards and guidelines.

16.4 Design Considerations

The following design considerations have been incorporated into the building services to a concept level of design:

- Maintenance
- Reliability
- Environmental and industry best practice
- Safety in Design for Construction and Maintenance
- Alternative Systems considered and assessed

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- Authority infrastructure size, age and capacity
- Incorporating spare capacity
- Redundancy and backup
- Systems monitoring
- Plant Location
- Staged CC
- Site access during construction

Based on the design considerations and completion of the utility service connection provisions for WMQ Southern precinct buildings 3&4, as outlined in this document. The new WMQ southern precinct student accommodation building 3 and social housing building 4 will be able to be constructed and commissioned in accordance with the project and statutory requirements and supports the proposal for the Southern Precinct development application.

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17. Appendices

Appendix 1 – Waterloo Station Utility Design

WATERLOO INTEGRATED STATION DEVELOPMENT

WATERLOO METRO QUARTER OSD
PROPOSED UTILITY SERVICES

LOCALITY PLAN
NOT TO SCALE

DRAWING INDEX

UTILITIES

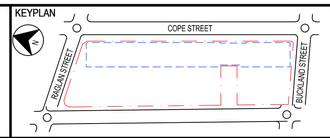
WMQ-SITE-WSP-UT-DWG-U8900	COVER SHEET AND DRAWING INDEX
WMQ-SITE-WSP-UT-DWG-U8901	GENERAL NOTES AND LEGEND
WMQ-SITE-WSP-UT-DWG-U8971	UTILITIES GENERAL ARRANGEMENT PLAN SHEET 1
WMQ-SITE-WSP-UT-DWG-U8972	UTILITIES GENERAL ARRANGEMENT PLAN SHEET 2

FOR REVIEW

REV.	BY	DATE	DESCRIPTION	APPD.
A	C.Z.	03.07.20	ISSUED FOR DEVELOPMENT APPLICATION	J.P.

SCALES

KEYPLAN



PRINCIPAL AEO

JOHN HOLLAND

CLIENT

mirvac

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wsp.com

DRAWN	C. ZHANG	03.07.20
DESIGNED	J. CEREZO	03.07.20
DRG CHECK	C. BIDART	03.07.20
DESIGN CHECK	R. JIANG	03.07.20
APPROVED	J. PICKERING	03.07.20

WATERLOO ISD
WATERLOO METRO QUARTER OSD
PROPOSED UTILITY SERVICES
COVER SHEET AND DRAWING INDEX

STATUS: FOR REVIEW | SHEET 1 OF 1 | ©

DRG No. WMQ-SITE-WSP-UT-DWG-U8900 | REV. A

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LEGEND

GENERAL

- EXISTING CADASTRAL BOUNDARY
- ROAD DESIGN

PROPOSED UTILITIES

- GAS
- SEWER
- WATER
- COMMUNICATION
- HV ELECTRICAL UNDERGROUND
- SERVICES TRENCH FOOTPRINT
- TO BE REMOVED

PROPOSED UTILITIES - WATERLOO STATION PACKAGE (DP22)

- GAS
- SEWER
- WATER
- COMMUNICATION
- ELECTRICAL UNDERGROUND
- SERVICES TRENCH FOOTPRINT
- TO BE REMOVED

EXISTING UTILITIES

- GAS MAIN - DIGITISED
- SEWER MAIN - DIGITISED
- WATER MAIN - DIGITISED
- ELECTRICAL - DIGITISED
- COMMS - DIGITISED
- DRAINAGE - DIGITISED
- EXISTING OVERHEAD STREET LIGHT
- EXISTING LOW VOLTAGE OVERHEAD
- TRANSMISSION LINE
- POLE
- STREET LIGHT
- EXISTING ELECTRICAL JUNCTION BOX
- OFP — OPTICAL FIBER PIT
- OJB — OPTICAL JUNCTION BOX
- JUNCTION MANHOLE
- MANHOLE COVER
- SLH — SEWER LAMPHOLE COVER

GENERAL NOTES

NOTES:

1. THE UTILITIES/SERVICES SHOWN IN THESE PLANS HAVE BEEN COMPILED FROM MULTIPLE SOURCES OF INFORMATION. IT IS RESPONSIBILITY OF THE CONTRACTOR TO UNDERTAKE THEIR OWN SITE INVESTIGATIONS (INCLUDING DBYD) PRIOR TO ANY CONSTRUCTION ACTIVITIES. THESE DRAWINGS ARE NEVER TO BE USED FOR THE PURPOSE OF LOCATING SERVICES. WSP SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE CAUSED USING THE UTILITIES/SERVICES INFORMATION SHOWN ON THIS DRAWINGS.
2. LOCATION AND LEVEL OF ALL EXISTING SERVICES CROSSING PROPOSED DRAINAGE MUST BE CONFIRMED PRIOR TO CONSTRUCTION.
3. UTILITY DRAWINGS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH THE UTILITY SERVICES STRATEGY REPORT.
4. ABANDONED UTILITIES DUE TO SERVICE RELOCATION ARE ASSUMED TO BE GROUT FILLED AND NOT COMPLETELY REMOVED BY THE UTILITY INSTALLATION CONTRACTOR.
5. EACH DRAWING IN THE UTILITY SET SHOULD NOT BE READ IN ISOLATION FROM THE OTHER SERVICE DRAWINGS IN THE SET.
6. UTILITIES ARE TO BE IN ACCORDANCE WITH ALLOCATIONS SPECIFIED BY THE NSW STREETS OPENING CONFERENCE. 'GUIDE TO CODES AND PRACTICES FOR STREET OPENING', UNLESS DETAILED OTHERWISE.

PITS

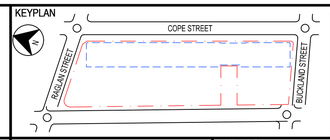
1. PITS WITHIN PAVED AREA TO BE INSTALLED WITH INFILLED LIDS AS PER LANDSCAPE ARCHITECT DETAILS.

FOR REVIEW

REV.	BY	DATE	DESCRIPTION	APPD.
A	C.Z.	03.07.20	ISSUED FOR DEVELOPMENT APPLICATION	J.P.

SCALES

KEYPLAN



PRINCIPAL AEO

JOHN HOLLAND

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DESIGNED	J. CEREZO	03.07.20
DRG CHECK	C. BIDART	03.07.20
DESIGN CHECK	R. JIANG	03.07.20
APPROVED	J. PICKERING	03.07.20

WATERLOO ISD

WATERLOO METRO QUARTER OSD
PROPOSED UTILITY SERVICES
GENERAL NOTES AND LEGEND

STATUS: FOR REVIEW | SHEET 1 OF 1 | ©

DRG No. WMQ-SITE-WSP-UT-DWG-U8901 | REV. A

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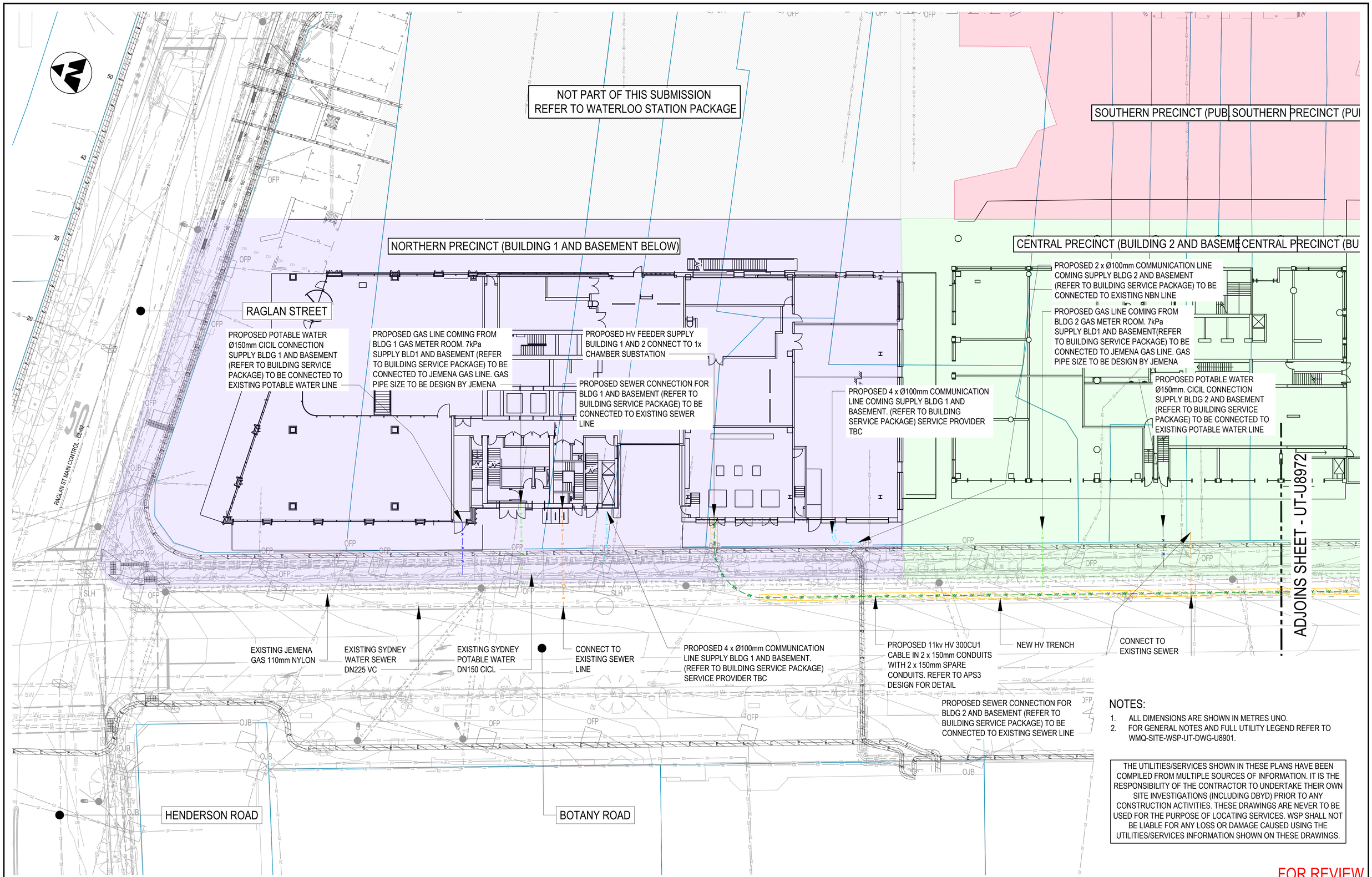

NOTES:

1. ALL DIMENSIONS ARE SHOWN IN METRES UNO.
2. FOR GENERAL NOTES AND FULL UTILITY LEGEND REFER TO WMQ-SITE-WSP-UT-DWG-U8901.

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B	C.Z	27.07.20	ISSUED FOR DEVELOPMENT APPLICATION	J.P.
A	C.Z.	03.07.20	ISSUED FOR DEVELOPMENT APPLICATION	J.P.

WORK IN PROGRESS

SCALES: 0 2 4 8 12 — Full Size 1:200 ; Half Reduction 1:400 SCALE (m)

KEYPLAN: COPE STREET, RAGLAN STREET, BUCKLAND STREET

PRINCIPAL AEO: JOHN HOLLAND

CLIENT: mirvac

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DRG CHECK	C. BIDART	27.07.20
DESIGN CHECK	R. JIANG	27.07.20
APPROVED	J. PICKERING	27.07.20

WATERLOO ISD

WATERLOO METRO QUARTER OSD
PROPOSED UTILITY SERVICES
GENERAL ARRANGEMENT PLAN

STATUS: FOR REVIEW | SHEET 1 OF 2 | ©

DRG No. WMQ-SITE-WSP-UT-DWG-U8971 | REV. B

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. [Alt. Drg. No.]

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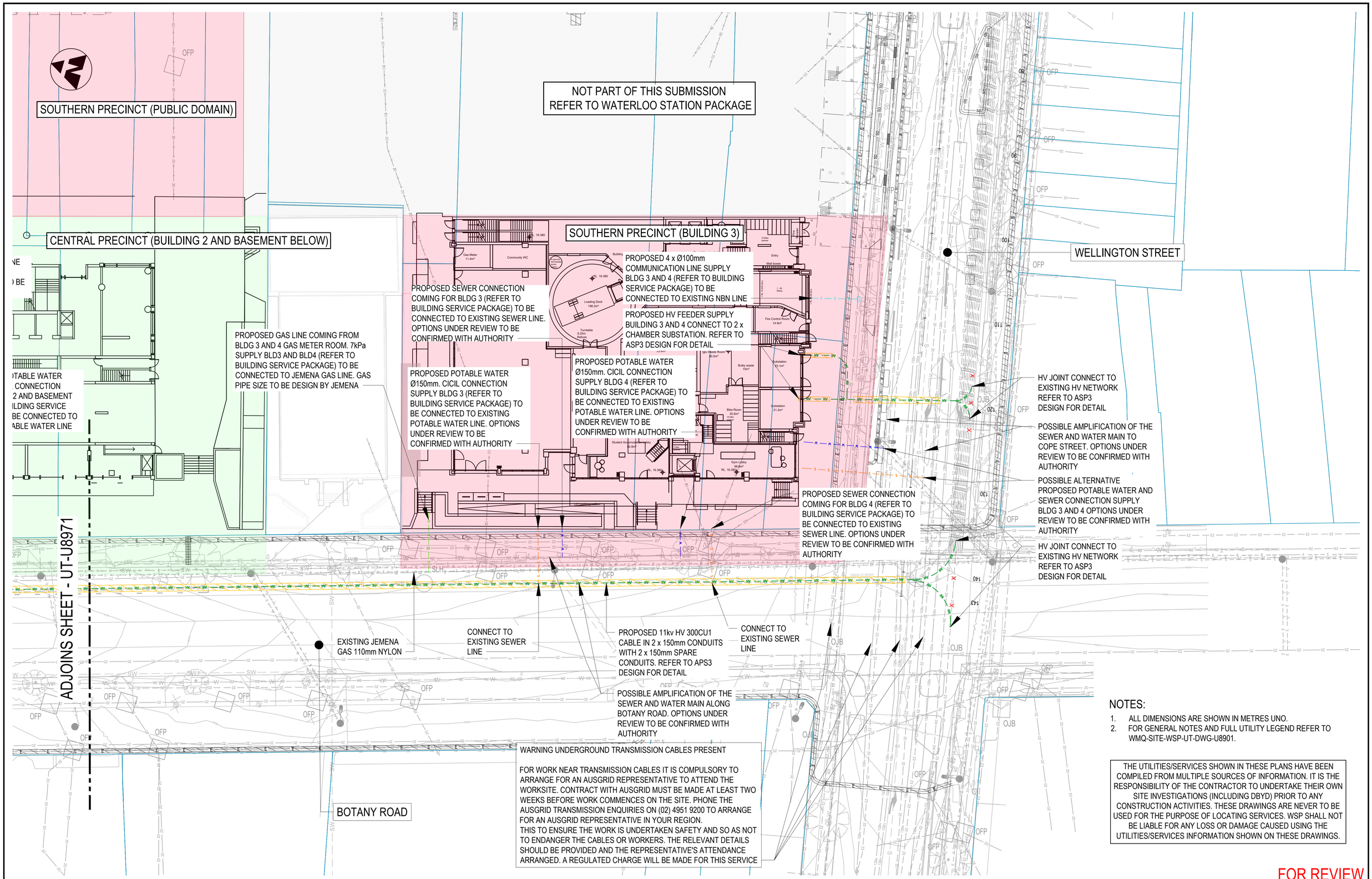

NOTES:

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A	C.Z.	03.07.20	ISSUED FOR DEVELOPMENT APPLICATION	J.P.

WORK IN PROGRESS

SCALES: 0 2 4 8 12 — Full Size 1:200 ; Half Reduction 1:400 SCALE (m)

KEYPLAN: COPE STREET; RAGLAN STREET; BUCKLAND STREET

PRINCIPAL AEO: JOHN HOLLAND

CLIENT: mirvac

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DESIGNED	J. CEREZO	27.07.20
DRG CHECK	C. BIDART	27.07.20
DESIGN CHECK	R. JIANG	27.07.20
APPROVED	J. PICKERING	27.07.20

WATERLOO ISD

WATERLOO METRO QUARTER OSD
PROPOSED UTILITY SERVICES
GENERAL ARRANGEMENT PLAN

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DRG No. WMQ-SITE-WSP-UT-DWG-U8972 | REV. B

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. [Alt. Drg. No.]

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Plot Date: 27/07/20 - 19:22
100mm AT FULL SIZE

Appendix 2 – Sydney Water Feasibility Notice of Requirements

Appendix 3 – Jemena Correspondence and Proposed connections

Patrick Garland

From: Zachary Kennett <Zachary.Kennett@jemena.com.au>
Sent: Wednesday, 1 July 2020 11:56 AM
To: Jiang, Ray
Cc: Pickering, John; Ramajoo, Jonathan; Patrick Garland; Fennelly, Geraldine
Subject: RE: Waterloo Over Station Development - Jemena Gas Connection

Hi Ray,

I have completed a preliminary investigation and confirmed with our capacity planners that we currently have sufficient network capacity to connect the below sites based on these loads. The next steps will be to submit formal application requests to Jemena either via the Jemena portal or through the end use customers preferred retailer.

The applications will need to be split up depending on the configuration of each building and metering required within those buildings, when submitting the applications you are unclear on what type of application you require please email me the buildings site plan, building use and meter room designs.

Please note Jemena does not reserve capacity on the network until a formal application is submitted and assessed.

Regards,
Zachary Kennett
Network Development Specialist – I&C
Jemena
99 Walker Street, North Sydney NSW 2060
PO Box 1220, North Sydney NSW 2059
Tel: 02 9867 7182 | 0409 608 399
www.jemena.com.au
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From: Jiang, Ray <Ray.Jiang@wsp.com>
Sent: Tuesday, 30 June 2020 3:22 PM
To: Zachary Kennett <Zachary.Kennett@jemena.com.au>
Cc: Pickering, John <john.pickering@wsp.com>; Ramajoo, Jonathan <Jonathan.Ramajoo@wsp.com>; patrick.garland@mirvac.com; Fennelly, Geraldine <Geraldine.Fennelly@wsp.com>
Subject: RE: Waterloo Over Station Development - Jemena Gas Connection

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Hi Zachary,

As requested, based on current design the estimated loads at each connection point are as of follows:

Connection 1
- Building 1: 6 off (inclusive of the Community Tenancies for future, and the 1 tenancy from the Metro Box) = 3000mj/hr

Connection 2
- Building 2: 12 off (inclusive of the Community Tenancies for future) = 6000mj/hr

Connection 3
- Building 3 HW plant 3000 Mj/hr
- Building 4 HW plant 900 MJ/h
- Retail allowances 2 x 750Mj/hr for building retail and 3rd 500Mj/hr for station retail, that's 750 x 2 + 500 = 2000Mj/hr

Please let me know if you need more information from us.

Regards,

Ray Jiang
Senior Engineer

M: 0437 397 314
Ray.Jiang@wsp.com

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Level 27, 680 George Street
Sydney, NSW
2000 Australia

wsp.com

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From: Zachary Kennett [mailto:Zachary.Kennett@jemena.com.au]
Sent: Thursday, 18 June 2020 11:42 AM
To: Jiang, Ray <Ray.Jiang@wsp.com>
Cc: Pickering, John <john.pickering@wsp.com>; Ramajoo, Jonathan <Jonathan.Ramajoo@wsp.com>; patrick.garland@mirvac.com
Subject: RE: Waterloo Over Station Development - Jemena Gas Connection

Hi Ray,

Ill be looking after the Waterloo over station development applications and process on behalf of Jemena as I'm currently looking after a number of other metro stations within the city.

The preliminary serving review completed in 2018 indicated that their was enough gas supply for these buildings with supply coming from the 210 kPa network and a load of 30,000 mj/h across the whole site with multiple connection points.

Can you please provide the estimated loads required at each of the point?

I also note that you are indicating 7kPa connection points off a 210kPa network which is not possible, the incoming connections will be at 210kPa and reduce down at either boundary regulators or meter sets within the lots.

Regards,
Zachary Kennett
Network Development Specialist – I&C
Jemena
99 Walker Street, North Sydney NSW 2060
PO Box 1220, North Sydney NSW 2059
Tel: 02 9867 7182 | 0409 608 399
www.jemena.com.au

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From: Jiang, Ray <Ray.Jiang@wsp.com>
Sent: Wednesday, 17 June 2020 2:23 PM
To: Neale Hilton <Neale.Hilton@jemena.com.au>
Cc: Pickering, John <john.pickering@wsp.com>; Ramajoo, Jonathan <Jonathan.Ramajoo@wsp.com>;

patrick.garland@mirvac.com; Stephen Angel <Stephen.Angel@jemena.com.au>; Zachary Kennett <Zachary.Kennett@jemena.com.au>; Andrew Haigh <Andrew.Haigh@jemena.com.au>
Subject: RE: Waterloo Over Station Development - Jemena Gas Connection

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Hi Neale,

Refer to the email below from Andrew. Could you please provide information on the existing Jemena gas network in relation to the attached proposed gas connection requirement for this project?

Please let me know if you need more information from us.

Regards,

Ray Jiang
Senior Engineer

M: 0437 397 314
Ray.Jiang@wsp.com

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Level 27, 680 George Street
Sydney, NSW
2000 Australia

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From: Andrew Haigh [mailto:Andrew.Haigh@jemena.com.au]
Sent: Wednesday, 17 June 2020 2:05 PM
To: Jiang, Ray <Ray.Jiang@wsp.com>
Cc: Pickering, John <john.pickering@wsp.com>; Ramajoo, Jonathan <Jonathan.Ramajoo@wsp.com>; patrick.garland@mirvac.com; Neale Hilton <Neale.Hilton@jemena.com.au>; Stephen Angel <Stephen.Angel@jemena.com.au>; Zachary Kennett <Zachary.Kennett@jemena.com.au>
Subject: RE: Waterloo Over Station Development - Jemena Gas Connection

Hi Ray,

As discussed, please contact Neale Hilton (cc'd). Cheers.

Regards,

Andrew Haigh
Commercial Manager – External Works
Mobile: 0427413252
Telephone : 02 9867 8573
Jemena
Level 12, 99 Walker Street, North Sydney, NSW 2060
andrew.haigh@jemena.com.au | www.jemena.com.au
www.gonaturalgas.com.au

From: Jiang, Ray <Ray.Jiang@wsp.com>
Sent: Wednesday, 17 June 2020 1:55 PM
To: Andrew Haigh <Andrew.Haigh@jemena.com.au>
Cc: Pickering, John <john.pickering@wsp.com>; Ramajoo, Jonathan <Jonathan.Ramajoo@wsp.com>; patrick.garland@mirvac.com
Subject: Waterloo Over Station Development - Jemena Gas Connection

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and are expecting the content or attachment from the sender.

Hi Andrew,

As discussed, please find attached gas connection design requirement for this project. We are currently working on towards detailed SSD DA application submission.

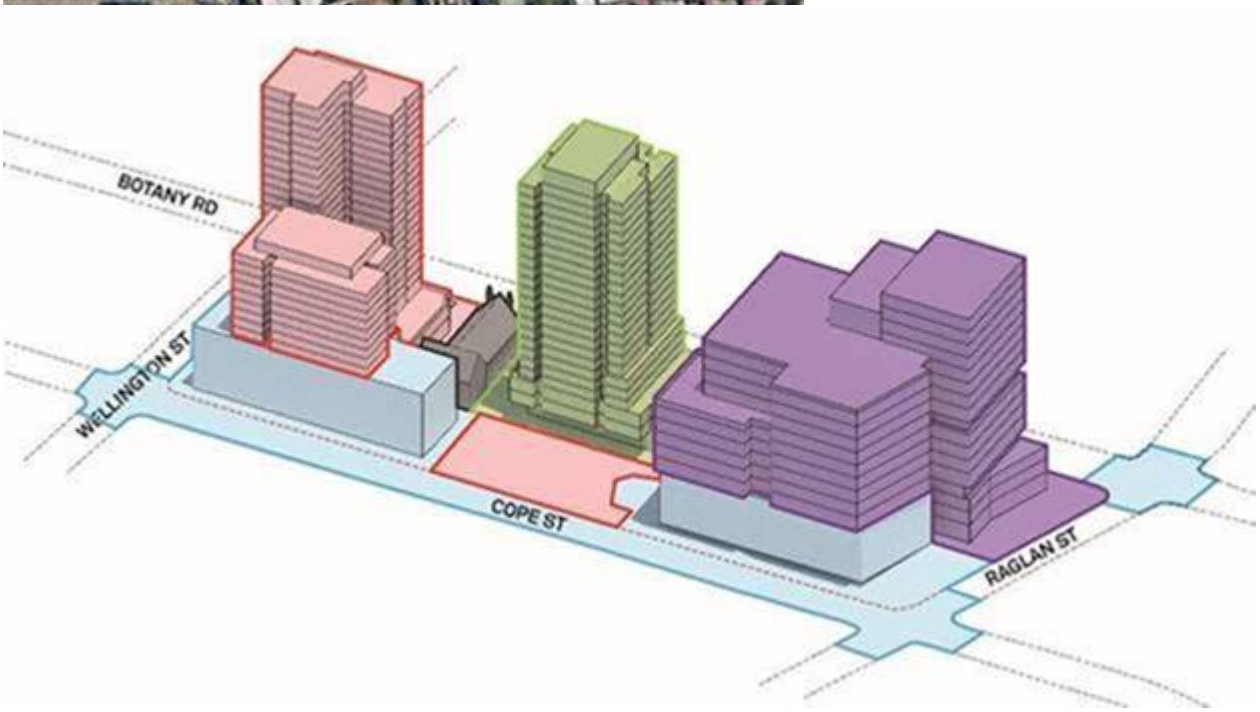
In particular, as part of the design process, we need to understand:

- What is the existing capacity of your current network in the precinct area.
- Does Jemena have any plans to upgrade its existing network in the precinct area.

Can you please refer me to an appropriate person if required.

Also, here is a bit of general overview of the Waterloo Metro Quarter project:

- podium, mid-rise and tower buildings
- excluding station floor space
- land use for non-residential and residential floor space
- social housing dwellings
- basement car parking, motorcycle parking, bicycle parking, and service vehicle spaces.



Please let me know if you need more information.

Regards,

Ray Jiang
Senior Engineer

M: 0437 397 314
Ray.Jiang@wsp.com

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Level 27, 680 George Street
Sydney, NSW
2000 Australia

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-LAEmHhHzdJzBITWfa4Hgs7pbKl

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****

Appendix 4 – Ausgrid Application for Connection AN21263

New Connection Above 100 AMP

Reference Code : 0099922

New Connection

LOCATION

Land Title Type
Strata
Lot Number
5
Nearest Cross Street
Wellington Street
Location Address
Botany Road, Waterloo, 2017
Land Zoning
Urban
Location Diagram

File name	Ausgrid filename reference	Size
SixMaps.pdf	LocationAttachmentFilePath_1	2.627 MB

APPLICANT

Applicant Type
Other On Behalf Of A Retail Customer Or Real Estate Developer
Full Name
Mr Patrick Garland
Email Address
patrick.garland@mirvac.com
ABN/ACN
44637792888
Company Name
Wl Developer Pty Ltd
Street Number/RMB
54
Applicant Address
Park Street Sydney 2000
Phone Number
0409510034

CUSTOMER

Customer Type
Real Estate Developer
Full Name
Mr Tim Manning
Email Address
tim.manning@mirvac.com
Phone Number
0408273358

ABN/ACN
44637792888
Company Name
Wl Developer Pty Ltd

LOAD DETAILS

Proposed Point Of Common Coupling
Substation
Proposed Asset Identifier
Unknown
Proposed Connection Point
Main Switchboard
Proposed Service Length
20
Proposed Service Type
Underground
Service Voltage
Low Voltage 230/400v
Service Size
2500 Amps

Proposed Maximum Demand	Number Of Phases:	Phase A:	Phase B:	Phase C:
	3	2113	2113	2113

Proposed Maximum Demand Calculation

File name	Ausgrid filename reference	Size
Waterloo South_Maximum Demand.pdf	WFAMaxDemandCalc_1	1.029 MB

Are You Intending To Connect Controlled Load At This Premises?
No

ADDITIONAL DEVELOPMENT DETAILS

RESIDENTIAL

No Of Residential Premises:	506
Average No Of Bedrooms Per Unit:	1
Gas Hot Water:	Yes
Gas Cooktop:	Yes

COMMERCIAL

Number Of Commercial Premises:	1
Total Floor Area With Air-Conditioning In M2:	1000

HOUSE SERVICES

Number Of House Service Premises:	1
Proposed Maximum Demand Number Of Phases:	3
Phase A:	111
Phase B:	111
Phase C:	111
Total Number Of Premises:	508

I Will Be Installing Equipment At The Premises That May Result In Non Linear / Fluctuating Loads
No

Construction Of The Premises Connection Assets Will Commence
02-Jan-2022
When Do You Wish To Electrify The Premises?

14-Mar-2022

Ausgrid Has Provided A Certified Design Number(Cdn) For A Network Augmentation Project Associated With The Premises

No

Asp 1 Has Been Appointed

No

Do You Have Development Consent (Da) For Your Proposal?

No

Do You Wish To Underground / Relocate Electricity Assets In Conjunction With This Connection Application?

Yes

Underground / Relocation Details

Install 2 Off 1000kva Standard Surface Chamber Distribution Substations. Redirect Existing Underground 11kv Feeder In The Street.

Comments

The 2 Chamber Substations Are Below The 1:100 Flood Levels, There Is A Chance That These Substation Location Might Be Relocated To The Back Courtyard (Northern Side) Of The Building With Ausgrid'S Right Of Way Being Coordinated.

Please attach any documents that are relevant to your connection for example Proposed Design, sketch of the building, Photos etc

File name	Ausgrid filename reference	Size
200421_DRP Meeting_Buildings 3&4 (1).pdf	AdditionalAttachment_1	18.201 MB
WMQ-BLD3-BSA-AR-DRG-DA100_C.pdf	AdditionalAttachment_2	0.737 MB

EXPEDITED CONNECTION

Do you want to expedite your connection offer for all premises?

Yes No

DECLARATION

Applicant Name

Mr Patrick Garland

Application Date

22-May-2020

Price Description	Price Including GST
Above 100 Amps Connection Offer - Technical Assessment required 1 x 452.80	AUD $452.80
Above 100 Amps Connection Offer 507 x 19.58	AUD $9,927.06
Total Price	AUD $10,379.86

Terms and Conditions:

In submitting this application you are engaging Ausgrid to provide you with a connection offer. Once submitted the fee charged is consumed. Ausgrid will aim to provide you with a written response within 10 business days. If additional work and/or fees are required, we will contact you to advise prior to providing the response.

Where this application requests an expedited connection, I declare that I have read and understood the terms and conditions of the connection offer and agree that if the connection is expedited that a contract based on that offer will be formed with Ausgrid on the date that Ausgrid receives the application. Where this application is being made on behalf of a retail customer or real estate developer, I declare that I have obtained the authority of that person to make this application of their behalf, including where applicable, making a request for expedition of the connection application.

*I acknowledge the terms & conditions.

PROPOSED DESIGN SCOPE

DATE: 02/07/2020

To: Ausgrid - Contestable Connections
contestability@ausgrid.com.au

Ausgrid reference: AN-21263

From: ASP Company: WSP Australia Pty Ltd
ASP Representative: Richard Saliba
Authorisation Number: 5045
Phone: 0404 898 456
Email: richard.saliba@wsp.cor

Project Description:	Establishment of 2 x single transformer surface chamber substations side by side.
Project Address:	111-121 Botany Road, Waterloo, 2017 (Wellington Street nearest cross road)

Connection Details	☐ HV Supply (i.e. HVC) ☒ LV Supply			Include description of existing and proposed load fields below	
Existing Load:	Phases	NA	Amps	UNKNOWN	
Proposed Load:	3 Phases	2113	Amps		
Total:		2113	Amps	Proposed connection Date:	01/04/2021

HV Proposal	
Proposed Distribution Centre: include substation type, size, LV panel layout (e.g. L type kiosk, 1000kVA, 1600/400 panels)	2 x STANDARD SURFACE CHAMBER SUB (1000kVA EACH), 1600/400/400 panels
Proposed Zone/Feeder:	ZETLAND/ZN188PA41L
HV Network Proposal: describe the HV connection proposal (e.g. loop in new new substation between HS01234 and HS09876)	Loop in new substations between Zetland zone sub & Sub 8838
HV Relocation Proposal:	NA

LV and/or SL Proposal, including comms	
LV and/or SL Network Proposal:	Connect one distributor to building 3 & another to building 4.
LV/SL Relocation Proposal:	NA

Does this proposal involve modification of Ausgrid's transmission, ADSS or pilot cable system(s)? If YES, please include on sketch	☐ YES ☒ NO
Do you require fault level information that is not on WebGIS:?	☐ YES ☒ NO

Attachments: Items marked with X are mandatory Items with * asterisk are mandatory if applicable to the project type/application		
	☒ Sketch - proposed method of connection*	☐ Master plan (if multi stage subdivision)*
	☒ Sketch – System Diagram (for HV works)*	☐ Photographs
	☒ Connection Application	☐ Development Site Plans
	☐ includes large/disturbing loads*	☐ Other
	☒ Design Contract Acceptance	

Ausgrid Use Only	Date Offer Accepted:	Load Cycle:
	Ausgrid Project Number:	CPC:
Planning: Response / Comments / Recommendations: (use additional pages if necessary)		

WATERLOO SOUTH - MAXIMUM DEMAND CALCULATION

Project No: PS112210

Date: 21/04/2020
Prepared By: AXA
Reviewd By:
Approved By:

Building 3 Maximum Demand

Area Description	GFA	GBA	Induction Cooktop (kVA)	Unit Mix QTY 1 BED	2 BED	3 BED	4 BED	Elec Load (kVA)	House Load (VA)
Student Accomodation									
Refer to Building 3 MD Tab									
Residential Subtotals	12,847 m2	17,890 m2		416	39	0	0	930kVA	25kVA

Podium Retail /Shared House			Lift Load	QTY					
Refer to Building 3 MD Tab									
Retail/House Subtotals	2,068 m2	264 m2						245 kVA	78 kVA

B3 Total (kVA)	1,277 kVA

Residential	954 kVA	1,405 A/ph	Maximum Demand	1,277 kVA
Retail	245 kVA	360 A/ph	Diversity	0.8
Shared House	78 kVA	115 A/ph	Diversified Load	1,021 kVA
				1,504 Amps

Building 4 / Station Retail Level	GFA	GBA	% Induction Cooktop (kVA)	Unit Mix QTY 1 BED	2 BED	3 BED	4 BED	Elec Load (kVA)	House Load (VA)
Social Housing									
Refer to Building 4 MD Tab									
Residential Subtotals	5,810 m2			28	34	7	1	205 kVA	62 kVA

Station Retail / House	GFA	GBA							
Refer to Building 4 MD Tab									
Retail/House Subtotals	m2							250 kVA	kVA

B4 Total kVA	517 kVA

Residential	267 kVA	393 A/ph	Maximum Demand	517 kVA
Station Retail	250 kVA	368 A/ph	Diversity	0.8
Shared House	N/A		Diversified Load	413 kVA
				609 Amps

TOTAL

		Rating (Non-Firm) - TBC	Amps/ph
mini-chamber Sub	2x1000kVA		2,800
	Available Current		**2,800 Amps/ph**
	Load (Amps)		2,113 Amps/ph
	Spare Capacity		**32.51%**

Site Maximum Demand	1,435 kVA
	2,113 Amps

Notes;
MD is based on gas cooking
B3 Retail power allowance has been made for Gym use

WATERLOO SOUTH - MAXIMUM DEMAND CALCULATION

Retail and House Load Allowance	HOUSE	RETAIL
Mech and Elec		**250 VA/m2**
House	**10 VA/m2**	**15 VA/m2**
Residential mix load Allowance		
1 Bed / Studio	**2.0kVA**	
2 Bed / Twin Studio	**2.5kVA**	
3 Bed	**3.0kVA**	
4 Bed	**4.0kVA**	

Diversified Induction CooktopLoad Allowance per unit

VA

Project No: PS112210
Date: 21/04/2020
Prepared By: AXA
Reviewd By:
Approved By:

Building 3 / Podium Retail				Unit Mix QTY					
Level	GFA	GBA	% Induction Cooktop (kVA)	1 BED	2 BED	3 BED	4 BED	Elec Load (kVA)	House Load (VA)
Student Accomodation									
Level 24 - Roof		377 m2						0.0kVA	566
Level 23	290 m2		kVA	7	2			19.0kVA	435
Level 22	590 m2		kVA	21	2			47.0kVA	885
Level 21	590 m2		kVA	21	2			47.0kVA	885
Level 20	590 m2		kVA	21	2			47.0kVA	885
Level 19	590 m2		kVA	21	2			47.0kVA	885
Level 18	590 m2		kVA	21	2			47.0kVA	885
Level 17	590 m2		kVA	21	2			47.0kVA	885
Level 16	590 m2		kVA	21	2			47.0kVA	885
Level 15	590 m2		kVA	22	1			46.5kVA	885
Level 14	570 m2		kVA	21	1			44.5kVA	855
Level 13	570 m2		kVA	21	1			44.5kVA	855
Level 12	570 m2		kVA	20	2			45.0kVA	855
Level 11	570 m2		kVA	20	2			45.0kVA	855
Level 10	570 m2		kVA	20	2			45.0kVA	855
Level 9	570 m2		kVA	20	2			45.0kVA	855
Level 8	570 m2		kVA	20	2			45.0kVA	855
Level 7	570 m2		kVA	20	2			45.0kVA	855
Level 6	570 m2		kVA	20	2			45.0kVA	855
Level 5	570 m2		kVA	20	2			45.0kVA	855
Level 4	570 m2		kVA	19	2			43.0kVA	855
Level 3	570 m2		kVA	19	2			43.0kVA	
Level 2 - Communal	337 m2							0.0kVA	506
Level 1 - Communal	660 m2								6,600
Residential Subtotals	12,847 m2			416	39	0	0	930 kVA	25 kVA

Podium Retail /Shared House			Lift Load	QTY				
Level 2 - Gym	489 m2						122.3kVA	1,100
Level 1 - Gym	489 m2						122.3kVA	1,100
Mezzanine Level		264 m2						2,640
Ground Leve	1,090 m2							10,900
Lift (25kVA/Lift)			25 kVA/Lift	3				62,500
Retail/House Subtotals	2,068 m2	264 m2	832		0	0	245 kVA	78 kVA

B3 Total kVA	1,277 kVA

TOTAL

Residential	954 kVA
Retail	245 kVA
Shared House	78 kVA

Maximum Demand	1,277 kVA
Diversity	0.8
Diversified Load	1,021 kVA
1,504 Amps	**1,881 Amps**

Notes;
MD is based on gas cooking
Retail area power allowance has been made for Gym use

WATERLOO SOUTH - MAXIMUM DEMAND CALCULATION

Retail and House Load Allowance	HOUSE	RETAIL
Mech and Elec		
House	**10 VA/m2**	**15 VA/m2**
Residential mix load Allowance		
1 Bed / Studio	**2.5kVA**	
2 Bed / Twin Studio	**3.0kVA**	
3 Bed	**4.0kVA**	**Diversified Induction CooktopLoad Allowance per unit**
4 Bed	**4.5kVA**	

Project No:	PS112210
Date:	21/04/2020
Prepared By:	AXA
Reviewd By:	
Approved By:	

VA

Building 4 / Station Retail Level	GFA	GBA	% Induction Cooktop (kVA)	Unit Mix QTY 1 BED	2 BED	3 BED	4 BED	Elec Load (kVA)	House Load (VA)
Social Housing									
Level 14 -Communal Rooftop	315 m2							0.0kVA	3,150
Level 14	180 m2		kVA				1	4.5kVA	270
Level 13	663 m2		kVA	2	5	1		24.0kVA	995
Level 12	663 m2		kVA	4	4	1		26.0kVA	995
Level 11	663 m2		kVA	4	4	1		26.0kVA	995
Level 10	663 m2		kVA	4	4	1		26.0kVA	995
Level 09	663 m2		kVA	4	4	1		26.0kVA	995
Level 08	663 m2		kVA	4	4	1		26.0kVA	995
Level 07	663 m2		kVA	4	4	1		26.0kVA	995
Level 06	599 m2		kVA	2	5			20.0kVA	899
Ground Level -	75 m2								750
Lift (25kVA/Lift)				25 kVA/Lift	2				50,000
Residential Subtotals	5,810 m2			28	34	7	1	205 kVA	62 kVA

Station Retail / House	GFA	GBA							
Retail 01			125 kVA					125.0kVA	
Retail 02			125 kVA					125.0kVA	
Retail/House Subtotals	m2							250 kVA	kVA

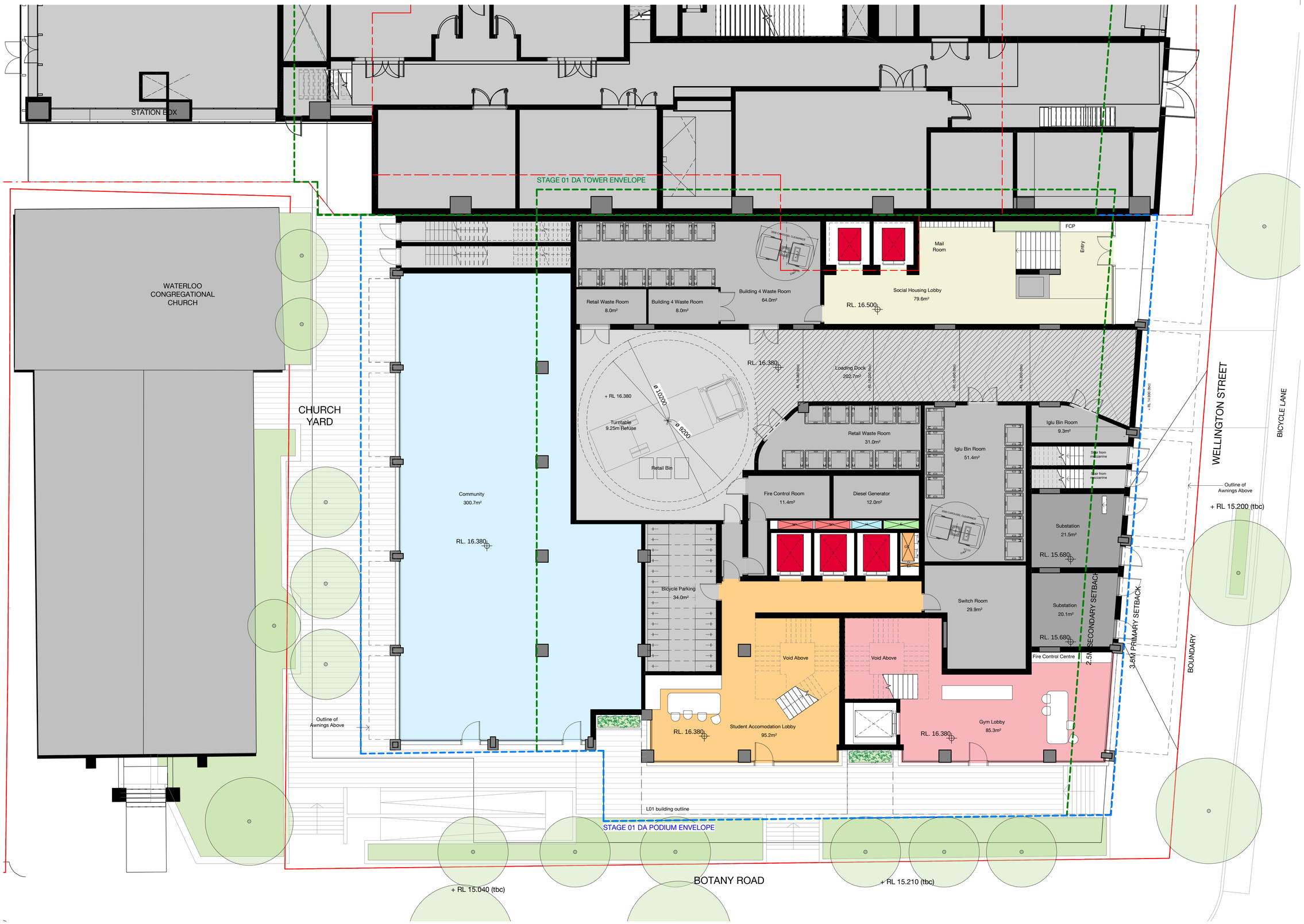
B4 Total kVA	517 kVA

TOTAL

Residential	267 kVA
Retail	250 kVA
Shared House	kVA

Maximum Demand	517 kVA	
Diversity	0.9	
Diversified Load	465 kVA	
	685 Amps	**761 Amps**

Notes;
MD is based on gas cooking



PRELIMINARY

Date generated 24/04/2020 2:09:34 PM BIM 360://Sydney Metro - Waterloo Station/WMQ-BLD3-BSA-AR-MDL-0101-RVT-R20.rvt

Recent revision history

#	Status	Description	Date
A	MV/JHG	COST PLAN B	30.03.20
B	MV	ISSUE FOR INFORMATION	17.04.20
C	MV	ISSUE FOR INFORMATION	24.04.20

Notes

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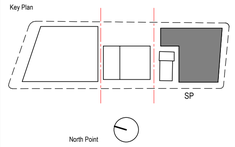
Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

Key Plan



Client

Waterloo Integrated Station Development
A Joint Venture Project
JOHN HOLLAND
mirvac

NSW GOVERNMENT
sydney METRO

Consultant

BATESSMART

Project

WATERLOO METRO QUARTER DEVELOPMENT

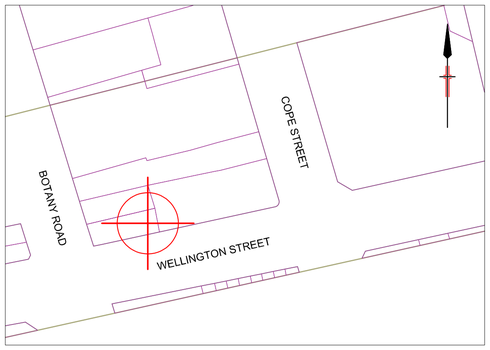
Project number		Size check	
S12398		25mm	
Checked	Approved	Sheet size	Scale
BS	Approver	A1	1 : 100

Sheet title

Ground Floor Plan

Status

Sheet number	Revision
-DRG-WMQ-BLD3-BSA-AR-DRG-DA100	C

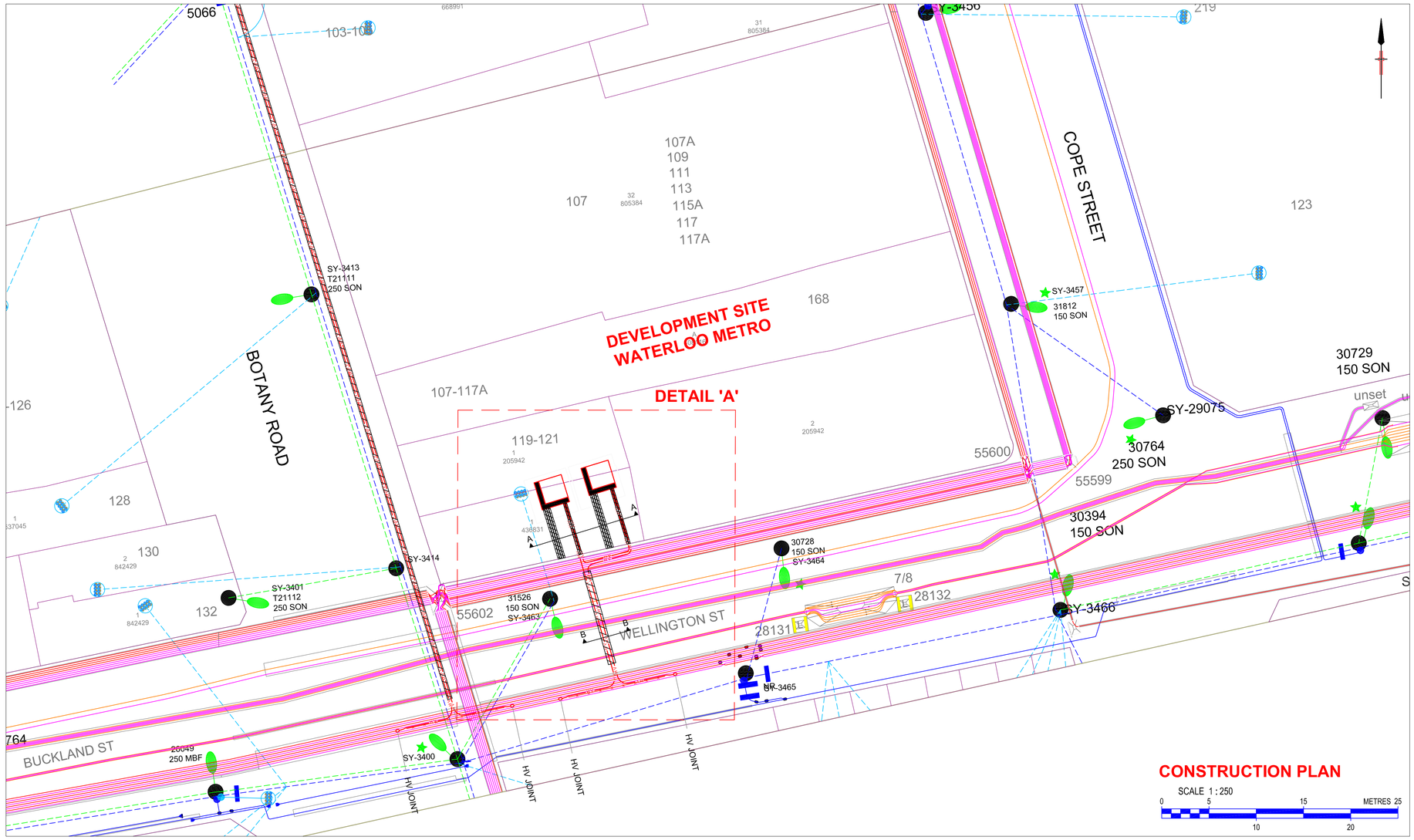


PROJECT LOCATION:
WATERLOO, UBD MAP 287 G11
NTS

LEGEND

	PROPOSED	EXISTING		PROPOSED	EXISTING
Pole	○	●	Item to be Removed	x	
SL Standard	▣	▣	Pole-to be removed		●
SL Column Remove		▣	Pillar-to be removed		■
LV Pillar	□	■	USL	▯▯	▮▮
LV Link Pillar	⊠	⊠	ABS	△	◀
Streetlight			IDT	▯	▮
Streetlight-PEC			Kiosk Sub		■
Streetlight-replacement			Chamber Sub		■
Streetlight-remove			Sealed End	◁	◀
UGOH or Riser	○	●	Cable Termination	◁	◀
Pot End	◁	◀	Service cable	○	●
Joint	⬭	⬬	Auxiliary cable	○	●
HV cable	○	●	Cable to be removed		✕
HV Triplex	♣	♣	Open Point	0	0
LV cable	○	●	PEC	☆	★
SL cable	○	●	4-WAY LINK BOX	▭	

	PROPOSED	EXISTING		REMOVE
Conduit				
OH Lines	UG Cables	OH Lines	UG Cables	OH Lines
HV	HV			
LV	LV			
SL	SL			
SV	SV			
TR132	TR132			
TR33	TR33			
AUX	AUX			



CONSTRUCTION PLAN

SCALE 1 : 250

0 5 10 15 20 METRES 25

CHECK FOR OTHER SERVICES BEFORE BORING OR EXCAVATING

ALL WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH AUSGRID'S NETWORK STANDARDS

CAD DRAWING
AMENDMENTS

ASSOCIATED DRAWINGS

ASP # 5045
L/4 27, 680 George St, Sydney, NSW, 2000
PO Box 5394, Sydney, NSW 2001, Australia
Tel: +61 2 9272 5100 Fax: +61 2 9272 5101
www.wspgroup.com/asia-pacific

ASP REF. ASP Quality File Reference

CERTIFICATION NUMBER

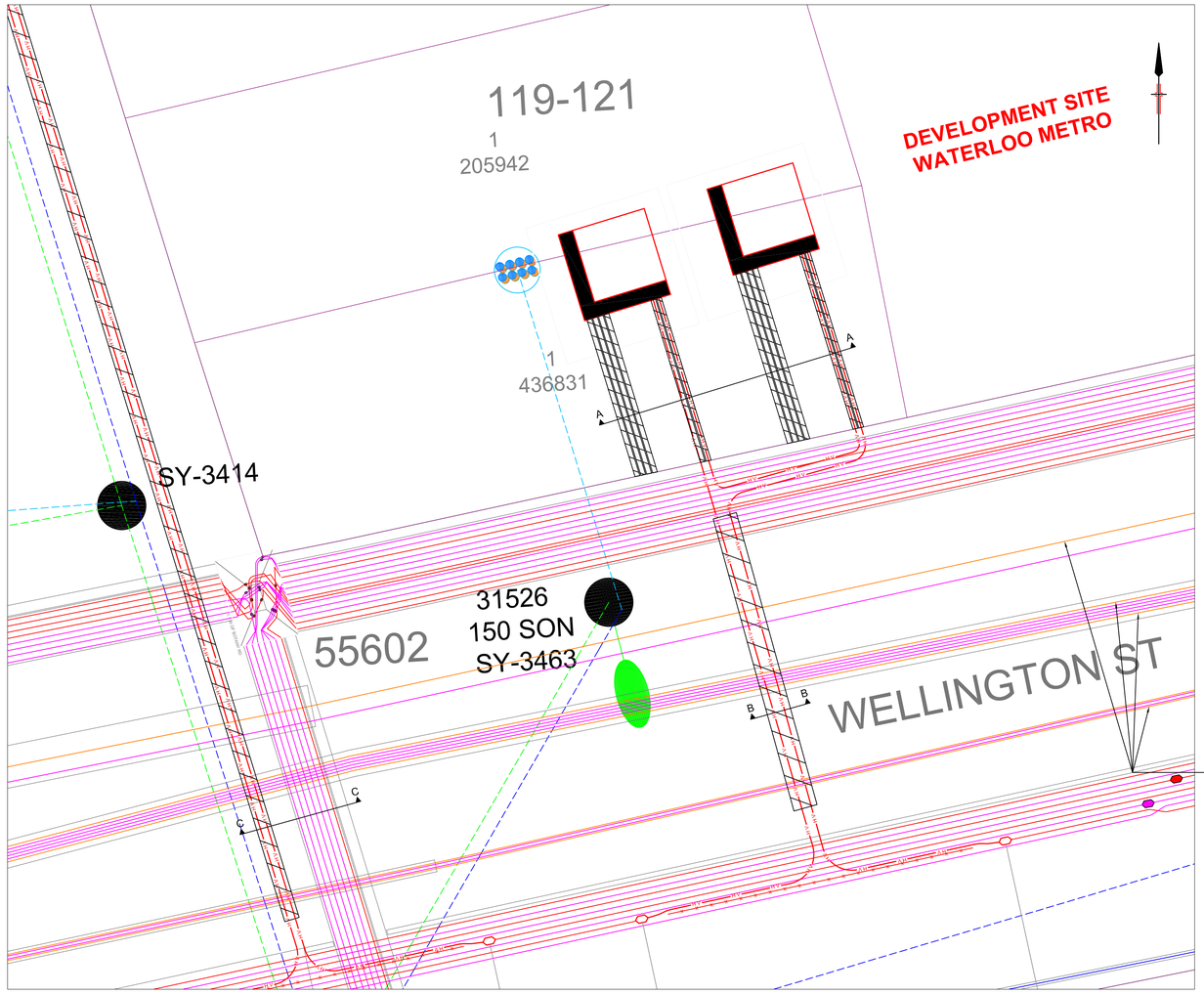
DESIGNED BY	
AUTH NO.	
SUBMIT DATE	SUBMITTED __/__/__
LGA	
MAP REF.	UBD or STREET DIR. REF.
AUSGRID REF.	AUSGRID MAP REF.
PRJTRAK No.	

/ #

WELLINGTON ST
WATERLOO
INSTALLTION OF 2 NEW
STANDARD SURFACE
CHAMBER SUBSTATION

SIZE A1 | AUSGRID PROJECT No. | SHEETS 1 of 1 | AMD.

20160817



WARNING UNDERGROUND TRANSMISSSION CABLES PRESENT

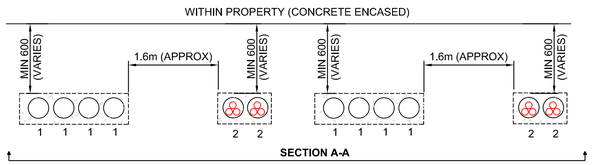
FOR WORK NEAR TRANSMISSION CABLES IT IS COMPULSORY TO ARRANGE FOR AN AUSGRID REPRESENTATIVE TO ATTEND THE WORKSITE. CONTACT WITH AUSGRID MUST BE MADE AT LEAST TWO WEEKS BEFORE WORK COMMENCES ON SITE. PHONE THE AUSGRID TRANSMISSION ENQUIRIES LINE ON (02) 4951 9200 TO ARRANGE FOR AN AUSGRID REPRESENTATIVE IN YOUR REGION.

THIS IS TO ENSURE THE WORK IS UNDERTAKEN SAFELY AND SO AS NOT TO ENDANGER THE CABLES OR WORKERS. THE RELEVANT DETAILS SHOULD BE PROVIDED AND THE REPRESENTATIVE'S ATTENDANCE ARRANGED. A REGULATED CHARGE WILL BE MADE FOR THIS SERVICE.

DETAIL 'A'

SCALE 1 : 100

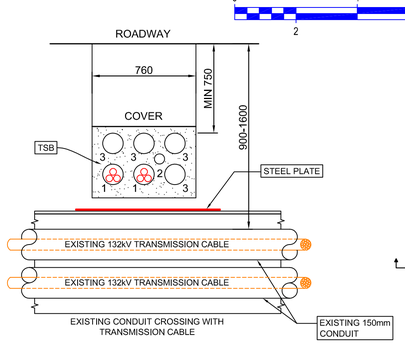
0 2 4 6 8 10 METRES



SECTION A-A

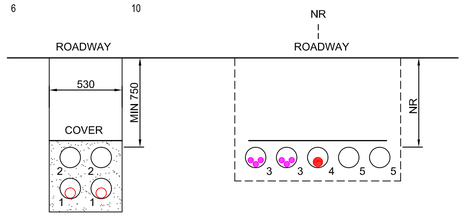
(ALL CONDUITS 125mm CONCRETE ENCASED)

1 - NEW 125mm CONDUIT - SPARE
2 - NEW 125mm CONDUIT WITH 11KV 300 CU1 CABLE



SECTION B-B

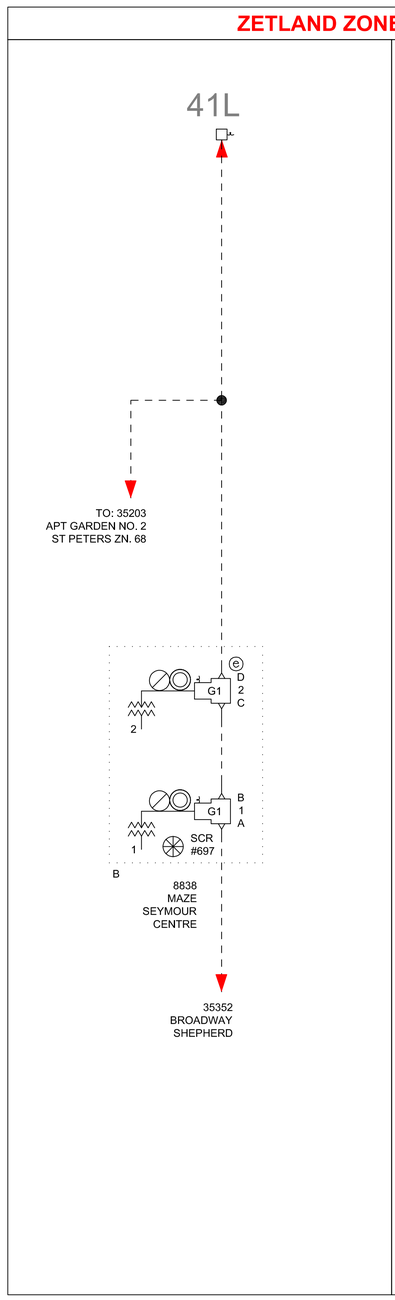
1 - NEW 150mm CONDUIT WITH 11kV 300 CU1 CABLE
2 - NEW 70mm CONDUIT - SPARE
3 - NEW 150mm CONDUIT - SPARE



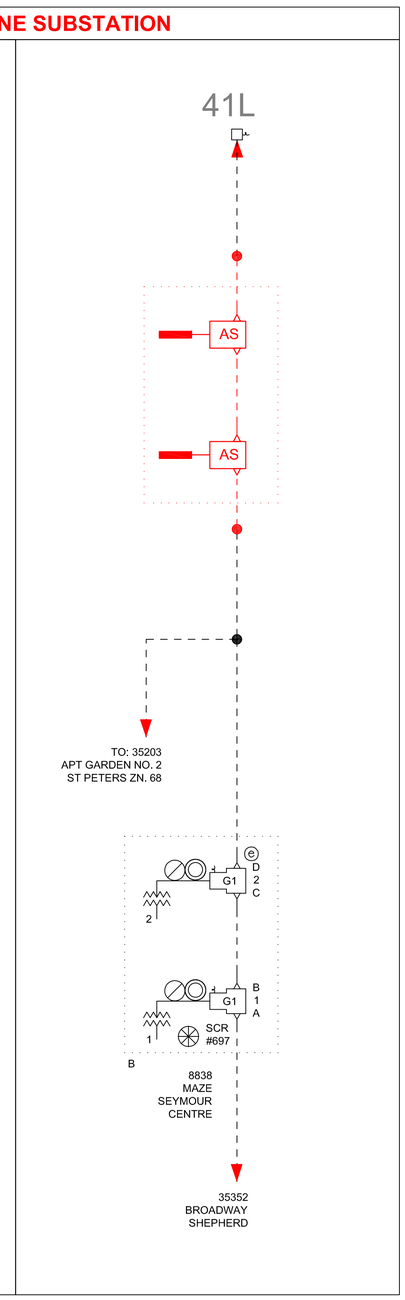
SECTION C-C

1 - NEW 11kV 400AL3 IN NEW 150mm CONDUIT
2 - NEW 150mm CONDUIT - SPARE
3 - EXISTING 3x4.6 CU3 P H + .82 CU3PR P L CABLE (#820) IN EXISTING 100mm CONDUIT
4 - EXISTING 11kV 194 CU3 P L CABLE (#255) IN EXISTING 100mm CONDUIT
5 - EXISTING 100mm CONDUIT

ZETLAND ZONE SUBSTATION



HV SCHEMATIC - EXISTING ZETLAND ZONE



HV SCHEMATIC - PROPOSED ZETLAND ZONE

CHECK FOR OTHER SERVICES BEFORE BORING OR EXCAVATING

ALL WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH AUSGRID'S NETWORK STANDARDS

CAD DRAWING

AMENDMENTS

ASSOCIATED DRAWINGS

wsp
ASP # 5045
Lvl. 27, 680 George St, Sydney, NSW, 2000
PO Box 5394, Sydney, NSW 2001, Australia
Tel: +61 2 9272 5100 Fax: +61 2 9272 5101
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DESIGNED BY	
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SUBMIT DATE	SUBMITTED __/__/___
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MAP REF.	UBD or STREET DIR. REF.
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CERTIFICATION NUMBER	# # / # #

WELLINGTON ST
WATERLOO
INSTALLATION OF 2 NEW
STANDARD SURFACE
CHAMBER SUBSTATION

SIZE A1 | AUSGRID PROJECT No. | SHEETS 2 of 2 | AMD.

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